ACCEPTANCE DATA PACKAGE

PROTO FLIGHT MODEL
(PFM)

EOS AURA (CHEM1)

HIRDLS

POWER CONVERTER UNIT REWORK

PCU

DOCUMENT No. PA-RAL-248

ELECTRONIC COPY

CLRC

TABLE OF SECTIONS

SECTION 00
Introduction To The ADP

ISSUE	SECTION	DATE	CHANGES

Rutherford Appleton Laboratory	ACCEPTANCE DATA PACKAGE		PRODUCT ASSURANCE Space Science and Technology Department
Spacecraft/Project:	**EOS AURA (CHEM 1)**	**Document No:**	**PA-RAL-248**
Instrument/Model:	**HIRDLS (REWORK)**	**Issue No:**	**1 REV:**
Subsystem:	**PCU**	**Date:**	**1st March 2001**

Table Of Contents; Hardware.

SECTION 1
Shipping Documents

<u>OUTGOING INSPECTION REPORT</u>

Inspection Report at receipt/delivery or other major movement of instrument/hardware and associated GSE.

PROJECT: HIRDLS

UNIT: PCU

MODEL: PFM

From: RAL

To: Lockheed Martin

Date of Inspection: ....28/04/2001.............

Inspection conducted by: (Name/Signature) ....Nigel Morris....................................

Witnessed by: (Name/Signature) ....Eric Clark...(Product Assurance)

Introduction

This inspection report shall be completed for formal transfers of hardware between RAL and customers, agencies or collaborating organisations
The following must be inspected:

• **Documentation**	**REFER TO SECTION**	**1**
• **Containers**	**“ “ “**	**2**
• **Contents**	**“ “ “**	**3**
• **Interface Verification**	**“ “ “**	**4**

Each section contains a checklist that shall be completed.

Unused boxes should have N/A entered.

Deviations e.g. items not delivered or incomplete documentation must be noted in the comments column.

For previously agreed deviations refer to the Delivery Review Board (DRB) minutes of meeting (MOM) or similar.

NCR’s must be raised for other deviations, damage or defects noted.

SECTION 1: DOCUMENTATION

Documentation shall be checked for completeness, any items not received or to be delivered later should be noted.

Note 1: The delivery review board minutes should list outstanding items, e.g. open work, open NCRs and Waivers etc. A copy should accompany or form part of the ADP. If there is no ADP then it should be referenced on this report.

Note 2: All items dispatched from the Laboratory must have a Dispatch Note completed and signed, with a copy filed in the appropriate section of the ADP.

Section 1: Documentation

No.	Procedure	Remarks (Include NCR Number if applicable)	Check √ or N/A
1.1	Is the documentation complete	ADP will be shipped seperately	√
1.2	Is the accompanying documentation compliant with project requirements	YES	√
1.3	Note DRB/MoM Document Number, minutes and note any discrepancies with respect to agreements recorded. OR attach copy of minutes.	See attached action list	√
1.4	Additional Remarks:		

Section 2: Inspection of Containers

The following to be inspected:

- Transport Containers – External condition.
  Check container markings for description and destination.
  Check security of container, fasteners/locks/clips, physical damage, dents or scratches etc.
  Check container for warning labels relating to handling, lifting, stacking limits and precautions before opening.
- Transport Containers – Internal condition.
  Check mounting fixtures or brackets and screws, padding and packing.
  Check environmental monitors such as humidity indicators, shock recorders and record the location and readings on the inspection report.

SECTION: 2 CONTAINERS

No.	Procedure	Remarks (Include NCR Number if applicable)	Check√ or N/A
2.1	Check the identity of the items and their completeness as indicated on the shipping documents.		√
2.2	Inspect the outside of the containers for obvious mechanical damage: Cracks Degradation of painting Sharp edges Handling provisions Other damage	No discharge damage	√
2.3	Check for loose and/or unscrewed parts	None	√
2.4	Check for any missing screws	N/A	√
2.5	Additional Remarks		

SECTION 3: VISUAL INSPECTION OF HARDWARE

- Check contents against shipping list.
- Record CI and serial numbers of items as marked and confirm they are correct.
- Inspect the outside for physical damage, cracks, dents, scratches or contamination.
- Check for protective caps or covers on all electrical and fluid connectors and on optical and sensor apertures and sensitive surfaces.
- Check that screws, bolts etc are secure and are correctly locked.
- Check item packed correctly.
- Confirm shock monitor, humidity sensor and silica gel are present if specified.
- Confirm humidity sensor and shock monitor working correctly.

Insert one copy of the following section for each configuration item,
OR
Individual unit.

Note: Section 3 when used with the front sheet may be used as a complete report for small units prior to final closure, if this is done confirm unit interior check carried out before closure Interior check will be limited to visible items.

SECTION 3: Visual Inspection.

UNIT: ……………HIRDLS PCU(PFM)……………………………………………………….

CI NUMBER:……A…………….   SERIAL NUMBER: …………#1……………….

No.	Procedure	Remarks (Include NCR Number if applicable)	Check√ or N/A
3.1	Check handling provisions for adequate position and removeability of the CI		√
3.2	Note external contamination		
3.3	Note obvious mechanical damage	None	√
3.4	Degradation of painting	None	√
3.5	Cracks	None	√
3.6	Mounting provisions	N/A	√
3.7	Sharp edges	None	√
3.8	Other damage	None	√
3.9	Fasteners correctly locked	YES	√
3.10	**Check all connectors for**		
3.10.1	Bent pins	None	√
3.10.2.	Internal / external damage	None	√
3.10.3	Internal debris	None	√
3.10.4	Connector covers fitted	NO	√
3.10.5	Connector savers in position	YES	√
3.10.6	EMC Covers Fitted	N/A	√
3.10.7	Any other damage	None	√
3.11	RED tag items/covers fitted	Radiator Panel Cover Fitted	√

3.12	**Check any harness and associated connectors associated with the CI for**	N/A	
3.12.1	Bent pins		
3.12.2	Internal / external damage		
3.12.3	Internal debris		
3.12.4	Protection caps fitted		
3.12.5	Any other damage		
3.13	Pre closure checks		
3.13.1	All internals units securely fastened and locked		
3.13.2	All internal connector fasteners locked		
3.13.3	All cabling secure		
3.13.4	No internal debris		
3.13	Check packaging is correct		
3.14	Shock recorders reset		
3.15	Additional remarks		

SECTION 4 Verification of Interfaces

Confirm all required interface-checking activities have been carried out.

4.1 **Mechanical interface** dimensions specified in the interface control documents such as mass, flatness of surfaces, location of fixing holes and overall dimensions should be measured accurately and recorded. **Record Test Report Number**, or confirm that measurement result is included in delivery documentation, (ADP).

4.2 **Electrical interfaces:** verifying the location and types of connectors against interface control document is normally carried as part of mechanical verification, confirm this has been done.
Functional testing: final functional test report number should be noted.

No.	**Procedure**	**Remarks (Include NCR Number if applicable)**	**Check √ or N/A**
4.1	**Mechanical interfaces verification:**	See Report TP-RAL-205C	√
4.2	**Electrical interfaces verification:**	See LPT Report in ADP	√

SECTION 2
Transportation, Packing, Handling And Integration Procedures

TC-RAL-219

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: N Morris Date: 23-Nov-00

Subject / Title: PFM PCU Transport, Handling & Packing Procedure

Contents / Description / Summary:

Key Words: Transport Handling Packing Procedure

Purpose (20 characters maximum): For packing and handling PFM PCU to/from LMSSC

Approved By: S Jaroslawski

Date (yy–mm–dd): 00-11-23

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

CHANGE RECORD PAGE

Revision	Date	Section affected	Description of Change
First	23-Nov-00	-	-

CONTENTS

1 INTRODUCTION

This document describes the procedures to be used in the transportation, handling and packing of the HIRDLS PFM Power Converter Unit (PCU). The PCU consists of one electronics box and is required to be delivered from RAL to the US Instrument Integrator, Lockheed Martin, based in Palo Alto, California.

2 DELIVERY CONDITION

The PCU shall be delivered in the following condition;

- Radiator Panel protective cover fitted.
- Connectors savers fitted to all external connectors.
- Plastic covers fitted to the free end of the savers.
- Shorting strap fitted across all four terminal studs.

3 PACKING INSTRUCTIONS

The PCU shall be triple-bagged using an electrically conductive bagging material, such as Lumaloy film. Each bag shall be approximately 50% bigger in volume than the PCU and shall be flushed with dry Nitrogen gas. Before sealing the bag with a heat welder, the excess air/N2 gas should be expelled to allow for the remaining gas inside the bag to expand during transportation by air. Desiccant material and a moisture indicator shall be inserted in the third bag prior to it being sealed.
The bagged PCU shall be packed inside the supplied Aluminium case. Additional foam packing shall be placed around the sides of the PCU to provide extra support. No other components shall be packed in this case. The PCU shall be inserted in the case with the Radiator Panel facing down toward the bottom of the case. The lid of the box shall be secured using the quick release catches.

4 TRANSPORTATION

The PCU shall be accompanied at all times by a cognisant person. During transport by road, the case shall be kept in the passenger compartment at all times. During transportation by air, the case shall be stored in the passenger cabin and **not in the aircraft hold**.

5 HANDLING

5.1 ESD Precautions

Before the last protective bag is removed from the PCU, the operator should ensure that he/she is wearing an earthing strap connected at one end to a verified earth. The PCU is not particularly ESD sensitive in its fully assembled condition.

5.2 Unpacking

The outer protective bag shall be removed in an area with a cleanliness of class 100,000 or better. The desiccant material and moisture indicator should be discarded along with the bag.

The second bag shall only be removed in an area with a cleanliness of class 10,000 or better. At this point the operator shall only handle the PCU with gloved hands. Removal of the final bag shall take place in the area where the PCU will be tested, or integrated, with the rest of the HIRDLS subsystems. Once the remaining bag has been removed the PCU shall only be handled with gloved hand.

5.3 Handling

Once the PCU has all it bagging removed, it can be manually moved as required. Where possible, the PCU should stand on its mounting interface plane and not on its side or front.

Care should be taken not to damage the connectors or connectors savers during handling. The Radiator Panel protective cover should not be used to lift the PCU, as it is only held on with four M1.6 screws.

The Radiator Panel protective cover should be kept in place at all times to protect the delicate thermal finish on the Radiator.

6 STORAGE

The PCU may be stored in its transport container provided it is triple bagged and all connector savers and protective covers are fitted. The transport container must be stored in a clean, dry environment that is protected from the elements. The temperature of the transport container must be maintained at 20 ° C ± 10 ° C.

7 RED TAG ITEMS

7.1 Radiator Cover

The PCU has a protective cover attached to the Radiator Panel by four M1.6 stainless steel screws. This must be removed before flight. Removal of the cover can be performed when the PCU is integrated into the HIRDLS instrument. Removal is achieved by undoing the four M1.6 screws taking care to support the cover as the last screw is removed.

7.2 Shorting Link

The shorting link fitted across all four terminals on the rear (-Y side) of the PCU should be removed.

8 GREEN TAG ITEMS

The shorting link connecting the lower two terminals on the –Y face of the PCU (labelled 3 and 4) should be fitted prior to launch.

9 CLEANING

9.1 Radiator Panel Cover

This cover should be cleaned using a lint free cloth moistened with Isopropyl Alcohol (IPA). **Under no circumstances should Acetone be used!**

9.2 PCU

To remove molecular contamination from the anodized surfaces of the PCU, a lint-free cloth soaked in IPA may be used. To remove particulate debris, a vacuum cleaner and non-shedding brush should be used. No attempt should be made to clean the Silverized Teflon tape on the Radiator panel. This will degrade its thermal characteristics.

10 INTEGRATION

Integration of the PCU with the other HIRDLS subsystems is the responsibility of the Instrument Integrator.

SECTION 3
C of C/Delivery Review Board Mom Ai-Lists

Certificate of Conformance

Herewith it is certified that the equipment

Name: HIRDLS POWER CONVERTOR UNIT
Config. Item No.:
Model: PFM
Serial No.:

Described in this Data Package complies with the requirements set out in SP-HIR-036A, with the exception of the waivers and NCRs as detailed in sections 11-12 and 23-24.

•

Responsible Officer: N. MORRIS

Signature: N. M

Date: 31/05/01

SECTION 4
Qualification Status List / Compliance Matrix

SECTION 5
Top Level Drawings (Inc. Family Tree)

Top Level Drawings (Inc Family Tree)

Component Drawing List

Drawing Number	Part Name	No. of Parts
3-KE-0123-905-00-A	PFM Drawing Family Tree	N/A
0- KE -0123-100-B	Radiator Plate assembly	1
1- KE -0123-120-B	+ X Plate Assembly	1
1- KE -0123-140-B	- X Plate Assembly	1
1-KE-0123-160-B	Base Plate Assembly	1
1-KE-0123-181-E	Top Plate	1

A 3-KE-0123-905-00-A

MECHANICAL DRAWINGS					ELECTRICAL DRAWINGS				
GENERAL ASSEMBLY	TOP LEVEL	SUB-ASSEMBLY	DETAIL DRAWINGS		TOP LEVEL SCHEMATIC	SCHEMATIC TITLE	NUMBER	PCB ASSY	SUB-ASSY
RADIATOR PLATE ASSEMBLY KE-0123-100	RADIATOR PLATE KE-0123-101	MTR L SECTION KE-0123-105 MFL L SECTION KE-0123-110	BALUN WASHER, 2 HOLE BALUN WASHER, 3 HOLE D CONNECTOR PILLAR MTR L SECTION ASSEMBLY MFL L SECTION MODULE MFL L SECTION CONNECTOR PILLARS MFL L SECTION FILTER PILLARS L SECTION TOPS L SECTION NUTS HARNESS STRAP STAR POINT MOD.BRACKET FOR MFL L SECTIONS	KE-0123-102 KE-0123-103 KE-0123-104 KE-0123-105 KE-0123-111 KE-0123-112 KE-0123-113 KE-0123-115 KE-0123-116 KE-0123-117 KE-0123-118 KE-0123-215	N/A	SINGLE POWER CONVERTER(MFL) SYS +5V POWER CONVERTER(MTR) SYS +15V POWER CONVERTER(MTR) STAR POINT	KE-0123-800 KE-0123-804 KE-0123-830 KE-0123-854	KE-0123-803 KE-0123-807 KE-0123-807 KE-0123-857	
+X SIDE PLATE ASSEMBLY KE-0123-120	+X SIDE PLATE KE-0123-121	N/A	CABLE CLIP STRAP D CONNECTOR BRACKET HYPERTAC BRACKET 2-AMP RELAY FLANGE	KE-0123-130 KE-0123-131 KE-0123-132 KE-0123-134	+X PLATE HARNESS KE-0123-877	+X RELAY DRIVER BOARD DIODE BOARD +X PCU O/P SOFT START +X	KE-0123-842 KE-0123-892 KE-0123-888	KE-0123-845 KE-0123-895 KE-0123-891	
BASE PLATE ASSEMBLY KE-0123-160	BASE PLATE KE-0123-161	N/A	SPU L SECTION PCU FILTER BLOCK SPU SUPPLY MONITOR BRACKET AMUX BOARD PILLARS SPU CONTROL BOARD STRAPS SPU SUPPLY MONITOR BOARD PILLARS BASE L-SECTION NUT BAR PCU L-SECTION	KE-0123-163 KE-0123-167 KE-0123-169 KE-0123-171 KE-0123-172 KE-0123-174 KE-0123-175 KE-0123-165	N/A	INTERNAL PSU(DUAL OUTPUT) OPTO BOARD SPU PSU (15V OUTPUT) PCU INT SUPPLY I/P SWITCHING SPU PSU (5V OUTPUT) FM CONTROLLER ANALOGUE BOARD SPU OUTPUT SOFT START	KE-0123-808 KE-0123-858 KE-0123-816 KE-0123-820 KE-0123-812 KE-0123-834 KE-0123-824 KE-0123-900	KE-0123-811 KE-0123-861 KE-0123-815 KE-0123-823 KE-0123-815 KE-0123-837 KE-0123-827 KE-0123-903	
-X SIDE PLATE ASSEMBLY KE-0123-140	-X SIDE PLATE KE-0123-141	N/A	D CONNECTOR BRACKET HYPERTAC BRACKET VENT PORT CLAMP RING	KE-0123-131 KE-0123-132 KE-0123-145	-X PLATE HARNESS KE-0123-878	-X RELAY DRIVER BOARD RELAY DIODE BOARD -X PCU O/P SOFT START -X PCU INDUCTOR FILTER BOARD	KE-0123-838 KE-0123-884 KE-0123-880 KE-0123-896	KE-0123-841 KE-0123-887 KE-0123-883 KE-0123-899	
CONNECTOR PLATE ASSEMBLY KE-0123-200	CONNECTOR PLATE KE-0123-201	VERTICAL SHELF ASSEMBLY KE-0123-212 INDUCTOR BRACKET KE-0123-218	VERTICAL SHELF BUS BAR PILLARS ISOLATING WASHER ISOLATING BUSH SHORTING STRAP ISOLATING WASHER 2 ISOLATING BUSH 2 INDUCTOR BRACKET STAND OFFS	KE-0123-203 KE-0123-206 KE-0123-207 KE-0123-208 KE-0123-209 KE-0123-210 KE-0123-211 KE-0123-219	CONNECTOR PLATE ASSEMBLY CIRCUIT DIAGRAM KE-0123-875	BUS BAR BOARD PCU INDUCTOR FILTER BOARD MOUNTED ON KE-0123-212 CURRENT TRANSIENT LIMITER TEMPERATURE SENSOR	KE-0123-846 KE-0123-896 KE-0123-870 KE-0123-862	KE-0123-849 KE-0123-899 KE-0123-873 KE-0123-876	KE-0123-874
TOP PLATE PLATE KE-0123-181	N/A	N/A	N/A		N/A	N/A			

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
A	03/05/01		D.HOWE			PFM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE
HIRDLS PCU PFM DRAWING FAMILY TREE

A 3-KE-0123-905-00-A

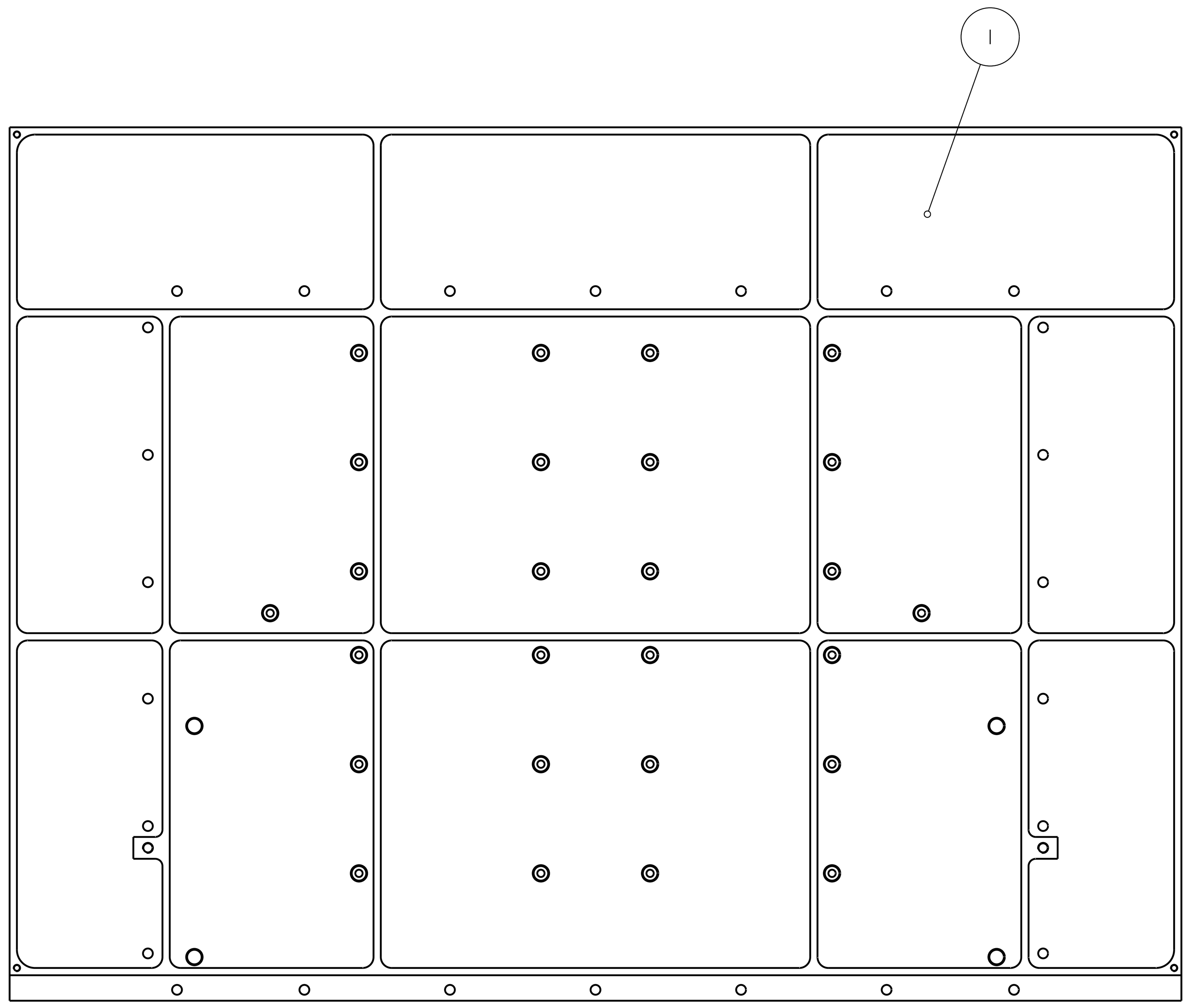
TOTAL NO. OF SHEETS 1

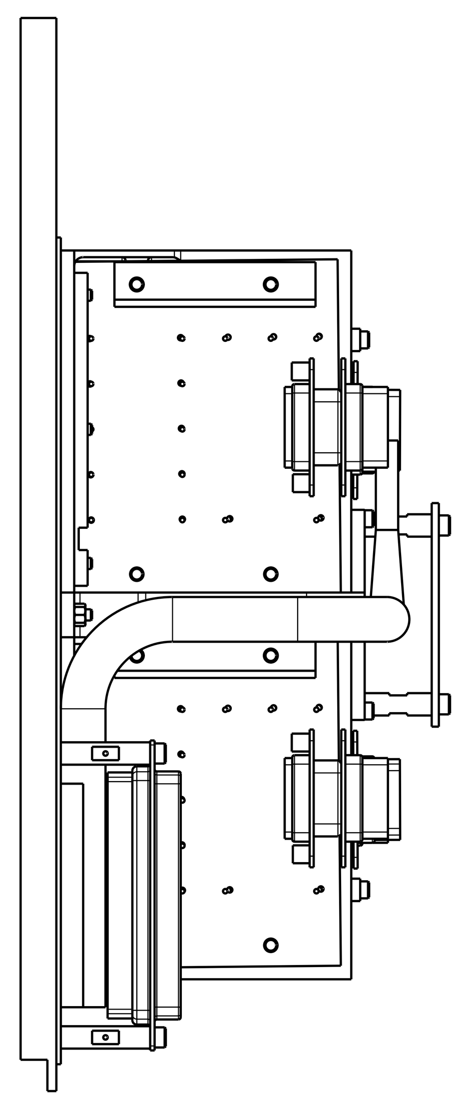
A 0-KE-0123-100-B

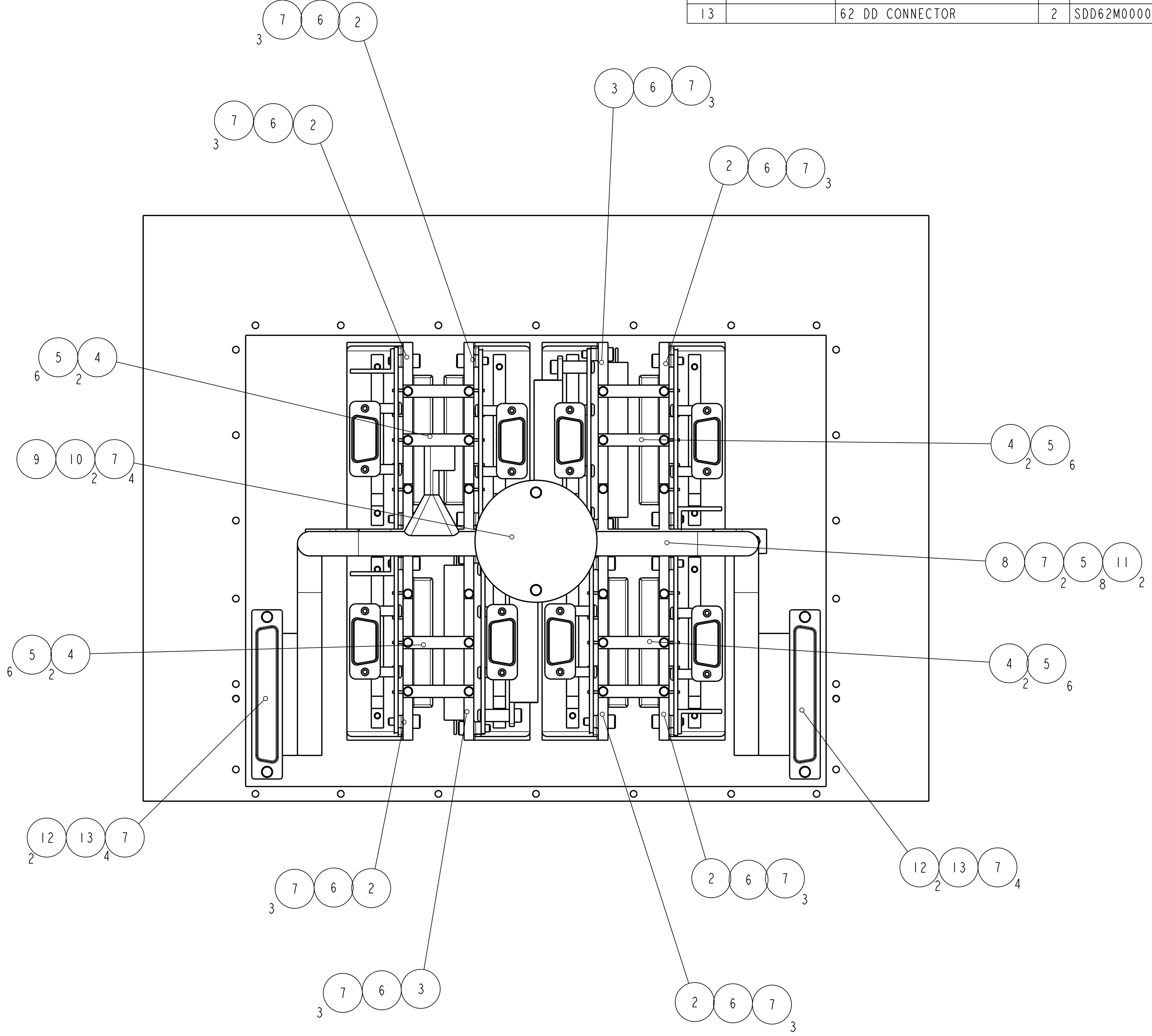
PROJECTION

THIS DRAWING CONFORMS TO B.S.308

ITEM NO.	DRAWING NO.	DESCRIPTION	NO. OFF	REMARKS
1	1-KE-0123-101	RADIATOR PLATE	1	
2	2-KE-0123-105	MTR L SECTION ASSY	6	
3	2-KE-0123-110	MFL L SECTION ASSY	2	
4	4-KE-0123-115	L SECTION TOPS	12	
5		M2 CAPHEAD SCREWS x6mm	24	SEE NOTE 1
6	4-KE-0123-116	L SECTION NUT BAR	8	
7		M2.5 CAPHEAD SCREWS x10mm	38	SEE NOTE 1
8	3-KE-0123-117	HARNESS STRAP	1	
9	4-KE-0123-118	STAR POINT	1	
10	4-KE-0123-119	STAR POINT PILLARS	2	
11		M2.5 NUTS	2	SEE NOTE 1
12	4-KE-0123-104	D CONNECTOR PILLARS	4	
13		62 DD CONNECTOR	2	SDD62M0000G-1082.24







NOTE:-

1. FASTENER MATERIAL :- STAINLESS STEEL A2 GRADE 50
TO BS 6105 DIN912
TORQUE SETTING ISO:SPAS/MECH/001

ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS
B	12-8-99	KE-2585	A.J.P.			MANUF
A	11-4-99	.	A.J.P.			MANUF

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE ITEM LIST THIS DRAWING

SURFACE TEXTURE μM 1.6 ✓ UNLESS STATED

0 50mm

USED ON KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE RADIATOR PLATE ASSEMBLY

HIRDLS PROTO-FLIGHT ELECTRONICS BOX

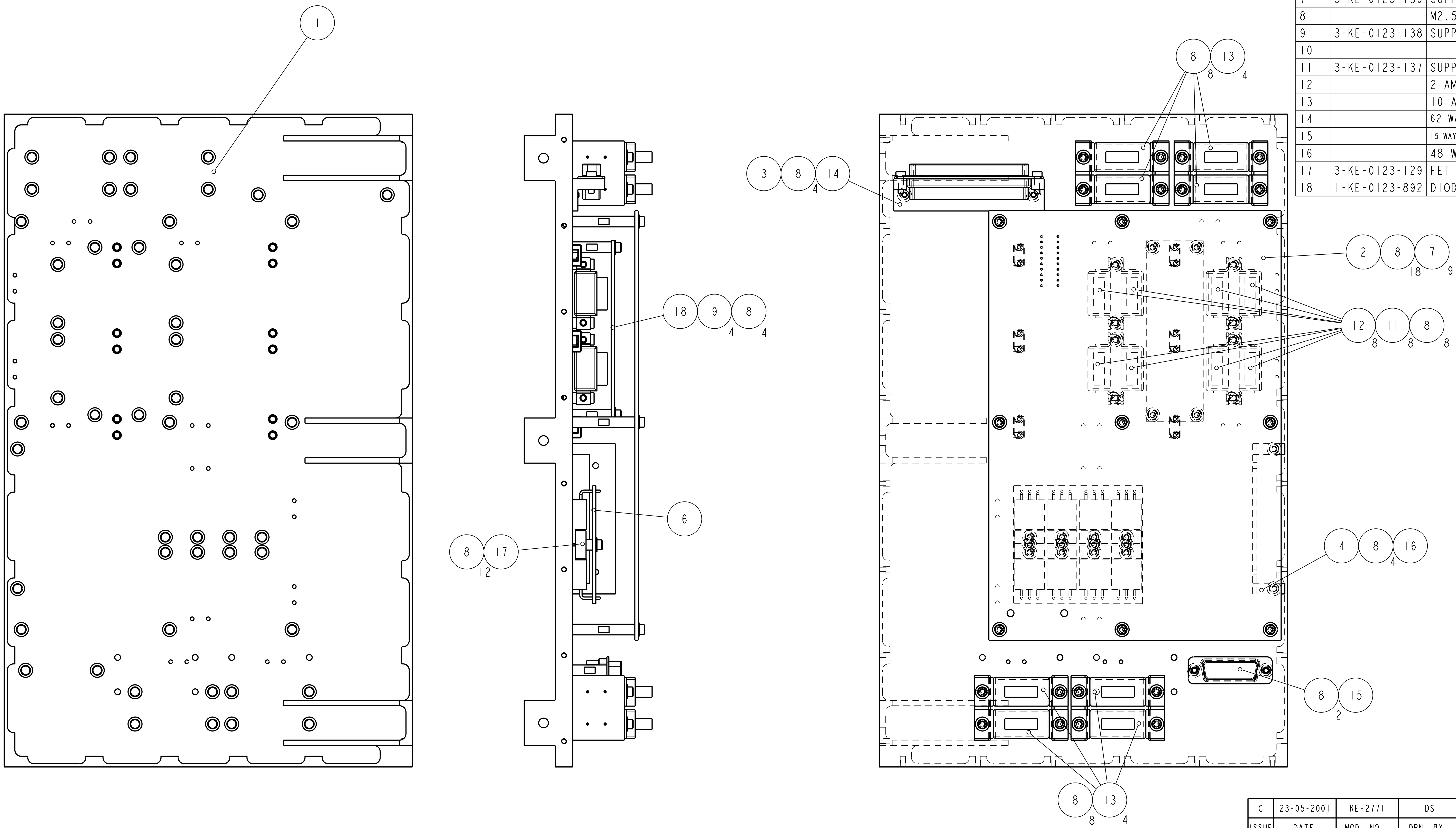
A 0-KE-0123-100-B 1 OF 1

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

0-KE-0123-100-B

A | 1-KE-0123-120-B | PROJECTION | THIS DRAWING CONFORMS TO B.S.308

ITEM No.	DRAWING NUMBER	DESCRIPTION	No. OFF	REMARKS
1	1-KE-0123-121	+ X SIDE PLATE	1	
2	2-KE-0123-842	+X RELAY DRIVER	1	
3	3-KE-0123-131	D CONNECTOR BRACKET	1	
4	3-KE-0123-132	HYPERTAC BRACKET	1	
5				
6	1-KE-0123-888	SOFT START +X	1	
7	3-KE-0123-139	SUPPORT PILLAR	9	
8		M2.5x6 CAPHEADS	68	SEE NOTE 1
9	3-KE-0123-138	SUPPORTPILLAR	4	
10				
11	3-KE-0123-137	SUPPORT PILLAR	8	
12		2 AMP RELAYS	8	MIL-R-39016/45B
13		10 AMP RELAYS	8	MIL-R-83536/13
14		62 WAY D CONNECTOR	1	SDD62F0000G-1082.24
15		15 WAY FEMALE D CONNECTOR	1	SND15M
16		48 WAY HYPERTAC	1	HPF048UFCL8070
17	3-KE-0123-129	FET SUPPORT	1	
18	1-KE-0123-892	DIODE BOARD + X	1	



NOTE :-

1. FASNER MATERIAL :- STAINLESS STEEL A2 GRADE 50
TO BS 6105 DIN912
TORQUE SETTING ISO:SPAS/MECH/001

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS
C	23-05-2001	KE-2771	DS			MANUF

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °
FINISH CLEAN REMOVE ALL BURRS
ORIGINAL SCALE 1:1 DO NOT SCALE
MATERIAL & SPEC. SEE PARTS LIST
SURFACE TEXTURE μM 0.8 UNLESS STATED
0 50 mm

USED ON 0-KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE + X SIDE PLATE ASSEMBLY

HIRDLS PROTO-FLIGHT ELECTRONICS BOX

A | 1-KE-0123-120-B | 1 OF 1

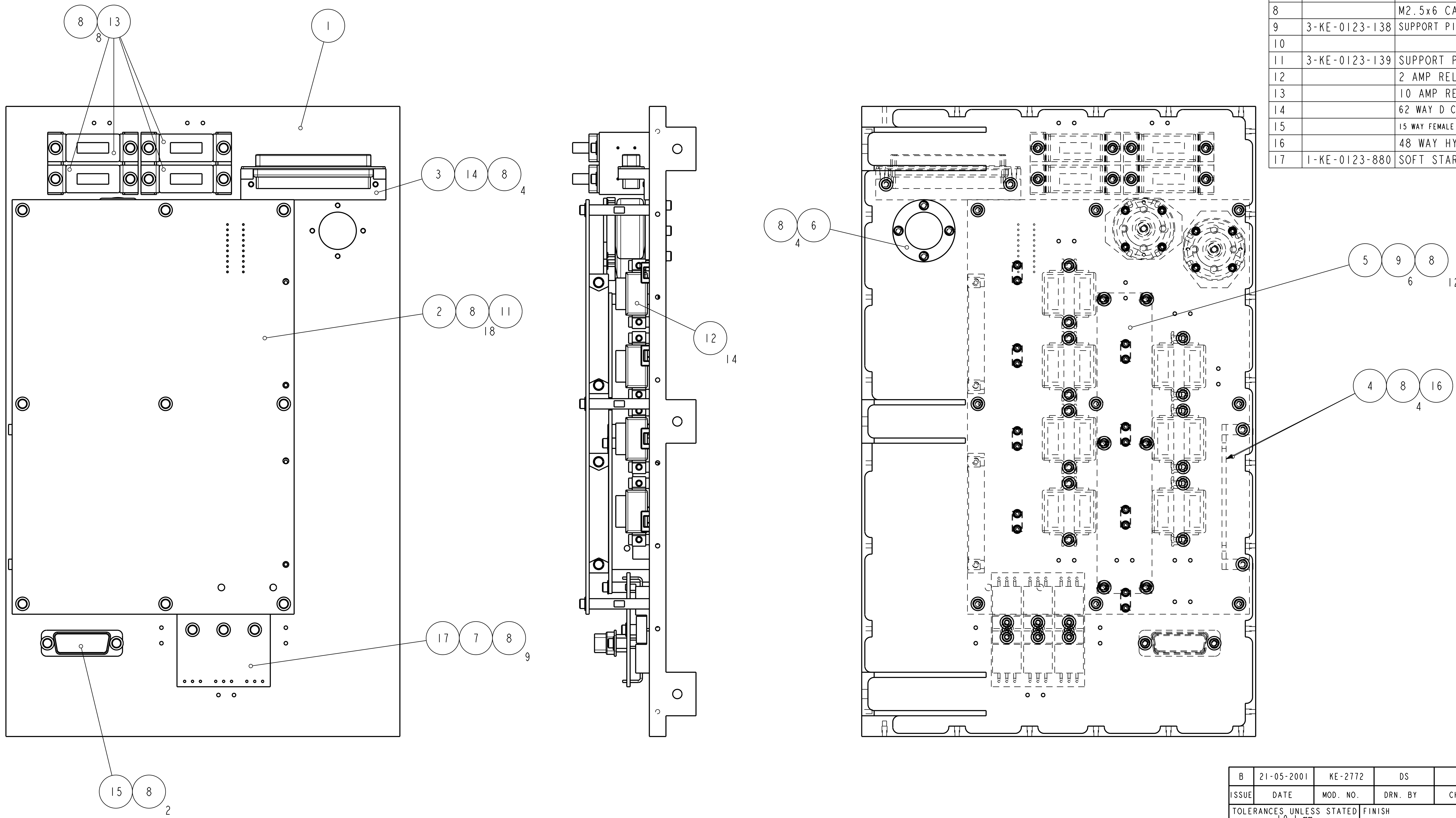
A 1-KE-0123-120-B

A | I-KE-0123-140-B

PROJECTION

THIS DRAWING CONFORMS TO B.S.308

ITEM No.	DRAWING NUMBER	DESCRITPION	No. OFF	REMARKS
1	1-KE-0123-141	- X SIDE PLATE	1	
2	2-KE-0123-838	- X RELAY DRIVER	1	
3	3-KE-0123-131	D CONNECTOR BRACKET	1	
4	3-KE-0123-132	HYPERTAC BRACKET	1	
5	4-KE-0123-133	2 AMP RELAY PCB	1	
6	3-KE-0123-145	VENT PORT	1	
7	3-KE-0123-147	FET SUPPORT	1	
8		M2.5x6 CAPHEADS	61	SEE NOTE 1
9	3-KE-0123-138	SUPPORT PILLAR	6	
10				
11	3-KE-0123-139	SUPPORT PILLAR	9	
12		2 AMP RELAYS	14	MIL-R-39016/45B
13		10 AMP RELAYS	2	MIL-R-83536/13
14		62 WAY D CONNECTOR	1	SDD62F0000G-1082.24
15		15 WAY FEMALE D CONNECTOR	1	SND15M
16		48 WAY HYPERTAC	1	HPF048UFCL8070
17	1-KE-0123-880	SOFT START -X	1	



B	21-05-2001	KE-2772	DS			MANUF
ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED ±0.1 mm ±0.1°

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE PARTS LIST

SURFACE TEXTURE μM 0.8 √ UNLESS STATED

0 50 mm

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

USED ON 0-KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE - X SIDE PLATE ASSEMBLY

HIRDLS PROTO-FLIGHT ELECTRONICS BOX

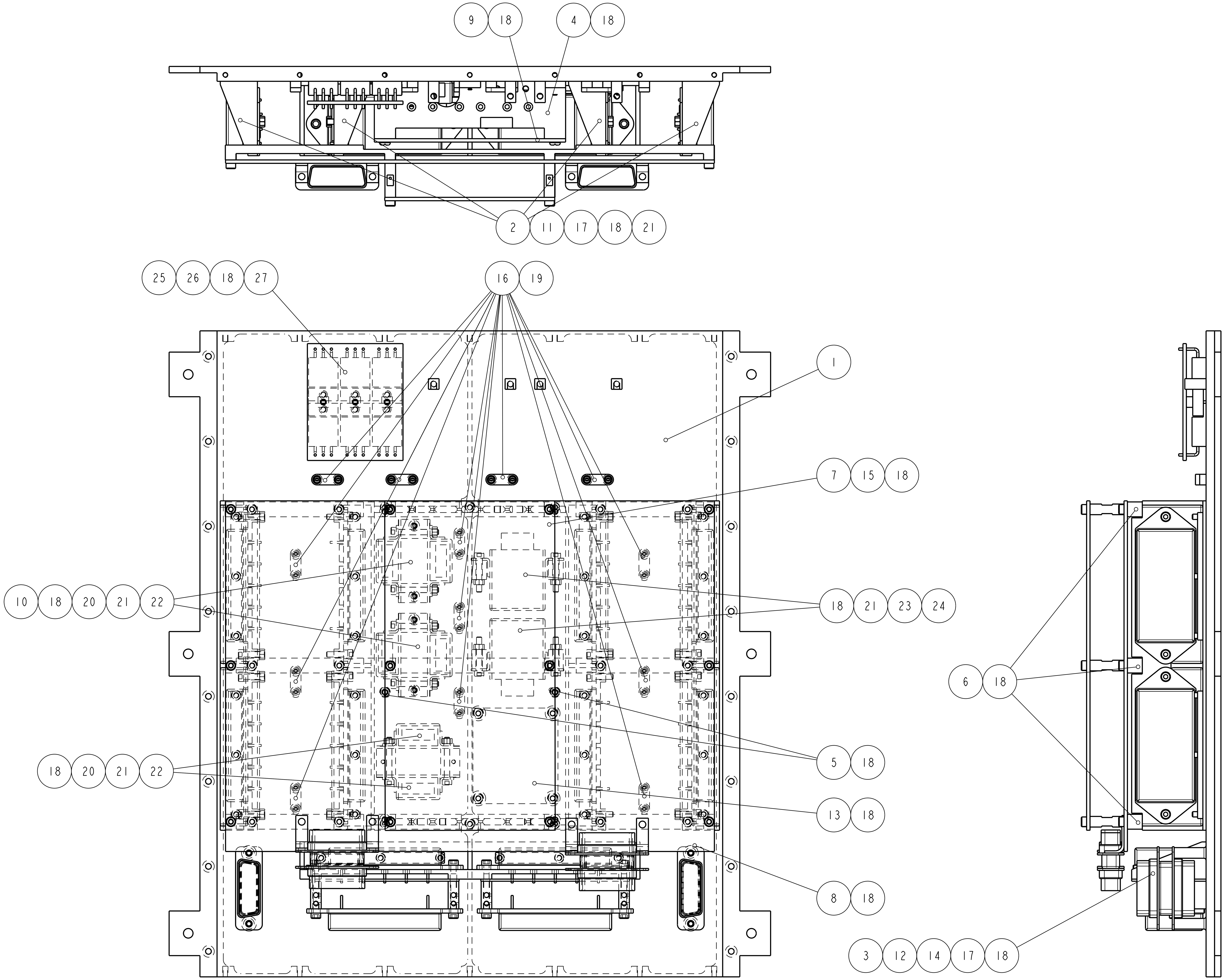
A | I-KE-0123-140-B | 1 OF 1

A I-KE-0123-140-B

A 1-KE-0123-160-B

PROJECTION

THIS DRAWING CONFORMS TO B.S.308



ITEM No.	DRAWING NUMBER	DESCRIPTION	No. OFF	REMARKS
1	0-KE-0123-161	BASE PLATE	1	
2	1-KE-0123-163	SPU L SECTION	4	
3	1-KE-0123-165	PCU L SECTION	1	
4	3-KE-0123-169	SPU PCU CONTROL MONITORING BOARD BRACKET	2	
5	4-KE-0123-174	SPU PCU CONTROL MONITORING BOARD PILLARS	2	
6	3-KE-0123-172	SPU CONTROL BOARD STRAP	4	
7	3-KE-0123-170	AMUX BOARD	1	
8	2-KE-0123-162	CONTROL BOARD	1	
9	3-KE-0123-168	SPU PCU CONTROL MONITORING BOARD	1	
10	4-KE-0123-133	2 AMP RELAY PCB	2	
11	2-KE-0123-164	SPU L SECTION BOARD	6	
12	2-KE-0123-166	PCU L SECTION BOARD	2	
13	4-KE-0123-173	UNUSED OPTO BOARD	1	
14	2-KE-0123-167	PCU FILTER BLOCK	4	
15	4-KE-0123-171	AMUX PILLARS	6	
16	4-KE-0123-130	CABLE CLIP STRAP	13	
17	4-KE-0123-175	BASE L SECTION NUT BAR	10	
18		M2.5 x 6mm CAPHEADS	82	
19		M1.6 x 5mm C'SK SCREWS	26	SEE NOTE 1
20		M2 x 5mm CAPHEADS	4	
21		M2.5 NUTS	26	
22		2 AMP RELAY	6	MIL-R-39016/45B
23		10 AMP RELAYS	4	MIL-R-83536/13
24	3-KE-0123-176	10 AMP RELAY SUPPORT BASE	4	
25	3-KE-0123-147	FETS SUPPORT -X	1	
26	3-KE-0123-142	FETS BROAD -X	1	
27		FETS	6	

NOTE:-

1. FASTENER MATERIAL :- STAINLESS STEEL A2 GRADE 50
TO BS 6105 DIN912
TORQUE SETTING ISO:SPAS/MECH/001

ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS
B	20-02-01	KE-2786	A.J.P.			MANUF
A	15-8-99	.	A.J.P.			MANUF

TOLERANCES UNLESS STATED ±0.1 mm ±0.1°

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE PARTS LIST

SURFACE TEXTURE µM 0.8 √ UNLESS STATED

0 50 mm

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

USED ON 0-KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE BASE PLATE ASSEMBLY

HIRDLS

PROTO-FLIGHT ELECTRONICS BOX

A 1-KE-0123-160-B

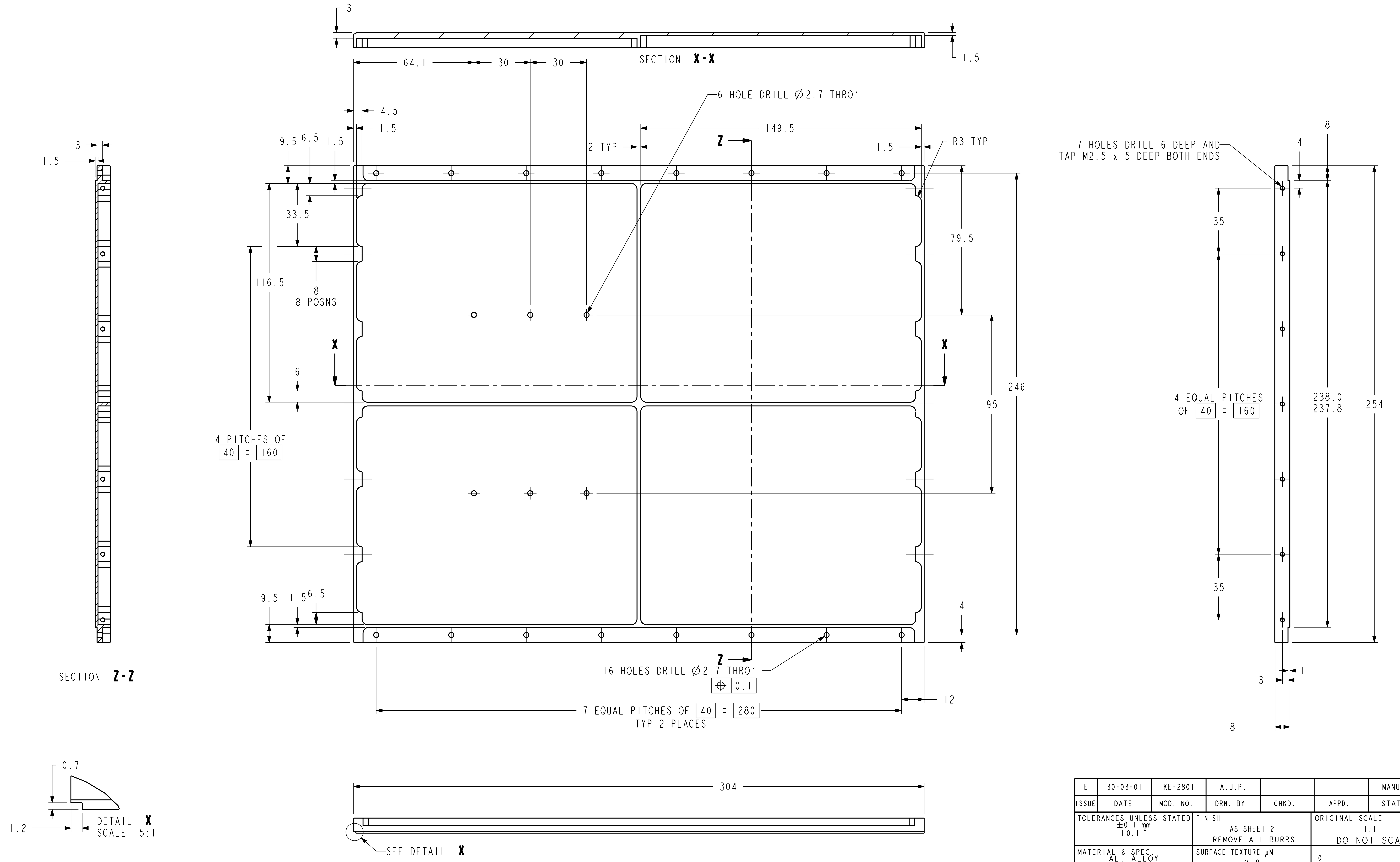
1 OF 1

A 1-KE-0123-160-B

A | 1-KE-0123-181-E

PROJECTION

THIS DRAWING CONFORMS TO B.S.308



NOTE:-
1. SURFACE COAT TO BE ARRANGED TO SHEET 2
2. PACKAGE AND SEAL. MARK PACKAGE WITH DRAWING No. AND WEIGHT
3. CLEAN WITH ALCOHOL BEFORE PACKAGING

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS
E	30-03-01	KE-2801	A.J.P.			MANUF

TOLERANCES UNLESS STATED ±0.1 mm ±0.1°

FINISH AS SHEET 2 REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. AL. ALLOY L115

SURFACE TEXTURE μM 0.8 UNLESS STATED

0 50 mm

USED ON 0-KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE

TOP PLATE

HIRDLS PROTO-FLIGHT ELECTRONICS BOX

A | 1-KE-0123-181-E | 1 OF 2

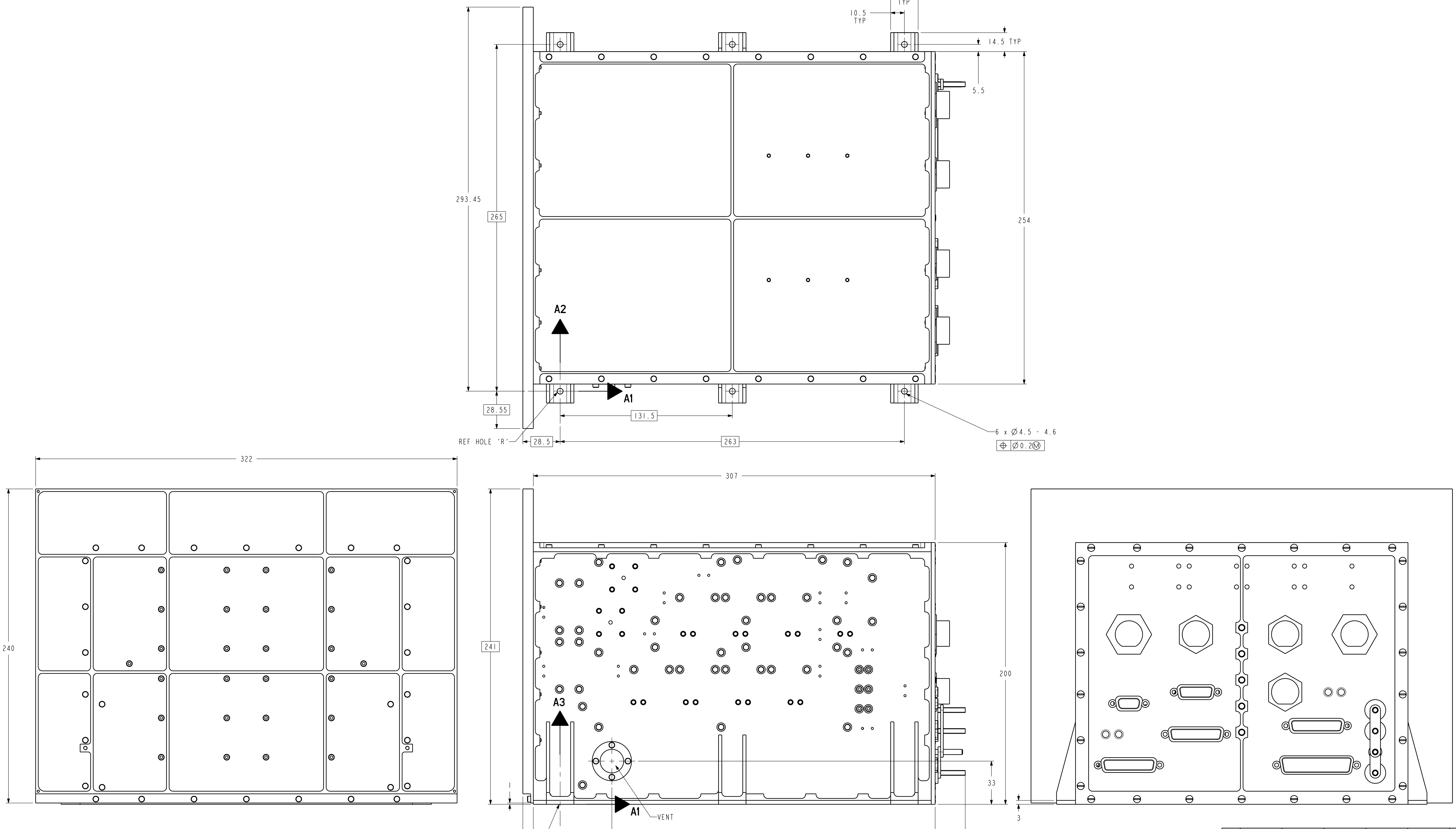
A 1-KE-0123-181-E

SECTION 6
Interface Drawings

A 0-KE-0123-000-B

PROJECTION

THIS DRAWING CONFORMS TO B.S.308



MASS PROPERTIES

MASS = 10.61 Kg

CoM W.R.T. 'R' HOLE

A1 = 119mm

A2 = 133mm

A3 = 96mm

B	04-05-2001	KE-2821	D. SMART			MANUF
ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH SEE THERMAL ICD 0-KE-0123-001 REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE GA 0-KE-0123-500

SURFACE TEXTURE µM ✓ UNLESS STATED

0 50mm

USED ON

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE

MECHANICAL INTERFACE DRAWING

HIRDLS PCU — FLIGHT MODEL

A 0-KE-0123-000-B — 1 OF 1

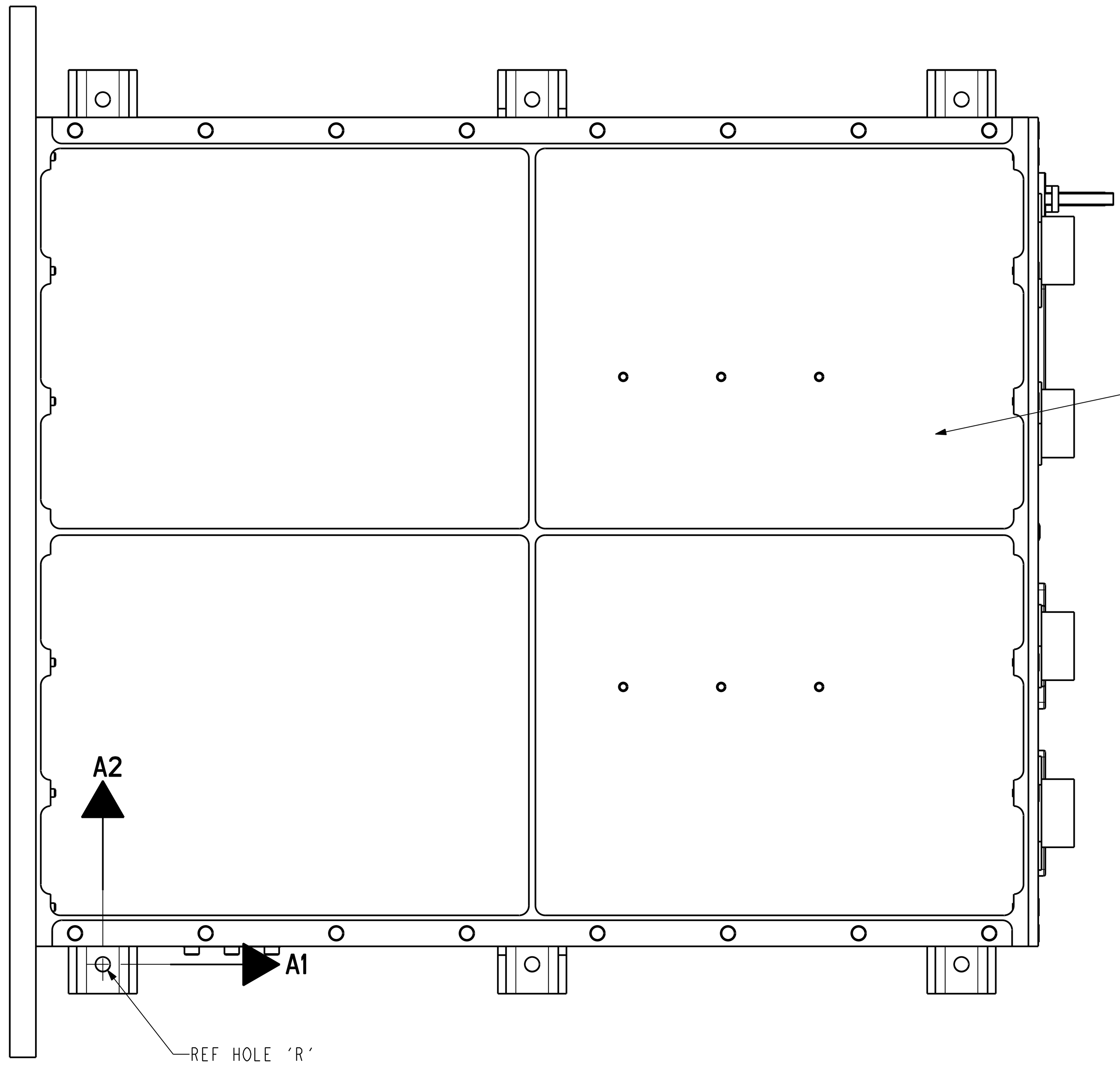
TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

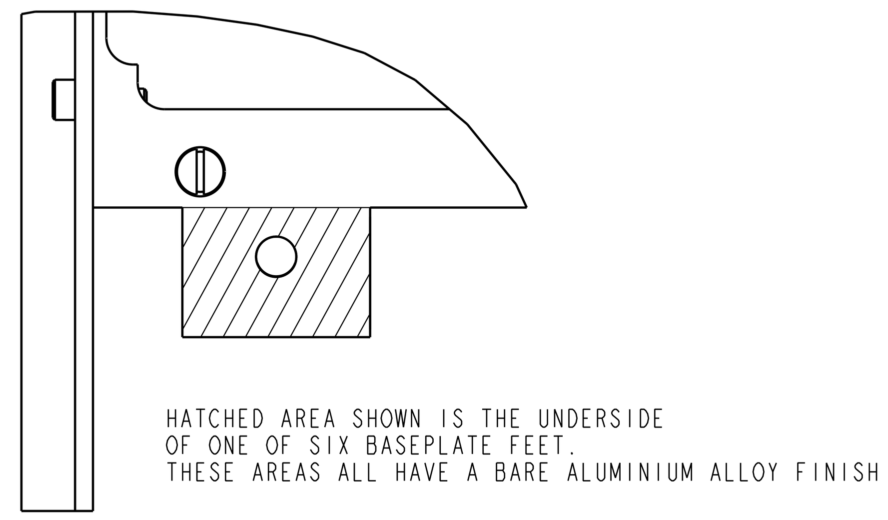
0-KE-0123-000-B

A 0-KE-0123-001-B

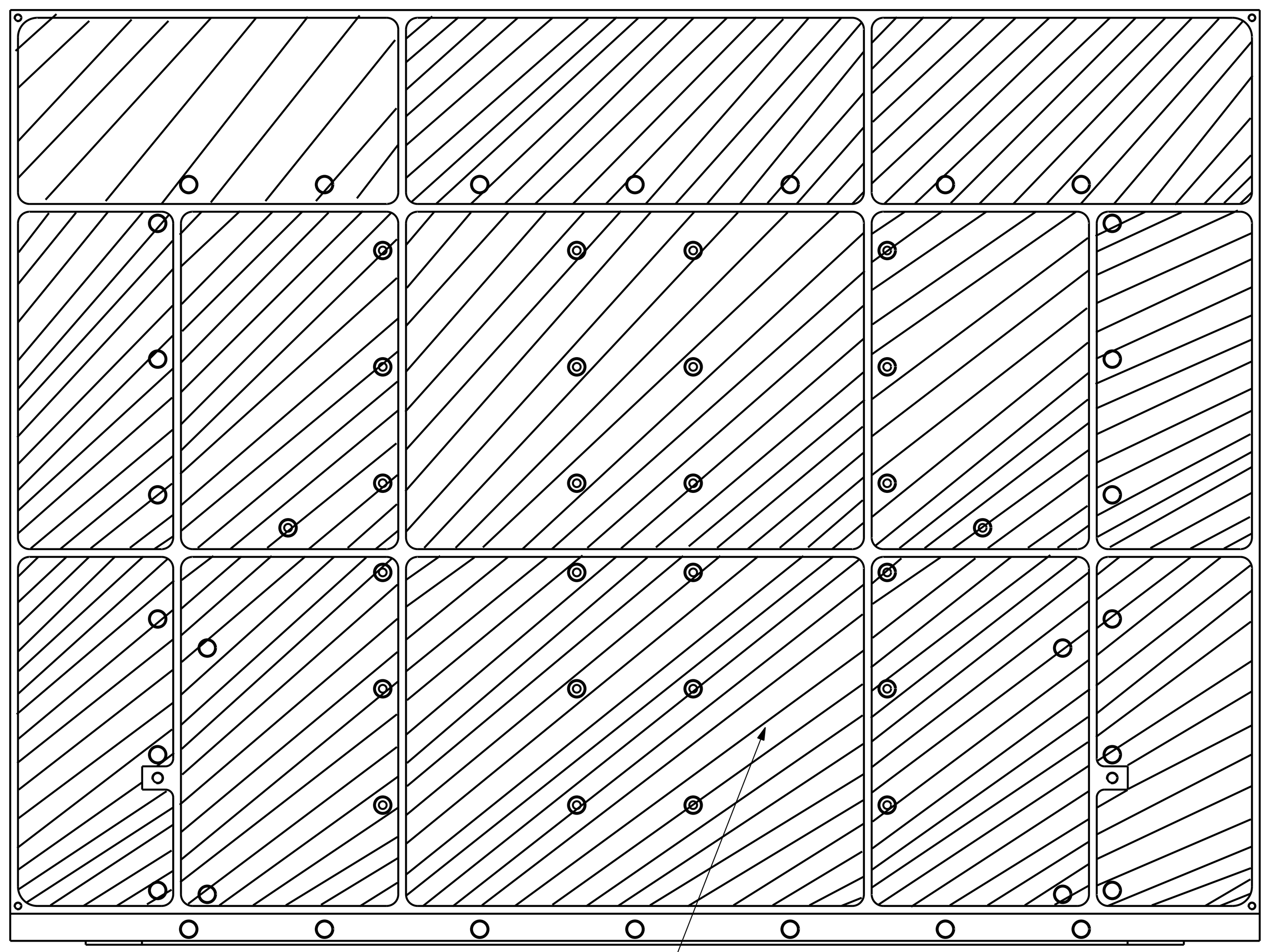
PROJECTION

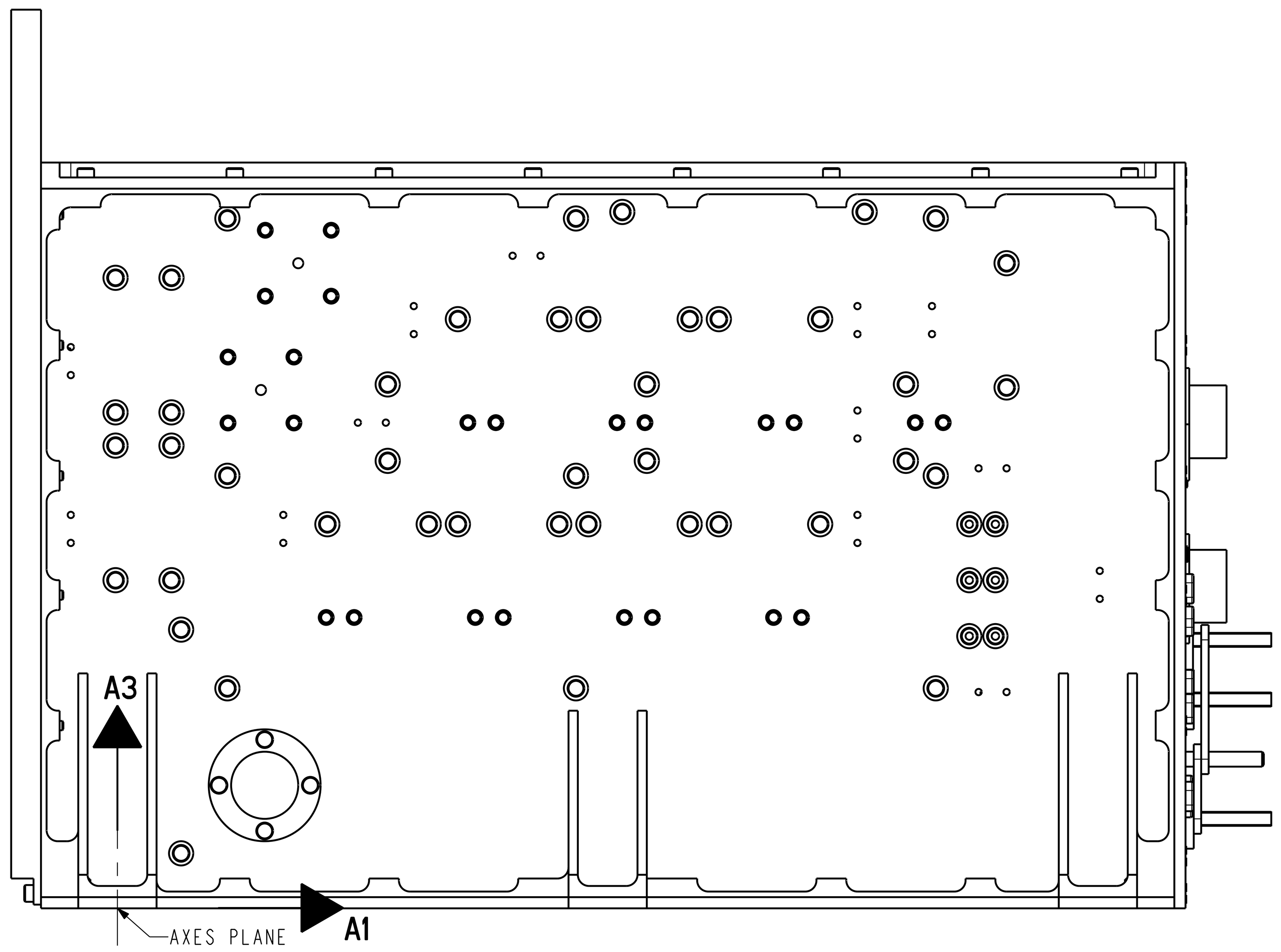
THIS DRAWING CONFORMS TO B.S.308

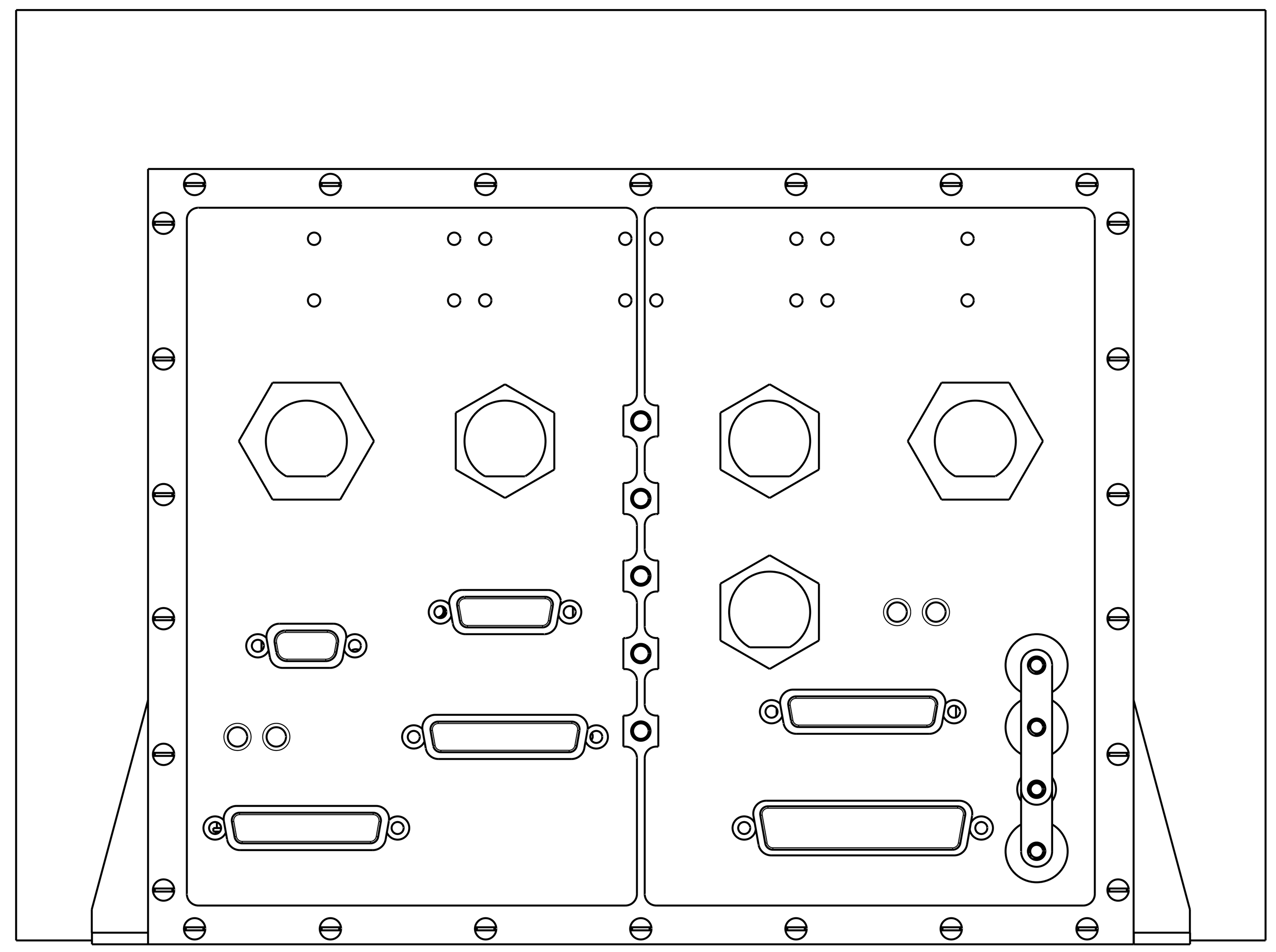




PARTIAL VIEW ON ARROW A
SCALE 2:1







RADIATOR PLATE
SILVERIZED FEP TEFLON - 5mil TAPE- 966
EMISSIVITY : 0.78
ABSORPTIVITY BOL : 0.771
ABSORPTIVITY EOL : 0.771
IN HATCHED AREA ONLY

A

NOTES

1 TOP PLATE EXTERNAL SURFACES PAINTED BLACK WITH AEROGLAZE Z306
UNDERSIDE OF BASEPLATE FEET HAVE BARE ALUMINIUM ALLOY FINISH (SEE VIEW ON ARROW A)
RADIATOR PLATE FINISHED WITH SILVERISED FEP TEFLON

ALL OTHER EXTERNAL SIDES ARE BLACK ANODIZED

EMISSIVITY : 0.80
ABSORPTIVITY BOL : 0.07
ABSORPTIVITY EOL : 0.18

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS
B	04-05-2001	KE-2822	D.SMART			MANUF

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH SEE NOTES REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE GA 0-KE-0123-500

SURFACE TEXTURE µM ✓ UNLESS STATED

0 50mm

USED ON

©CLRC 1996

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE

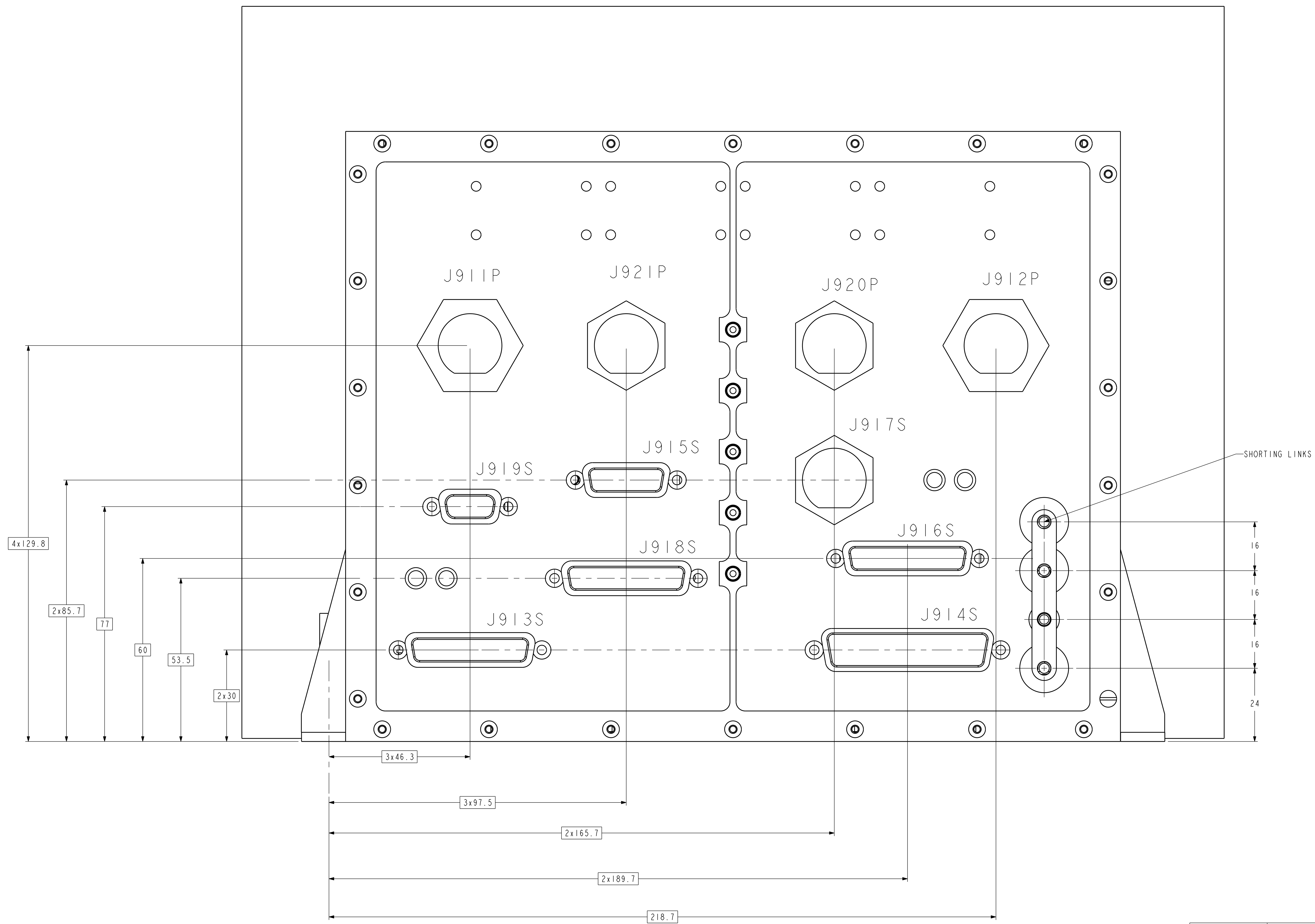
THERMAL INTERFACE DRAWING

HIRDLS PCU FLIGHT MODEL

A 0-KE-0123-001-B 1 OF 1

A 0-KE-0123-001-B

A 0-KE-0123-002-A | PROJECTION | THIS DRAWING CONFORMS TO B.S.308



A	31-01-00	.	A.J.P.			MANUF
ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH: REMOVE ALL BURRS

ORIGINAL SCALE 2:1 DO NOT SCALE

MATERIAL & SPEC.

SURFACE TEXTURE µM ✓ UNLESS STATED

0 50mm

USED ON

©CLRC 1996

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

TITLE

CONNECTOR INTERFACE DRAWING

HIRDLS PCU — FLIGHT MODEL

A 0-KE-0123-002-A — 1 OF 1

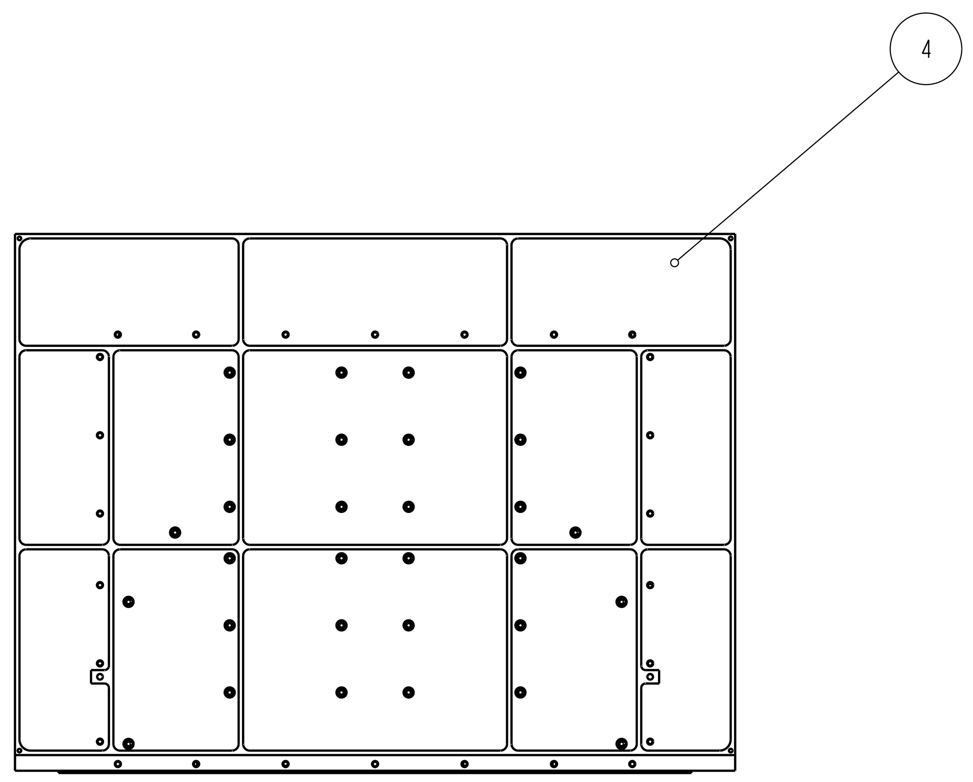
A 0-KE-0123-002-A

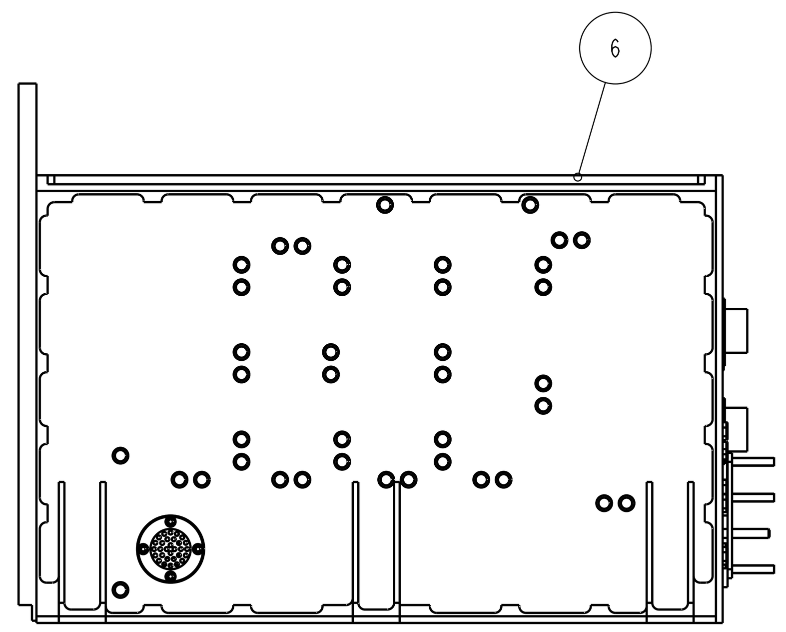
A 0-KE-0123-500-A

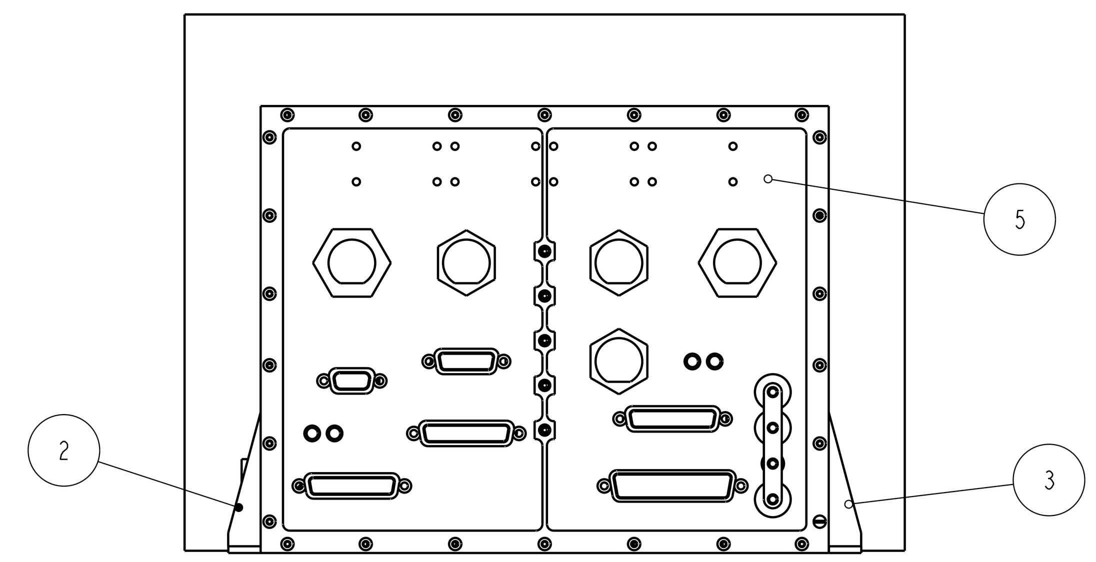
PROJECTION

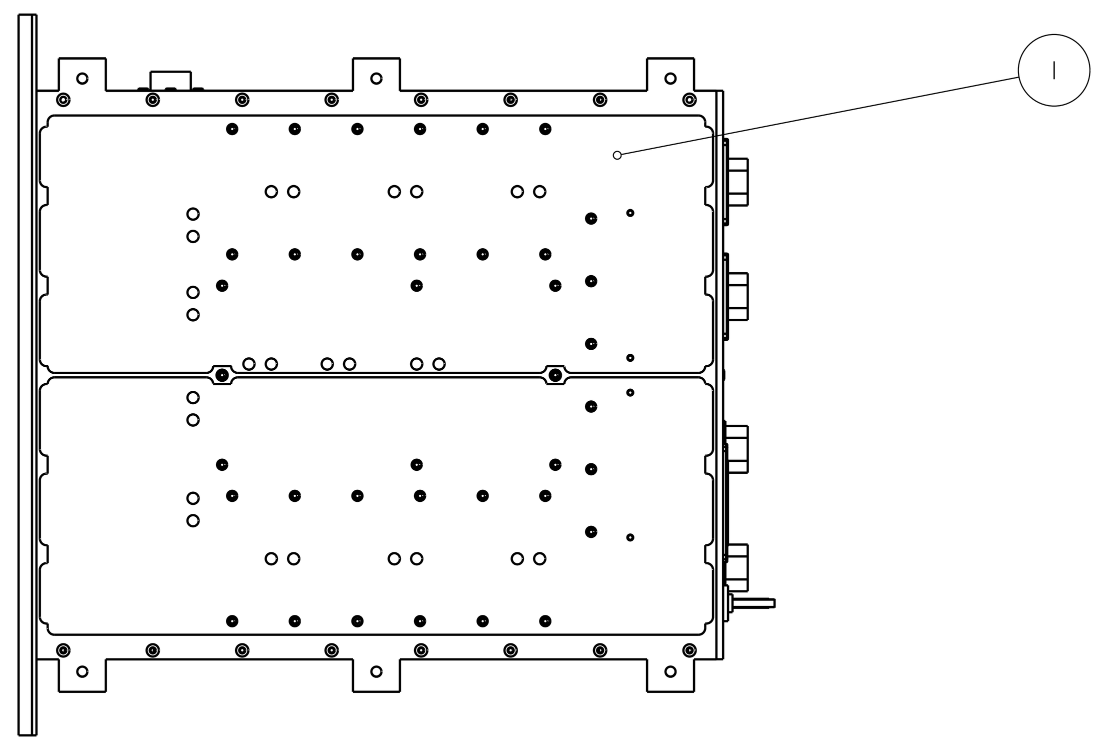
THIS DRAWING CONFORMS TO B.S.308

ITEM No.	DRAWING No.	TITLE	No. OFF	REMARKS
1	1-KE-0123-160	BASE PLATE ASSEMBLY	1	
2	1-KE-0123-120	+X SIDE PLATE ASSY	1	
3	1-KE-0123-140	-X SIDE PLATE ASSY	1	
4	0-KE-0123-100	RADIATOR PLATE ASSY	1	
5	1-KE-0123-200	CONNECTOR PLATE ASSY	1	
6	1-KE-0123-181	TOP PLATE	1	









TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS
A	16-5-00	.	A.J.P.			MANUF

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:2 DO NOT SCALE

MATERIAL & SPEC. SEE PARTS LIST THIS DRAWING

SURFACE TEXTURE μM 1.6 ✓ UNLESS STATED

0 50mm

USED ON

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE MAIN PCU GA

HIRDLS PROTO-FLIGHT ELECTRONICS BOX

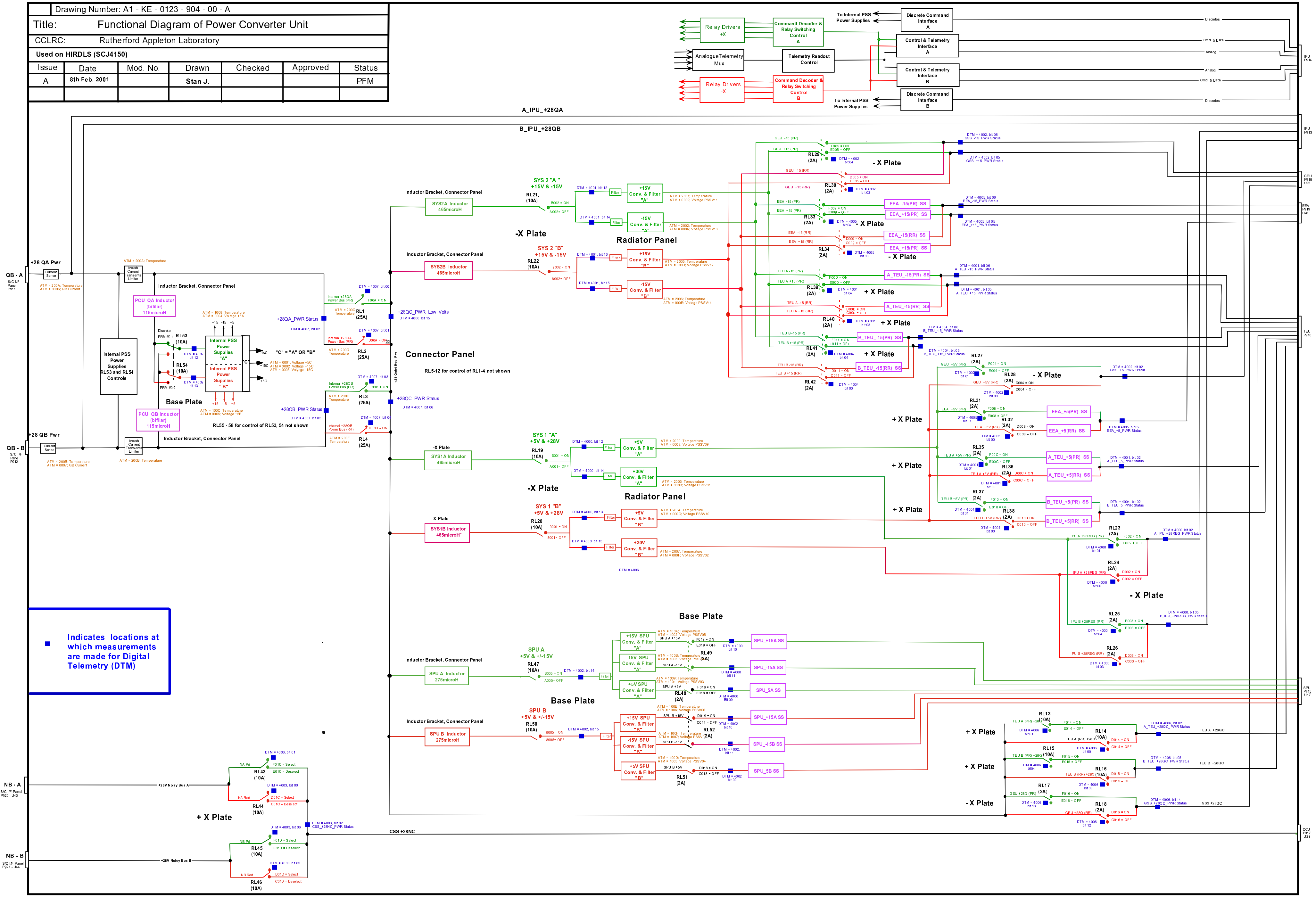
A 0-KE-0123-500-A 1 OF 1

SECTION 7
Functional Diagrams (Block Diagram)

Section 7 Functional Diagrams

Drawing Number	Description	No. of Sheets
1-KE-0123-904-00-A	FUNTIONAL DIAGRAM OF POWER CONVERTER UNIT	1
2-KE-0123-828-04-D	INTERNAL SUPPLY DIAGRAM	4
1-KE-0123-875-02-B	CONNECTOR PLATE ASSEMBLY CIRCUIT DIAGRAM	2
1-KE-0123-877-00-E	+X PLATE HARNESS SCHEMATIC	1
1-KE-0123-878-00-E	-X PLATE HARNESS SCHEMATIC	1

Drawing Number: A1 - KE - 0123 - 904 - 00 - A						
Title: Functional Diagram of Power Converter Unit						
CCLRC: Rutherford Appleton Laboratory						
Used on HIRDLS (SCJ4150)						
Issue	Date	Mod. No.	Drawn	Checked	Approved	Status
A	8th Feb. 2001		Stan J.			PFM

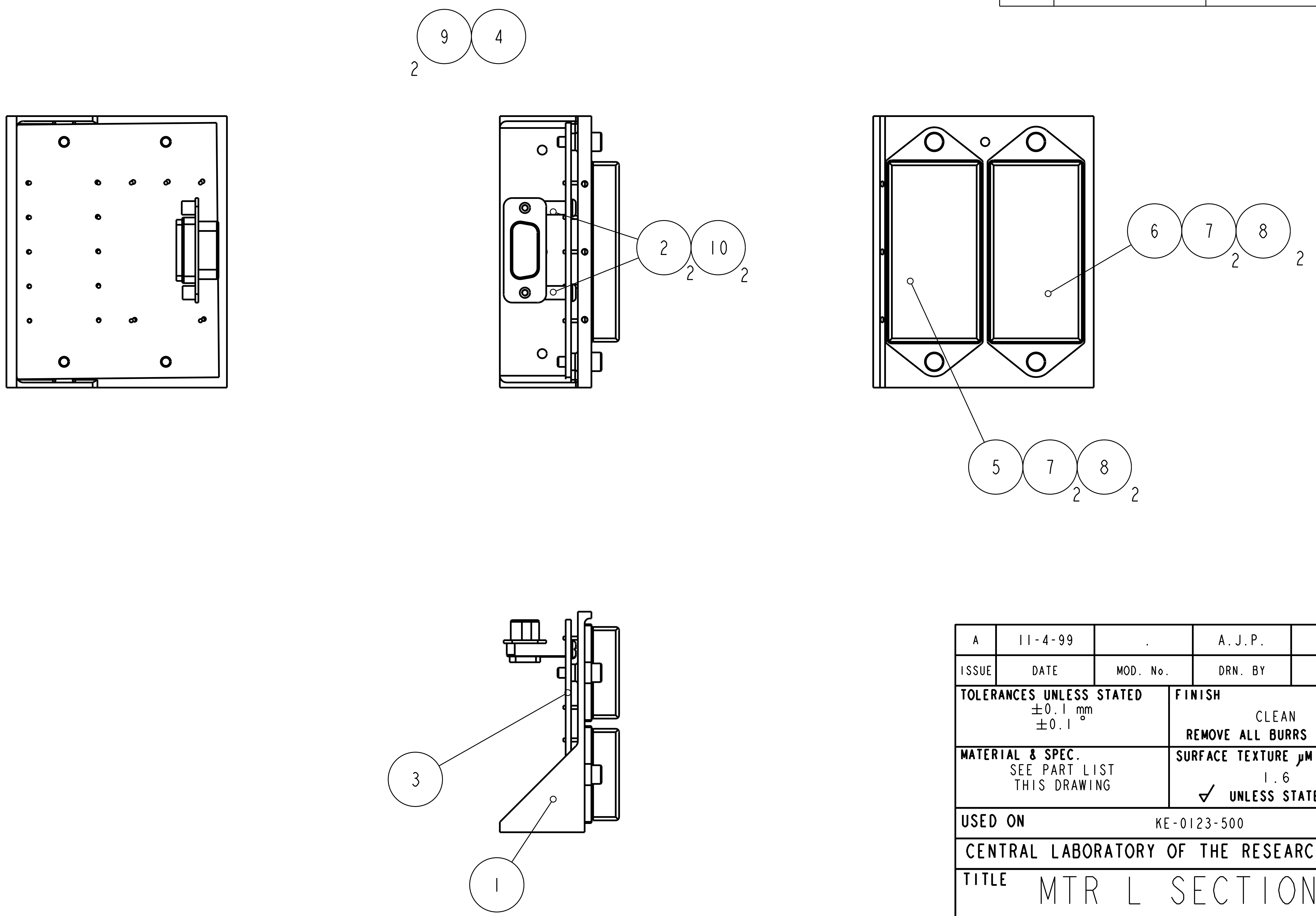


A 2-KE-0123-105-A

PROJECTION

THIS DRAWING CONFORMS TO B.S.308

ITEM NO.	DRAWING NO.	DESCRIPTION	NO. OFF	REMARKS
1	2-KE-0123-106	MTR L SECTION MODULE	1	
2	4-KE-0123-107	MTR L SECTION CONNECTOR PILLARS	2	
3	3-KE-0123-108	MTR L SECTION PCB	1	
4		15 WAY D CONNECTOR	1	
5		MTR FILTER	1	
6		MTR CONVERTER	1	
7		M3 CAP HEAD SCREWS	4	
8		M3 NUTS	4	
9		M2 CAP HEAD SCREWS	2	
10		M2 PAN HEAD SREWS	2	



A	11-4-99	.	A.J.P.			MANUF
ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE PART LIST THIS DRAWING

SURFACE TEXTURE μM 1.6 UNLESS STATED

0 50 mm

USED ON KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE MTR L SECTION ASSEMBLY

HIRDLS PROT-FLIGHT ELECTRONICS BOX

A 2-KE-0123-105-A 1 OF 1

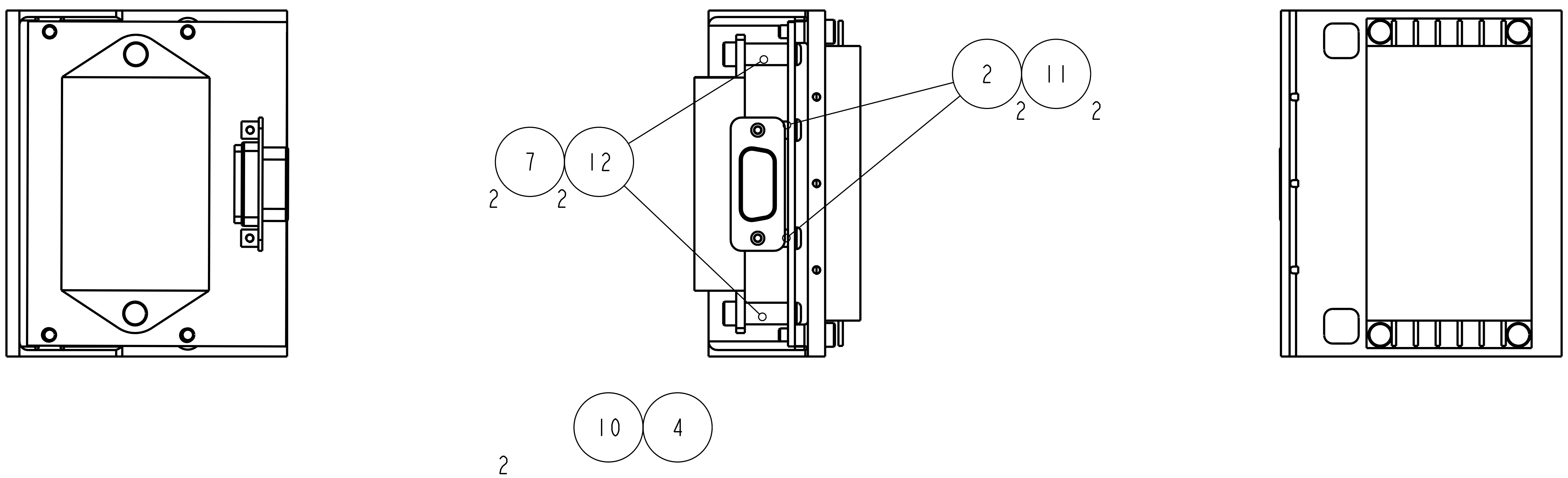
A 2-KE-0123-105-A

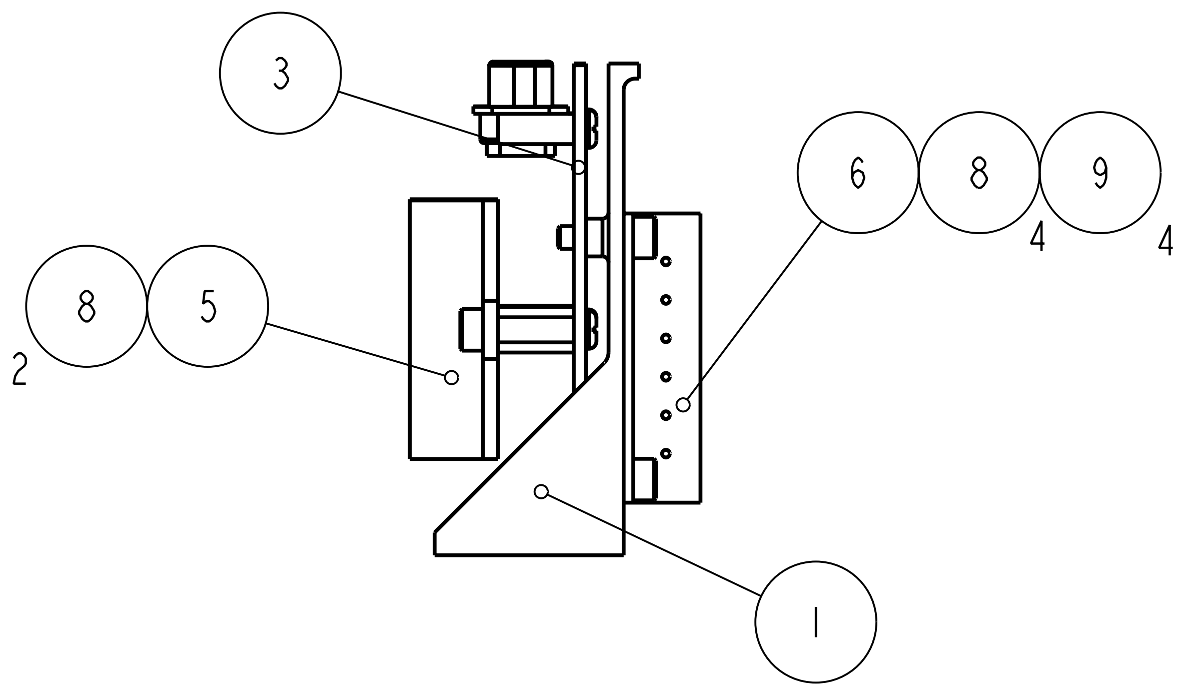
A 2-KE-1023-110-A

PROJECTION

THIS DRAWING CONFORMS TO B.S.308

ITEM NO.	DRAWING NO.	DESCRIPTION	NO. OFF	REMARKS
1	2-KE-0123-111	MFL L SECTION MODULE	1	
2	4-KE-0123-112	MFL L SECTION CONNECTOR PILLARS	2	
3	3-KE-0123-114	MFL L SECTION PCB	1	
4		15 WAY D CONNECTOR	1	
5		MFL FILTER	1	
6		MFL CONVERTER	1	
7	4-KE-0123-113	MFL CONVERTER PILLARS	2	
8		M3 CAP HEADS	6	
9		M3 NUTS	4	
10		M2 CAP HEADS	2	
11		M2 PAN HEADS	2	
12		M3 PAN HEADS	2	





A	11-4-99	.	A.J.P.			MANUF
ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE PARTS LIST THIS DRAWING

SURFACE TEXTURE μM 1.6 ✓ UNLESS STATED

0 50 mm

USED ON KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE MFL L SECTION ASSEMBLY

HIRDLS

PROT-FLIGHT ELECTRONICS BOX

A 2-KE-1023-110-A

1 OF 1

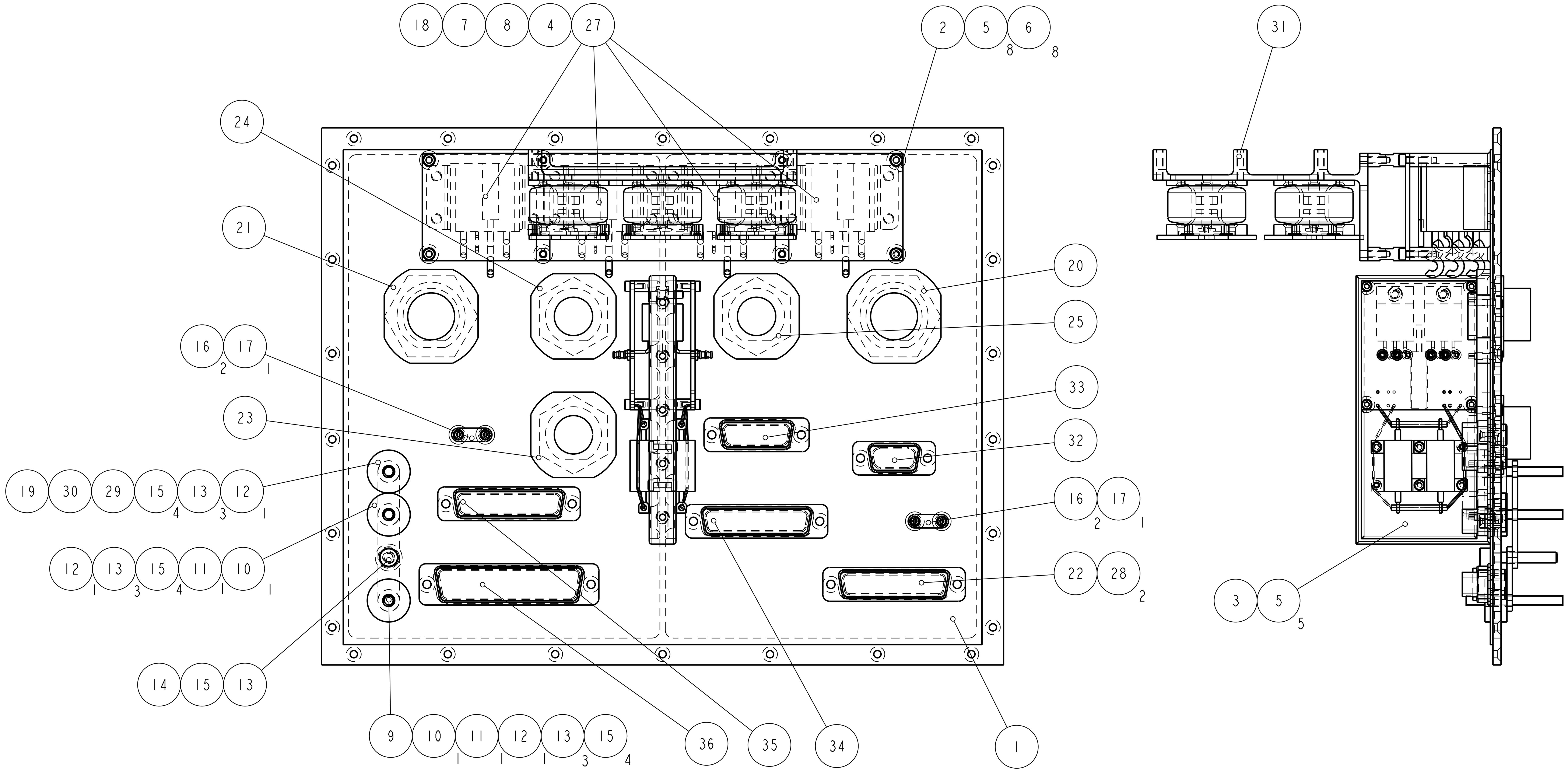
A 2-KE-1023-110-A

A | I-KE-0123-200-D

PROJECTION

THIS DRAWING CONFORMS TO B.S.308

ITEM No.	DRAWING No.	DESCRIPTION	No. OFF	REMARKS
1	0-KE-0123-201	CONNECTOR PLATE	1	
2	2-KE-0123-874	BUSBAR SUB-ASSEMBLY	1	
3	3-KE-0123-212	VERTICAL SHELF ASSY	1	
4		M3 WASHERS	32	
5		M2.5 x 6mm CAPHEADS	13	
6		M2.5 WASHERS	8	SEE NOTE 1
7		M3 x 8mm LG CAPHEADS	16	
8		M3 NUTS	16	
9	3-KE-0123-213	SHORTING STRAP 2	1	
10	3-KE-0123-207	ISOLATING WASHER	2	
11	3-KE-0123-208	ISOLATING BUSH	2	
12		M4 x 36mm LONG STUD	3	
13		M4 NUTS	9	
14		M4 x 20mm CAPHEAD	3	SEE NOTE 1
15		M4 WASHER	12	
16		M1.6 CSK SCREW x 5mm	4	
17	4-KE-0123-130	CABLE CLIP STRAP	2	
18	KC-J2A-003	LEACH CONTACTOR	4	
19	3-KE-0123-214	SHORTING STRAP 3	1	
20	MS27468T13F98P	CONNECTOR	1	J911
21	MS27468T13F98PA	CONNECTOR	1	J912
22	SND25F0000G	CONNECTOR	1	J913
23	MS27468T11F98S	CONNNECTOR	1	J917
24	MS27468T11F99P	CONNECTOR	1	J920
25	MS27468T11F99PA	CONNECTOR	1	J921
26				
27	3-KE-0123-876	TEMPERATURE SENSOR & RESISTOR ASSY	4	
28	SND00000T2G	D-TYPE FEMALE SCREW LOCK	2	
29	3-KE-0123-210	ISOLATING WASHER 2	1	
30	3-KE-0123-211	ISOLATING BUSH 2	1	
31	1-KE-0123-218	BALUN SUPPORT BRACKET	1	
32	15 WAY D-TYPE	CONNECTOR	1	J919
33	15 WAY D-TYPE	CONNECTOR	1	J915
34	25 WAY D-TYPE	CONNECTOR	1	J918
35	25 WAY D-TYPE	CONNECTOR	1	J916
36	78 WAY D-TYPE	CONNECTOR	1	J914



NOTE:-
1. FASTENER MATERIAL :- STAINLESS STEEL A2 GRADE 50
TO BS 6105 DIN912
TORQUE SETTING ISO:SPAS/MECH/001

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS
D	21-05-2001	KE-2717	DS			MANUF

TOLERANCES UNLESS STATED ±0.1 mm ±0.1°

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE PARTS LIST THIS DRAWING

SURFACE TEXTURE μM 1.6 UNLESS STATED

0 50 mm

USED ON KE-0123-500

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE CONNECTOR PLATE ASSEMBLY

HIRDLS

PROTO-FLIGHT ELECTRONICS BOX

A | I-KE-0123-200-D

1 OF 1

A | I-KE-0123-200-D

A 2-KE-0123-212-A

PROJECTION

THIS DRAWING CONFORMS TO B.S.308

ITEM NO.	DRAWING NUMBER	DESCRIPTION	NO. OFF	COMMENTS
1	4-KE-0123-873	CURRENT TRANSIENT LIMITER PCB	2	
2	RER65 FR100R	RESISTOR 100m OHMS	4	
3	JANTXV1RHM9150	TRANSISTOR, FIELD EFFECT	4	
4	IEC 317-13 GRADE2 2.0mm	WIRE, TAURAMIDE 200, 2mm	A/R	
5		HEATSHRINK, KYNAR, 3mm	A/R	
6	3-KE-0123-876	AD590 TEMPERATURE SENSOR & RESISTOR ASSY	2	
7		M2 x 5mm CAPHEAD	8	
8		M2 WASHERS	20	
9		M2 x 10mm CAPHEAD	6	
10		M2 NUTS	6	
11		M3 x 10mm CAPHEAD	2	
12		M3 NUTS	2	
13		M3 WASHERS	4	
14	3-KE-0123-203	VERTICAL SHELF	1	
15	55A0112-22-9	WIRE, 22AWG	A/R	

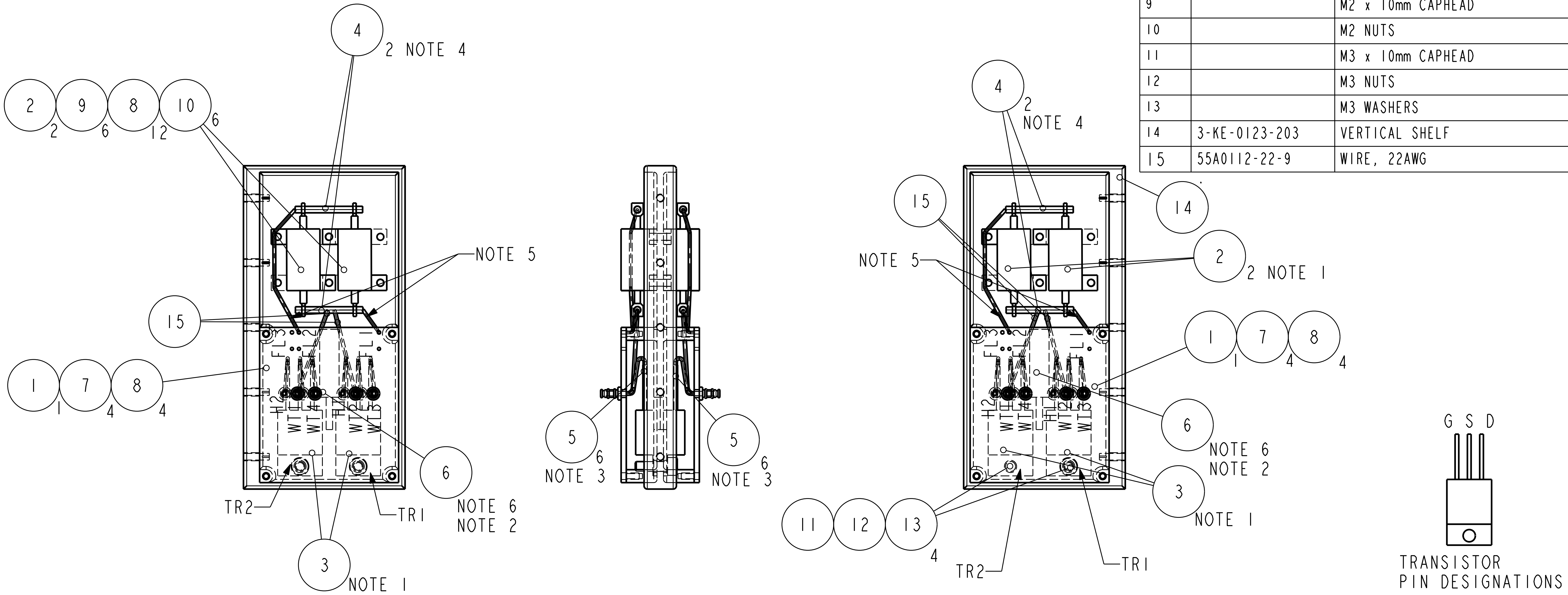


TABLE 1	
FROM	TO
H1	TR1-G
H2	TR2-G
WT1	TR2-S
WT2	TR1-S
WT3	TR1-D
WT4	TR2-D

NOTE:-

1, THE RESISTORS (ITEM 2) AND THE TRANSISTORS (ITEM 3) SHALL BE THERMALLY BONDED TO ITEM 14 USING STYCAST 4952 IN ACCORDANCE WITH ISO:SPAS/ELEC/002.

2, ITEM 6 SHALL BE GLUED IN POSITION SHOWN USING SCOTCHWELD 2216 IN ACCORDANCE WITH ISO:SPAS/ELEC/002. THE SIDE WITHOUT THE PART MARKING SHOULD BE PLACED SO THAT THE SENSOR IC (GREY RECTANGLE) IS IN CONTACT WITH ITEM 14.

3, WIRE TRANSISTORS (ITEM 3) TO PCB (ITEM 1) IN ACCORDANCE WITH TABLE 1. THE WIRES SHOULD BE AS SHORT AS POSSIBLE AND BE ROUTED SO THAT THE BOARD CAN BE MOVED TO ALLOW ACCESS TO THE TRANSISTORS. COVER THE WIRE JOINT AND TRANSISTOR LEG WITH ITEM 5. STAKE JOINT TO ITEM 14 USING SCOTCHWELD 1838 B/A GREEN IN ACCORDANCE WITH RAL/SSD/SPAS 026.

4, REMOVE WIRE INSULATION AND TIN THE COMPLETE LENGTH PRIOR TO FITTING TO RESISTORS.

5, ROUTE WIRES FROM FL1, FL2, WT1 AND WT2 AS SHOWN. STAKE WIRES AS REQUIRED USING SCOTCHWELD 2216 IN ACCORDANCE WITH ISO:SPAS/ELEC/002.

6, WIRES FROM FL3 AND THE TEMPERATURE SENSORS (ITEM 6) SHOULD BE COILED AND SECURED TO THE ASSEMBLY USING KAPTON TAPE. MARK THE POSITIVE WIRE FROM ITEM 6.

TITLE	SIGNATURE
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
THERMAL ENG	
P.A. GROUP	
STRESS ENG	

A	17-02-00	.	AJP			MANUF
ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED ±0.1 mm ±0.1 °

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE PARTS LIST

SURFACE TEXTURE μM 1.6 ✓ UNLESS STATED

0 50 mm

USED ON KE-0123-200

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

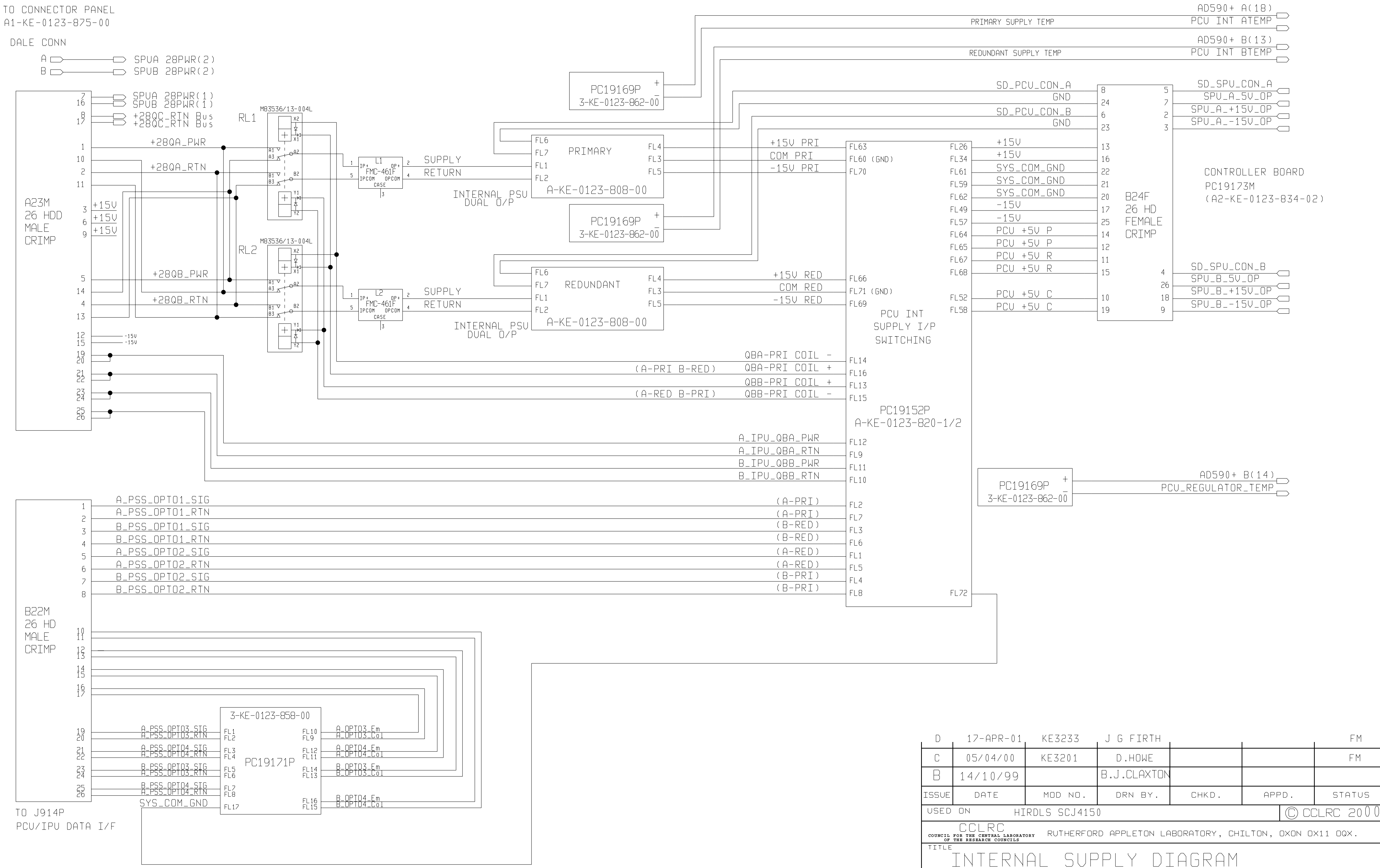
TITLE VERTICAL SHELF ASSY

HIRDLS PCU PROTO-FLIGHT

A 2-KE-0123-212-A 1 OF 1

A 2-KE-0123-212-A

A 2-KE-0123-828-01-D THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	17-APR-01	KE3233	J G FIRTH			FM
C	05/04/00	KE3201	D.HOWE			FM
B	14/10/99		B.J.CLAXTON			

USED ON HIRDLS SCJ4150

CCLRC COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

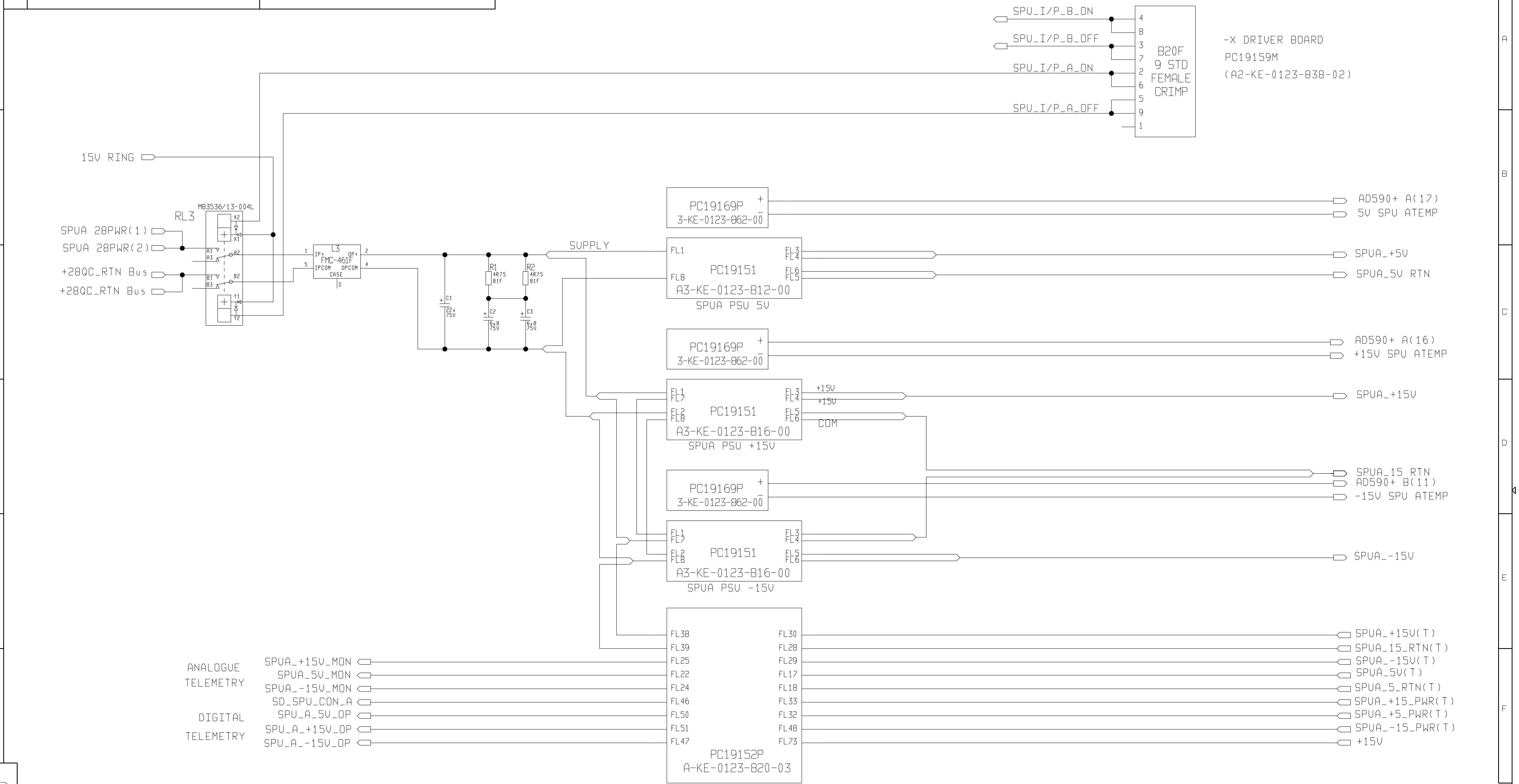
INTERNAL SUPPLY DIAGRAM PCU SECTION

A 2-KE-0123-828-01-D

TOTAL NO. OF SHEETS 4

A 2-KE-0123-828-01-D

A 2-KE-0123-828-02-D THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	17-APR-01	KE3233	J G FIRTH			FM
C	05/04/00	KE3201	D.HOWE			FM
B	14/10/99		B.J.CLAXTON			

USED ON HIRDLS SCJ4150

CCLRC COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

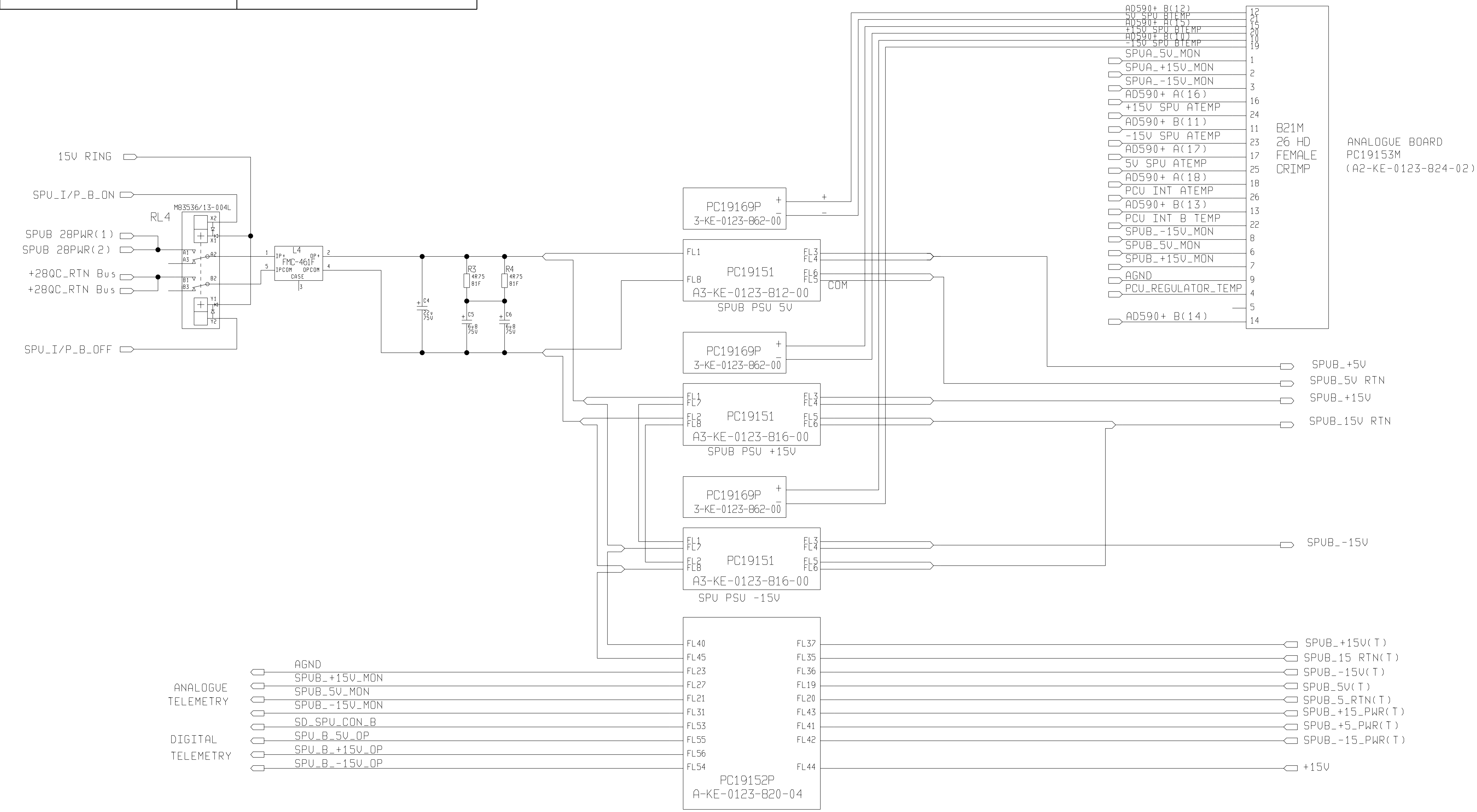
INTERNAL SUPPLY DIAGRAM
SPU A SECTION

A 2-KE-0123-828-02-D

TOTAL NO. OF SHEETS 4

A 2-KE-0123-828-02-D

A 2-KE-0123-828-03-D | THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	17-APR-01	KE3233	J G FIRTH			FM
C	05/04/00	KE3201	D.HOWE			FM
B	14/10/99		B.J.CLAXTON			

USED ON HIRDLS SCJ4150

CCLRC COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

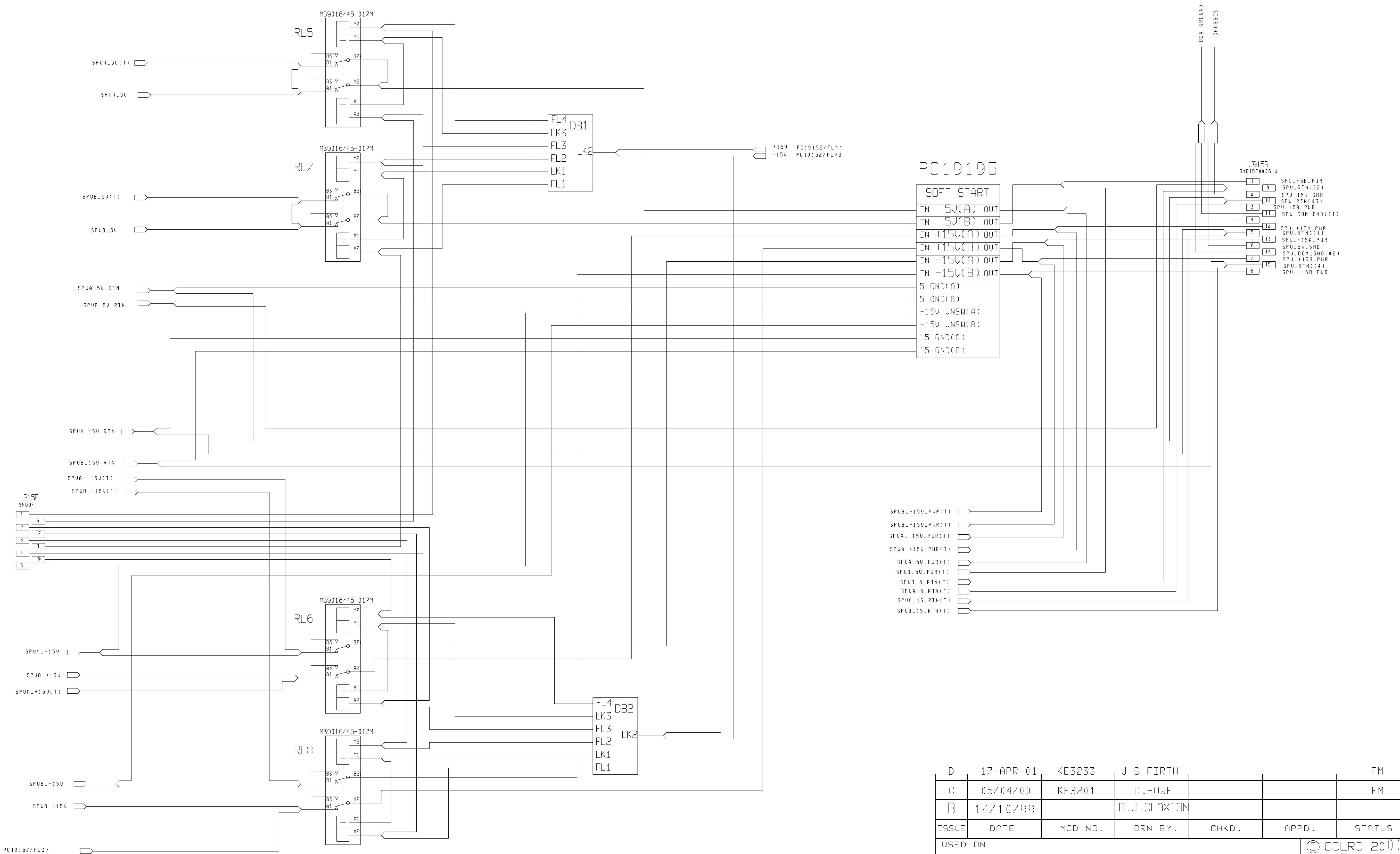
TITLE
INTERNAL SUPPLY DIAGRAM SPU B SECTION

A 2-KE-0123-828-03-D

TOTAL NO. OF SHEETS 4

A 2-KE-0123-828-03-D

A 2-KE-0123-828-04-D | THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	17-APR-01	KE3233	J G FIRTH			FM
C	05/04/00	KE3201	D.HOWE			FM
B	14/10/99		B.J.CLAXTON			

USED ON

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

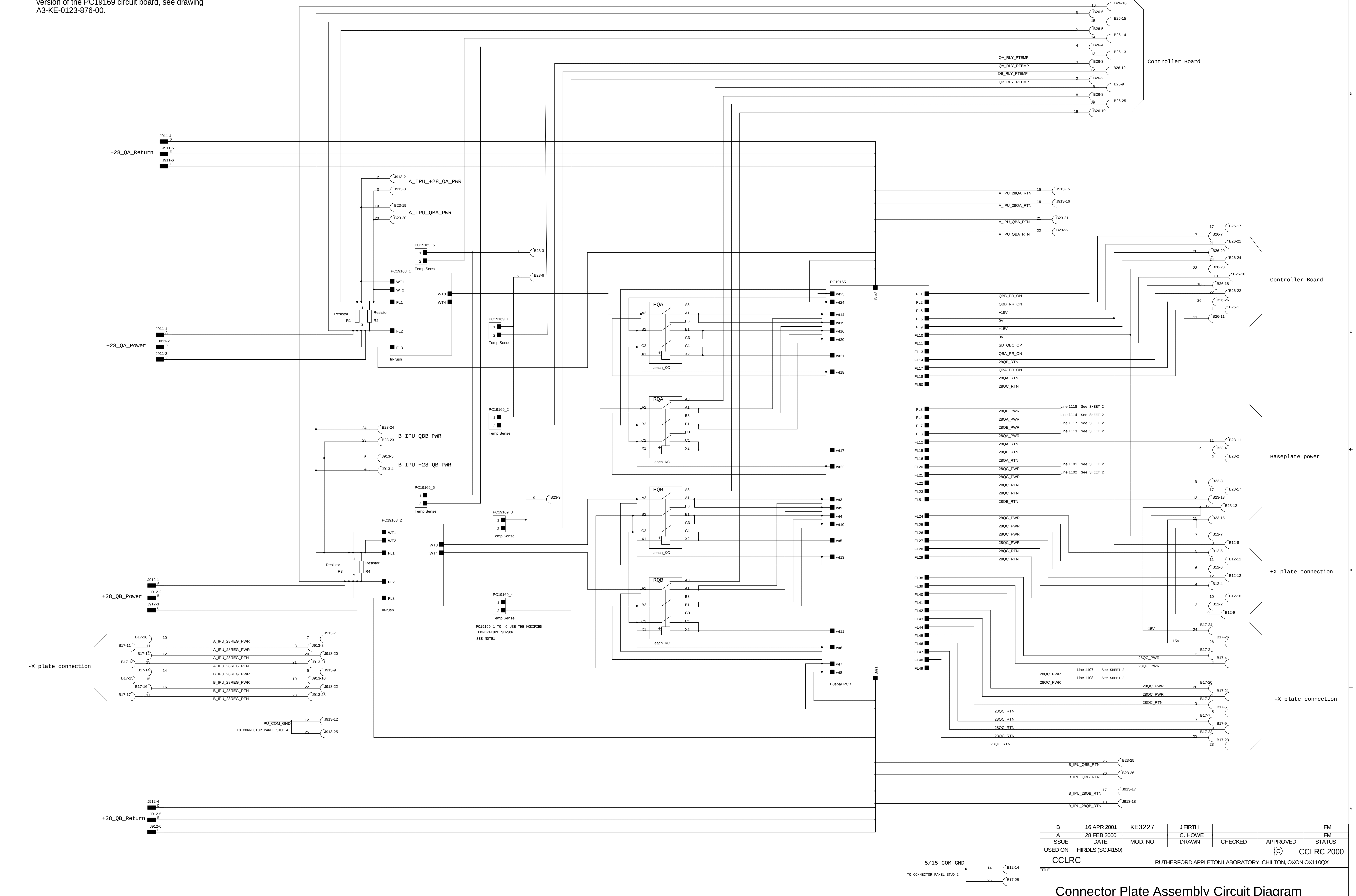
INTERNAL SUPPLY DIAGRAM

SPU SUPPLY OUTPUT CIRCUITS

A 2-KE-0123-828-04-D

TOTAL NO. OF SHEETS

NOTE1: The temperature sensor used on this assembly is a modified version of the PC19169 circuit board, see drawing A3-KE-0123-876-00.



ISSUE	DATE	MOD. NO.	DRAWN	CHECKED	APPROVED	STATUS
B	16 APR 2001	KE3227	J FIRTH			FM
A	28 FEB 2000		C. HOWE			FM

USED ON HIRDLS (SCJ4150)

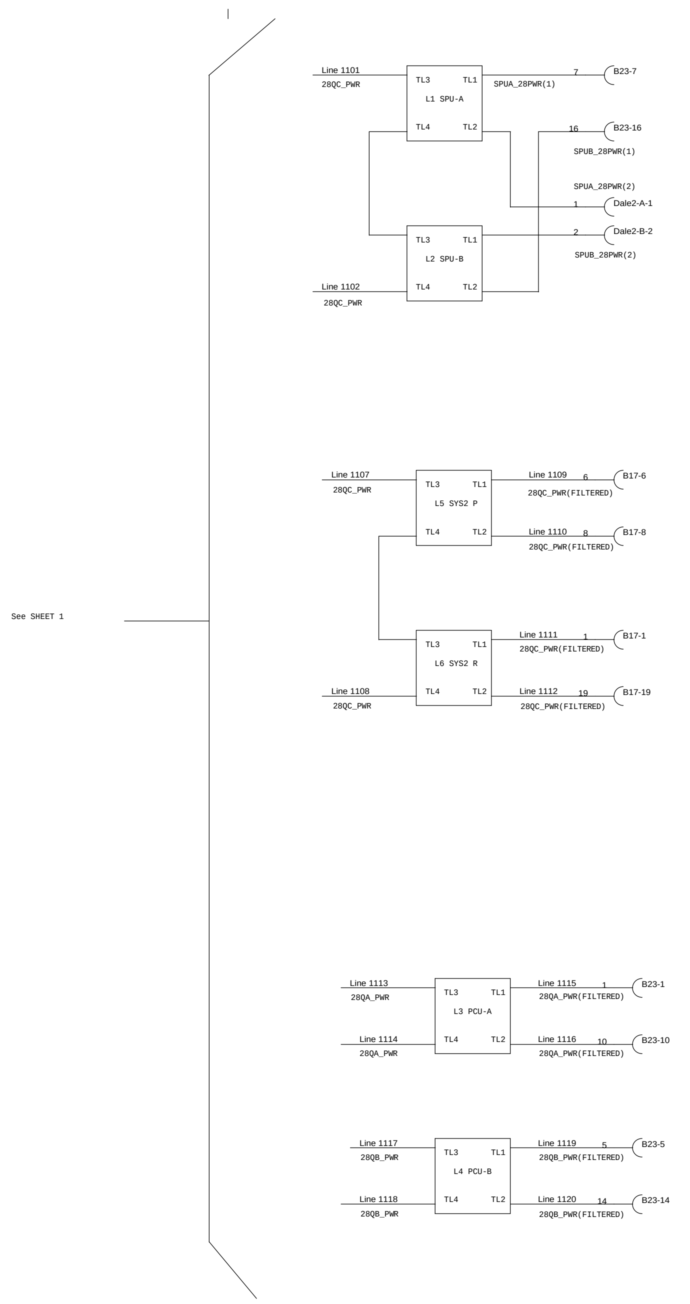
CCLRC RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX110QX

TITLE

Connector Plate Assembly Circuit Diagram

A 1-KE-0123-875-01- B

Monday, April 16, 2001 TOTAL NO. OF SHEETS 2



B	16 APR 2001	KE3227	J FIRTH			FM
A	28 FEB 2000		C.HOWE			FM
ISSUE	DATE	MOD. NO.	DRAWN	CHECKED	APPROVED	STATUS

USED ON HIRDLS (SCJ4150)

CCLRC RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX110QX

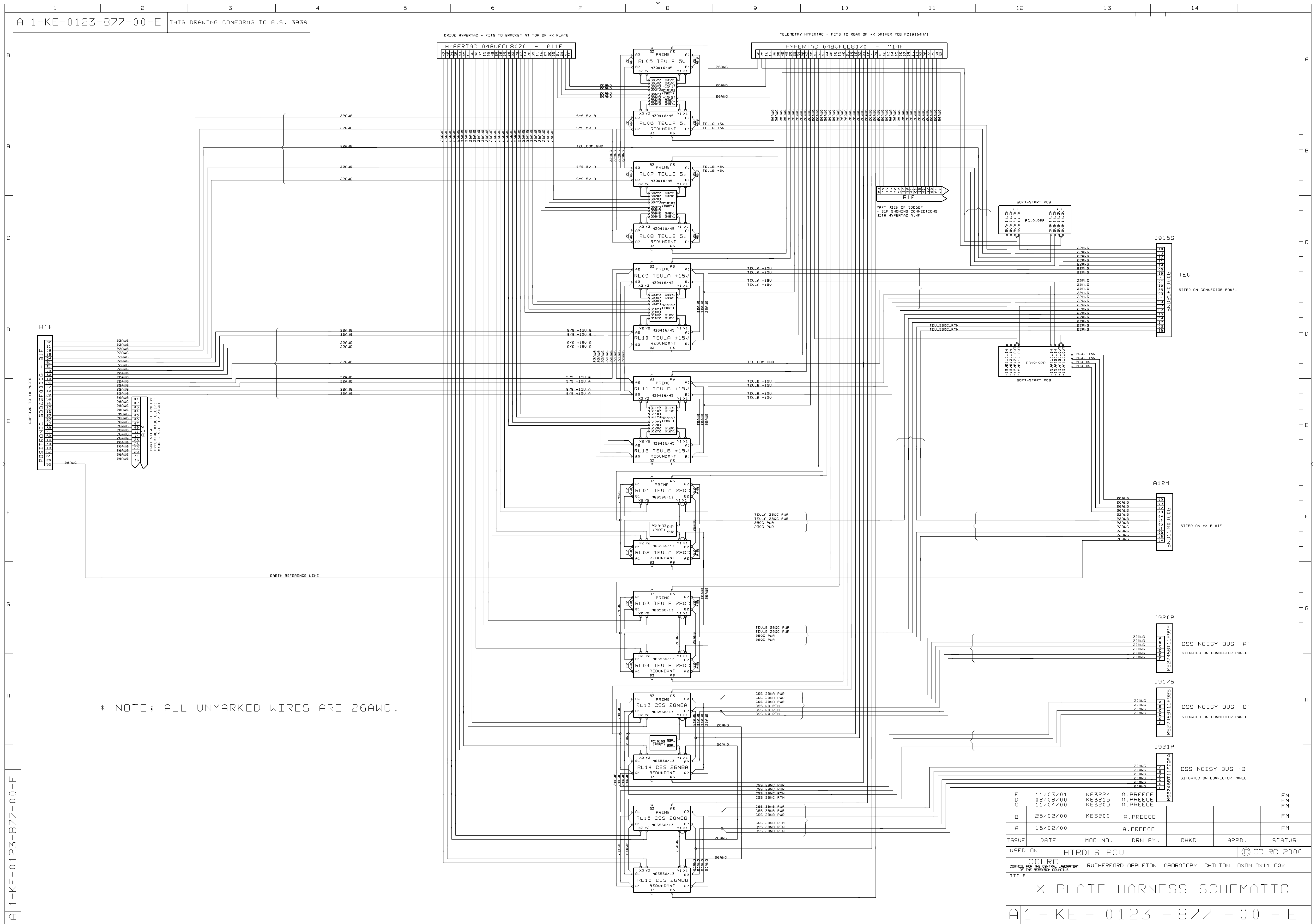
TITLE

Connector Plate Assembly Circuit Diagram

A 1-KE-0123-875-02- B

Monday, April 16, 2001

TOTAL NO. OF SHEETS 2


A 1-KE-0123-877-00-E
THIS DRAWING CONFORMS TO B.S. 3939
DRIVE HYPERTAC - FITS TO BRACKET AT TOP OF +X PLATE
HYPERTAC 048UFCLB070 - A11F
TELEMETRY HYPERTAC - FITS TO REAR OF +X DRIVER PCB PC19166M/1
HYPERTAC 048UFCLB070 - A14F
RL05 TEU_A 5V
RL06 TEU_A 5V
RL07 TEU_B 5V
RL08 TEU_B 5V
RL09 TEU_A ±15V
RL10 TEU_A ±15V
RL11 TEU_B ±15V
RL12 TEU_B ±15V
RL01 TEU_A 28QC
RL02 TEU_A 28QC
RL03 TEU_B 28QC
RL04 TEU_B 28QC
RL13 CSS 28NBA
RL14 CSS 28NBA
RL15 CSS 28NBB
RL16 CSS 28NBB
PRIME
REDUNDANT
B1F
POSITRONIC SDD62F0000G - B1F
CAPTIVE TO +X PLATE
PART VIEW OF SDD62F - B1F SHOWING CONNECTIONS WITH HYPERTAC A14F
SOFT-START PCB
PC19192P
J916S
TEU
SND25F0000G
SITED ON CONNECTOR PANEL
A12M
SND15M0000G
SITED ON +X PLATE
EARTH REFERENCE LINE
J920P
CSS NOISY BUS 'A'
SITUATED ON CONNECTOR PANEL
J917S
CSS NOISY BUS 'C'
SITUATED ON CONNECTOR PANEL
J921P
CSS NOISY BUS 'B'
SITUATED ON CONNECTOR PANEL
* NOTE; ALL UNMARKED WIRES ARE 26AWG.
E 11/03/01 KE3224 A.PREECE FM
D 02/08/00 KE3215 A.PREECE FM
C 11/04/00 KE3209 A.PREECE FM
B 25/02/00 KE3200 A.PREECE FM
A 16/02/00 A.PREECE FM
ISSUE DATE MOD NO. DRN BY. CHKD. APPD. STATUS
USED ON HIRDLS PCU
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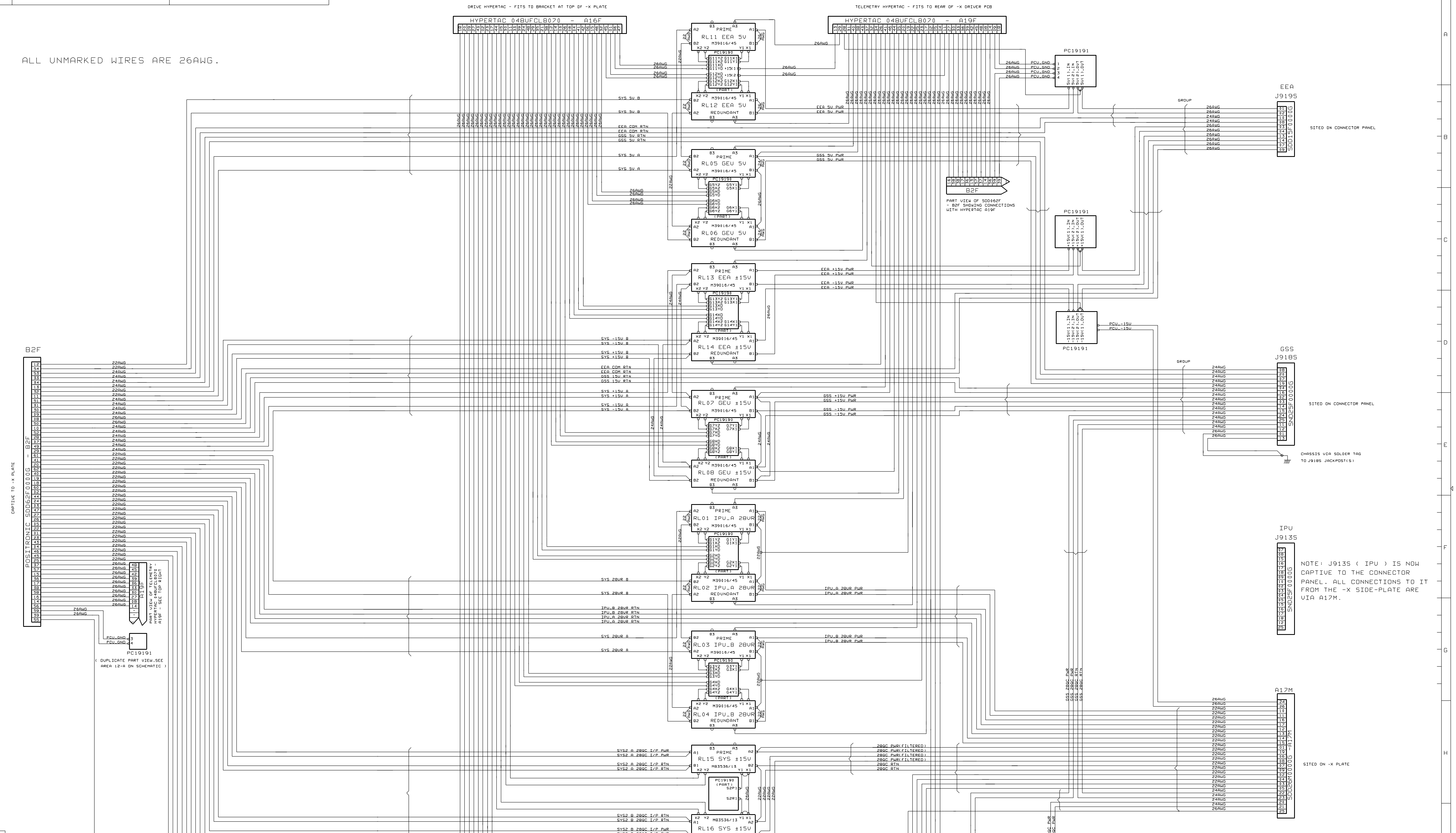
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.
TITLE
+X PLATE HARNESS SCHEMATIC
A 1 - KE - 0123 - 877 - 00 - E
TOTAL NO. OF SHEETS 1
A 1-KE-0123-877-00-E

A | 1-KE-0123-878-00-E | THIS DRAWING CONFORMS TO B.S. 3939

ALL UNMARKED WIRES ARE 26AWG.



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
E	29/03/01	KE3230	A.PREECE			FM
D	05/03/01	KE3223	A.PREECE			FM
C	09/04/00	KE3208	A.PREECE			FM
B	01/03/00	KE3202	A.PREECE			FM
A	15/02/00		A.PREECE			FM

USED ON HIRDLS PCU

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TITLE

-X PLATE HARNESS SCHEMATIC

A | 1 - KE - 0123 - 878 - 00 - E

TOTAL NO. OF SHEETS 1

SECTION 8
Electrical Circuit Diagrams

Section 8 Electrical Circuit Diagrams & Assemblies

Drawing Number	Description	No. of Sheets
KE-0123-800-00-B	SINGLE POWER CONVERTER MODULE (MFL VERSION) SCH.	1
KE-0123-803-00-C	SINGLE POWER CONVERTER MODULE (MFL VERSION) ASSY	1
KE-0123-804-00-B	SYSTEM +5V POWER CONVERTER MODULE (MTR VERSION) SCH	1
KE-0123-807-00-C	SYSTEM POWER CONVERTER MODULE (MTR VERSION) ASSY	1
KE-0123-808-00-B	INTERNAL PSU (DUAL OUTPUT)	1
KE-0123-811-00-B	INTERNAL PSU (DUAL OUTPUT)	1
KE-0123-812-00-C	SPU PSU (5V OUTPUT)	1
KE-0123-815-00-D	SPU PSU	1
KE-0123-816-00-C	SPU PSU (15V OUTPUT)	1
KE-0123-820-04-D	PCU INT SUPPLY I/P SWITCHING	4
KE-0123-823-00-B	PCU INT SUPPLY I/P SWITCHING(ASSY)	1
KE-0123-824-02-D	ANALOGUE BOARD	2
KE-0123-827-00-B	ANALOGUE BOARD (ASSY)	1
KE-0123-830-00-B	SYSTEM +15V CONVERTER MODULE (MTR VERSION) (SCH)	1
KE-0123-834-02-E	CONTROLLER (PC19173M/1) IPU I/F DECODING)	2
KE-0123-837-00-A	CONTROLLER (ASSY)	1
KE-0123-838-02-D	-X RELAY DECODING	2
KE-0123-841-00-B	-X RELAY DRIVER (ASSY)	1
KE-0123-842-02-C	+X RELAY DRIVER	2
KE-0123-845-00-B	+X RELAY DRIVER BOARD (TOP ASSY)	1
KE-0123-846-00-B	BUS BAR BOARD	1
KE-0123-849-00-A	BUS BAR BOARD (ASSY.)	1
KE-0123-854-00-A	STAR POINT	1
KE-0123-857-00-A	STAR POINT (ASSY.)	1
KE-0123-858-00-A	OPTO BOARD	1
KE-0123-861-00-A	OPTO BOARD (ASSY.)	1
KE-0123-862-00-A	TEMPERATURE SENSOR BOARD (SCH)	1
KE-0123-864-00-A	AD590 TEMPERATURE SENSOR BOARD (ASSY)	1
KE-0123-865-02-A	AD590 TEMPERATURE SENSOR PC19169P (MANUFACTURING DRWG)	2
KE-0123-870-00-D	CURRENT TRANSIENT LIMITER (SCH)	1
KE-0123-873-00-C	CURRENT TRANSIENT LIMITER (ASSY.)	1
KE-0123-874-00-B	BUS BAR SUB-ASSEMBLY	1
KE-0123-876-00-A	AD590 TEMPERATURE SENSOR & RESISTOR ASSEMBLY	1
KE-0123-880-00-B	HIRDLS PCU OUTPUT SOFT START –X	1
KE-0123-883-00-B	HIRDLS PCU OUTPUT SOFT START –X (ASSY)	1
KE-0123-884-00-A	HIRDLS RELAY DIODE BOARD –X	1
KE-0123-887-00-A	HIRDLS RELAY DIODE BOARD –X (ASSY)	1
KE-0123-888-00-A	HIRDLS PCU OUTPUT SOFT START +X	1
KE-0123-891-00-A	HIRDLS PCU OUTPUT SOFT START +X (ASSY)	1
KE-0123-892-00-A	HIRDLS RELAY DIODE BOARD +X	1
KE-0123-895-00-A	HIRDLS RELAY DIODE BOARD +X (ASSY)	1
KE-0123-896-00-A	PCU INDUCTOR FILTER BOARD	1
KE-0123-899-00-B	PCU INDUCTOR FILTER BOARD (ASSY)	1
KE-0123-900-00-A	HIRDLS SPU OUTPUT SOFT START	1
KE-0123-903-00-A	HIRDLS SPU OUTPUT SOFT START (ASSY)	1

A 3-KE-0123-800-00-B

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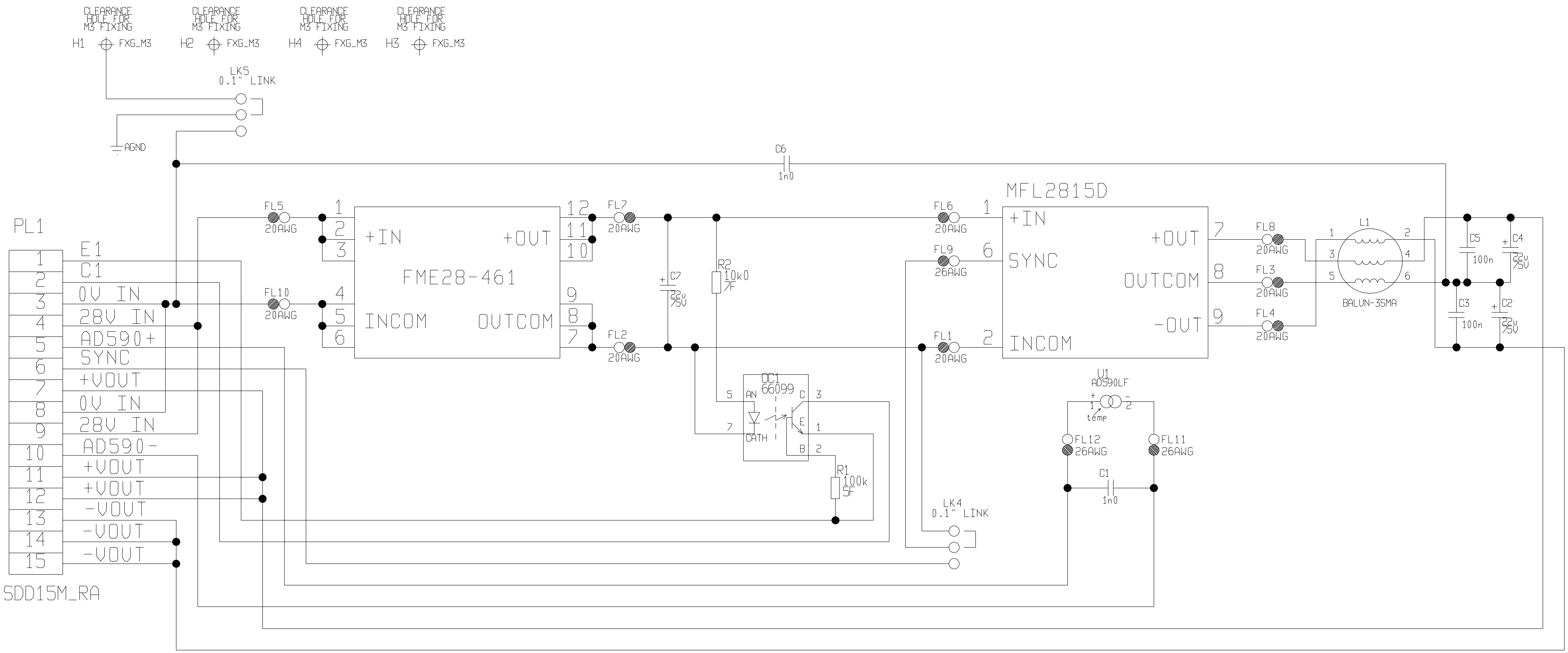

USED ON HIRDLS SCJ4150

© CCLRC 2001

TITLE

SINGLE POWER CONVERTER MODULE (MFL VERSION)
PC19148

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	30-MAR-01	KE3228	JGF			FM
A	28-07-99		ARU			FM

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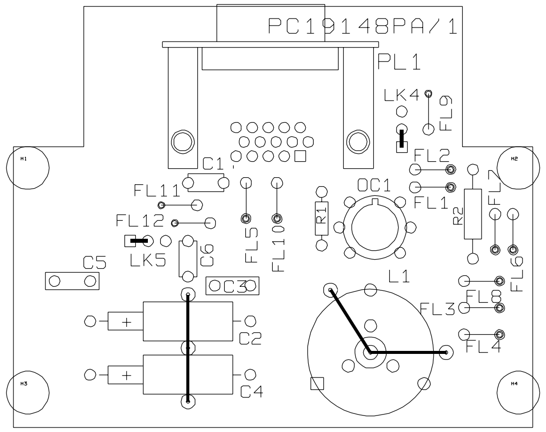
A 3-KE-0123-800-00-B

TOTAL NO. OF SHEETS

A 3-KE-0123-803-00-C

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



PCB ASSEMBLERS NOTES:

1. L1,C2 AND C4 TO BE SECURED USING GUDEBROD 22DPTH (NATURAL) LACING CORD

2. OC1 TO BE FITTED USING MILTON-ROSS TRANSIPADS 10328

3. FIT LINKS LK4 AND LK5 AS SHOWN

4. FIT FLYING LEADS FL1-FL10 (24 AWG 200mm LONG)

5. FIT FLYING LEADS FL11,FL12 (26 AWG 150mm LONG)

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
C	04 APR 01	KE3228	D.HOWE			FM
B	29 NOV 99	KE3187	D.HOWE			FM
A	28 JUL 99		ARU			FM

USED ON HIRDLS (SCJ4150)

SCIENCE & ENGINEERING RESEARCH COUNCIL RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

SINGLE POWER CONVERTER MODULE (MFL VERSION)
ASSEMBLY DRAWING (PC19148P/1)

TOLERANCES UNLESS STATED

FINISH

REMOVE ALL BURRS

ORIGINAL SCALE

DO NOT SCALE

0 mm

MATERIAL & SPEC

SURFACE TEXTURE micro m

✓ UNLESS STATED

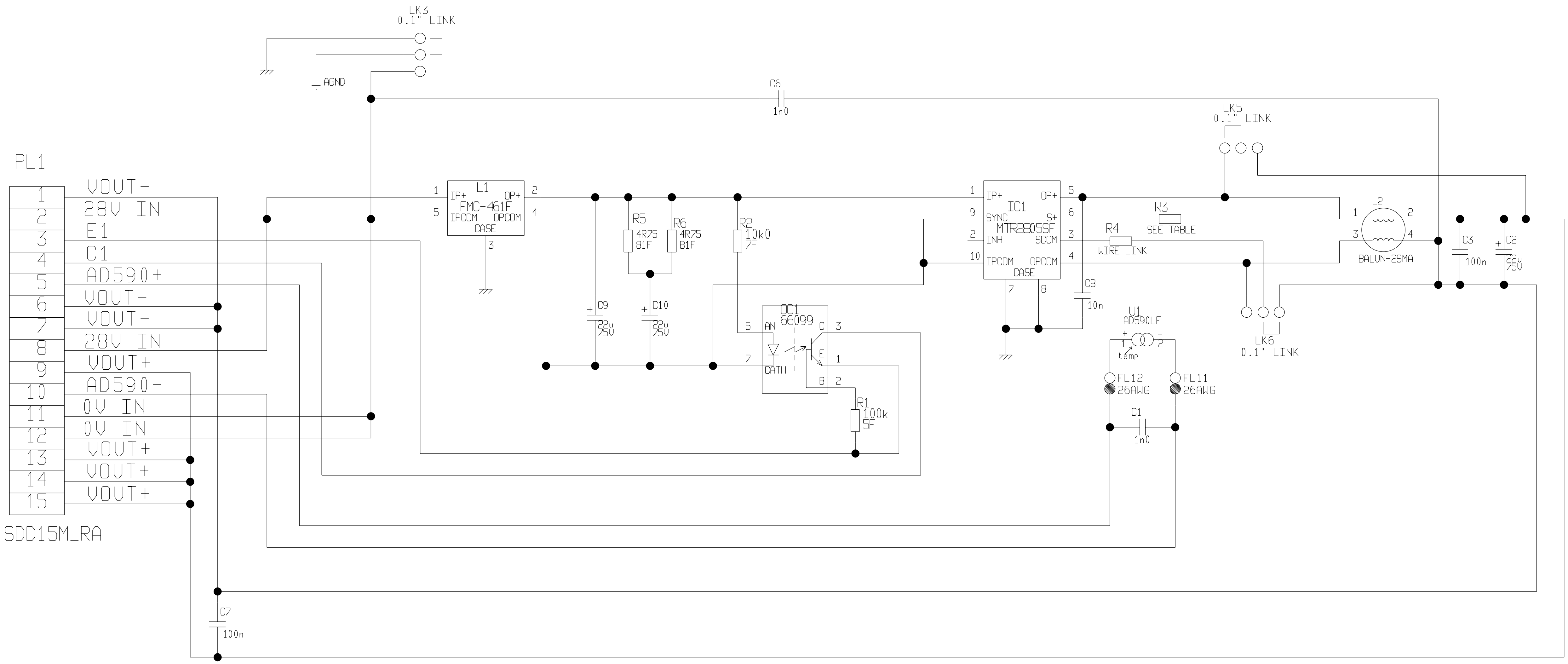
A 3-KE-0123-803-00-C

TOTAL NO. OF SHEETS 1

A 3-KE-0123-803-00-C

A 3-KE-0123-804-00-B

THIS DRAWING CONFORMS TO B.S. 3939



SUPPLY	MODULE	RESISTORS FITTED	MEASURED VALUE
SYS +5P	MTR01	RLR05S4120FS RLR05S2611FS IN PARALLEL	355.8R
SYS +5R	MTR02	RLR05S4120FS RLR05S1212FS IN PARALLEL	398.4R

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	16-04-01	KE3231	JGF			FM
A	28-07-99		ARU			FM

USED ON HIRDLS SCJ4150

TITLE

SYSTEM +5V POWER CONVERTER MODULE (MTR VERSION)

PC19149

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RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

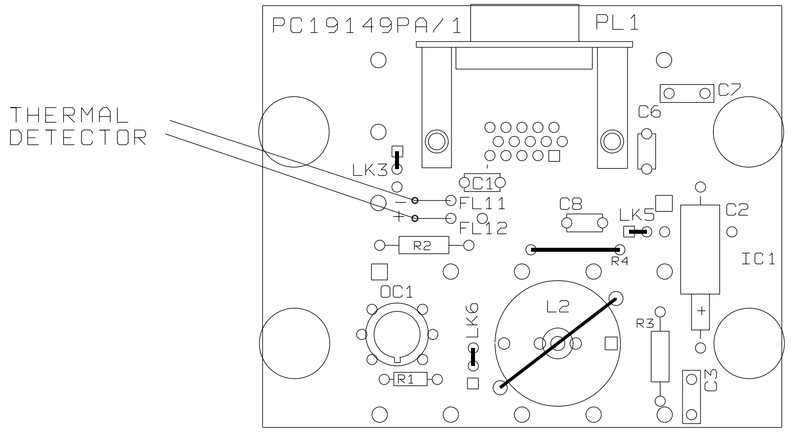
A 3-KE-0123-804-00-B

TOTAL NO. OF SHEETS

A 3-KE-0123-807-00-C

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



PCB ASSEMBLERS NOTES:

1. L2 TO BE SECURED USING GUDEBROD 22DPTH (NATURAL) LACING CORD
2. OC1 TO BE FITTED USING MILTON-ROSS TRANSIPADS 10328
3. LK3,LK5 AND LK6 FITTED AS SHOWN
4. FIT INSULATED LINK FOR R4
5. FIT OXLEY PINS AT R3 LOCATION
6. FIT FLYING LEADS FL11,FL12 (26 AWG 150mm LONG)

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
C	04 APR 01	KE3231	D.HOWE			FM
B	29 NOV 99	KE3187	D.HOWE			FM
A	28 JUL 99		ARU			FM

USED ON HIRDLS (SCJ4150)

SCIENCE & ENGINEERING RESEARCH COUNCIL RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

SYSTEM POWER CONVERTER MODULE (MTR VERSION)
ASSEMBLY DRAWING (PC19149P/1)

TOLERANCES UNLESS STATED	FINISH REMOVE ALL BURRS	ORIGINAL SCALE DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE micro m ✓ UNLESS STATED	0 mm

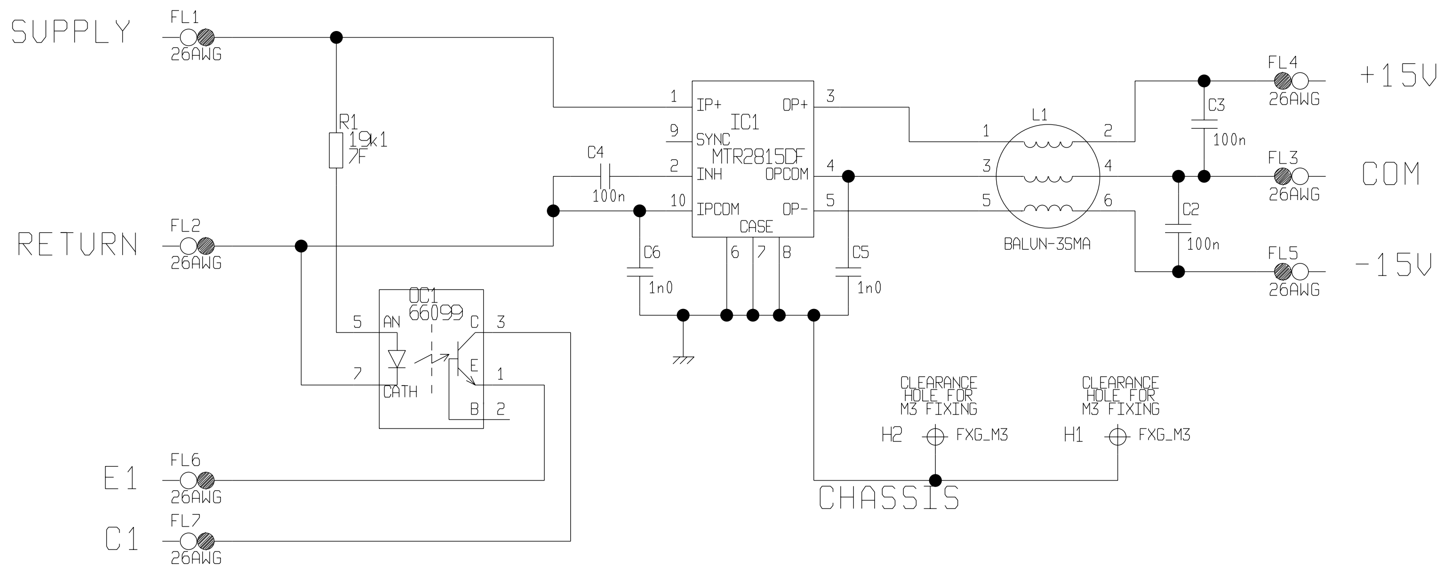
A 3-KE-0123-807-00-C

TOTAL NO. OF SHEETS 1

A 3-KE-0123-807-00-C

A 3-KE-0123-808-00-B

THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	25-01-00	KE3192	DH			FM
A	28-07-99		ARU			FM

USED ON HIRDLS SCJ4150

TITLE
INTERNAL PSU (DUAL OUTPUT) PC19150

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

A 3-KE-0123-808-00-B

TOTAL NO. OF SHEETS 1

A 3-KE-0123-811-00-B

PROJECTION

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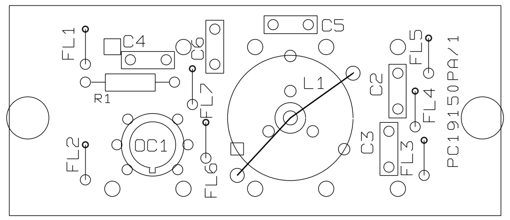


PCB ASSEMBLERS NOTES:

1. L1 TO BE SECURED USING GUDEBROD 22DPTH (NATURAL) LACING CORD
2. OC1 TO BE FITTED USING MILTON-ROSS TRANSIPADS 10328
3. THE FOLLOWING ITEMS ARE FITTED DURING INTEGRATION OF PCB INTO CONVERTOR ASSEMBLY, NOT DURING PCB ASSEMBLY.

FLYING LEADS FL1-FL7 INCLUSIVE

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	29 NOV 99	KE3187	D.HOWE			FM
A	28 JUL 99		ARU			FM

USED ON

SCIENCE & ENGINEERING RESEARCH COUNCIL RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

INTERNAL PSU (DUAL O/P)
ASSEMBLY DRAWING (PC19150P/1)

TOLERANCES UNLESS STATED	FINISH REMOVE ALL BURRS	ORIGINAL SCALE DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE micro m ✓ UNLESS STATED	0 mm

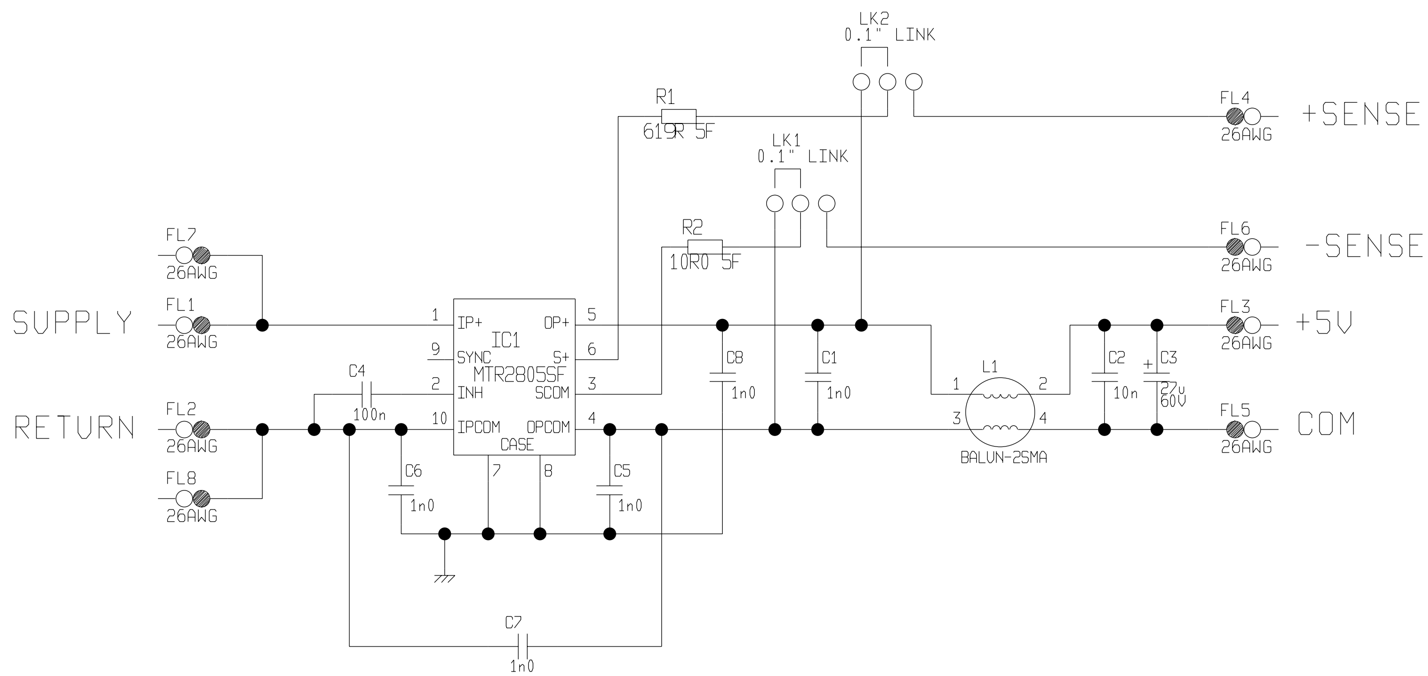
A 3-KE-0123-811-00-B

TOTAL NO. OF SHEETS 1

A 3-KE-0123-811-00-B

A 3-KE-0123-812-00-C

THIS DRAWING CONFORMS TO B.S. 3939



C7,C8 TO BE HARD WIRED

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
C	30-04-01	KE3237	DH			FM
B	28-01-00	KE3190	DH			FM
A	28-07-99		ARU			FM

USED ON HIRDLS SCJ4150

TITLE

SPU PSU (5V OUTPUT) PC19151

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

A 3-KE-0123-812-00-C

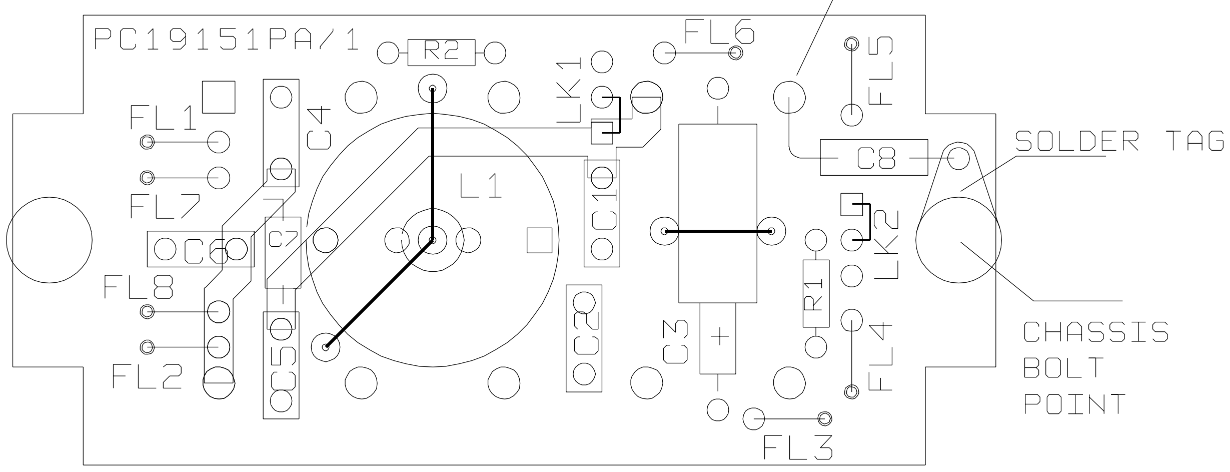
TOTAL NO. OF SHEETS 1

A3-KE-0123-815-00-D

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308

NOTE: SCALE 2:1



NOTE: C7 NEEDS TO BE INSERTED ACROSS THE INDICATED TRACKS (SEE NOTE 4)

PCB ASSEMBLERS NOTES:

1. L1 AND C3 TO BE SECURED USING GUDEBROD 22DPTH (NATURAL) LACING CORD
2. THE FOLLOWING ITEMS ARE FITTED DURING INTEGRATION OF PCB INTO CONVERTOR ASSEMBLY, NOT DURING PCB ASSEMBLY.

   FLYING LEADS FL1-FL8 INCLUSIVE
3. INSERT LINKS FOR LK1 AND LK2 AS SHOWN
4. FOR INSERTING C7 SEE MANUFACTURING LOGBOOK, SECTION 5 "SPECIAL INSTRUCTIONS"
5. C8 TO BE MOUNTED UPSIDE DOWN,GLUED AND CONNECTED AS SHOWN

NOTE: THIS BOARD IS ALSO USED ON A3-KE-0123-816-00

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	01 MAY 01	KE3237	D.HOWE			FM
C	26 JAN 00	KE3190	D.HOWE			FM
B	15 NOV 99	KE3187	D.HOWE			FM
A	28 JUL 99		ARU			FM

USED ON HIRDLS (SCJ4150)

SCIENCE & ENGINEERING RESEARCH COUNCIL RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

SPU PSU

ASSEMBLY DRAWING (PC19151P/1)

TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
	REMOVE ALL BURRS	DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE micro m ✓ UNLESS STATED	0 mm

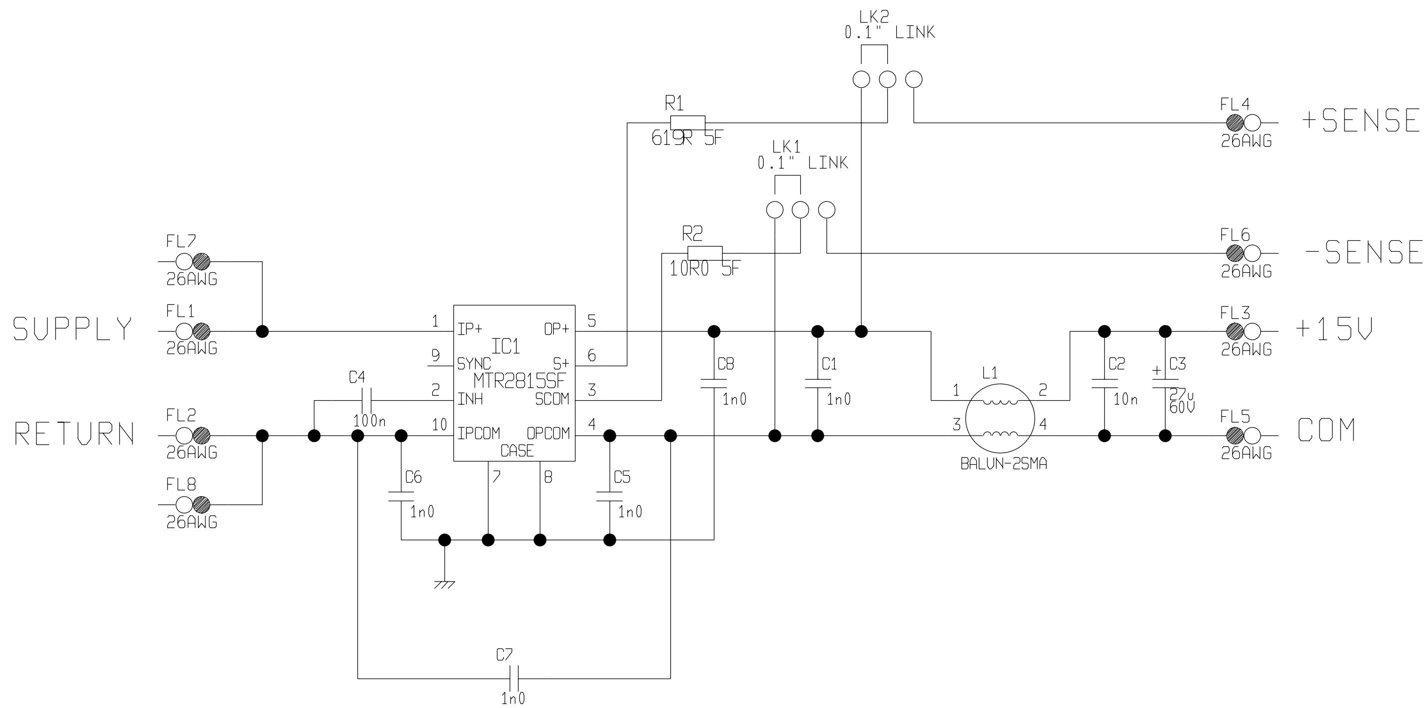
A3-KE-0123-815-00-D

TOTAL NO. OF SHEETS 1

A3-KE-0123-815-00-D

A3-KE-0123-816-00-C

THIS DRAWING CONFORMS TO B.S. 3939



C7,C8 TO BE HARD WIRED

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
C	01-05-01	KE3237	DH			FM
B	28-01-00	KE3191	DH			FM
A	28-07-99		ARU			

USED ON HIRDLS SCJ4150

TITLE
SPU PSU (15V OUTPUT) PC19151

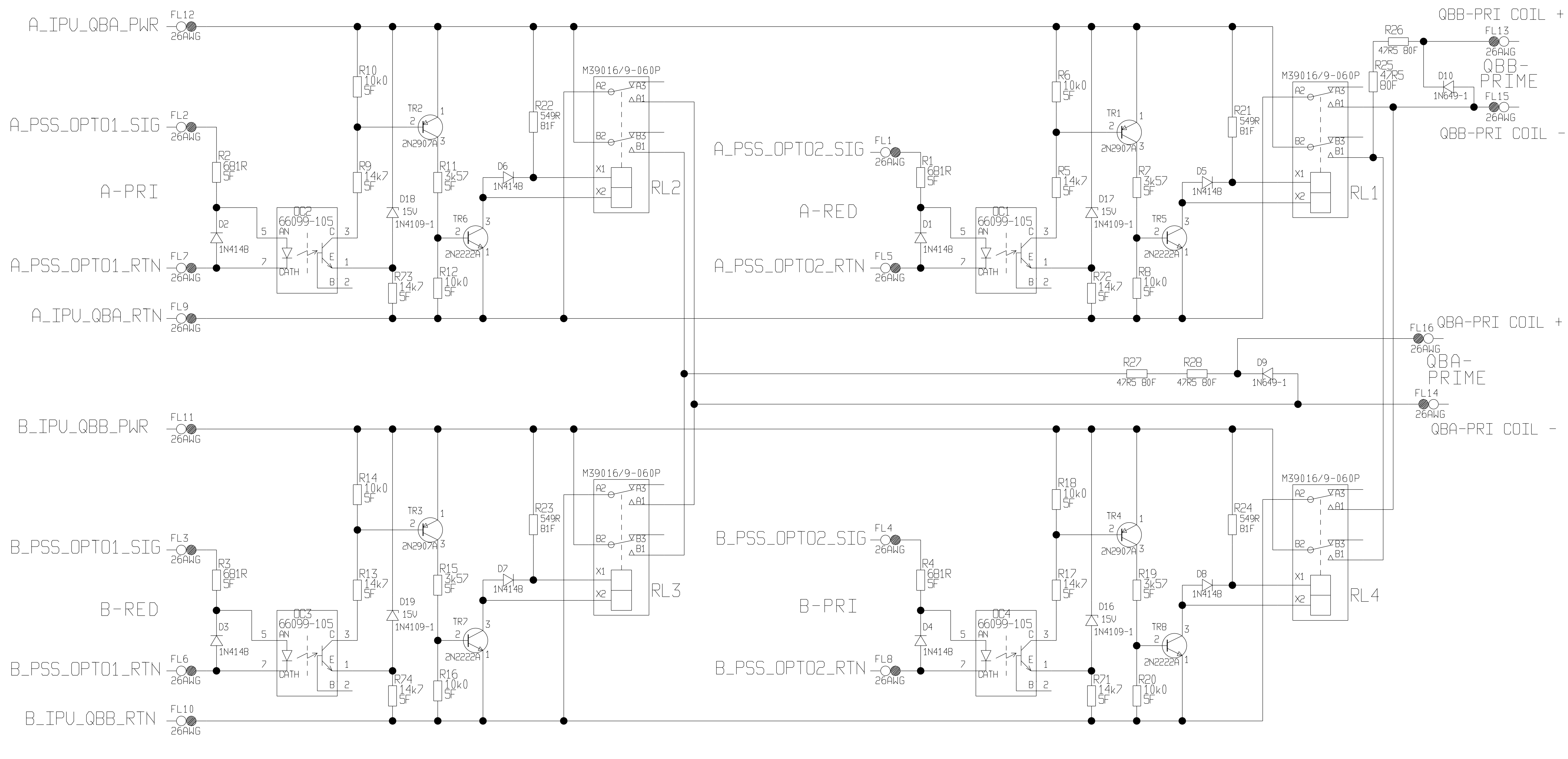
CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

A3-KE-0123-816-00-C

TOTAL NO. OF SHEETS 1

A 3-KE-0123-820-01-D

THIS DRAWING CONFORMS TO B.S. 3939



TIE DOWN HOLES FOR CABLE LOOMS

2.5mm HOLE
-o H7-22
REPEAT=16

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	22 APR 01	KE3232	D.HOWE			FM
C	03 APR 00	KE3206	D.HOWE			FM
B	27 NOV 99	KE3188	D.HOWE			FM

USED ON HIRDLS POWER SUB SYSTEM FM

TITLE PCU INT SUPPLY I/P SWITCHING

PC19152P/2

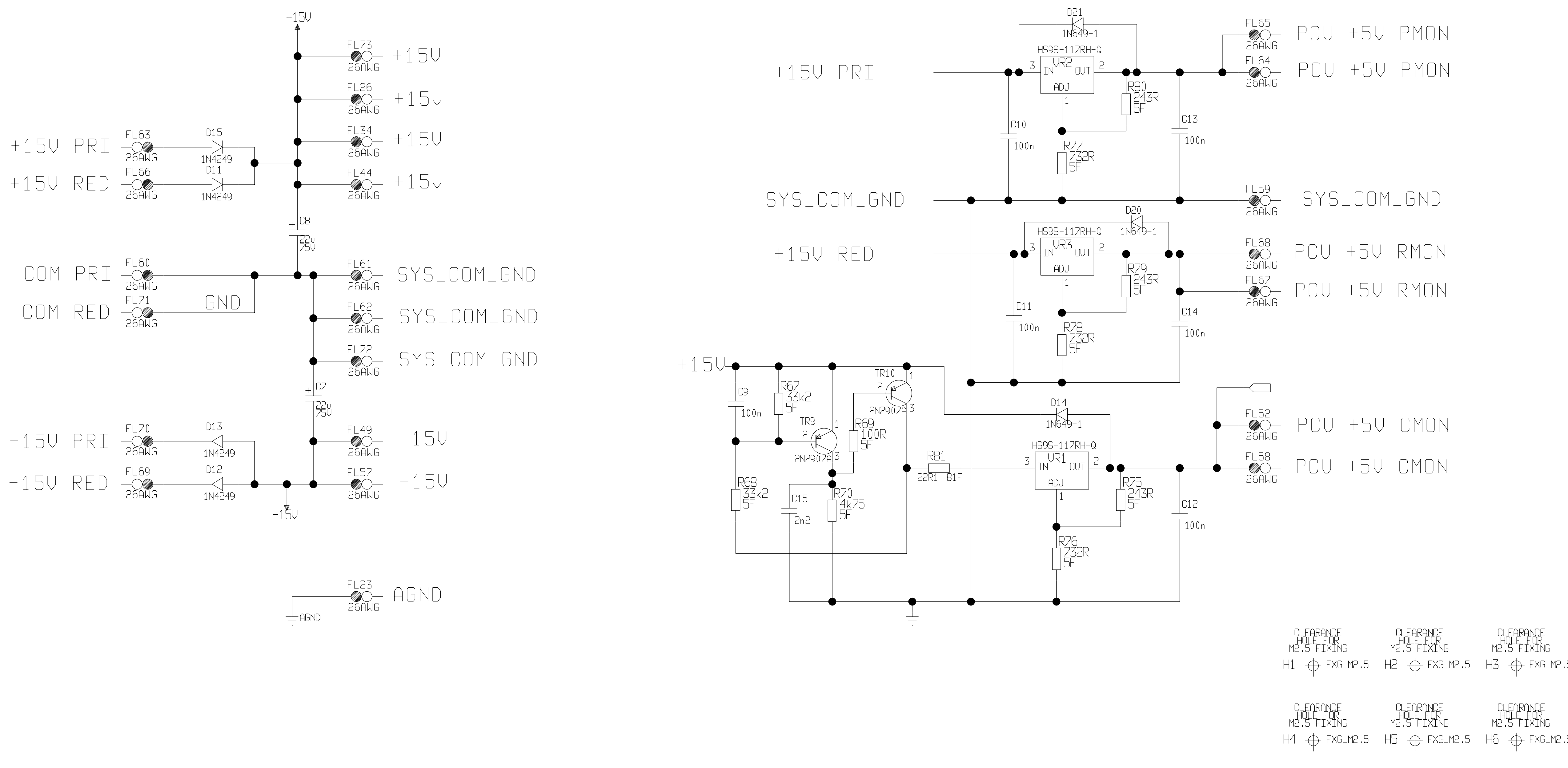
CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

A 3-KE-0123-820-01-D

TOTAL NO. OF SHEETS 4

A 3-KE-0123-820-02-D

THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	22 APR 01	KE3232	D.HOWE			FM
C	03 APR 00	KE3206	D.HOWE			FM
B	27 NOV 99	KE3188	D.HOWE			FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

USED ON HIRDLS POWER SUBSYSTEM FM

TITLE PCU INT SUPPLY I/P SWITCHING

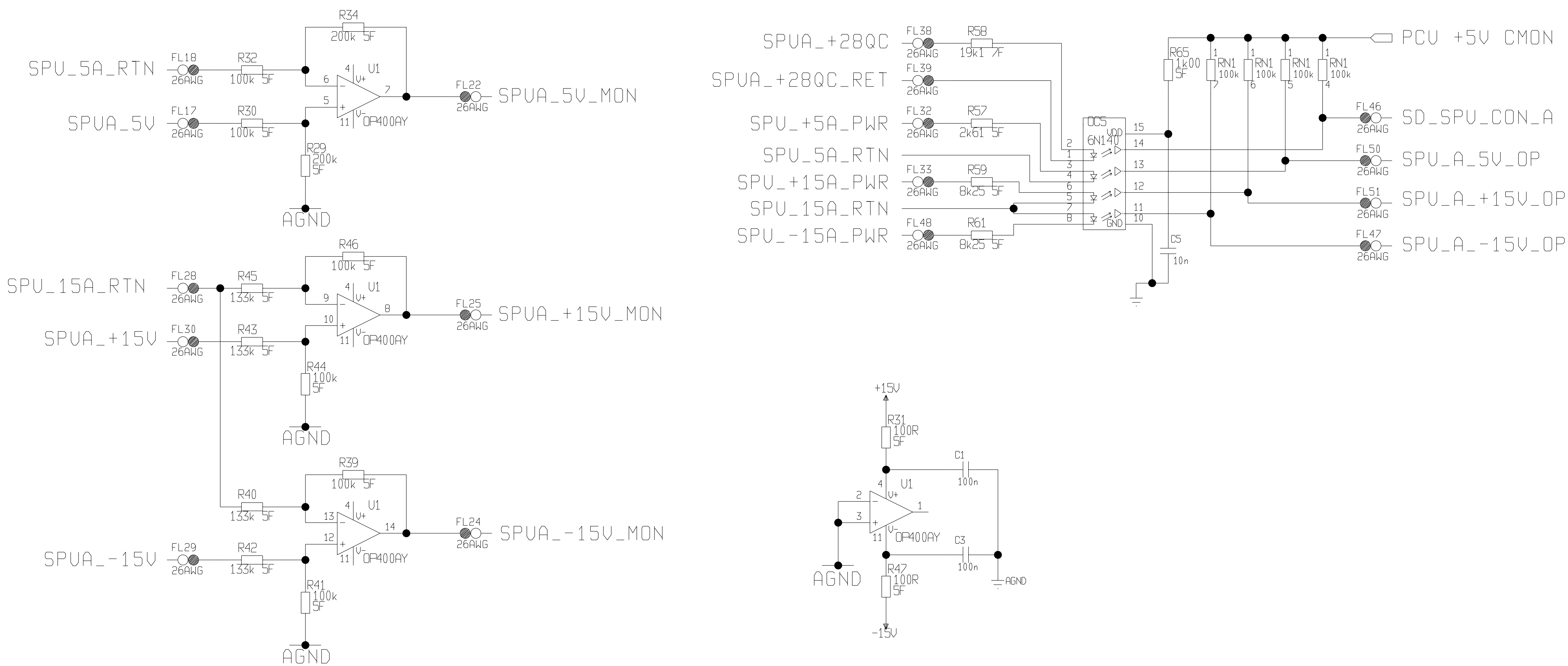
PC19152P/2

A 3- KE- 0123- 820- 02- D

TOTAL NO. OF SHEETS 4

A 3-KE-0123-820-03-D

THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	22 APR 01	KE3232	D.HOWE			FM
C	03 APR 00	KE3206	D.HOWE			FM
B	27 NOV 99	KE3188	D.HOWE			FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

USED ON HIRDLS POWER SUB SYSTEM FM

TITLE PCU INT SUPPLY I/P SWITCHING

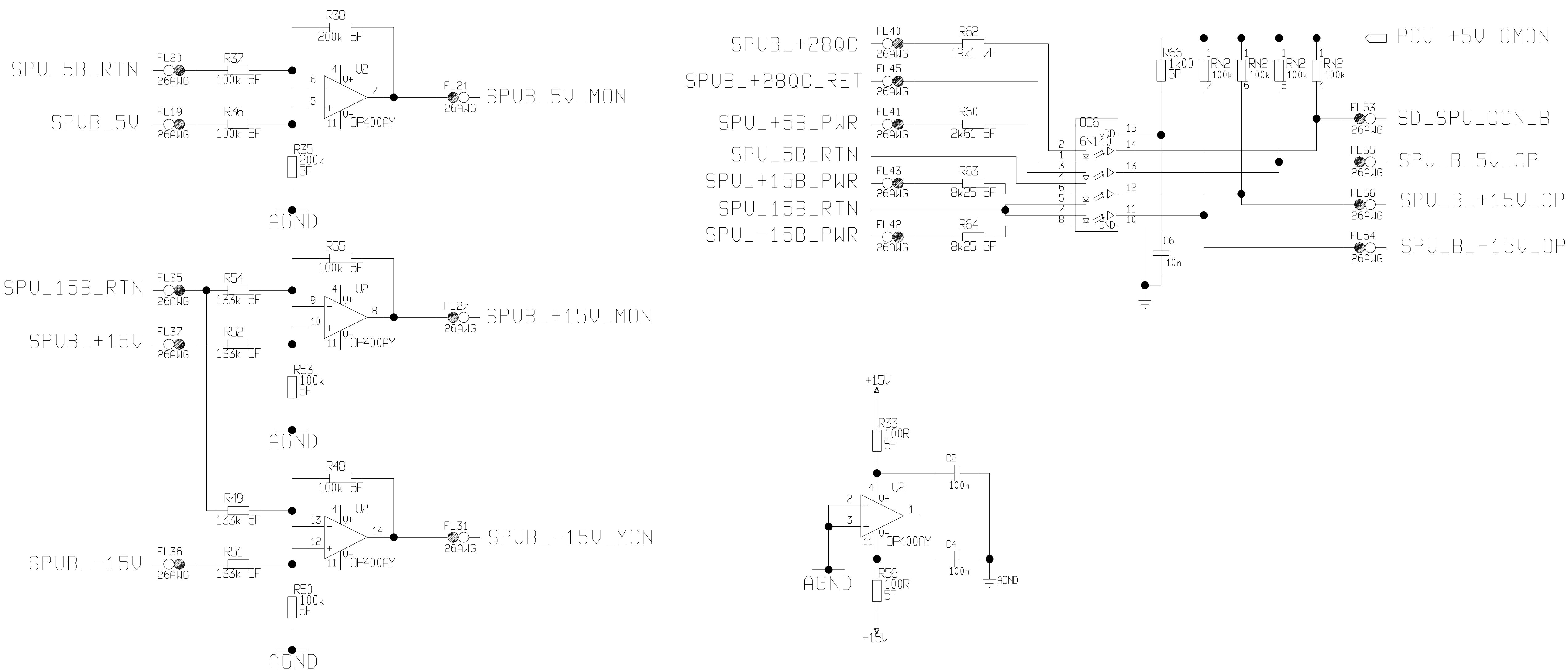
PC19152P/2

A 3- KE- 0123- 820- 03- D

TOTAL NO. OF SHEETS 4

A3-KE-0123-820-04-D

THIS DRAWING CONFORMS TO B.S. 3939



D	22 APR 01	KE3232	D.HOWE			FM
C	03 APR 00	KE3206	D.HOWE			FM
B	27 NOV 99	KE3188	D.HOWE			FM
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

USED ON HIRDLS POWER SUB SYSTEM FM

TITLE PCU INT SUPPLY I/P SWITCHING

PC19152P/2

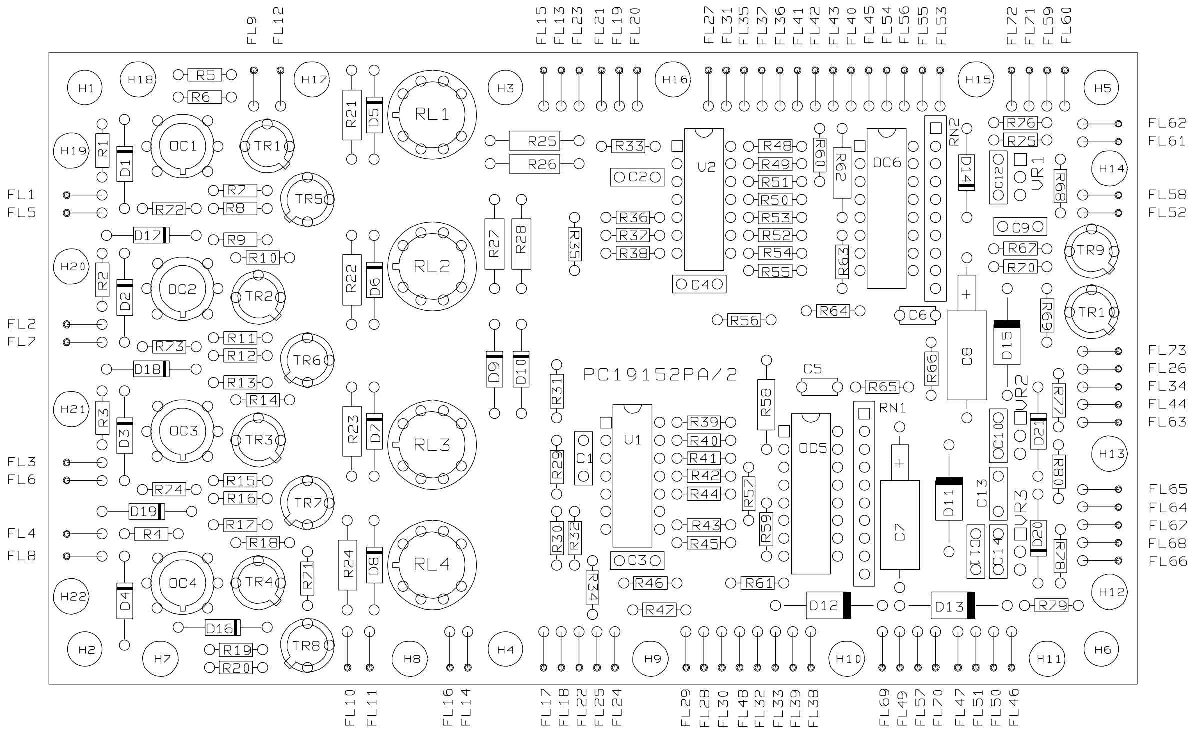
A3- KE- 0123- 820- 04- D

TOTAL NO. OF SHEETS 4

A 3-KE-0123-823-00-B

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



PCB ASSEMBLERS NOTES:

ASSEMBLY INSTRUCTIONS SP-RAL-158 COVERS PROCEDURES FOR THE FOLLOWING

1. FL1-73 (FLYING LEAD ATTACHMENTS)
2. USE OF TRANSIPADS 10328 FOR OC1-4
3. USE OF TRANSIPADS 10329 FOR TR1-10
4. USE OF TRANISPADS 10050 AND WASHERS 10051 FOR RL1-4
5. MOUNTING OF VR1-3
6. H7-22 FOR SECURING WIRE LOOMS
7. H1-6 FOR BOARD MOUNTING HOLES

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	27 NOV 99	KE3188	D.HOWE			FM
A	05 NOV 99		A.UPTON B.J.CLAXTON			FM

USED ON HIRDLS POWER SUB SYSTEM FM (SCJ 4150)

CCLRC COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

PCU INT SUPPLY I/P SWITCHING
PC19152P/2 ASSEMBLY DRAWING

TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
	REMOVE ALL BURRS	DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE m1cro m ✓ UNLESS STATED	0 mm

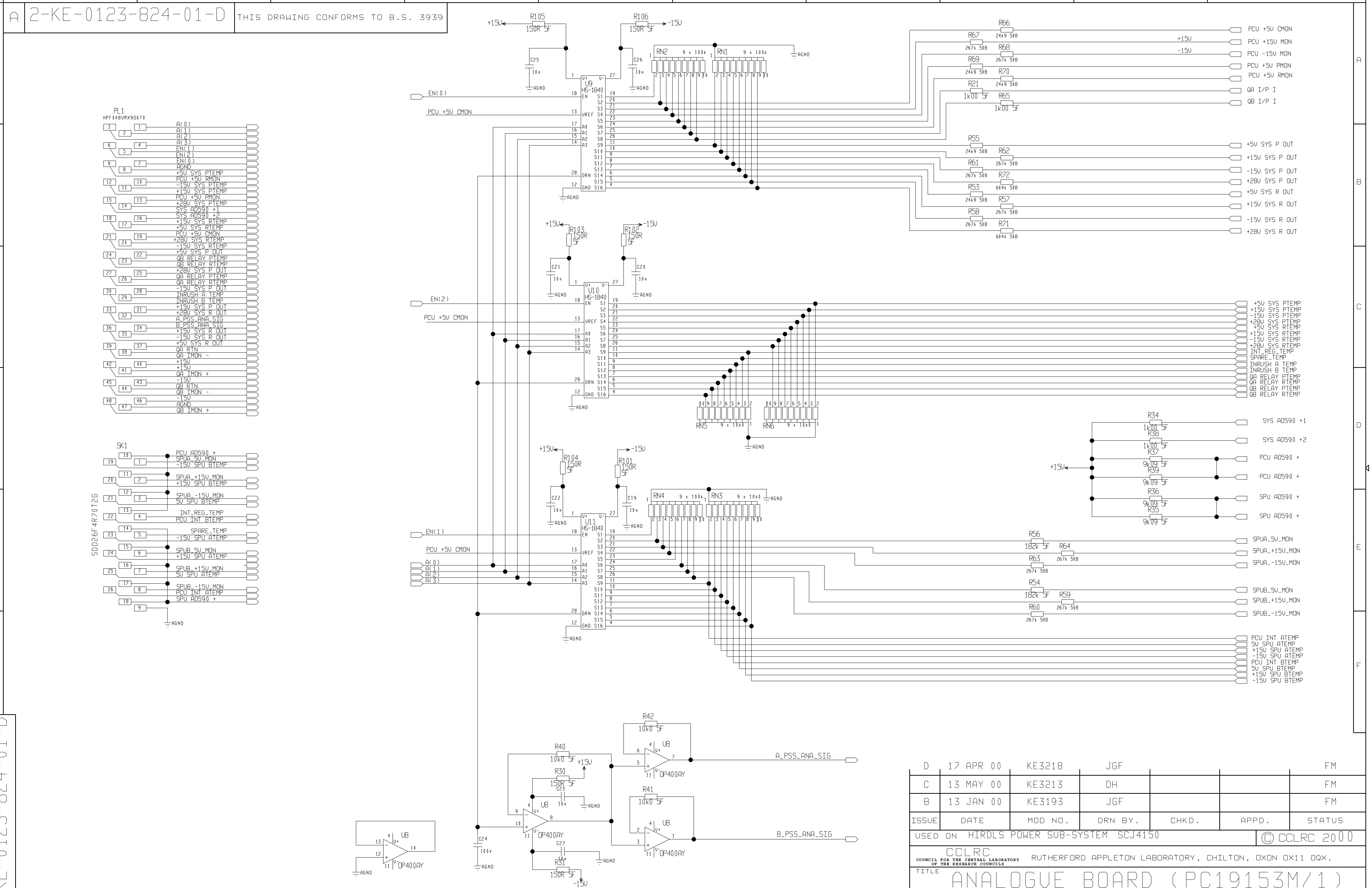
A 3-KE-0123-823-00-B

TOTAL NO. OF SHEETS 1

A 3-KE-0123-823-00-B

2-KE-0123-824-01-D

THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	17 APR 00	KE3218	JGF			FM
C	13 MAY 00	KE3213	DH			FM
B	13 JAN 00	KE3193	JGF			FM

USED ON HIRDLS POWER SUB-SYSTEM SCJ4150

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

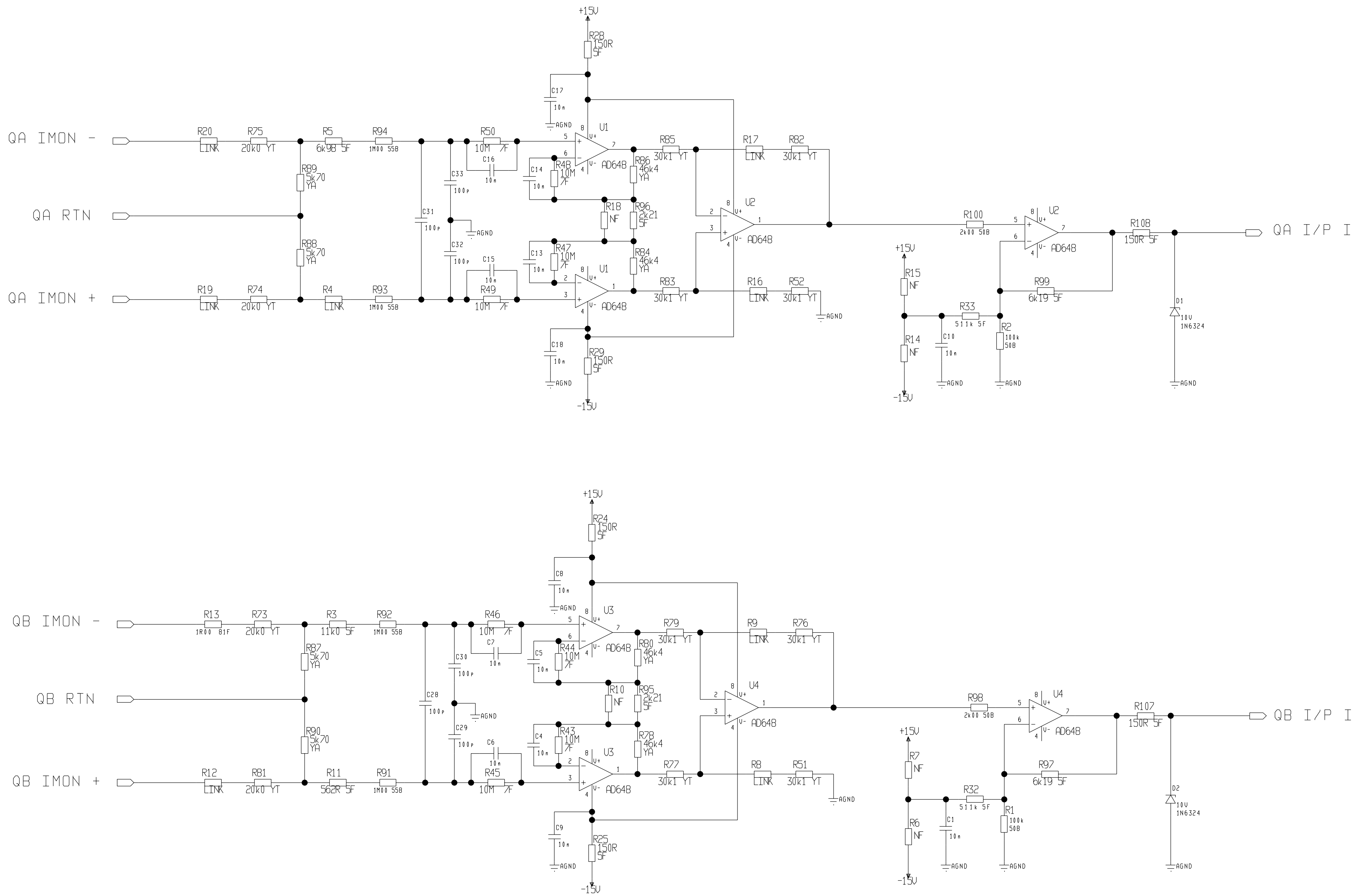
ANALOGUE BOARD (PC19153M/1)

ANALOGUE TELEMETRY MULTIPLEXER FM S/N 2

A 2-KE-0123-824-01-D

TOTAL NO. OF SHEETS 2

A | 2-KE-0123-824-02-D | THIS DRAWING CONFORMS TO B.S. 3939



NOTES:

1. FOR R8,9,12,16,17,19,20 FIT 0.020" WIRE LINKS
2. R6,7,10,14,15,18 NOT TO BE FITTED

CLEARANCE HOLE FOR M2.5 FIXING H6 FXG_M2.5
CLEARANCE HOLE FOR M2.5 FIXING H4 FXG_M2.5
CLEARANCE HOLE FOR M2.5 FIXING H2 FXG_M2.5
CLEARANCE HOLE FOR M2.5 FIXING H5 FXG_M2.5
CLEARANCE HOLE FOR M2.5 FIXING H3 FXG_M2.5
CLEARANCE HOLE FOR M2.5 FIXING H1 FXG_M2.5

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	17 APR 00	KE3218	JGF			FM
C	13 MAY 00	KE3213	DH			FM
B	13 JAN 00	KE3193	JGF			FM

USED ON HIRDLS POWER SUB-SYSTEM SCJ4150

CCLRC COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS — RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE ANALOGUE BOARD (PC19153M/1)

QUIET BUS CURRENT MONITOR TELEMETRY CIRCUIT

A 2-KE-0123-824-02-D

TOTAL NO. OF SHEETS 2

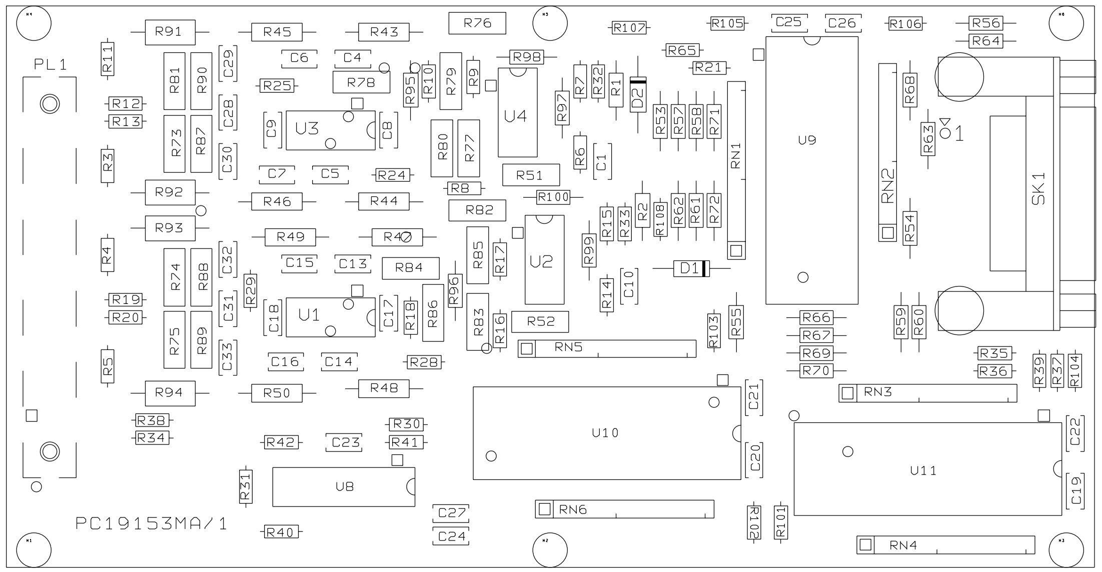
2-KE-0123-824-02-D A

A 3-KE-0123-827-00-B

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308

PL1 TO BE MOUNTED ON UNDERSIDE OF BOARD



PCB MANUFACTURERS NOTES:

1. PL1 TO BE MOUNTED ON UNDERSIDE OF THE BOARD
2. R6,7,10,14,15,18 ARE NOT TO BE FITTED
3. FIT 0.020" WIRE LINKS FOR R4,8,9,12,16,17,19,20

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	17 APR 01	KE3218	D.HOWE			FM
A	30 SEP 99		ARU			FM

USED ON HIRLDS SCJ4150

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

ANALOGUE BOARD
ASSEMBLY DRAWING (PC19153M/1)

TOLERANCES UNLESS STATED

FINISH

REMOVE ALL BURRS

ORIGINAL SCALE

DO NOT SCALE

0 mm

MATERIAL & SPEC

SURFACE TEXTURE micro m

✓ UNLESS STATED

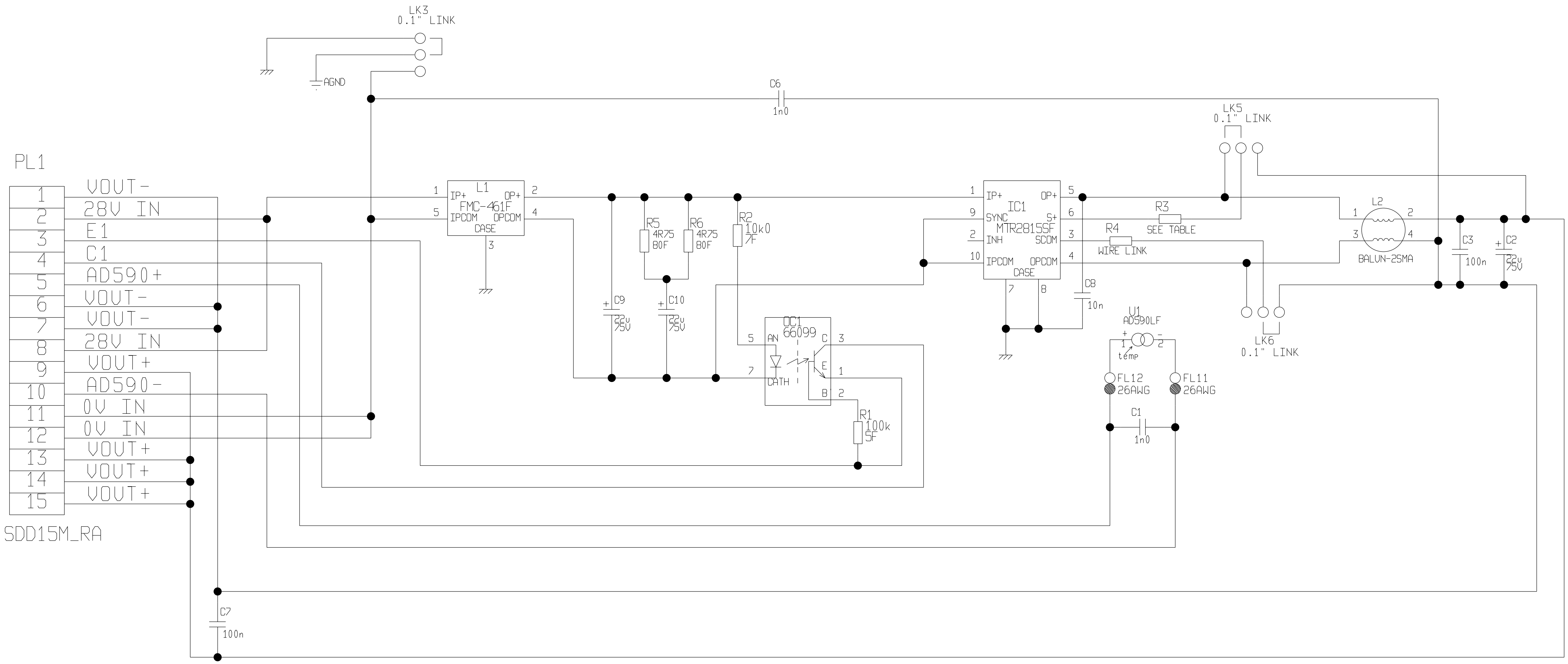
A 3-KE-0123-827-00-B

TOTAL NO. OF SHEETS 1

A 3-KE-0123-827-00-B

A 3-KE-0123-830-00-B

THIS DRAWING CONFORMS TO B.S. 3939



SUPPLY	MODULE	RESISTORS FITTED	MEASURED VALUE
SYS +15P	MTR05	RLR05S3320FS	333R
SYS -15P	MTR03	RLR05S3650FS RLR05S1212FS IN PARALLEL	356R
SYS +15R	MTR06	RLR05S3920FS	394R
SYS -15R	MTR04	RLR05S4120FS RLR05S2002FS IN PARALLEL	406R

USED ON HIRDLS SCJ4150

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	16-APR-01	KE3229	JGF			FM
A	28-07-99		ARU			FM

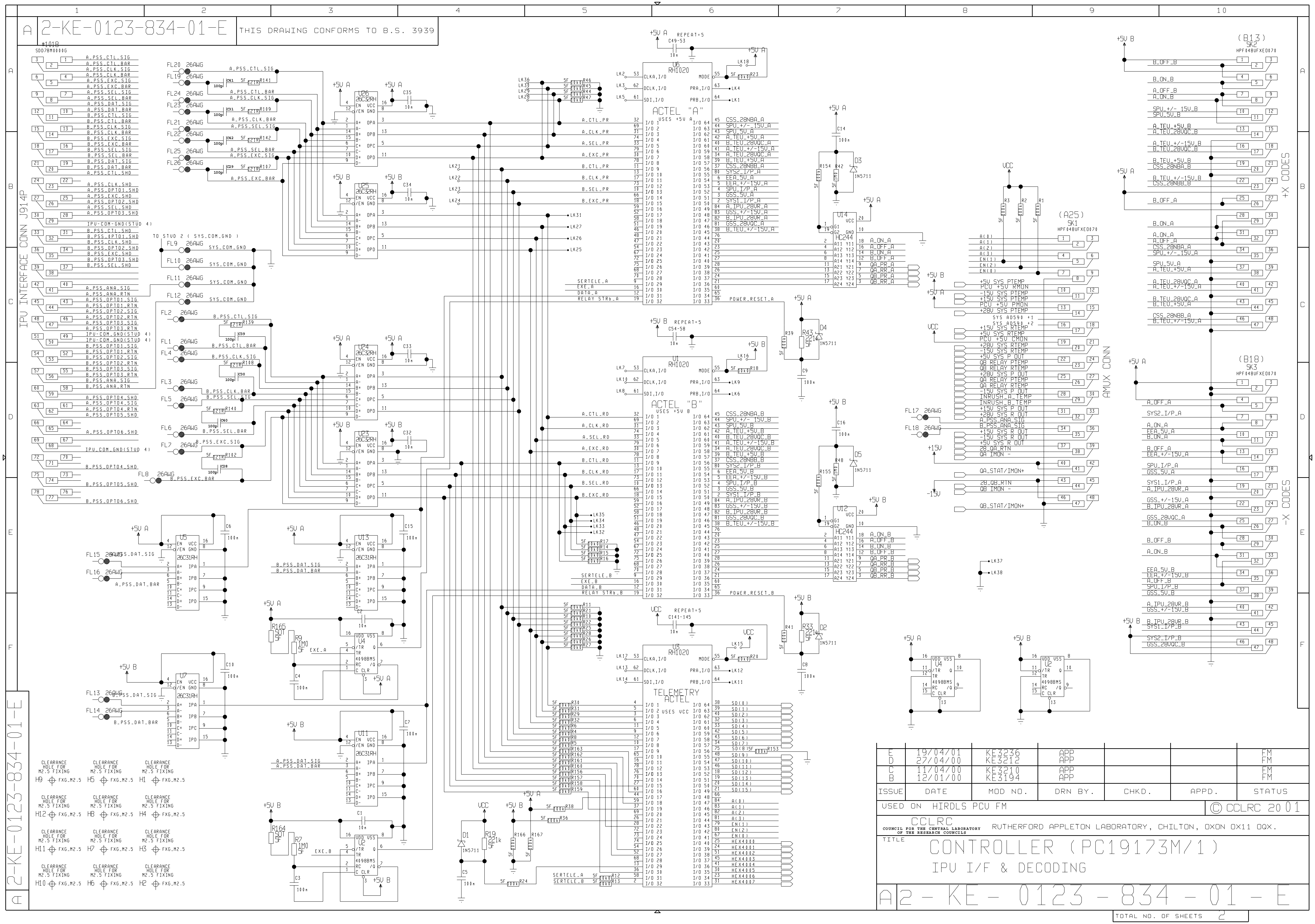
TITLE

SYSTEM +15V POWER CONVERTER MODULE (MTR VERSION) PC19149

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

A 3-KE-0123-830-00-B

TOTAL NO. OF SHEETS



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
E	19/04/01	KE3236	APP			FM
D	27/04/00	KE3212	APP			FM
C	11/04/00	KE3210	APP			FM
B	12/01/00	KE3194	APP			FM

USED ON HIRDLS PCU FM

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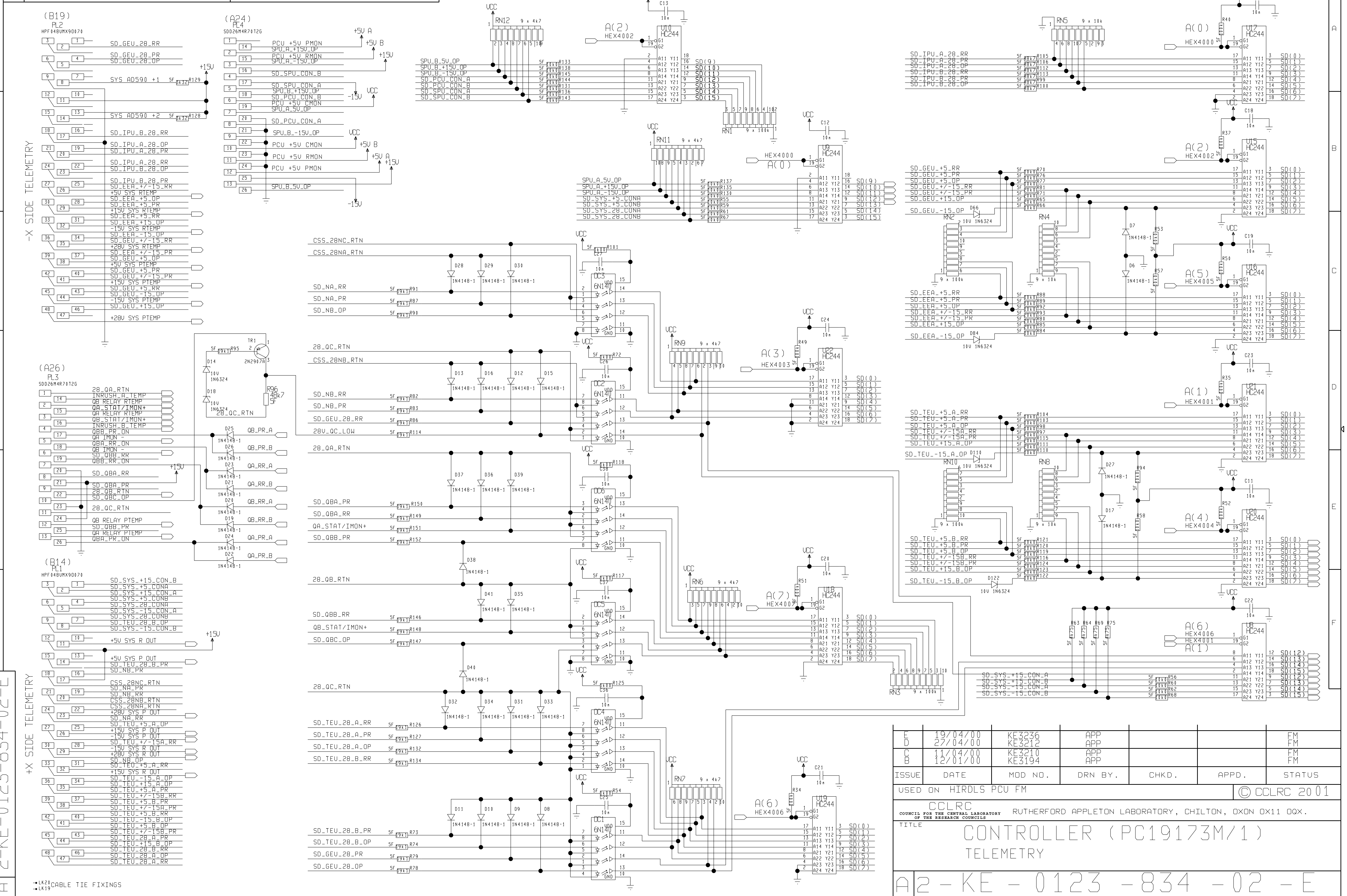
CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE
CONTROLLER (PC19173M/1)
IPU I/F & DECODING

A 2 - KE - 0123 - 834 - 01 - E

TOTAL NO. OF SHEETS 2

A 2-KE-0123-834-02-E THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
E	19/04/00	KE3236	APP			FM
D	27/04/00	KE3212	APP			FM
C	11/04/00	KE3210	APP			FM
B	12/01/00	KE3194	APP			FM

USED ON HIRDLS PCU FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE
CONTROLLER (PC19173M/1)
TELEMETRY

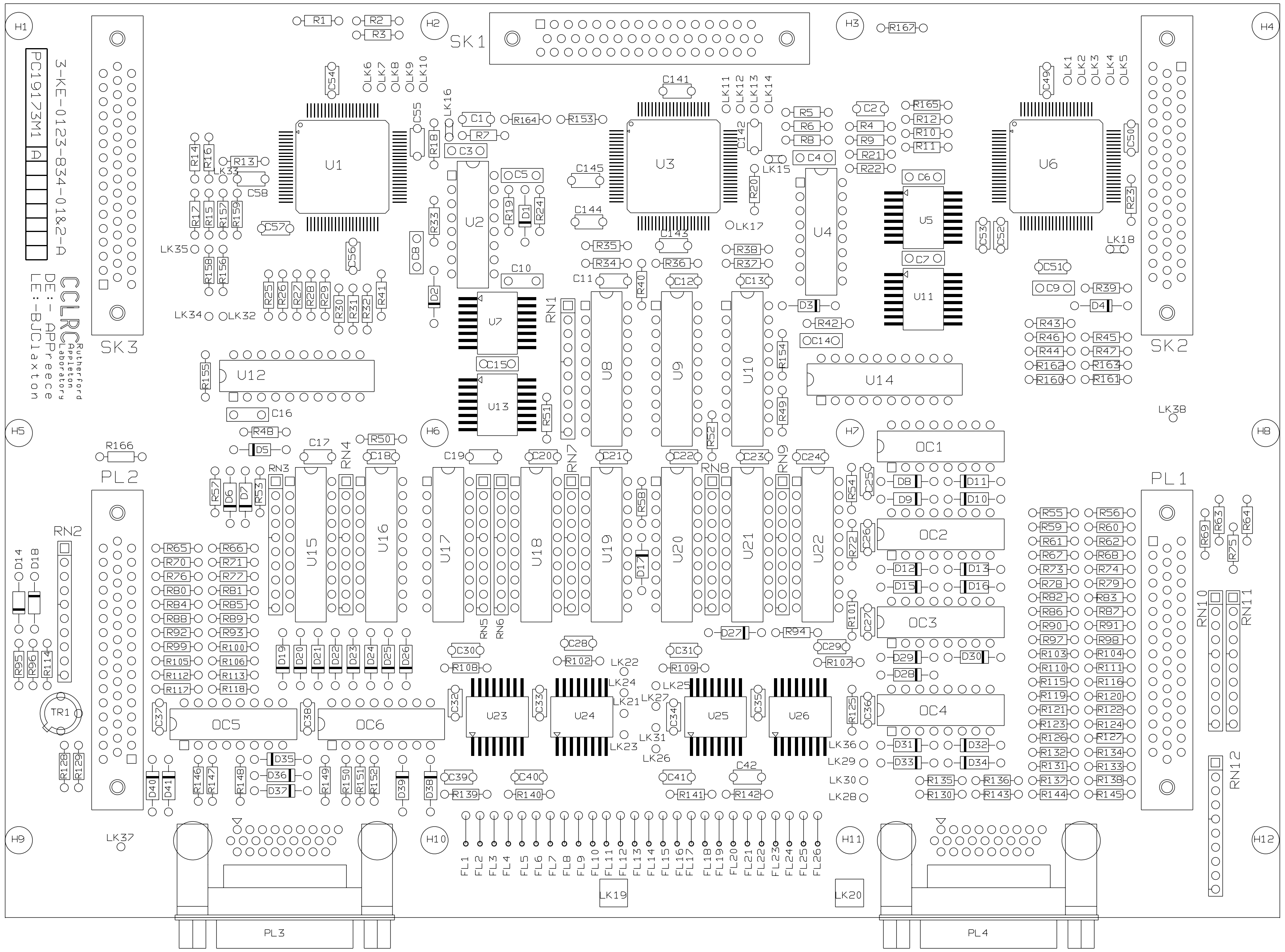
A 2-KE-0123-834-02-E

TOTAL NO. OF SHEETS 2

A 3-KE-0123-837-00-A

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



PCB ASSEMBLERS NOTES:

1. SEE MANUFACTURING LOGBOOK (PC19173M/1)
   SECTION 5 "SPECIAL INSTRUCTIONS"
   FOR ASSEMBLY PROCEDURES

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
A	23 DEC 99		APP			FM

USED ON HIRDLS (SCJ4150)

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

CONTROLLER
ASSEMBLY DRAWING (PC19173M/1)

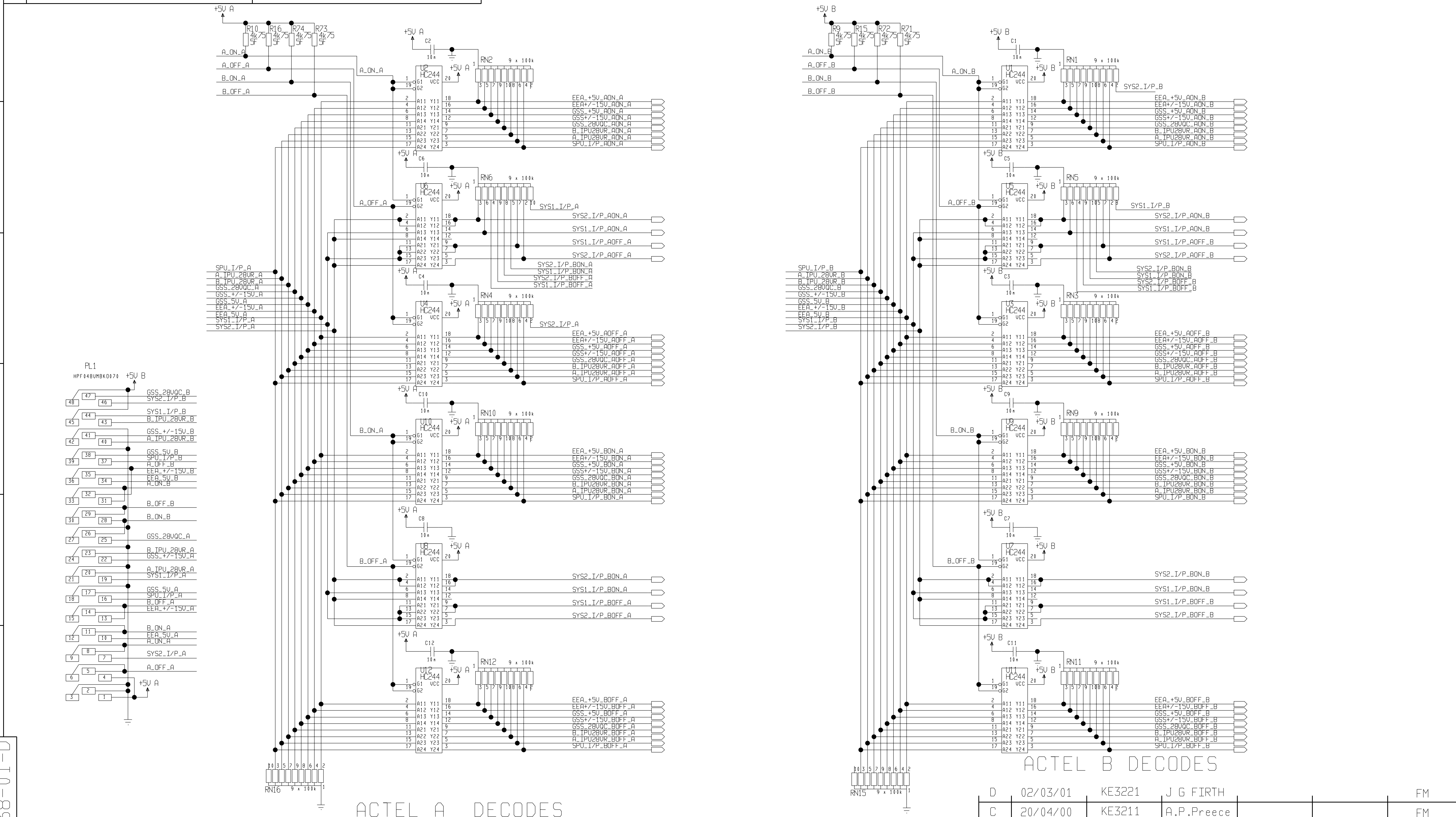
TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
	REMOVE ALL BURRS	DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE micro m ✓UNLESS STATED	0 mm

A 3-KE-0123-837-00-A

TOTAL NO. OF SHEETS 1

A 3-KE-0123-837-00-A

A 2-KE-0123-838-01-D THIS DRAWING CONFORMS TO B.S. 3939



FIXING HOLES

PCB	CONNECTOR
CLEARANCE HOLE FOR M2.5 FIXING H1 FXG_M2.5; H7 FXG_M2.5; H4 FXG_M2.5	
H2 FXG_M2.5; H8 FXG_M2.5; H5 FXG_M2.5	H11 FXG_M2.5
H3 FXG_M2.5; H9 FXG_M2.5; H6 FXG_M2.5	H10 FXG_M2.5

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	02/03/01	KE3221	J G FIRTH			FM
C	20/04/00	KE3211	A.P.Preece			FM
B	04/10/99	KE3185	A.P.Preece			FM

USED ON HIRDLS POWER SUB-SYSTEM FM © CCLRC 1999

CCLRC COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS — RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

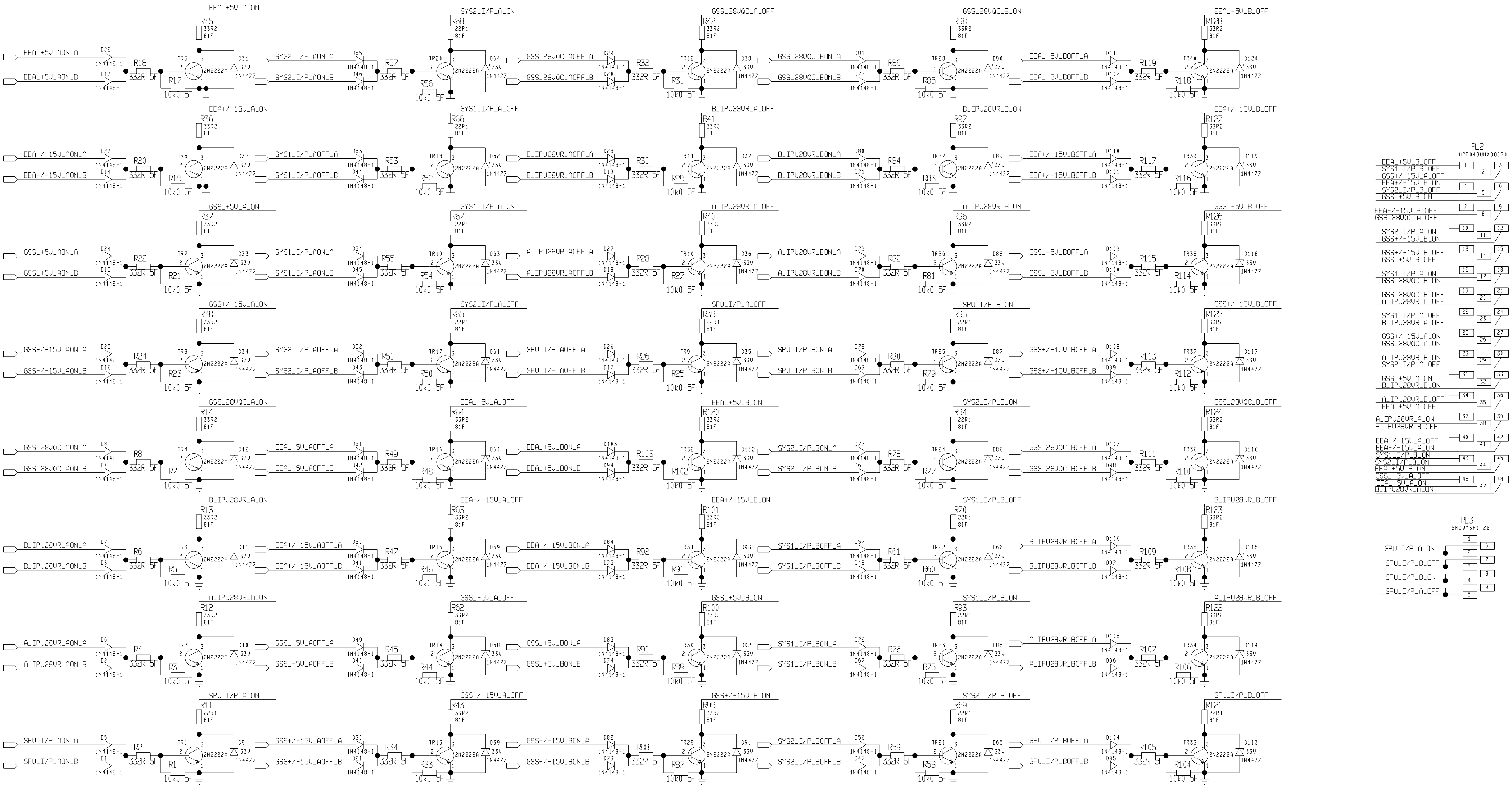
-X RELAY DECODING

PC19159M2

A 2-KE-0123-838-01-D

TOTAL NO. OF SHEETS 2

A 2-KE-0123-838-02-D THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	02/03/01	KE3221	J G FIRTH			FM
C	20/04/00	KE3211	A.P.Preece			FM
B	04/10/99	KE3185	A.P.Preece			FM

USED ON HIRDLS POWER SUB-SYSTEM FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

-X RELAY DRIVERS

PC19159M2

A 2-KE-0123-838-02-D

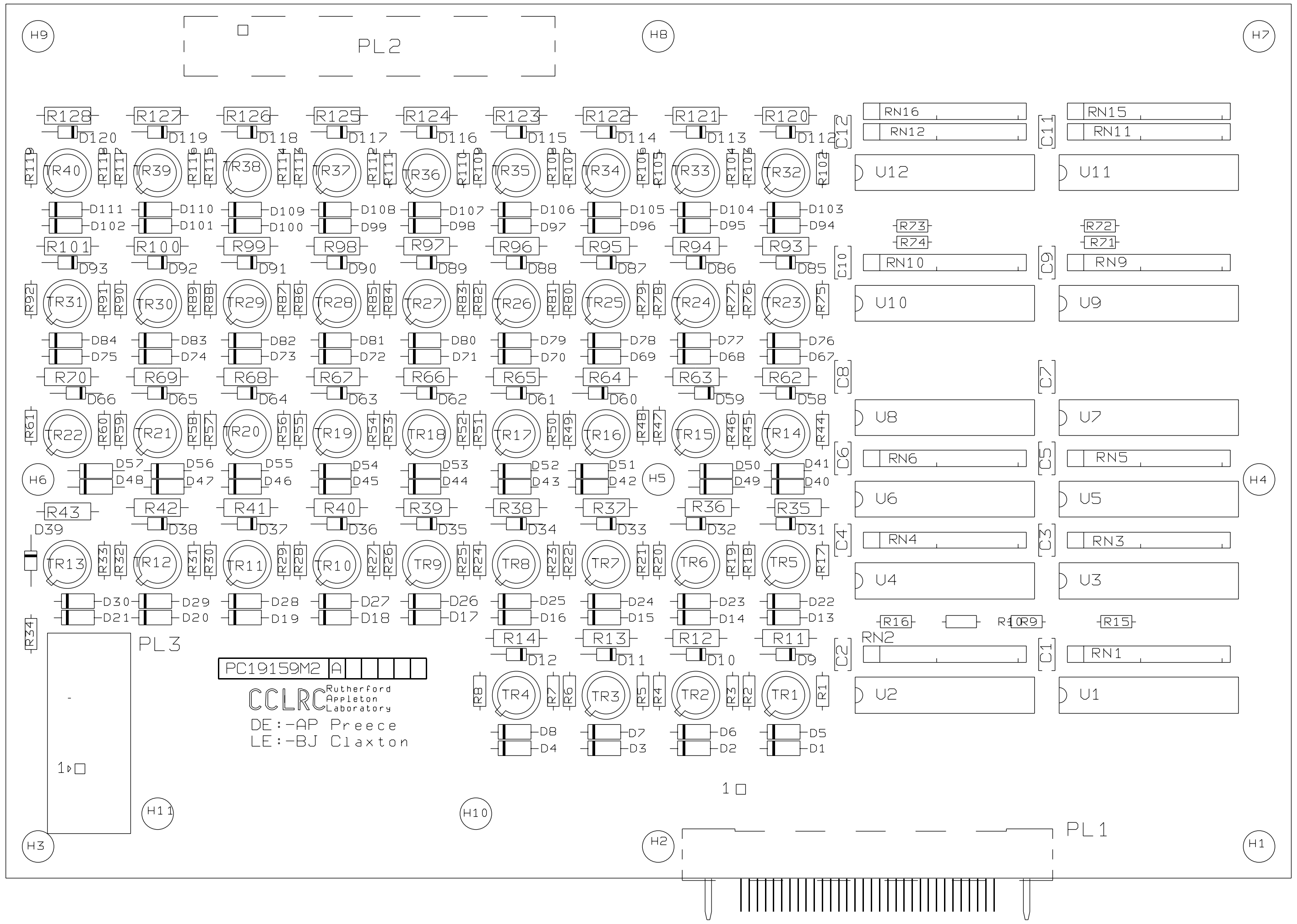
TOTAL NO. OF SHEETS 2

A 2-KE-0123-838-02-D

A 3-KE-0123-841-00-B

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



Notes.

1. ALL COMPONENTS MOUNTED ON THIS FACE "A" WITH THE EXCEPTION OF PL1 & 2 WHICH ARE MOUNTED ON THE REVERSE FACE "F"
2. TRANSISTORS TR1 - 40 ARE MOUNTED WITH MILTON ROSS 10329 LEAD SPREADERS FITTED

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	04/10/99	KE3185	A.P.Preece			
A	9-08-99	————	B.J.Claxton	J.G.Firth		MANUFACTURE

USED ON HIRDLS PSS FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

-X RELAY DRIVER BOARD

TOP ASSEMBLY

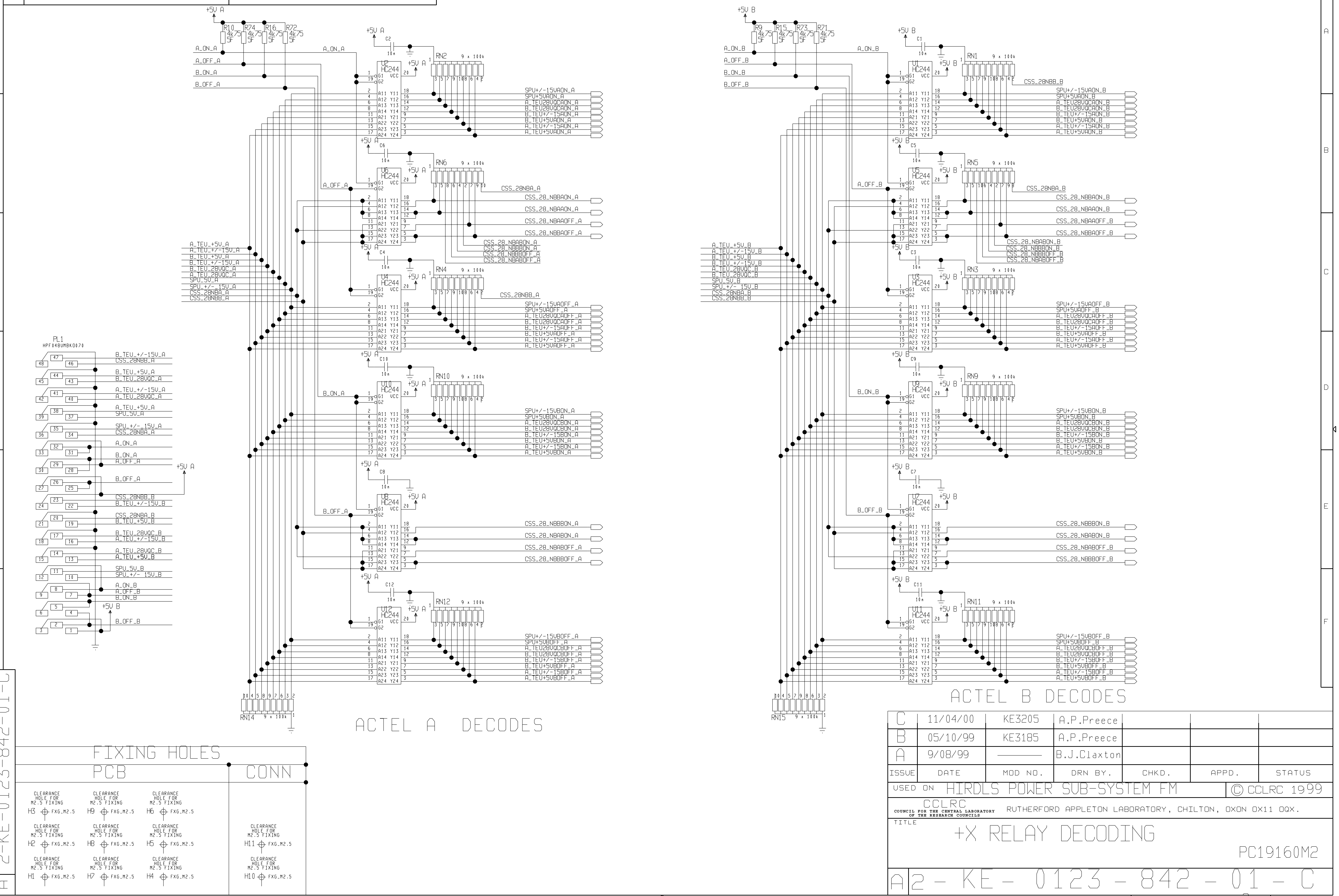
PC19159M/2

TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
+/- 0.1mm	REMOVE ALL BURRS	DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE micro m	0 mm
FR4	✓ UNLESS STATED	

A 3-KE-0123-841-00-B

TOTAL NO. OF SHEETS 1

A 2-KE-0123-842-01-C THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
C	11/04/00	KE3205	A.P.Preece			
B	05/10/99	KE3185	A.P.Preece			
A	9/08/99	————	B.J.Claxton			

USED ON HIRDLS POWER SUB-SYSTEM FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

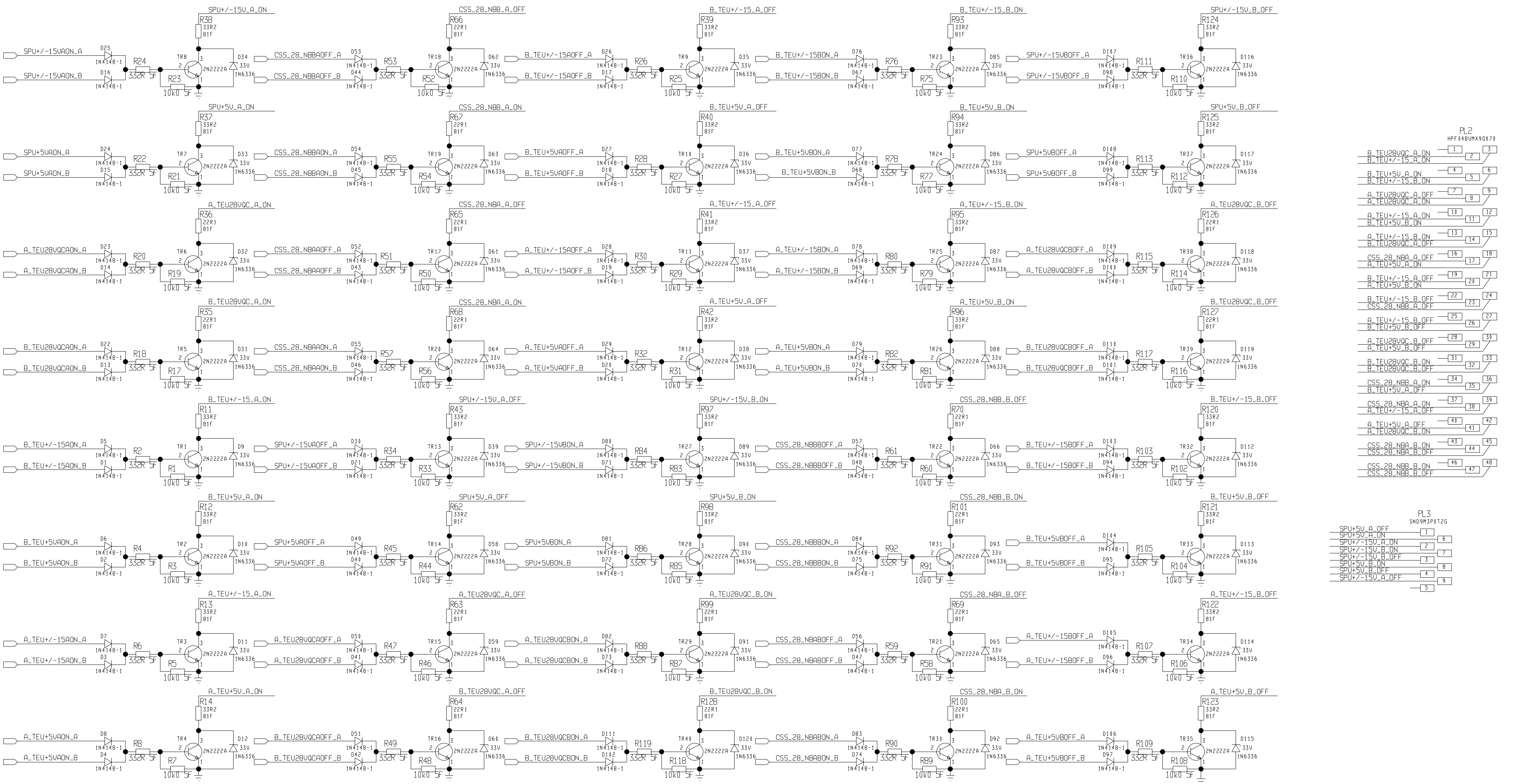
TITLE
+X RELAY DECODING

PC19160M2

A 2 - KE - 0123 - 842 - 01 - C

TOTAL NO. OF SHEETS 2

A 2-KE-0123-842-02-C THIS DRAWING CONFORMS TO B.S. 3939



ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
C	11/04/00	KE3205	A.P.Preece			
B	05/10/99	KE3185	A.P.Preece			
A	9/08/99	———	B.J.Claxton			

USED ON HIRDLS POWER SUB-SYSTEM FM

CCLRC COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

+X RELAY DRIVERS

PC19160M2

A 2- KE- 0123 - 842 - 02 - C

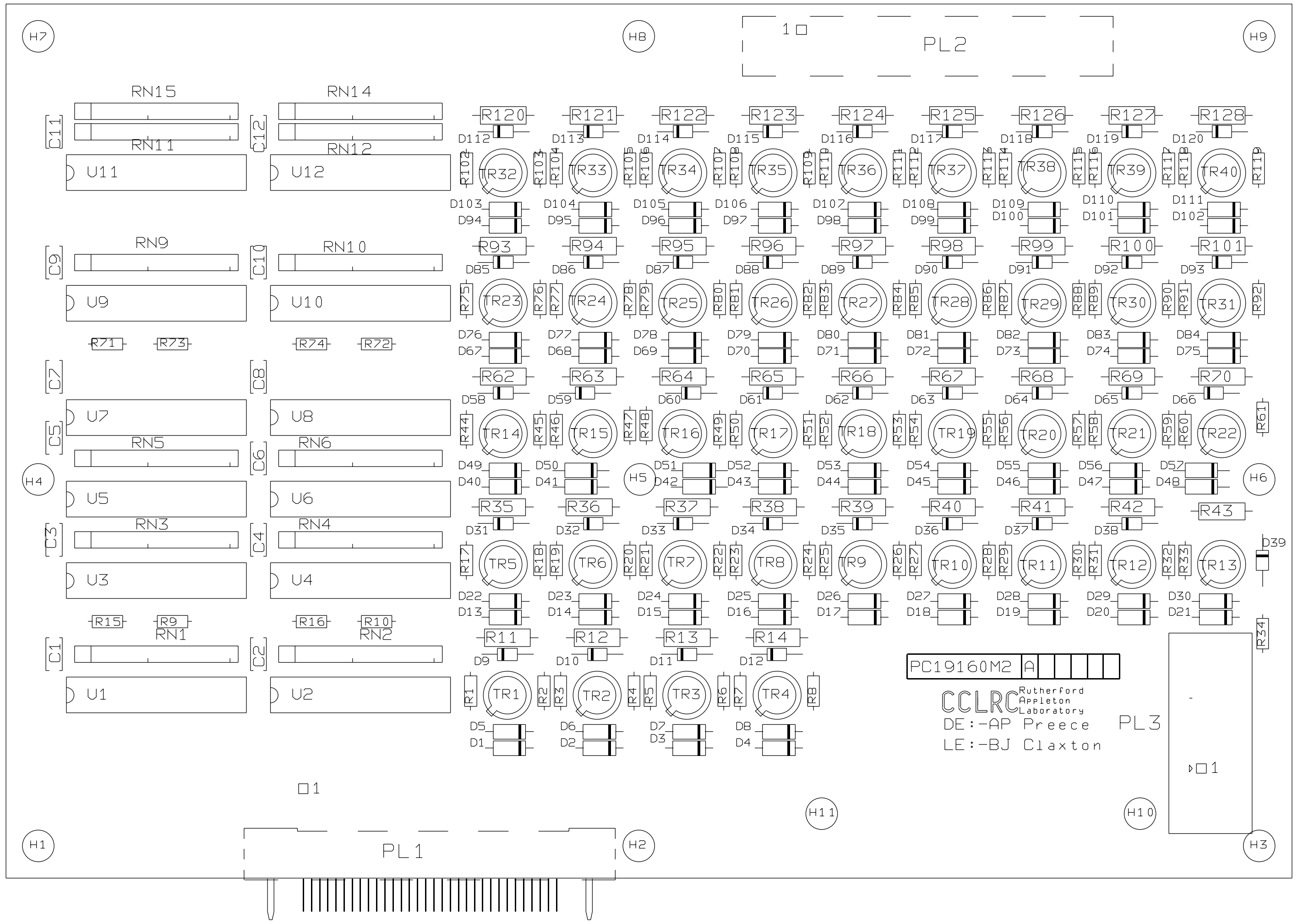
TOTAL NO. OF SHEETS 2

A 2-KE-0123-842-02-C

A 3-KE-0123-845-00-B

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



NOTES.

1. ALL COMPONENTS MOUNTED ON THIS FACE "A" WITH THE EXCEPTION OF PL1 & 2 WHICH ARE MOUNTED ON THE REVERSE FACE "F"
2. TRANSISTORS TR1 - 40 ARE MOUNTED WITH MILTON ROSS 10329 LEAD SPREADERS FITTED

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	05/10/99	KE3185	A.P.Preece			
A	9-08-99	————	B.J.Claxton	J.G.Firth		MANUFACTURE

USED ON HIRDLS PSS FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

+X RELAY DRIVER BOARD PC19160M/2
TOP ASSEMBLY

TOLERANCES UNLESS STATED +/- -0.1 MM	FINISH REMOVE ALL BURRS	ORIGINAL SCALE 1:1 / DO NOT SCALE
MATERIAL & SPEC FR4	SURFACE TEXTURE micro m ✓ UNLESS STATED	0 mm

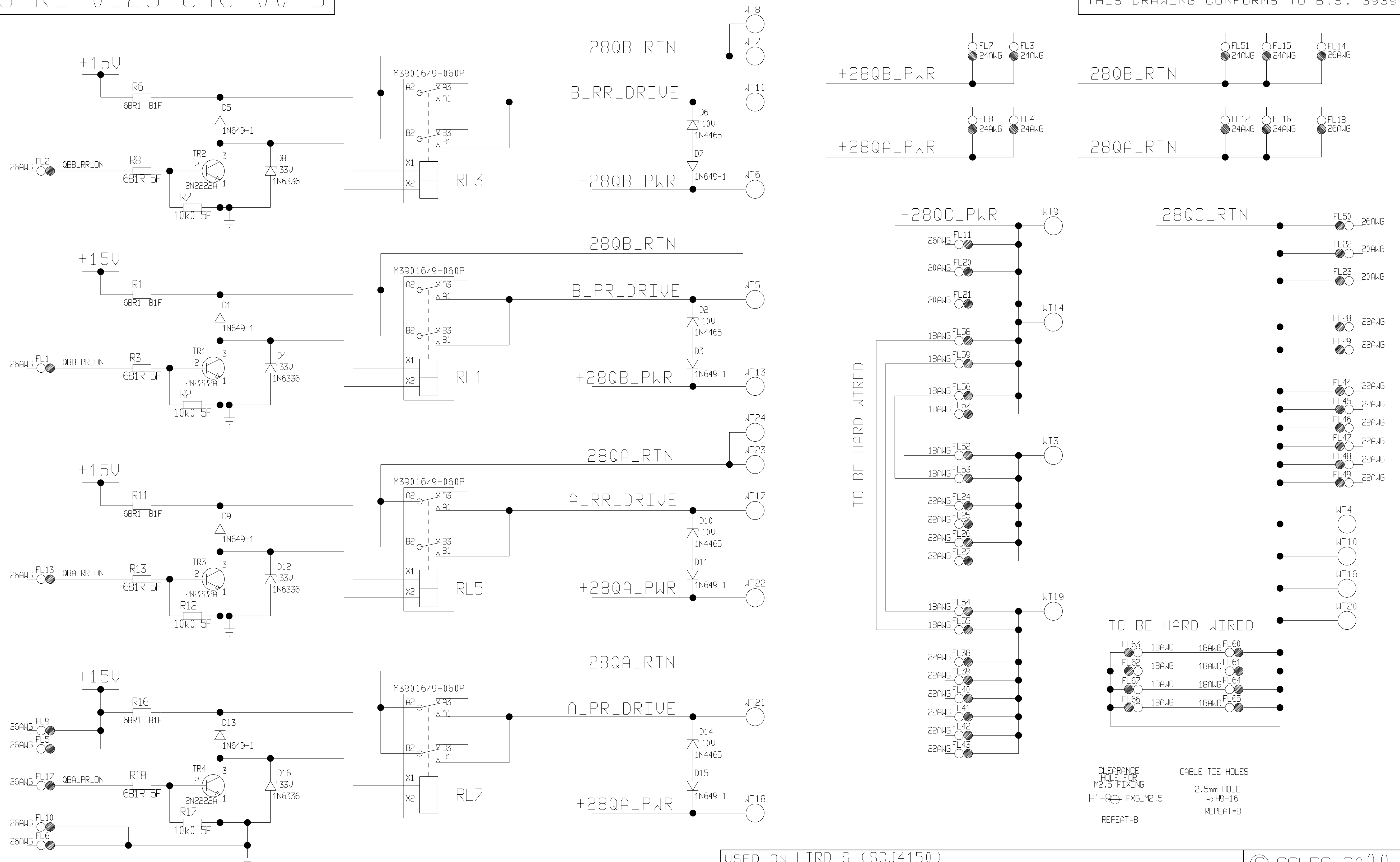
A 3-KE-0123-845-00-B

TOTAL NO. OF SHEETS 1

3-KE-0123-845-00-B A

A3-KE-0123-846-00-B

THIS DRAWING CONFORMS TO B.S. 3939



USED ON HIRDLS (SCJ4150)

© CCLRC 2000

TITLE

BUS BAR BOARD (PC19165P/1)

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
B	15 FEB 00	KE3197	D.HOWE			FM
A	14 DEC 99		D.HOWE			FM

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

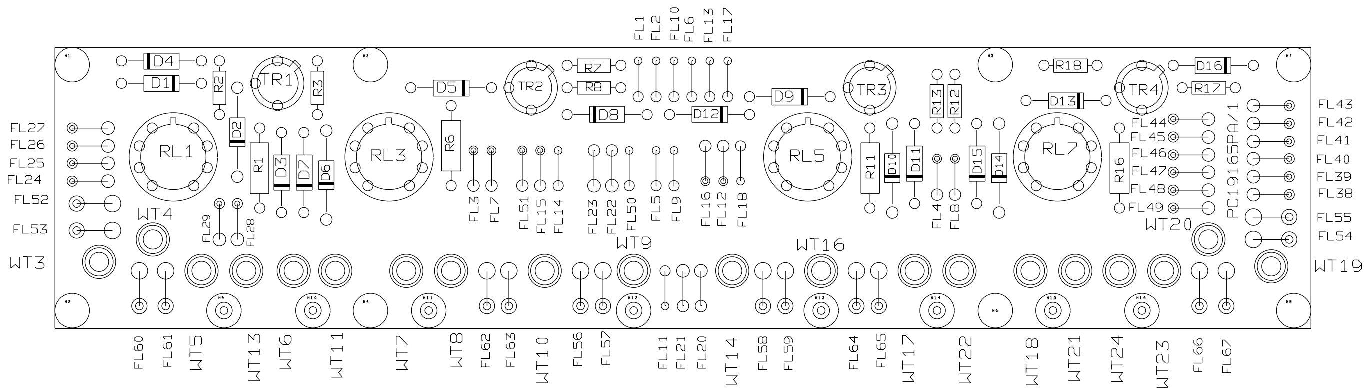
A3-KE-0123-846-00-B

TOTAL NO. OF SHEETS 1

A 3-KE-0123-849-00-A

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



PCB ASSEMBLERS NOTES:

1. USE TRANISPADS 10050 AND WASHERS 10051 FOR RL1,3,5,7 IN ACCORDANCE WITH ISO:SPAS/ELEC/002
2. USE TRANSIPADS 10329 FOR TR1-4 IN ACCORDANCE WITH ISO:SPAS/ELEC/002
3. WT3-11, WT13,14 AND WT16-24 (WIRE TURRET) SHALL BE FITTED IN ACCORDANCE WITH ISO:SPAS/ELEC/002 USING THE DOUBLE SIDED SWAGE METHOD

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
A	13 JAN 00		D.HOWE			FM

USED ON HIRDLS (SCJ 4150)

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

BUS BAR BOARD
PC19165P/1 ASSEMBLY DRAWING

TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
	REMOVE ALL BURRS	DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE m1cro m ✓ UNLESS STATED	0 mm

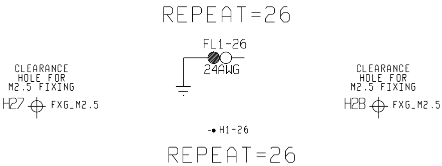
A 3-KE-0123-849-00-A

TOTAL NO. OF SHEETS 1

A 3-KE-0123-849-00-A

A 4-KE-0123-854-00-A

THIS DRAWING CONFORMS TO B.S. 3939



NOTE :

STARPOINT IS ON A CIRCULAR PCB TO ACCOMODATE 26 FLYING LEAD ATTACHMENTS(FL1-26) AND RESPECTIVE STRAIN RELIEF HOLES(H1-26)

WIRE TYPE IS RAYCHEM SPEC 55 , 24 AWG.

A	10/09/99		D.HOWE			FM
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS

USED ON HIRDLS (SCJ4150)

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, DIDCOT, OXON. OX11 0QX

TITLE

STARPOINT (PC19167P/1)

A 4-KE-0123-854-00-A

TOTAL NO. OF SHEETS 1

4-KE-0123-857-00-A

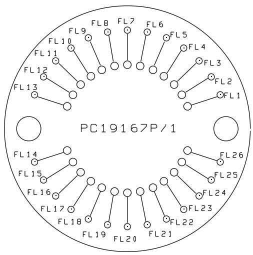
A

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308

PCB MANUFACTURERS NOTES:

1. SEE HARNESS DOCUMENT SP-RAL-152 FOR FLYING LEAD ATTACHMENTS (FL1-26)



A	13/09/99		D.HOWE			FM
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED

FINISH

REMOVE ALL BURRS

ORIGINAL SCALE

DO NOT SCALE

MATERIAL & SPEC

SURFACE TEXTURE micro m

✓ UNLESS STATED

0 mm

USED ON HIRDLS (SCJ4150)

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

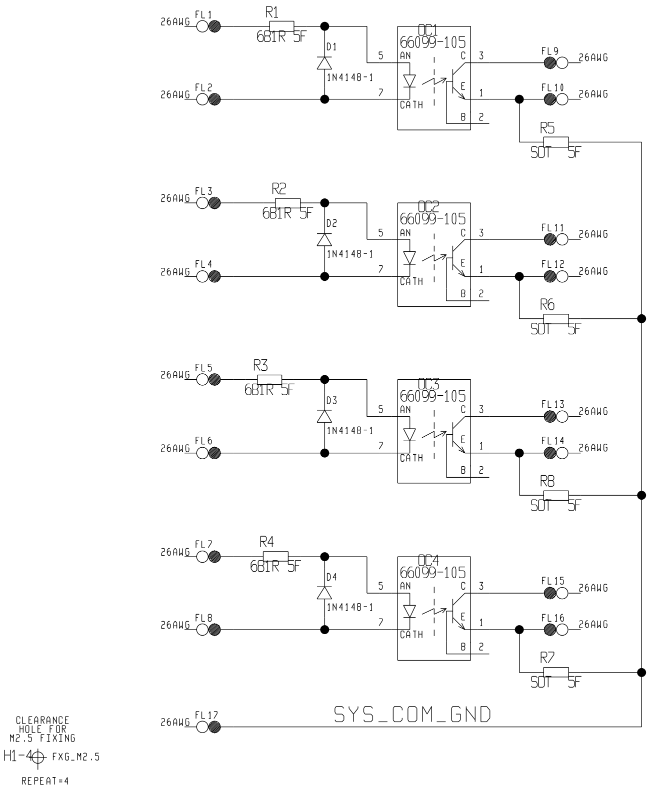
PC19167P /1 ASSEMBLY DRG. (STARPOINT)

A 4-KE-0123-857-00-A

TOTAL NO. OF SHEETS 1

A 4-KE-0123-858-00-A

THIS DRAWING CONFORMS TO B.S. 3939



A	17 DEC 99		D.HOWE			FM
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS

USED ON HIRDLS (SCJ4150)

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RUTHERFORD APPLETON LABORATORY, CHILTON, DIDCOT, OXON. OX11 0QX

TITLE

OPTO BOARD (PC19171P/1)

A 4-KE-0123-858-00-A

TOTAL NO. OF SHEETS 1

4-KE-0123-861-00-A

A

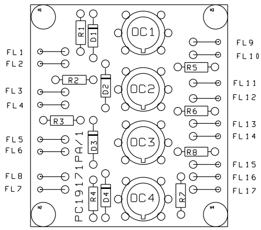
PROJECTION

THIS DRAWING CONFORMS TO B.S. 308

PCB MANUFACTURERS NOTES:

SEE HARNESS DOCUMENT SP-RAL-159 FOR:

1. FLYING LEAD ATTACHMENTS (FL1-17)
2. TRANSIPADS 10328 FOR OC1-4
3. R1-8 ARE RLR05 (S.O.T) BUT MAY REQUIRE WIRE LINKS (26 AWG)



A	20/12/99		D.HOWE			FM
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED

FINISH

REMOVE ALL BURRS

ORIGINAL SCALE

DO NOT SCALE

MATERIAL & SPEC

SURFACE TEXTURE micro m

✓ UNLESS STATED

0 mm

USED ON HIRDLS (SCJ4150)

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RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

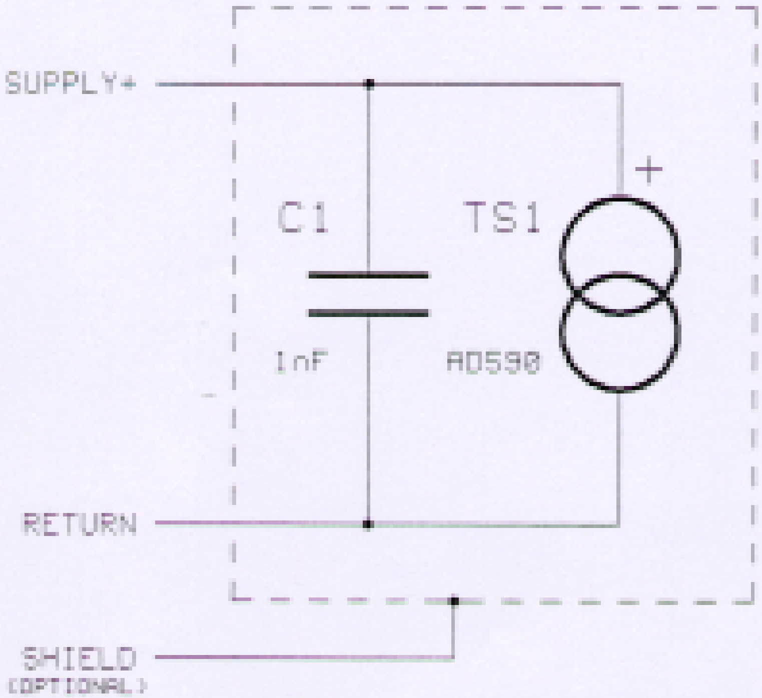
OPTO BOARD

PC19171P /1 ASSEMBLY DRG.

A 4-KE-0123-861-00-A

TOTAL NO. OF SHEETS 1

A	4-KE-0123-862-00-A	THIS DRAWING CONFORMS TO B.S.3939



HIRDLS MASTER DRAWING	
TITLE	SIGNATURE
PROJECT MNGR.	
SYSTEMS ENG.	
ELECTRON ENG.	C A Eley
THERMAL ENG.	N/A
STRESS ENG.	N/A
P.A. GROUP	

BILL OF MATERIALS	
PC BOARD: RAL PC19169P	
TEMP. SENSOR: AD590LF/883B	
CAPACITOR: CDR32BP102BJSS	

ISSUE	DATE	MOD NO.	DRN. BY	CHKD.	APPD.	STATUS
A	08-10-99		C A ELEY			FLIGHT WKG.

USED ON

CAE

Council for the Central Laboratory of the Research Councils

RUTHERFORD APPLETON LABORATORY, CHILTON, DIDCOT, OXFORDSHIRE OX11 0QX

TITLE

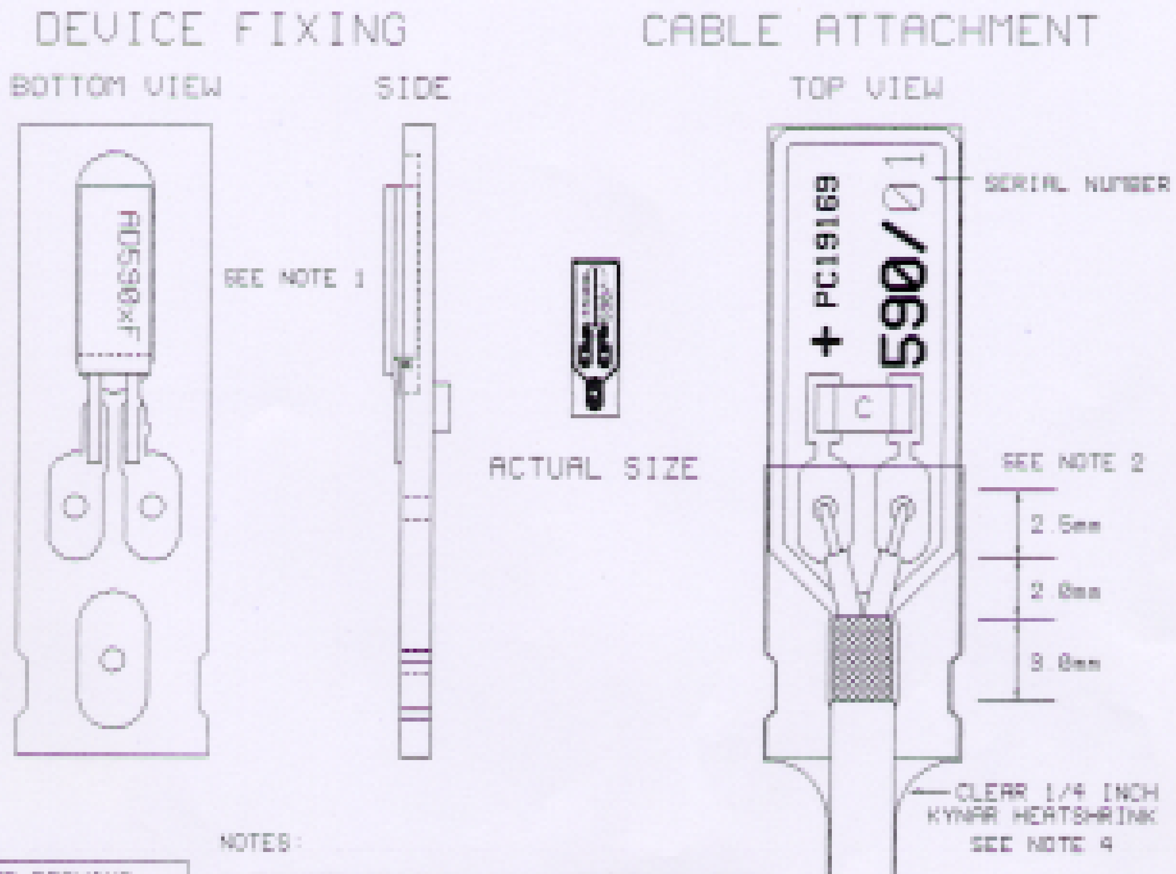
HIRDLS TEMPERATURE SENSOR SCHEMATIC

A 4 — KE — 0123 — 862 — 00 — A

A 4 - KE - 0123 - 864 - 00 - A

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



HIRDLS MASTER DRAWING	
TITLE	SIGNATURE
PROJECT MNGR.	[signature]
SYSTEMS ENG.	
ELECTRON. ENG.	C.A. Eley
THERMAL ENG.	N/A
STRESS ENG.	N/A
P.A. GROUP	[signature]

NOTES:

1. TRIM AD590 LEADS TO 3mm, DEGOLD THEN BEND INTO RECESS WITH SCOTCHWELD 2216 EPOXY. ENSURE THAT STEP (*) WHERE LEADS JOIN DEVICE BODY IS FILLED (POTENTIAL WEAK POINT) WHEN CURED, SOLDER LEADS TO PADS WITH MINIMUM MENISCUS
2. PREPARE CABLE AS SHOWN, SOLDER BRAID TO LARGE PAD BEND WIRES THROUGH HOLES, CUT OFF FLUSH WITH UNDERSIDE AND SOLDER TO TOP SURFACE PADS (AVOID SOLDER PROTRUSION ON UNDERSIDE) N.B. UNSCREENED WIRE CAN ALSO BE USED
3. INSTALL SMD CAPACITOR (C) AS SHOWN. DEFLUX ASSEMBLY
4. FIT KYNAR HEATSHRINK TAKING CARE NOT TO OVERHEAT SENSOR INSCRIBE SERIAL NUMBER AT SPACE INDICATED

ISSUE	DATE	MOD NO.	DRN. BY	CHKD.	APPD.	STATUS
A	08-10-99		C.A.ELEY			FLIGHT WKG.

TOLERANCES UNLESS STATED: +- 0.2mm

FINISH: CLEAN
REMOVE ALL BURRS

ORIGINAL SCALE 4:1
DO NOT SCALE

0 10 mm

MATERIAL & SPEC.: EPOXY-GLASS FR-4

SURFACE TEXTURE µm: UNLESS STATED

USED ON HIRDLS PCU

CAE

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Central Laboratory of the Research Councils
RUTHERFORD APPLETON LABORATORY, CHILTON, DIDCOT, OXON OX11 0QX

TITLE

AD590 TEMPERATURE SENSOR BOARD PC19169P

ASSEMBLY DRAWING

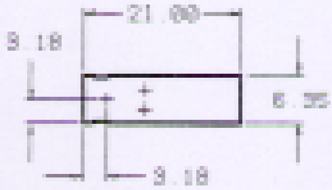
A 4 - KE - 0123 - 864 - 00 - A

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308

NOTE:

SEE DRG. KE-0123-865-02
FOR TOP & BOTTOM TRACKS
AND FULL DIMENSIONS



	DRILL TABLE (FINISHED)			
Tool	Symbol	Size	Plated	Qty
T01	+	0.8 mm	P	3

LAYER STRUCTURE		
LAYER	FILENAME	DRAWING NO.
TOP TRACKS	PC19169R.001	KE-0123-865-02
BOTTOM TRACKS	PC19169P.002	KE-0123-865-02
APERTURES	PC19169P.00A	N/A

PCB MANUFACTURING DETAILS

1. TO BE RELEASED TO : MIL-PRF-55110 REV.F
2. MATERIAL / STYLE : FR4 / 2 LAYERS
3. FINAL PCB THICKNESS : 1.0 mm
4. BASE COPPER : 35 μm
5. FINAL COPPER : PLATED TO 70 μm
6. FINISH : HOT AIR SOLDER COAT
7. RELEASE DOCUMENT : CERT. OF CONFORMITY

A	13-10-99		C.A.ELEY			FLIGHT WKG.
ISSUE	DATE	MOD NO.	DRN. BY	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED +- 0.2 mm OVERALL SIZE +0.001/-0.002 INCH TRACKS & PADS	FINISH CLEAN REMOVE ALL BURRS	ORIGINAL SCALE 1:1 DO NOT SCALE
MATERIAL & SPEC. EPOXY-GLASS FR-4	SURFACE TEXTURE μm ✓ UNLESS STATED	0 40 mm
USED ON HIRDLS PCU		CAE © CLRC 1999

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TITLE **AD590 TEMPERATURE SENSOR BOARD PC19169P**

MANUFACTURING DRAWING (SHEET 1 OF 2)

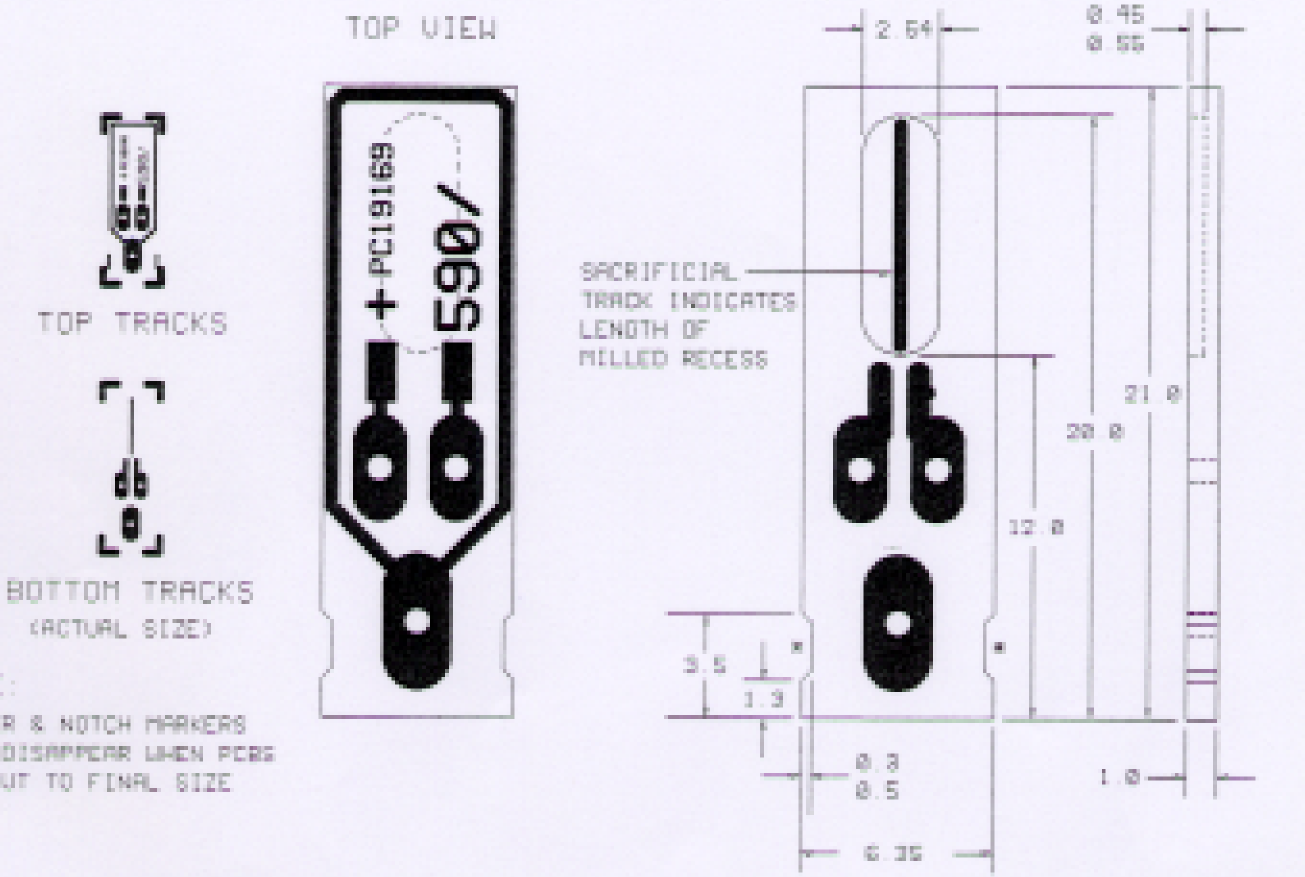
A4 — KE — 0123 — 865 — 01 — A

A 4- KE- 0123 —865 —01 —A

A4-KE-0123-865-02-A

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



NOTE:
CORNER & NOTCH MARKERS WILL DISAPPEAR WHEN PCBS ARE CUT TO FINAL SIZE

HIRDLS MASTER DRAWING	
TITLE	SIGNATURE
PROJECT MNGR	[signature]
SYSTEMS ENG	
ELECTRON. ENG	[signature]
THERMAL ENG	N/A
STRESS ENG.	N/A
P.A. GROUP	[signature]

NOTES:
1. * EXACT DIMENSIONS AND LOCATION OF NOTCHES IS NOT CRITICAL
2. TAKE CARE TO PREVENT DELAMINATION WHEN CUTTING BOARDS TO SIZE
3. AVOID DAMAGE TO TINNED SURFACES
4. SEE DRG. KE-0123-865-01 FOR MORE INFO.

ISSUE	DATE	MOD NO.	DRN. BY	CHKD.	APPD.	STATUS
A	13-10-99		C.A.ELEY			FLIGHT WKG.

TOLERANCES UNLESS STATED: +- 0.2mm

FINISH: CLEAN — REMOVE ALL BURRS

ORIGINAL SCALE 4:1 — DO NOT SCALE

MATERIAL & SPEC.: EPOXY-GLASS FR-4

SURFACE TEXTURE μm: ✓ UNLESS STATED

0 10 mm

USED ON: HIRDLS PCU

CAE

Council for the Central Laboratory of the Research Councils

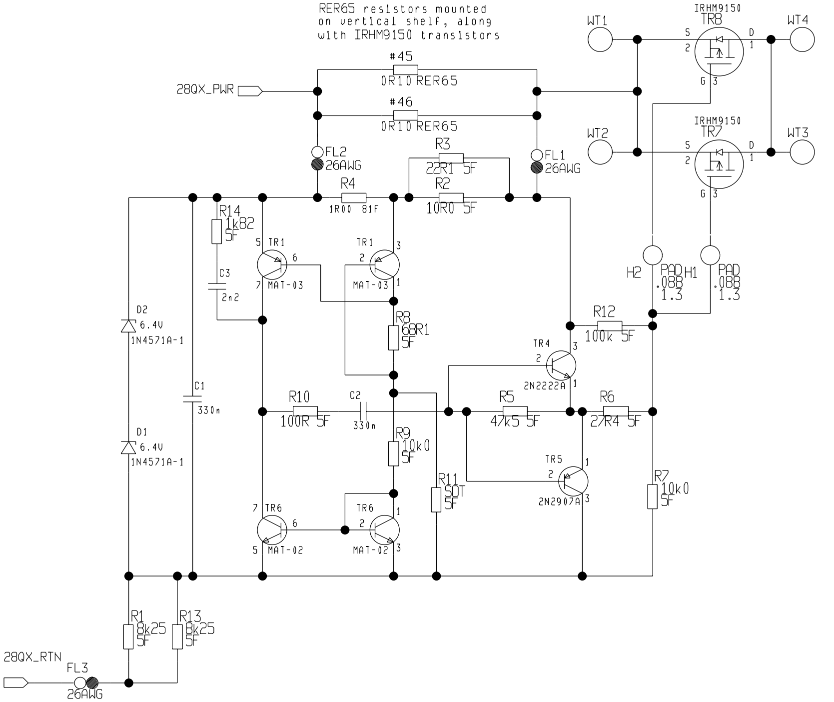
RUTHERFORD APPLETON LABORATORY, CHILTON, DIDCOT, OXON OX11 0QX

TITLE: **AD590 TEMPERATURE SENSOR BOARD** **PC19169P**

MANUFACTURING DRAWING (SHEET 2 OF 2)

A4 - KE - 0123 - 865 - 02 - A

A	4-KE-0123-870-00-D	THIS DRAWING CONFORMS TO B.S. 3939



MOUNTING HOLES

H7	H8	H6	H5	H3	H4	H9	H10
FXG_6.0	FXG_6.0	FXG_2.1mm	FXG_2.1mm	FXG_2.1mm	FXG_2.1mm	FXG_2.1mm	FXG_2.1mm

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
D	10/04/01	KE3234	D.HOWE			FM
C	26/03/00	KE3204	D.HOWE			FM
B	20/02/00	KE3199	D.HOWE			FM

USED ON HIRDLS PCU FLIGHT MODEL

CCLRC
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RUTHERFORD APPLETON LABORATORY, CHILTON, DIDCOT, OXON. OX11 0QX

TITLE

CURRENT TRANSIENT LIMITER

(PC19168P/1)

A 4 - KE - 0123 - 870 - 00 - D

TOTAL NO. OF SHEETS 1

A 3-KE-0123-873-00-C

PCB ASSEMBLERS NOTES:

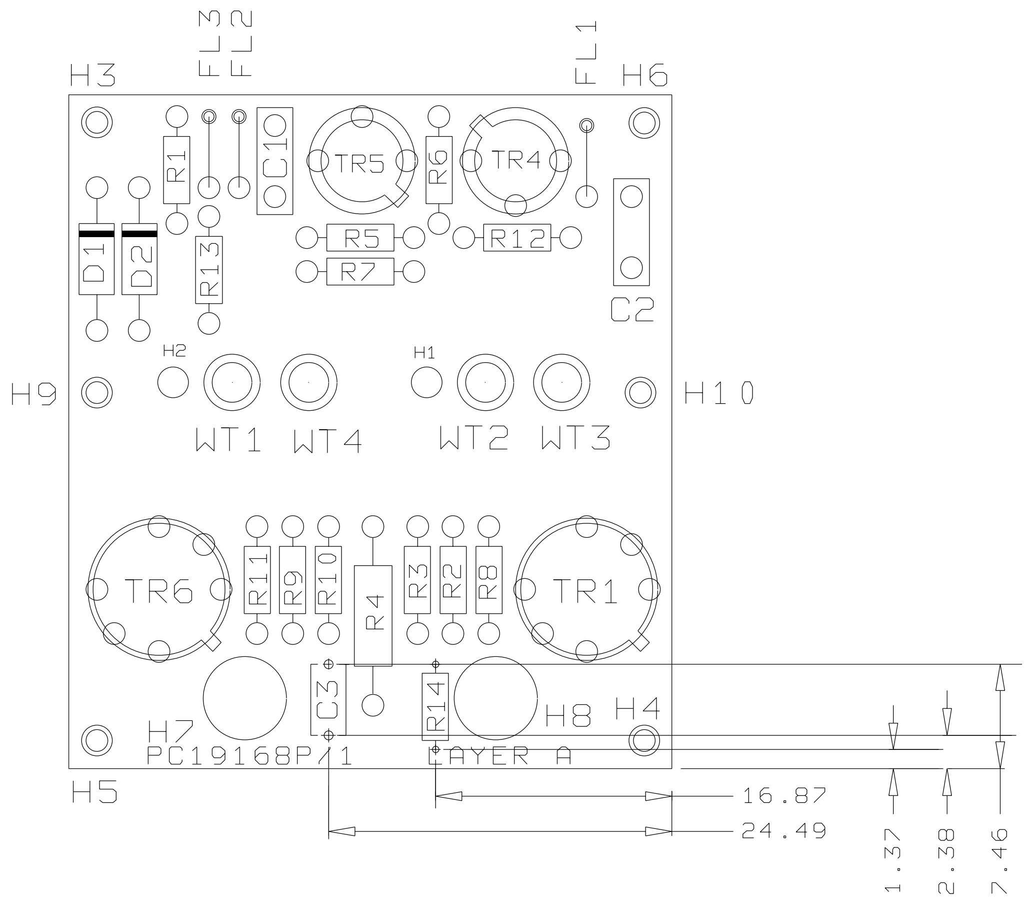
PROJECTION

THIS DRAWING CONFORMS TO B.S. 308

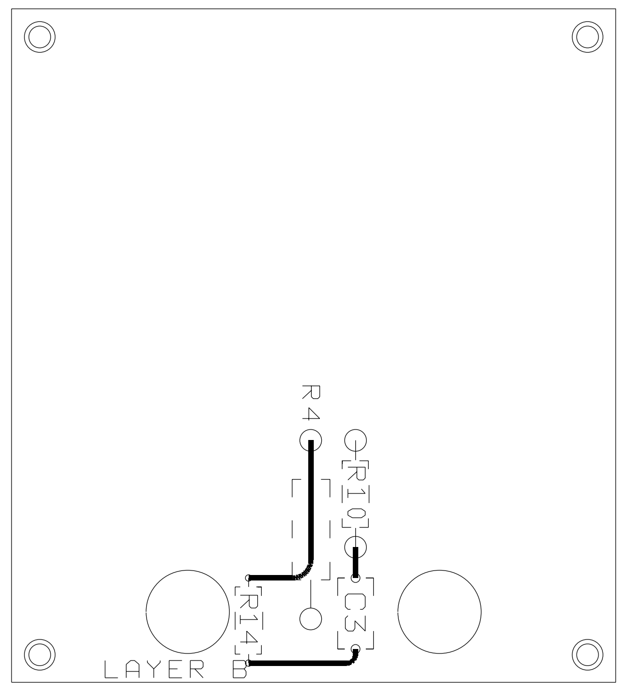
1. SEE MANUFACTURING LOGBOOK (PC19168P/1) SECTION 5 "SPECIAL INSTRUCTIONS" FOR ASSEMBLY PROCEDURES

PROCEDURES COVER
FLYING LEAD ATTACHMENTS(FL1-3) ,TR1 AND TR6 TRANSIPADS 10329, TR4 AND TR5 TRANSIPADS 10328

"TOP FACE" SCALE 2:1



"BOTTOM FACE" SCALE 2:1



3. USE 55A0112-26-9 (26AWG) WIRE FOR THE LINKS INDICATED

2. ADDITION OF C3 AND R14

DRILL HOLES AS DIMENSIONED (C3=0.7mm , R14=0.5mm)
STAKE PARTS TO THE PCB USING SCOTCH-WELD 2216.

ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
C	10/04/01	KE3234	D.HOWE			FM
B	26/03/00	KE3204	D.HOWE			FM
A	13/01/00		D.HOWE			FM

USED ON HIRDLS (SCJ4150)

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

PC19168P/1 ASSEMBLY DRAWING
(CURRENT TRANSIENT LIMITER)

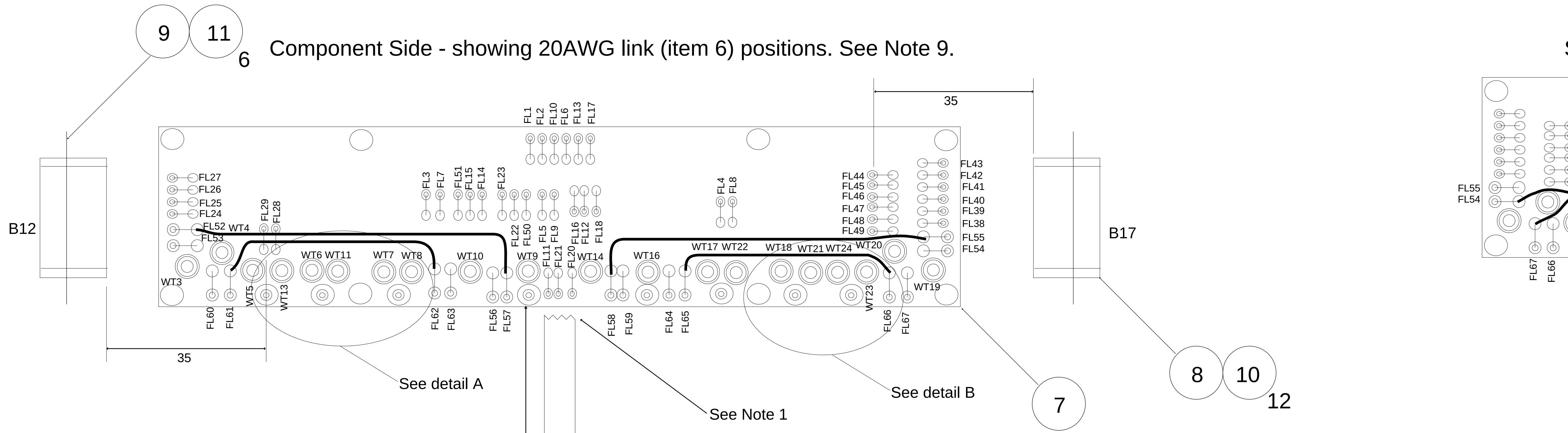
TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
	REMOVE ALL BURRS	DO NOT SCALE
MATERIAL & SPEC	SURFACE TEXTURE micro m ✓ UNLESS STATED	0 mm

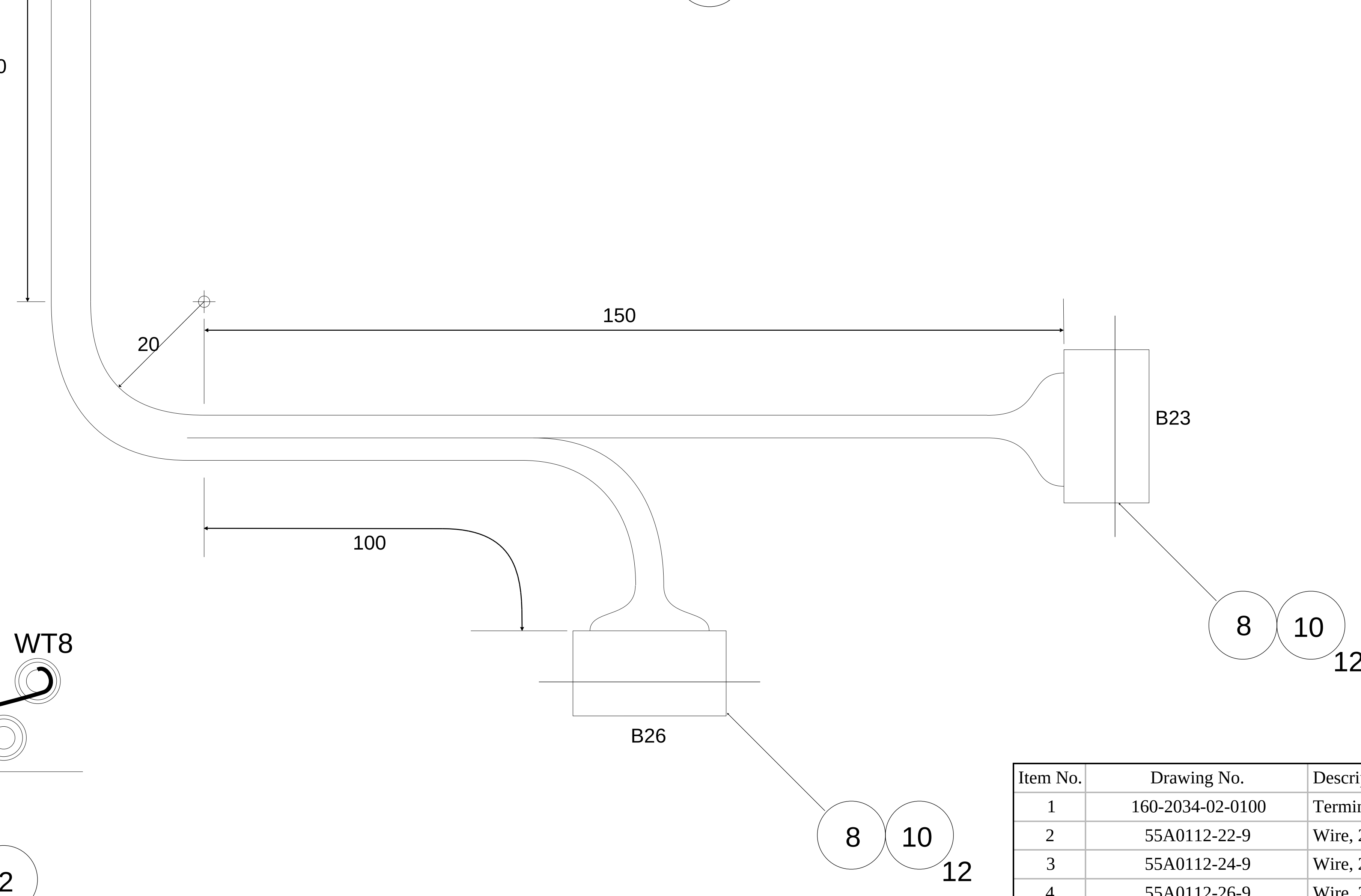
A 3-KE-0123-873-00-C

TOTAL NO. OF SHEETS 1

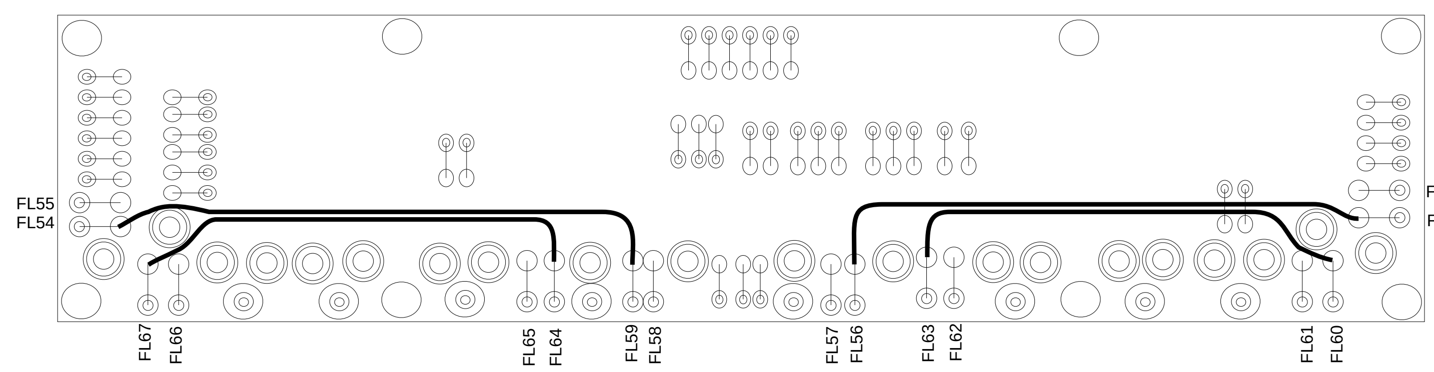
A 3-KE-0123-873-00-C

Component Side - showing 20AWG link (item 6) positions. See Note 9.

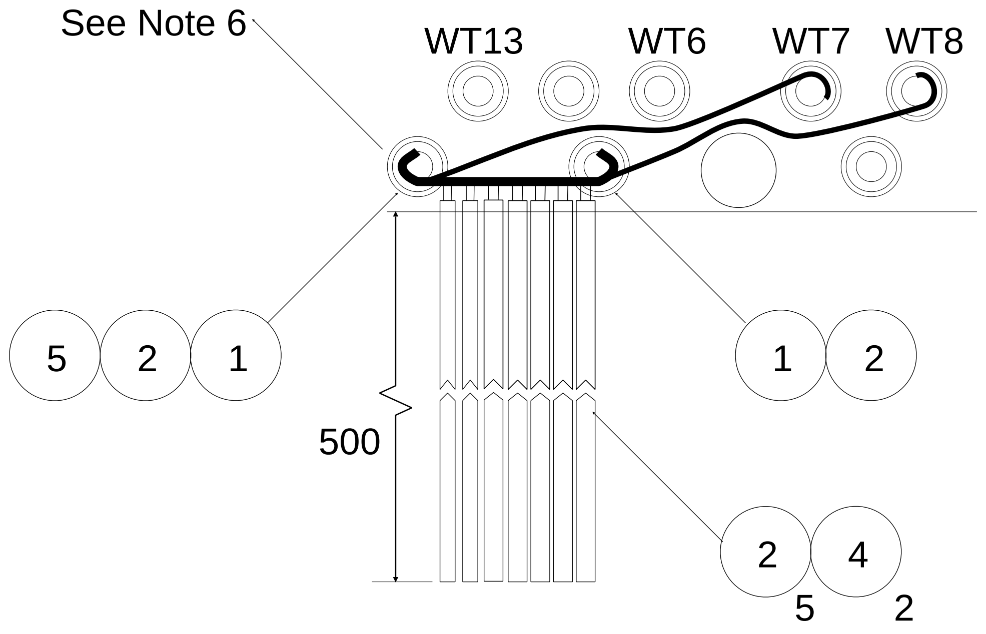




Solder Side - showing 20AWG link (item 6) positions. See Note 9.



Detail A
Scale 2:1



Detail B
Scale 2:1

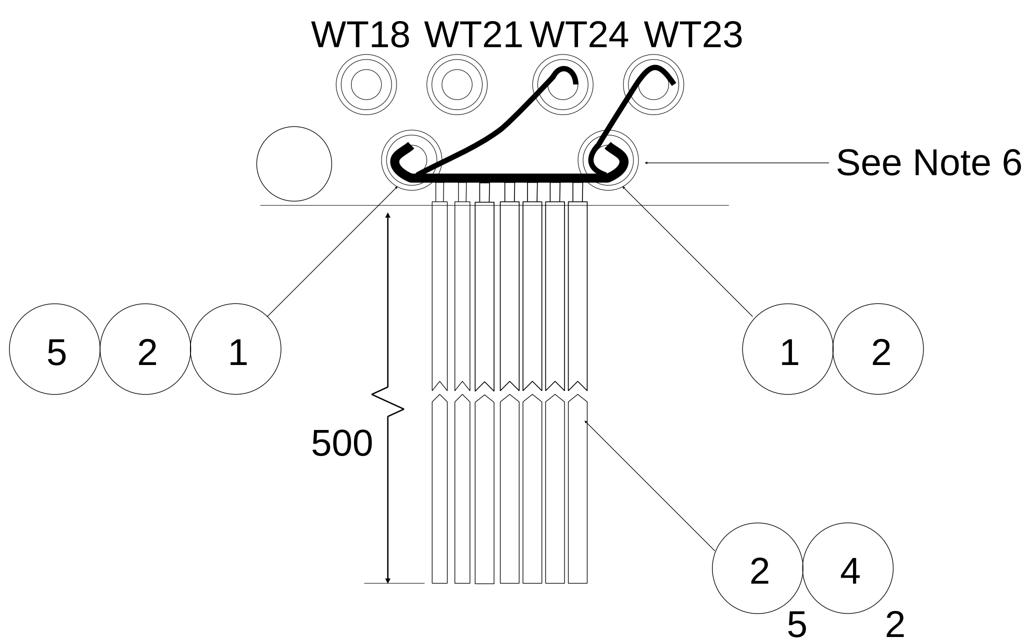


Table 1

Wire	Terminal	Connector	Pin	Wire Gauge	Signal
1	FL1	B26	17	26	QBB_PR_ON
2	FL2	B26	7	26	QBB_RR_ON
3	FL3	B23	14	24	+28QB_PWR (post current limit)
4	FL4	B23	10	24	+28QA_PWR (post current limit)
5	FL5	B26	21	26	+15V
6	FL6	B26	20	26	0V
7	FL7	B23	5	24	+28QB_PWR (post current limit)
8	FL8	B23	1	24	+28QA_PWR (post current limit)
9	FL9	B26	24	26	+15V
10	FL10	B26	23	26	0V
11	FL11	B26	10	26	+28QC_PWR Bus
12	FL12	B23	11	24	+28QA_RTN
13	FL13	B26	18	26	QBA_RR_ON
14	FL14	B26	22	26	+28QB_RTN
15	FL15	B23	4	24	+28QB_RTN
16	FL16	B23	2	24	+28QA_RTN
17	FL17	B26	26	26	QBA_PR_ON
18	FL18	B26	1	26	+28QA_RTN
19	FL20	B23	7	22	+28QC_PWR Bus
20	FL21	B23	16	22	+28QC_PWR Bus
21	FL22	B23	8	22	+28QC_RTN Bus
22	FL23	B23	17	22	+28QC_RTN Bus
23	FL24	B12	5	22	+28QC_PWR Bus
24	FL25	B12	11	22	+28QC_PWR Bus
25	FL26	B12	6	22	+28QC_PWR Bus
26	FL27	B12	12	22	+28QC_PWR Bus
27	FL28	B12	4	22	+28QC_RTN Bus
28	FL29	B12	10	22	+28QC_RTN Bus
29	FL38	B17	2	22	+28QC_PWR Bus
30	FL39	B17	4	22	+28QC_PWR Bus
31	FL40	B17	6	22	+28QC_PWR Bus
32	FL41	B17	8	22	+28QC_PWR Bus
33	FL42	B17	20	24	+28QC_PWR Bus
34	FL43	B17	21	24	+28QC_PWR Bus
35	FL44	B17	3	22	+28QC_RTN Bus
36	FL45	B17	5	22	+28QC_RTN Bus
37	FL46	B17	7	22	+28QC_RTN Bus
38	FL47	B17	9	22	+28QC_RTN Bus
39	FL48	B17	22	24	+28QC_RTN Bus
40	FL49	B17	23	24	+28QC_RTN Bus
41	FL50	B26	11	26	+28QC_RTN Bus
42	FL51	B23	13	24	+28QB_RTN

Item No.	Drawing No.	Description	Qty	Remarks
1	160-2034-02-0100	Terminal post	4	
2	55A0112-22-9	Wire, 22AWG	A/R	
3	55A0112-24-9	Wire, 24AWG	A/R	
4	55A0112-26-9	Wire, 26AWG	A/R	
5	IEC317-13 Grade 2 2.0mm	Wire, Tauramide 200, 2mm	A/R	
6	MTV 1/20/A AQ	Wire, Filotex, 20AWG	A/R	
7	PC19165	Busbar PCB	1	
8	SDD26F0000G	Connector, D-Type, Skt, 26way	3	B17, B23 & B26
9	SND15F0000G	Connector, D-Type, Skt, 15way	1	B12
10	FC8022D-50-1202.0	Connector, D-type, DD crimp sockets	36	for item 8
11	FC6020D-50-1202.1	Connector, D-type, ND crimp sockets	6	for item 9

Notes:

1) The central cable bundle shall be positioned 20mm above the plane of the PCB (item 7).
2) The connectors (items 8 & 9) shall be wired to item 7 in accordance with Table 1.
3) Item 1 shall be swaged in accordance with ISO:SPAS/ELEC/002 using single sided PCB method.
4) The wiring from FL38 to FL49 (connecting to B17) shall exit on the solder side of the PCB and be routed to the board edge at FL66. From this point the wires are routed to the connector passing over and WT20 and FL39.
5) The wiring from FL24 to FL29 (connecting to B12) shall exit on the solder side of the PCB and be routed to the board edge at FL61. From this point the wires are routed to the connector passing over and WT4 and FL24.
6) The Busbars (details A & B) shall have item 5 (2mm wire, insulation removed & wire tinned) connected to the bottom of the post (item 1). The 22AWG wires to the WT terminals shall be connected at the top of the post.
7) All items on the on the solder side of the PCB shall have a height less than 3mm.
8) The completed assembly shall be cleaned in accordance with ISO:SPAS/ELEC/004, mounting holes masked with Kapton tape and be conformally coated in accordance with ISO:SPAS/ELEC/003.
9) Wire links to be staked every 25mm using Scotchweld 2216, see ISO:SPAS/ELEC/002.

ISSUE	DATE	MOD NO	DRN BY	CHKD	APPD	STATUS
B	6 April 2000	KE3207	C Howe			FM
A	29 Feb 2000		C Howe			FM

TOLERANCES UNLESS STATED: +5, -0

FINISH: CLEAN — REMOVE ALL BURRS

ORIGINAL SCALE: DO NOT SCALE

MATERIAL & SPEC

SURFACE TEXTURE μm — UNLESS STATED

0 — 40 mm

USED ON: Hirdls (SCJ4150)

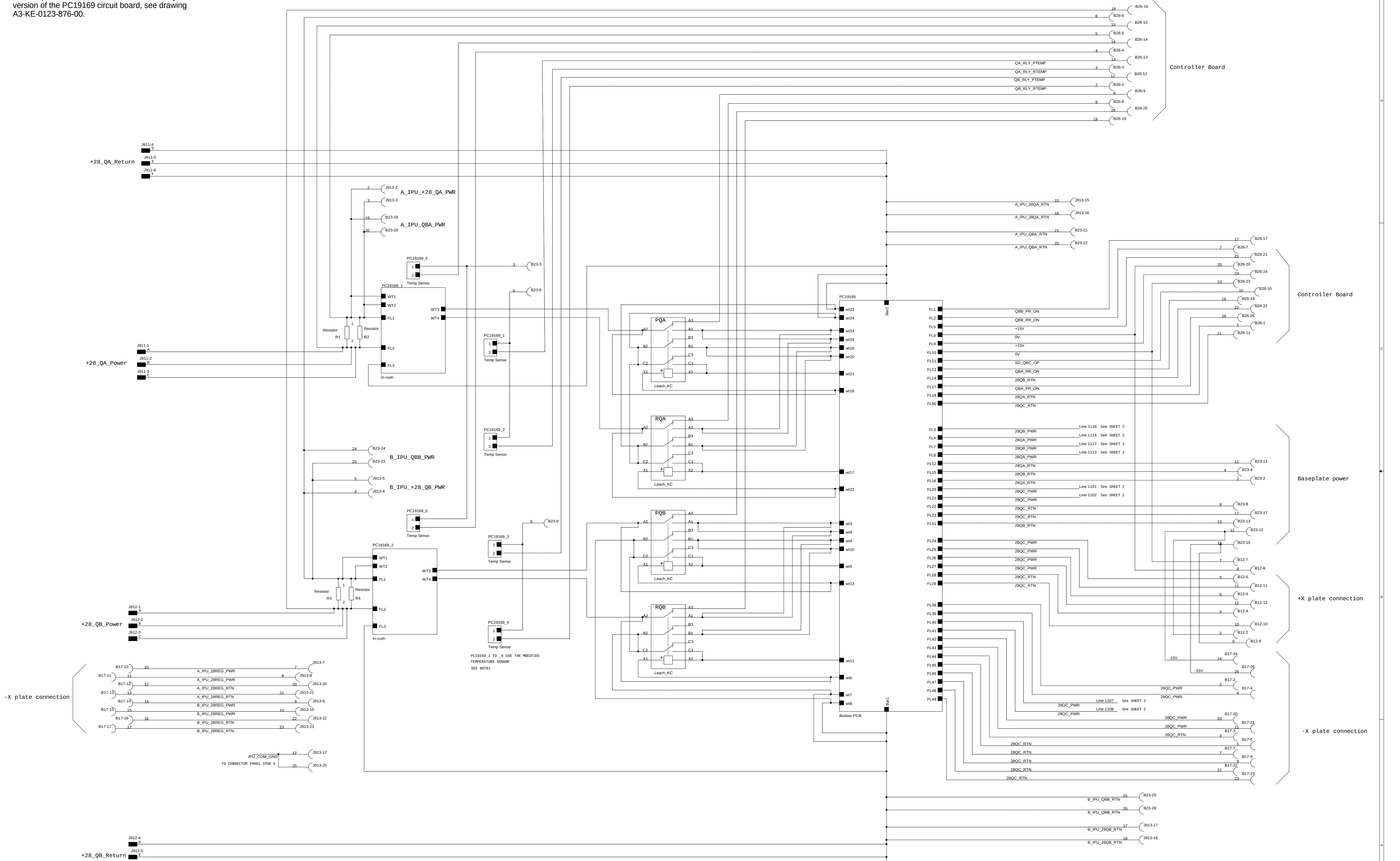
Council for the Central Laboratory of the Reseach Councils — Rutherford Appleton Laboratory, Chilton, Didcot, Oxon. OX11 0QX

TITLE

Busbar Sub-assembly

A 2-KE-0123-874-00-B

NOTE1: The temperature sensor used on this assembly is a modified version of the PC19169 circuit board, see drawing A3-KE-0123-876-00.



ISSUE	DATE	MOD. NO.	DRAWN	CHECKED	APPROVED	STATUS
B	16 APR 2001	KE3227	J FIRTH			FM
A	28 FEB 2000		C. HOWE			FM

USED ON HIRDLS (SCJ4150)

CCLRC

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX110QX

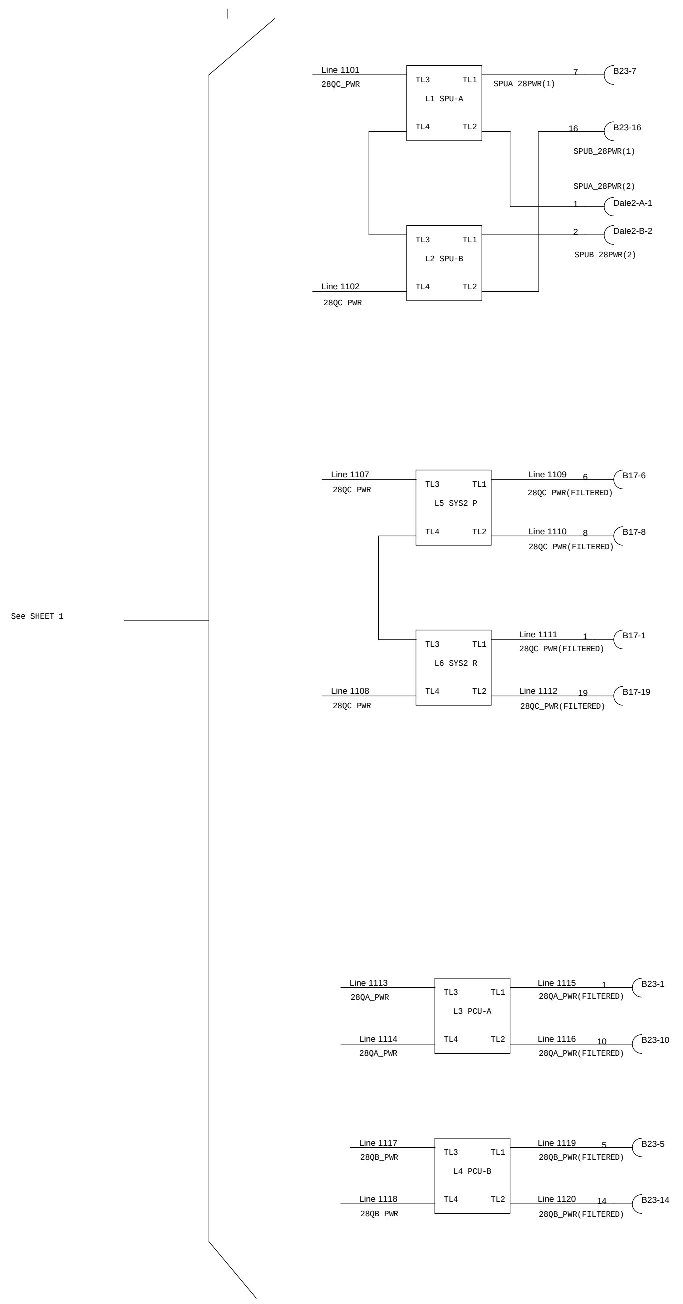
TITLE

Connector Plate Assembly Circuit Diagram

A 1-KE-0123-875-01- B

Monday, April 16, 2001

TOTAL NO. OF SHEETS 2



ISSUE	DATE	MOD. NO.	DRAWN	CHECKED	APPROVED	STATUS
B	16 APR 2001	KE3227	J FIRTH			FM
A	28 FEB 2000		C.HOWE			FM

USED ON HIRDLS (SCJ4150)

CCLRC RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX110QX

TITLE

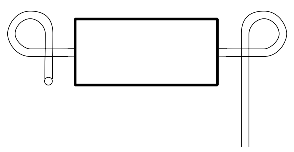
Connector Plate Assembly Circuit Diagram

A 1-KE-0123-875-02- B

Monday, April 16, 2001

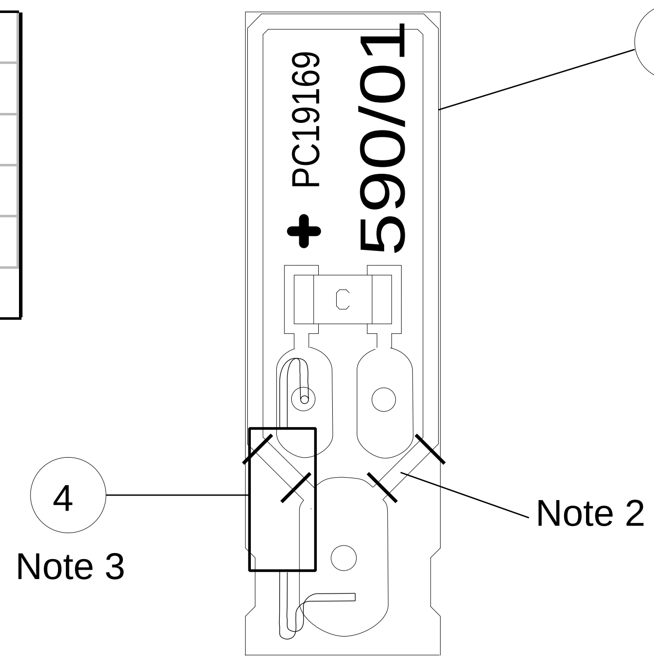
TOTAL NO. OF SHEETS 2

Item No.	Drawing No.	Description	Qty	Remarks
1	4-KE-0123-864	AD590 Temperature sensor board	1	
2	55A0112-26-9	Wire, 26AWG	A/R	
3		Heatshrink, Kynar, 1/4 inch	A/R	
4	RLR05C1502FS	Resistor, 15K, 1%, 1/8W	1	R1
5		Heatshrink, Kynar, 1/8 inch	A/R	

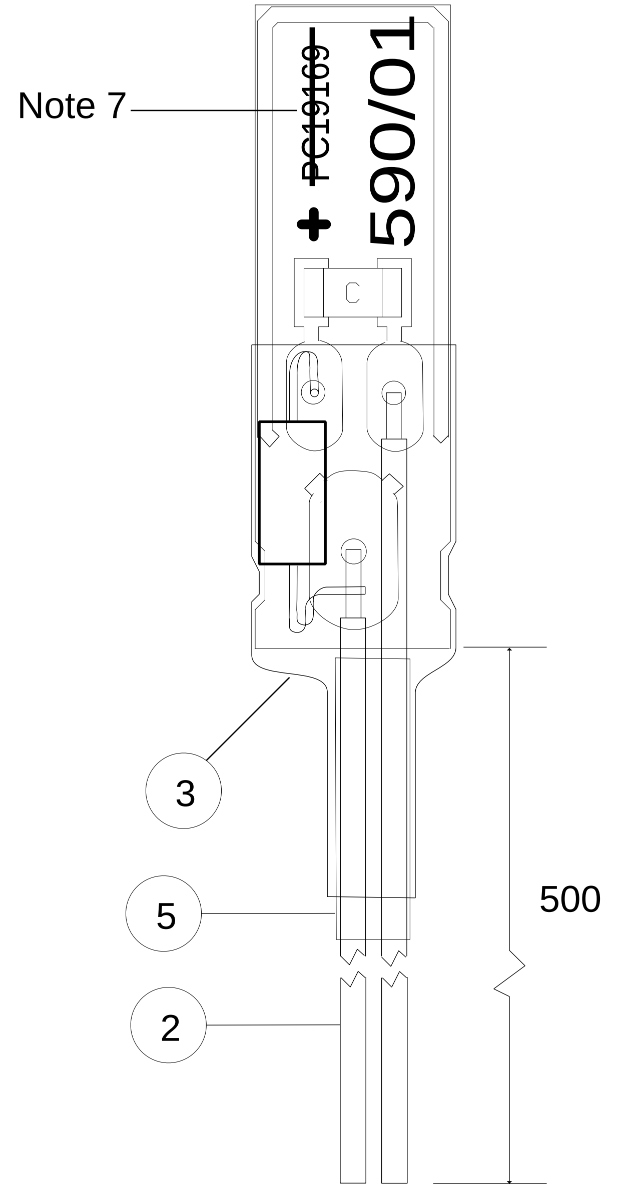


Detail A
Example of resistor lead forming

PCB Modifications



Wire Termination, Note 5.



Notes:
1) If necessary, remove the Kynar Heatshrink and wires from item 1 before commencing modifications.
2) Cut tracks (4 places) in the positions shown and remove the portion of track between the cuts.
3) Bend resistor leads (item 4) as shown in Detail A. Fit to item 1 in position shown. Ensure that the lead going to the pad connected to the capacitor is cut flush with the underside of the PCB.
4) The resistor (item 4) shall be 'staked' to the board using Scotch-Weld 2216 in accordance with ISO:SPAS/ELEC/002.
5) Fit wire (item 2) as shown, trim off excess wire flush with the underside of the PCB.
6) Fit Kynar heatshrink in location shown taking care not to overheat sensor.
7) Mark part by scribing a single line through 'PC19169' text.
8) Clean PCB in accordance with ISO:SPAS/ELEC/004 and conformally coat the side of the PCB with the part marking on in accordance with ISO:SPAS/ELEC/003.

ISSUE	DATE	MOD NO.	DRN. BY	CHKD.	APPD.	STATUS
A	29 Feb 2000		C.J.Howe			FM

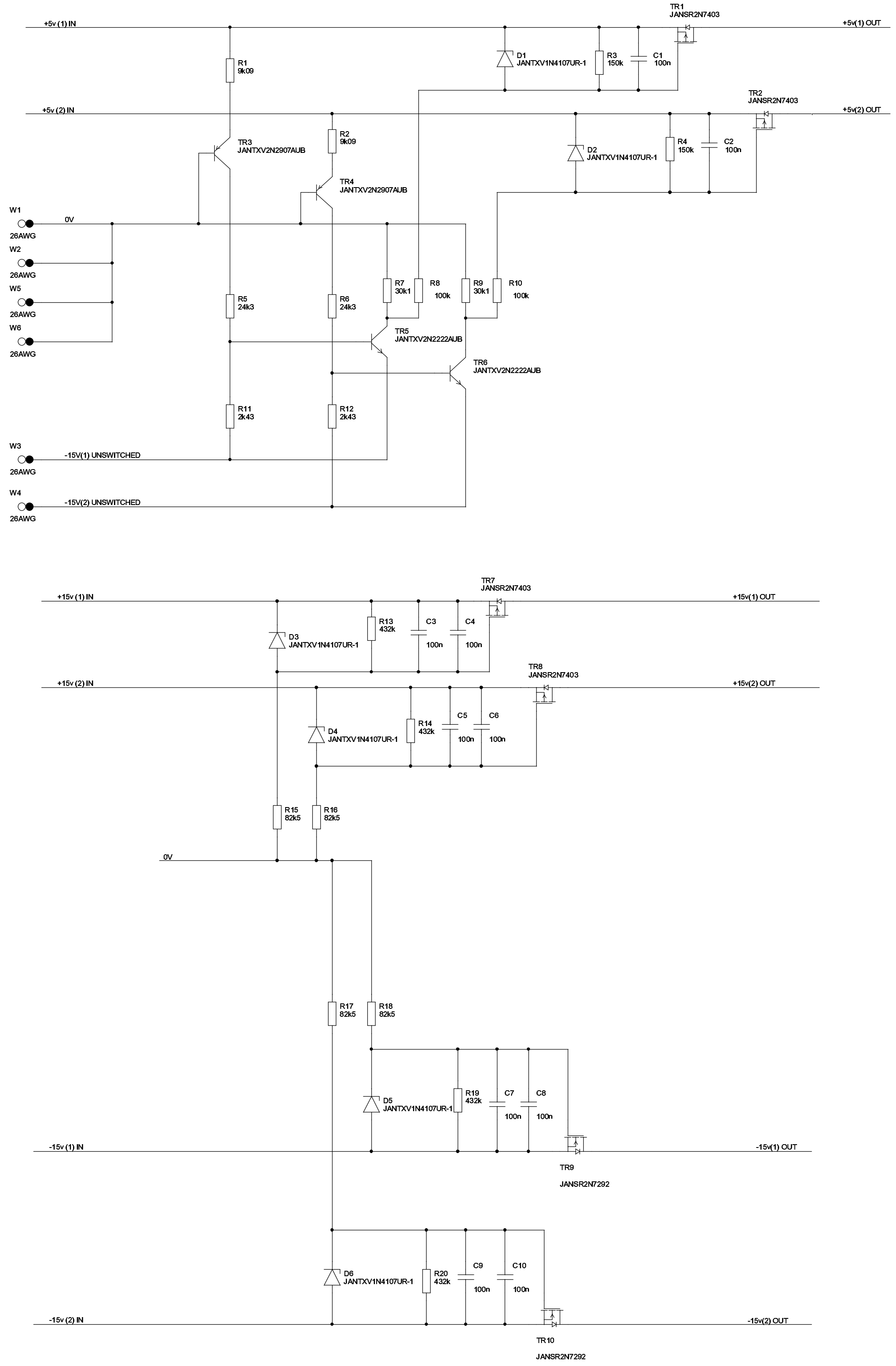
TOLERANCES UNLESS STATED +5, -0
FINISH CLEAN REMOVE ALL BURRS
ORIGINAL SCALE 4:1 DO NOT SCALE
MATERIAL & SPEC.
SURFACE TEXTURE μm UNLESS STATED
0 40 mm

USED ON HIRDLS (SCJ4150)

Council for the Central Laboratory of the Reseach Councils Rutherford Appleton Laboratory, Chilton, Didcot, Oxon. OX11 0QX

TITLE
AD590 Temperature Sensor & Resistor Assembly

A 3-KE-0123-876-00-A



NOTE 1: -X PLATE
SOFT STARTS ARE PROVIDED FOR EEA 5V, +15V AND -15V SUPPLIES.
0V INPUTS ARE CONNECTED TO PCU INT 0V.
-15V(1) AND -15V(2) ARE CONNECTED TO PCU INT -15V SUPPLY.

NOTE 2: BASE PLATE
SOFT STARTS ARE PROVIDED FOR SPU 5V, +15V AND -15V SUPPLIES.
0V INPUTS ARE CONNECTED TO SPU GND.
-15V(1) AND -15V(2) ARE CONNECTED TO SPU -15V CONVERTOR OUTPUTS.

NOTE 3:
CONTROLLED SUPPLIES ENTER AND LEAVE SOFT START CIRCUIT VIA FET SOURCE AND DRAIN LEADS.

ISSUE	DATE	MOD.No.	DRN.BY.	CHKD.	APPD.	STATUS
B	21-Feb-01	KE-3220	J G FIRTH			FM
A	25-Jan-01		J G FIRTH			

USED ON

CCLRC

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX

TITLE

HIRDLS PCU OUTPUT SOFT START -X

A 1-KE-0123-880-00-B

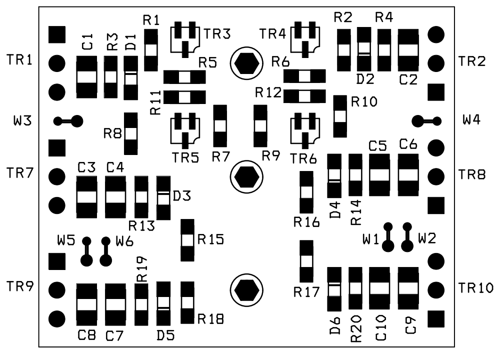
Wednesday, February 21, 2001

TOTAL NO. OF SHEETS 1

A | 3-KE-0123-883-00-B

PROJECTION

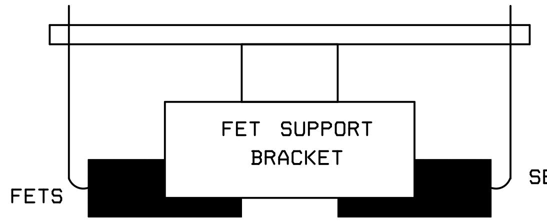
THIS DRAWING CONFORMS TO B.S.308



PCB ASSEMBLERS NOTES:

1. ASSEMBLE IN ACCORDANCE WITH ISO:SPAS/ELEC/002
2. TR1,2,7,8,9,10 ARE NOT MOUNTED DIRECTLY ONTO THIS PCB
   THEY WILL BE MOUNTED ONTO THE "FETS SUPPORT -X" (A3-KE-0123-147-A) BRACKET
   WITH THEIR LEGS BENT UP AT 90 DEGREES AND SOLDERED IN PLACE AS SHOWN

NOTE: NOT TO SCALE



B	22/02/01	KE-3220	D.HOWE			FM
A	30/01/01		D.HOWE			FM
ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS

USED ON : HIRDLS (SCJ4150)

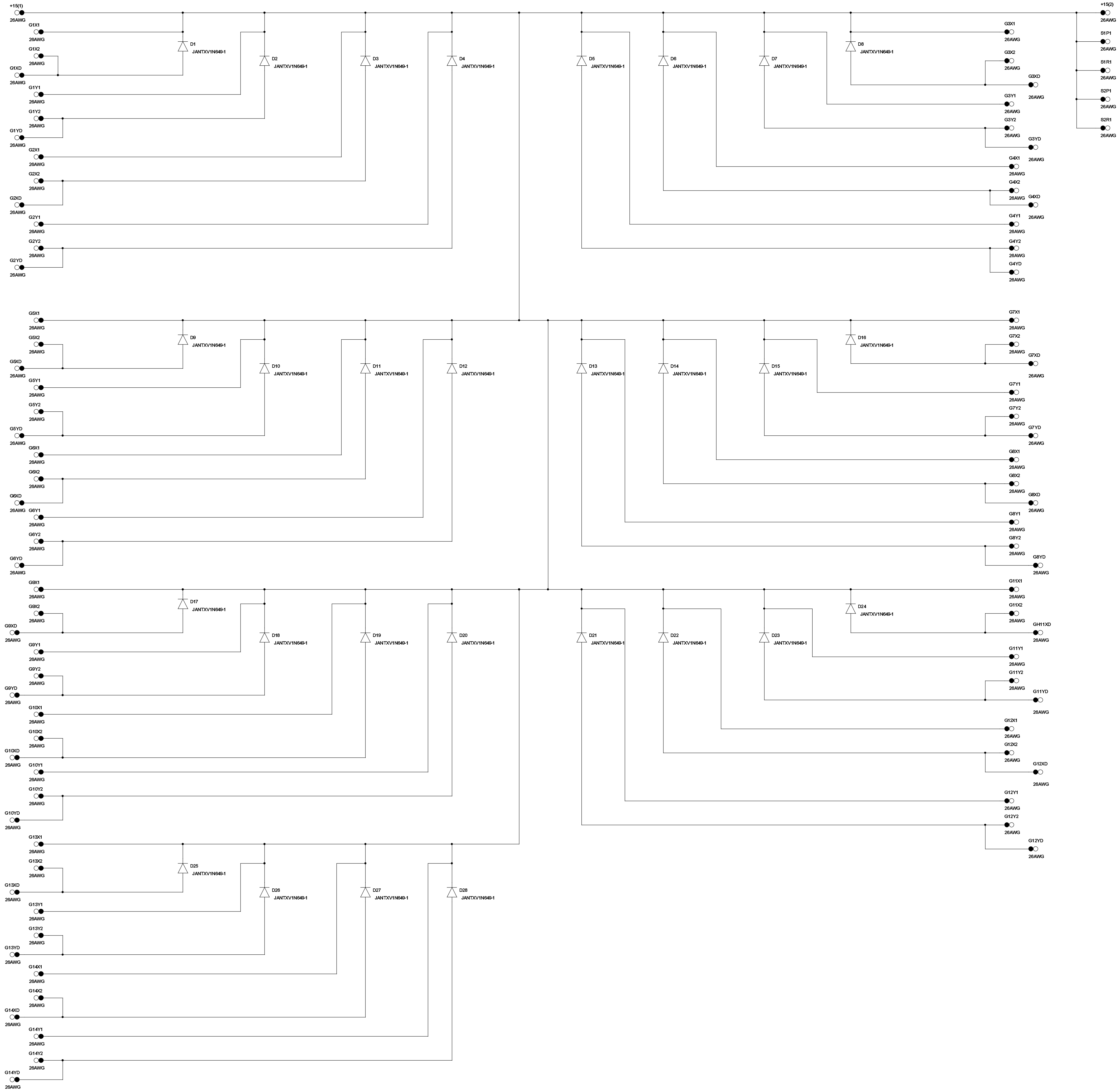
THE COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
	REMOVE ALL BURRS	1:1 DO NOT SCALE
MATERIAL & SPEC.	SURFACE TEXTURE um	0 — 50 mm
	✓ UNLESS STATED	

TITLE
HIRDLS PCU OUTPUT SOFT START -X (PC19191P/1)
ASSEMBLY DRAWING

A | 3-KE-0123-883-00-B

A 3-KE-0123-883-00-B



ISSUE	DATE	MOD.No.	DRN.BY.	CHKD.	APPR.	STATUS
A	20-Jan-01		J G FIRTH			

USED ON

CCLRC

© CCLRC 1999

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX

TITLE

HIRDLS RELAY DIODE BOARD -X

A 1-KE-0123-884-00-A

Tuesday, January 23, 2001

TOTAL NO. OF SHEETS

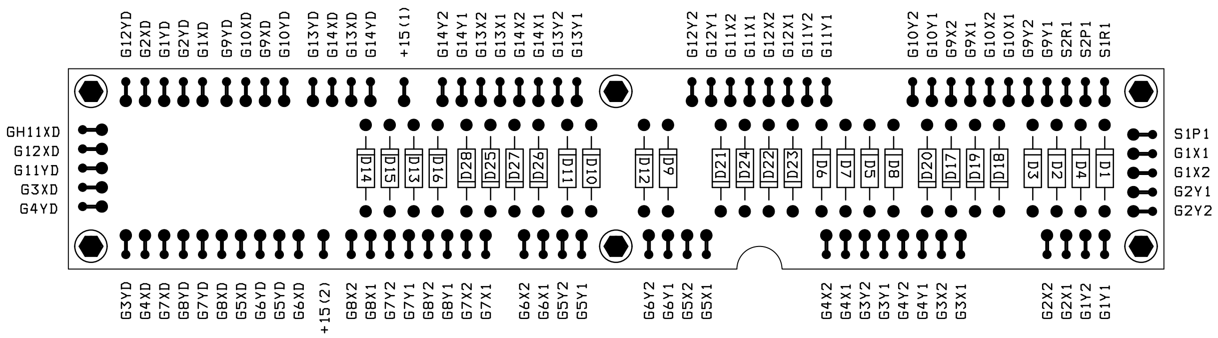
A 3-KE-0123-887-00-A

PROJECTION

THIS DRAWING CONFORMS TO B.S.308

ASSEMBLY NOTES:

1.ASSEMBLE IN ACCORDANCE WITH ISO:SPAS/ELEC/002



A	24/01/01		D.HOWE			FM
ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS

USED ON : HIRDLS (SCJ4150)

THE COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TOLERANCES UNLESS STATED	FINISH	ORIGINAL SCALE
	REMOVE ALL BURRS	1:1 DO NOT SCALE
MATERIAL & SPEC.	SURFACE TEXTURE um	0 50 mm
	√ UNLESS STATED	

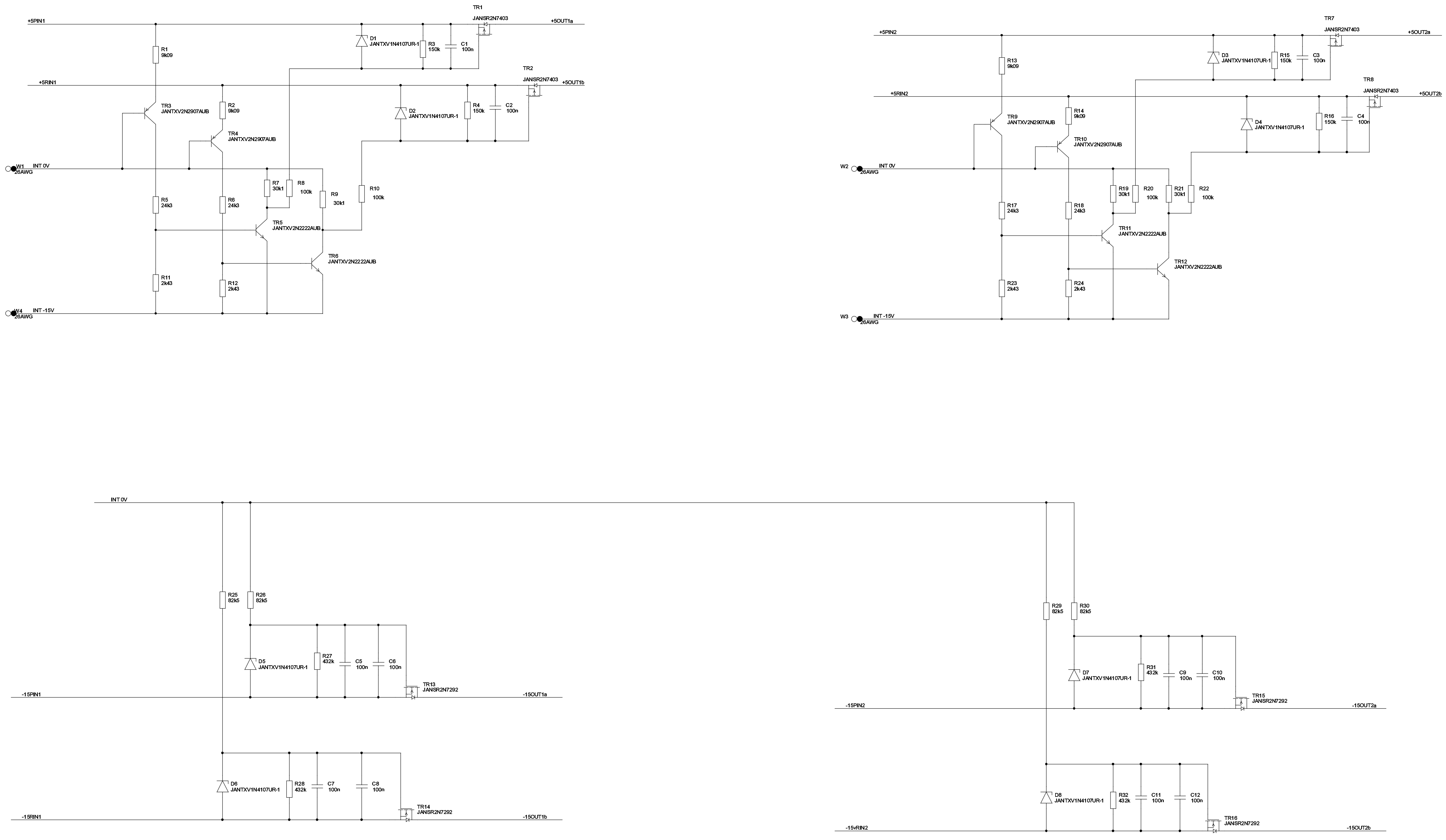
TITLE

DIODE BOARD -X (PC19190P/1)

ASSEMBLY DRAWING

A 3-KE-0123-887-00-A

A 3-KE-0123-887-00-A



NOTE 1:
SOFT STARTS ARE PROVIDED FOR +5V AND -15V
FOR BOTH TEU A AND TEU B.

NOTE 2:
CONTROLLED SUPPLIES ENTER
AND LEAVE SOFT START CIRCUIT
VIA FET SOURCE AND DRAIN
LEADS.

NOTE3:
0V INPUTS ARE CONNECTED TO PCU INT 0V.
-15V(1) AND -15V(2) ARE CONNECTED TO
PCU INT -15V SUPPLY.

A	30-Jan-01		J G FIRTH			
ISSUE	DATE	MOD. No.	DRN. BY.	CHKD.	APPD.	STATUS

USED ON

CCLRC

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX

TITLE

HIRDLS PCU OUTPUT SOFT START +X

A 1-KE-0123-888-00-A

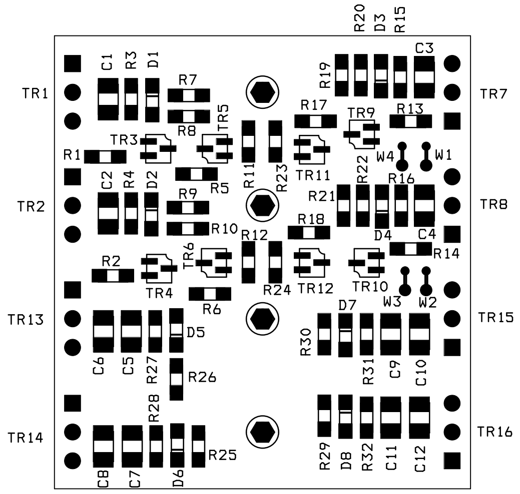
Tuesday, January 30, 2001

TOTAL NO. OF SHEETS

A	3-KE-0123-891-00-A

PROJECTION

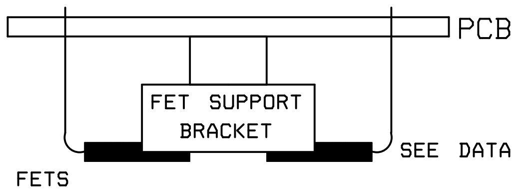
THIS DRAWING CONFORMS TO B.S.308



PCB ASSEMBLERS NOTES:

1. ASSEMBLE IN ACCORDANCE WITH ISO:SPAS/ELEC/002
2. TR1,2,7,8,13,14,15,16 ARE NOT MOUNTED DIRECTLY ONTO THIS PCB
   THEY WILL BE MOUNTED ONTO A "FET SUPPORT BRACKET"
   WITH THEIR LEGS BENT UP AT 90 DEGREES AND SOLDERED AS SHOWN

NOTE: NOT TO SCALE



A	02/02/01		D.HOWE			FM
ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS

USED ON : HIRDLS(SCJ4150)

THE COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 OQX.

TOLERANCES UNLESS STATED	FINISH REMOVE ALL BURRS	ORIGINAL SCALE 1:1 DO NOT SCALE
MATERIAL & SPEC.	SURFACE TEXTURE um √ UNLESS STATED	0 50 mm

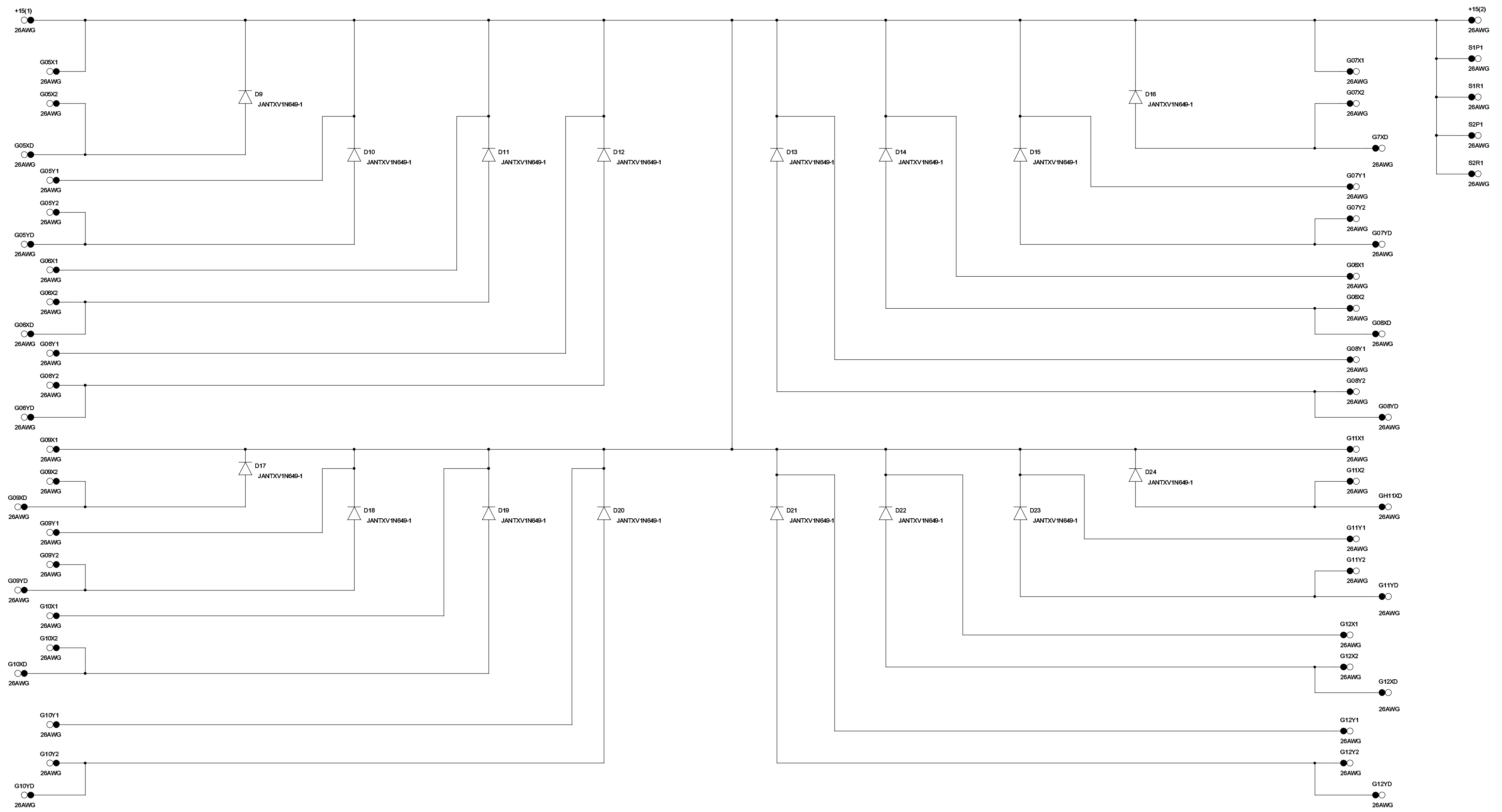
TITLE

HIRDLS PCU SOFT START +X (PC19192P/1)

ASSEMBLY DRAWING

A	3-KE-0123-891-00-A

A 3-KE-0123-891-00-A



ISSUE	DATE	MOD.No.	DRN.BY.	CHKD.	APPR.	STATUS
A	30-Jan-01		J G FIRTH			

USED ON

CCLRC

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX

TITLE

HIRDLS RELAY DIODE BOARD +X

A 1-KE-0123-892-00-A

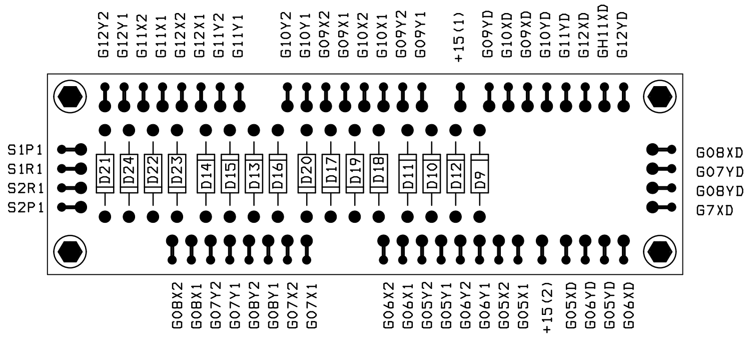
Wednesday, January 31, 2001

TOTAL NO. OF SHEETS

A	3-KE-0123-895-00-A

PROJECTION

THIS DRAWING CONFORMS TO B.S.308



PCB ASSEMBLERS NOTES:

1. ASSEMBLE IN ACCORDANCE WITH ISO:SPAS/ELEC/002

A	06/02/01		D.HOWE			FM
ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS

USED ON : HIRDLS (SCJ4150)

THE COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TOLERANCES UNLESS STATED	FINISH REMOVE ALL BURRS	ORIGINAL SCALE 1:1 DO NOT SCALE
MATERIAL & SPEC.	SURFACE TEXTURE um √ UNLESS STATED	0 50 mm

TITLE

DIODE BOARD +X (PC19193P/1)

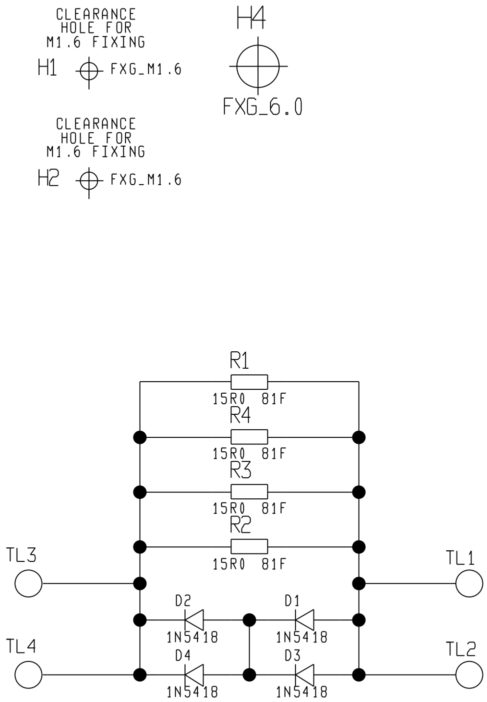
ASSEMBLY DRAWING

A	3-KE-0123-895-00-A

3-KE-0123-895-00-A A

A4-KE-0123-896-00-A

THIS DRAWING CONFORMS TO B.S. 3939



A	09/02/01		A.PREECE			FM
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS

USED ON

CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS

RUTHERFORD APPLETON LABORATORY, CHILTON, DIDCOT, OXON. OX11 0QX

TITLE

PCU INDUCTOR FILTER BOARD (PC19194P/1)

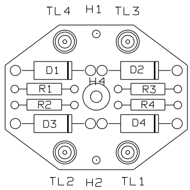
A 4 - KE - 0123 - 896 - 00 - A

TOTAL NO. OF SHEETS 1

A 4-KE-0123-899-00-B

PROJECTION

THIS DRAWING CONFORMS TO B.S. 308



PCB ASSEMBLERS NOTES:

1. ASSEMBLE IN ACCORDANCE WITH ISO:SPAS/ELEC/002
2. DIODE BODIES NEED TO BE IN CONTACT WITH THE PCB TO KEEP HEIGHT TO A MINIMUM.
3. COMPONENT TAILS ON THE INNER PORTION OF THE PCB (SURROUNDING H4) SHOULD BE <=1.0MM IN LENGTH.

B	11/03/01	KE3226	A.P.PREECE			FM
A	06/03/01		A.P.PREECE			FM
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS

TOLERANCES UNLESS STATED

FINISH

REMOVE ALL BURRS

ORIGINAL SCALE

DO NOT SCALE

MATERIAL & SPEC

SURFACE TEXTURE micro m

✓ UNLESS STATED

0 mm

USED ON HIRDLS

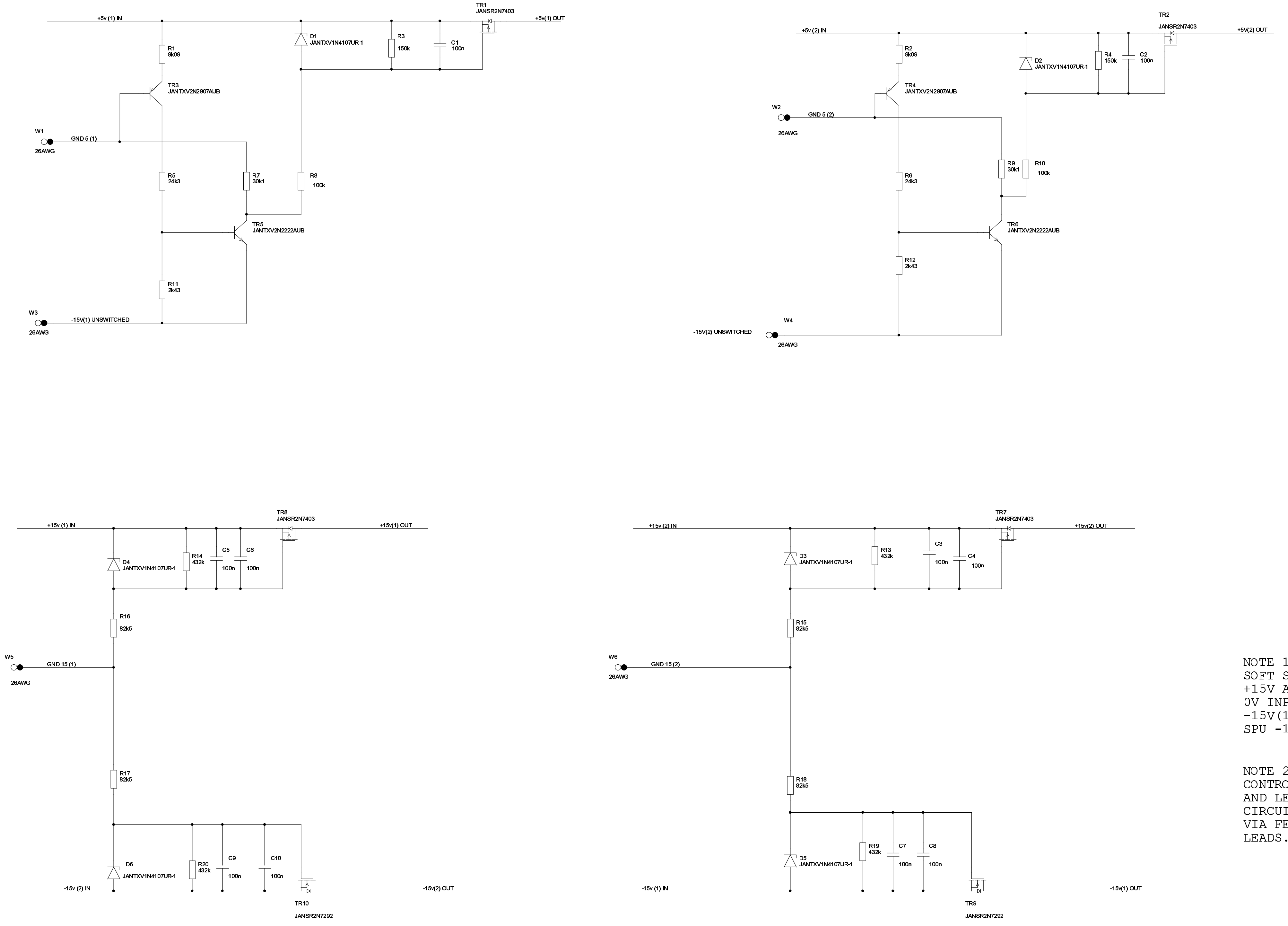
CCLRC
COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS
RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TITLE

PCU INDUCTOR FILTER BOARD (PC19194P/1)
ASSEMBLY DRAWING

A 4 - KE - 0123 - 899 - 00 - B

TOTAL NO. OF SHEETS 1



NOTE 1: BASE PLATE
SOFT STARTS ARE PROVIDED FOR SPU 5V,
+15V AND -15V SUPPLIES.
0V INPUTS ARE CONNECTED TO SPU GND.
-15V(1) AND -15V(2) ARE CONNECTED TO
SPU -15V CONVERTOR OUTPUTS.

NOTE 2:
CONTROLLED SUPPLIES ENTER
AND LEAVE SOFT START
CIRCUITS
VIA FET SOURCE AND DRAIN
LEADS.

ISSUE	DATE	MOD.No.	DRN.BY.	CHKD.	APPD.	STATUS
A	27-Feb-01		J G FIRTH			

USED ON
CCLRC

RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX

TITLE
HIRDLS SPU OUTPUT SOFT START (PC19195)

A 1-KE-0123-900-00-A

Tuesday, February 27, 2001

TOTAL NO. OF SHEETS

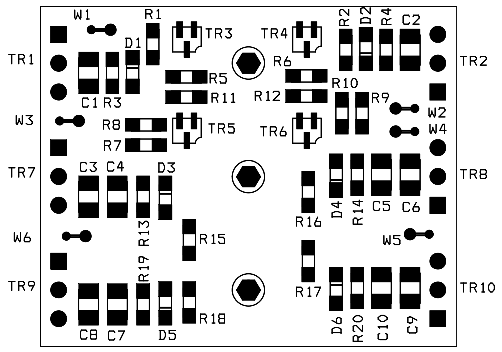
A | 3-KE-0123-903-00-A

PROJECTION

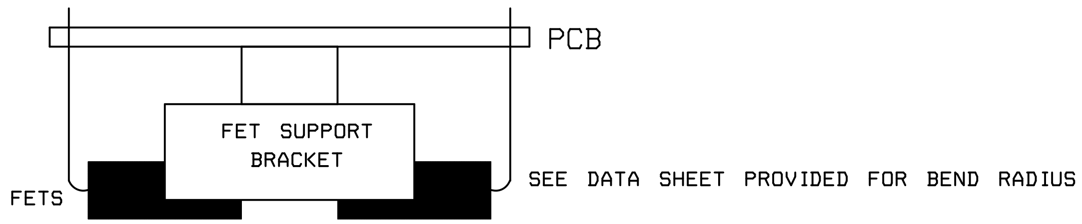
THIS DRAWING CONFORMS TO B.S.308

PCB ASSEMBLERS NOTES:

1. ASSEMBLE IN ACCORDANCE WITH ISO:SPAS/ELEC/002
2. TR1,2,7,8,9,10 ARE NOT MOUNTED DIRECTLY ONTO THIS PCB
   THEY WILL BE MOUNTED ONTO THE "FETS SUPPORT -X" (A3-KE-0123-147-A) BRACKET
   WITH THEIR LEGS BENT UP AT 90 DEGREES AND SOLDERED IN PLACE AS SHOWN



NOTE: NOT TO SCALE



A	27/02/01		D.HOWE			FM
ISSUE	DATE	MOD. NO.	DRN. BY	CHKD.	APPD.	STATUS

USED ON : HIRDLS (SCJ4150)

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THE COUNCIL FOR THE CENTRAL LABORATORY OF THE RESEARCH COUNCILS RUTHERFORD APPLETON LABORATORY, CHILTON, OXON OX11 0QX.

TOLERANCES UNLESS STATED	FINISH REMOVE ALL BURRS	ORIGINAL SCALE 1:1 DO NOT SCALE	TITLE HIRDLS SPU OUTPUT SOFT START (PC19195P/1) ASSEMBLY DRAWING
MATERIAL & SPEC.	SURFACE TEXTURE um √ UNLESS STATED	0 50 mm	A 3-KE-0123-903-00-A

A 3-KE-0123-903-00-A

SECTION 9
As Built Configuration Status List

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: N Morris

Date: 24-Apr-01

Subject / Title: PFM PCU As-built Configuration Status List

Contents / Description / Summary:

Key Words: Configuration Status List

Purpose (20 characters maximum): Configuration of as-built PFM PCU.

Approved By: S Jaroslawski

Date (yy–mm–dd): 01-04-24

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

CHANGE RECORD PAGE

Revision	Date	Section affected	Description of Change
First	16-Aug-00	-	-
A	24-Apr-01	2.2	Mechanical & electrical drawing lists updated
		2.3	TV test plan updated to issue C

CONTENTS

1 INTRODUCTION

This document defines the list of configured documents for the HIRDLS Protoflight Model Power Converter Unit (PFM PCU).

2 CONFIGURATION STATUS

2.1 Specifications and Interface Control Documents

Document Ref.	Document Title	Issue	Date	Approval Status	Comments
Specifications					
SP-HIR-036B	PSS Subsystem Specification Document	B	01-Aug-00	Approved	
SP-HIR-169G	HIRDLS Power Distribution, Switching and Grounding	G	01-Feb-00	Approved	
SP-HIR-111	HIRDLS Thermal Interface Requirements	First	28-May-99	Approved	
SP-HIR-103	Command & Telemetry Handbook				
SP-HIR-188	HIRDLS Subsystem Environmental Req.	First	23-Feb-00	Approved	
ICDs					
SP-HIR-279A	IPS to PSS Interface Control Document	A	01-Aug-00	Approved	
SP-HIR-289A	CSS to PSS Interface Control Document	A	04-Feb-00	Approved	
SP-HIR-239B	GSS to PSS Interface Control Document	B	02-Jun-00	Approved	
SP-HIR-249A	TSS to PSS Interface Control Document	A	06-Jun-00	Approved	
SP-HIR-219B	STH to PSS Interface Control Document	B	09-Sep-00	Approved	

2.2 Drawings

Document Ref.	Document Title	Issue	Date	Approval Status	Comments
Mechanical					
0-KE-0123-100-B	RADIATOR PLATE ASSEMBLY	B	12-Aug-99	Approved	
1-KE-0123-101-B	RADIATOR PLATE	B	27-Jul-99	Approved	
4-KE-0123-102-B	BALUN WASHER 2 HOLES	B	01-Oct-99	Approved	
4-KE-0123-103-B	BALUN WASHER 3 HOLES	B	01-Oct-99	Approved	
4-KE-0123-104-A	D CONNECTOR PILLAR	A	13-Aug-99	Approved	
2-KE-0123-105-A	MTR L SECTION ASSY	A	11-Apr-99	Approved	
2-KE-0123-106-B	MTR L SECTION MODULE	B	11-Apr-99	Approved	
4-KE-0123-107-A	MTR L SECTION CONNECTOR PILLARS	A	11-Apr-99	Approved	
3-KE-0123-108-A	MTR L SECTION PCB	A	11-Apr-99	Approved	
2-KE-0123-110-A	MFL L SECTION ASSY	A	11-Apr-99	Approved	
2-KE-0123-111-B	MFL L SECTION MODULE	B	11-Apr-99	Approved	
4-KE-0123-112-A	MFL L SECTION CONNECTOR PILLARS	A	11-Apr-99	Approved	
4-KE-0123-113-A	MFL L SECTION FILTER PILLARS	A	11-Apr-99	Approved	
3-KE-0123-114-A	MFL L SECTION PCB	A	11-Apr-99	Approved	
4-KE-0123-115-A	L SECTION TOPS	A	11-Apr-99	Approved	
4-KE-0123-116-B	L SECTION NUTS	B	15 Feb-00	Approved	
2-KE-0123-117-B	HARNESS STRAP	B	9-Sep-99	Approved	
4-KE-0123-118-A	STAR POINT	A	13-Sep-99	Approved	
4-KE-0123-119-A	STAR POINT PILLARS	A	13-Aug-99	Approved	
1-KE-0123-120-B	+ X SIDE PLATE ASSY	B	01-Jan-01	Approved	
1-KE-0123-121-B	+ X SIDE PLATE	B	30-Dec-00	Approved	
3-KE-0123-123-A	+ X PC BOARD	A	14-Aug-99	Approved	
4-KE-0123-130-A	CABLE CLIP STRAP	A	4-Jul-99	Approved	
3-KE-0123-131-A	D CONNECTOR BRACKET	A	14-Aug-99	Approved	
0-KE-0123-002-A	CONNECTOR INTERFACE DRAWING	A	31-Jan-00	Approved	
3-KE-0123-210-A	ISOLATING WASHER 2	A	04-Jan-00	Approved	
3-KE-0123-211-A	ISOLATING BUSH 2	A	04-Jan-00	Approved	

Document Ref.	Document Title	Issue	Date	Approval Status	Comments
Mechanical					
2-KE-0123-212-A	VERTICAL SHELF ASSY	A	17-Feb-00	Approved	
3-KE-0123-136-B	CONNECTOR ADAPTOR	B	01-Mar-00	Approved	
0-KE-0123-500-A	GENERAL ASSEMBLY	A	13-May-99	Approved	
3-KE-0123-132-A	HYPERTAC BRACKET	A	14-Aug-99	Approved	
4-KE-0123-133-A	2 AMP RELAY PCB	A	14-Aug-99	Approved	
4-KE-0123-134-B	2 AMP RELAY FLANGE	B	11-Oct-99	Approved	
4-KE-0123-135-A	D CONNECTOR SPACERS	A	27-Oct-99	Approved	
1-KE-0123-140-B	- X SIDE PLATE ASSY	B	31-Dec-00	Approved	
1-KE-0123-141-B	- X SIDE PLATE	B	01-Jan-01	Approved	
3-KE-0123-143-A	INNER PC BOARD	A	14-Sep-99	Approved	
3-KE-0123-145-A	VENT PORT	A	06-Mar-00	Approved	
1-KE-0123-160-B	BASE PLATE ASSY	B	20-Feb-01	Approved	
1-KE-0123-161-B	BASE PLATE	B	14-Sep-99	Approved	
2-KE-0123-162-A	CONTROL BOARD	A	21-Apr-99	Approved	
1-KE-0123-163-A	SPU L SECTION	A	21-Jul-99	Approved	
2-KE-0123-164-A	SPU L SECTION BOARD	A	21-Jul-99	Approved	
1-KE-0123-165-B	PCU L SECTION	B	14-Feb-00	Approved	
2-KE-0123-166-A	PCU L SECTION BOARD	A	21-Jul-99	Approved	
2-KE-0123-167-A	PCU FILTER BLOCK	A	21-Jul-99	Approved	
3-KE-0123-168-A	SPU PCU CONTROL MONITORING BOARD	A	4-Sep-99	Approved	
3-KE-0123-169-D	SPU PCU CONTROL MONITORING BOARD BRACKET	D	4-Sep-99	Approved	
3-KE-0123-170-A	AMUX BOARD	A	15-Sep-99	Approved	
4-KE-0123-171-A	AMUX BOARD PILLARS	A	15-Sep-99	Approved	
3-KE-0123-172-B	SPU CONTROL BOARD STRAPS	B	15-Sep-99	Approved	
4-KE-0123-173-A	UNUSED OPTO BOARD	A	15-Sep-99	Approved	
4-KE-0123-174-A	SPU PCU CONTROL MONITORING BOARD PILLARS	A	15-Sep-99	Approved	

Document Ref.	**Document Title**	**Issue**	**Date**	**Approval Status**	**Comments**
Mechanical					
4-KE-0123-175-A	BASE L SECTION NUT BAR	A	16-Sep-99	Approved	
1-KE-0123-181-E	TOP PLATE	E	30-Mar-01	Approved	
1-KE-0123-200-C	CONNECTOR PLATE ASSY	C	12-Sep-00	Approved	
0-KE-0123-201-D	CONNECTOR PLATE	D	12-Sep-00	Approved	
3-KE-0123-202-A	BUS BAR BOARD	A	27-Apr-99	Approved	
3-KE-0123-203-A	VERTICAL SHELF	A	27-Apr-99	Approved	
3-KE-0123-204-A	VERTICAL SHELF PCB	A	11-May-99	Approved	
3-KE-0123-205-A	BALUN BUS BAR BOARD	A	15-Sep-99	Approved	
3-KE-0123-206-A	BALUN BUS BAR PILLARS	A	15-Sep-99	Approved	
3-KE-0123-207-A	ISOLATING WASHER	A	15-Sep-99	Approved	
3-KE-0123-208-A	ISOLATING BUSH	A	15-Sep-99	Approved	
3-KE-0123-209-B	SHORTING STRAP	B	04-Jan-00	Approved	
3-KE-0123-213-A	SHORTING STRAP 2	A	12-Sep-00	Approved	
3-KE-0123-214-A	SHORTING STRAP 3	A	12-Sep-00	Approved	
3-KE-0123-215-A	MODIFICATION BRACKET TO MTR L SECTIONS	A	23-Sep-00	Approved	
0-KE-0123-000-B	MECHANICAL INTERFACE DRAWING	B	04-May-01	Approved	
0-KE-0123-001-B	THERMAL INTERFACE DRAWING	B	04-May-01	Approved	
3-KE-0123-125-A	2 AMP RELAY DIODE BOARD + X	A	31-Dec-00	Approved	
3-KE-0123-126-A	10 AMP RELAY SUPPORTS	A	31-Dec-00	Approved	
3-KE-0123-127-A	15 WAY D-CONNECTOR SUPPORT PILLARS	A		Approved	
3-KE-0123-128-A	TIE DOWNS COMPLETE	A	31-Dec-00	Approved	
3-KE-0123-129-A	FETS SUPPORTS + X	A	01-Jan-01	Approved	
3-KE-0123-131-B	D CONNECTOR BRACKET	B	02-Jan-01	Approved	
3-KE-0123-132-B	HYPERTAC BRACKET	B	02-Jan-01	Approved	
3-KE-0123-137-A	2 AMP RELAY SUPPORT PILLARS	A	31-Dec-00	Approved	
3-KE-0123-138-A	2 AMP RELAY DIODE BOARD SUPPORT PILLARS	A	31-Dec-00	Approved	
3-KE-0123-139-A	RELAY DRIVE BOARD SUPPORT PILLARS	A	31-Dec-00	Approved	
3-KE-0123-146-A	2 AMP RELAY DIODE BOARD - X	A	31-Dec-00	Approved	
3-KE-0123-147-A	FETS SUPPORT - X	A	01-Jan-01	Approved	
1-KE-0123-218-B	BALUN SUPPORT BRACKET	B	02-Feb-01	Approved	

Drawing Number	**Title**	**Issue**	**Date**	**Type**	**Approval Status**	**Comments**
Electrical						
A3-KE-0123-800-2-B	SINGLE POWER CONVERTER (MFL)	A		Schematic	Approved	
A3-KE-0123-801-2-A	SINGLE POWER CONVERTER (MFL)	A	28-Jul-99	PCB Layers	Approved	
A3-KE-0123-802-1-A	SINGLE POWER CONVERTER (MFL)	A	28-Jul-99	Drill Drawing	Approved	
A3-KE-0123-803-1-C	SINGLE POWER CONVERTER (MFL)	C		Top Assembly	Approved	
A3-KE-0123-804-1-B	SINGLE +5V POWER CONVERTER (MTR)	B		Schematic	Approved	
A3-KE-0123-805-2-A	SYSTEM POWER CONVERTER (MTR)	A	28-Jul-99	PCB Layers	Approved	
A3-KE-0123-806-1-A	SYSTEM POWER CONVERTER (MTR)	A	27-Aug-99	Drill Drawing	Approved	
A3-KE-0123-807-1-B	SYSTEM POWER CONVERTER (MTR)	B	29-Nov-99	Top Assembly	Approved	
A3-KE-0123-808-1-B	INTERNAL PSU DUAL OUTPUT	B	25-Jan-00	Schematic	Approved	
A3-KE-0123-809-2-A	INTERNAL PSU DUAL OUTPUT	A	28-Jul-99	PCB Layers	Approved	
A3-KE-0123-810-1-A	INTERNAL PSU DUAL OUTPUT	A	27-Aug-99	Drill Drawing	Approved	
A3-KE-0123-811-1-B	INTERNAL PSU DUAL OUTPUT	B		Top Assembly	Approved	
A3-KE-0123-812-1-B	SPU PSU 15V	B	28-Jul-99	Top Assembly	Approved	
A3-KE-0123-812-1-B	SPU PSU 5V	B	28-Jan-00	Schematic	Approved	
A3-KE-0123-813-2-A	SPU PSU 5V	A	28-Jul-99	PCB Layers	Approved	
A3-KE-0123-814-1-A	SPU PSU 5V	A	27-Aug-99	Drill Drawing	Approved	
A3-KE-0123-815-1-C	SPU PSU 5V	C	26-Jan-00	Top Assembly	Approved	
A3-KE-0123-816-1-B	SPU PSU 15V	B	28-Jan-00	Schematic	Approved	
A3-KE-0123-820-4-D	PCU INT SUPPLY I/P SWITCHING	D		Schematic	Approved	
A3-KE-0123-821-2-B	PCU INT SUPPLY I/P SWITCHING	B	27-Nov-99	PCB Layers	Approved	
A3-KE-0123-822-1-B	PCU INT SUPPLY I/P SWITCHING	B	27-Nov-99	Drill Drawing	Approved	
A3-KE-0123-823-1-B	PCU INT SUPPLY I/P SWITCHING	B	27-Nov-99	Top Assembly	Approved	
A2-KE-0123-824-2-D	ANALOGUE BOARD	D		Schematic	Approved	
A3-KE-0123-825-4-A	ANALOGUE BOARD	A	29-Sep-99	PCB Layers	Approved	
A3-KE-0123-826-1-A	ANALOGUE BOARD	A	30-Sep-99	Drill Drawing	Approved	
A3-KE-0123-827-1-B	ANALOGUE BOARD	B		Top Assembly	Approved	
A2-KE-0123-828-1-D	INTERNAL SUPPLY DIAGRAM SPU	D		Schematic	Approved	
A3-KE-0123-830-1-B	SYSTEM +15V POWER CONVERTER (MTR)	B		Schematic	Approved	
A2-KE-0123-834-2-E	FM CONTROLLER	E		Schematic	Approved	

Drawing Number	Title	Issue	Date	Type	Approval Status	Comments
Electrical						
A3-KE-0123-835-8-A	FM CONTROLLER	A	21-Dec-99	PCB Layers	Approved	
A3-KE-0123-836-1-A	FM CONTROLLER	A	30-Nov-99	Drill Drawing	Approved	
A3-KE-0123-837-1-A	FM CONTROLLER	A	23-Dec-99	Top Assembly	Approved	
A2-KE-0123-838-2-D	-X RELAY DRIVER BOARD	D		Schematic	Approved	
A3-KE-0123-839-6-B	-X RELAY DRIVER BOARD	B	04-Oct-99	PCB Layers	Approved	
A3-KE-0123-840-1-B	-X RELAY DRIVER BOARD	B	04-Oct-99	Drill Drawing	Approved	
A3-KE-0123-841-1-B	-X RELAY DRIVER BOARD	B	04-Oct-99	Top Assembly	Approved	
A2-KE-0123-842-2-C	+X RELAY DRIVER BOARD	C	11-Apr-00	Schematic	Approved	
A3-KE-0123-843-6-B	+X RELAY DRIVER BOARD	B	05-Oct-99	PCB Layers	Approved	
A3-KE-0123-844-1-B	+X RELAY DRIVER BOARD	B	05-Oct-99	Drill Drawing	Approved	
A3-KE-0123-845-1-B	+X RELAY DRIVER BOARD	B	05-Oct-99	Top Assembly	Approved	
A3-KE-0123-846-1-B	BUS BAR BOARD	B	15-Feb-00	Schematic	Approved	
A3-KE-0123-847-2-A	BUS BAR BOARD	A	14-Dec-99	PCB Layers	Approved	
A3-KE-0123-848-1-A	BUS BAR BOARD	A	14-Dec-99	Drill Drawing	Approved	
A3-KE-0123-849-1-A	BUS BAR BOARD	A	13-Jan-00	Top Assembly	Approved	
A4-KE-0123-850-1-A	RELAY DIODE BOARD	A	21-Aug-99	Schematic	Approved	
A4-KE-0123-851-2-A	RELAY DIODE BOARD	A	26-Aug-99	PCB Layers	Approved	
A4-KE-0123-852-1-A	RELAY DIODE BOARD	A	30-Aug-99	Drill Drawing	Approved	
A4-KE-0123-853-1-A	RELAY DIODE BOARD	A	22-Aug-99	Top Assembly	Approved	
A4-KE-0123-855-2-A	STARPOINT	A	12-Sep-99	PCB Layers	Approved	
A4-KE-0123-856-1-A	STARPOINT	A	13-Sep-99	Drill Drawing	Approved	
A4-KE-0123-857-1-A	STARPOINT ASSEMBLY DRW.	A	13-Sep-99	Top Assembly	Approved	
A4-KE-0123-858-1-A	OPTIONAL OPTO BOARD	A	17-Dec-99	Schematic	Approved	
A4-KE-0123-859-2-A	OPTIONAL OPTO BOARD	A	18-Dec-99	PCB Layers	Approved	
A4-KE-0123-860-1-A	OPTIONAL OPTO BOARD	A	18-Dec-99	Drill Drawing	Approved	
A4-KE-0123-861-1-A	OPTIONAL OPTO BOARD	A	20-Dec-99	Top Assembly	Approved	
A4-KE-0123-862-1-A	TEMP SENSOR BOARD	A	08-Oct-99	Schematic	Approved	
A4-KE-0123-864-1-A	TEMP SENSOR BOARD	A	08-Oct-99	Top Assembly	Approved	
A4-KE-0123-865-2-A	TEMP SENSOR BOARD	A	13-Oct-99	Drill / Layers	Approved	
A4-KE-0123-870-1-D	INRUSH CONTROL BOARD	D	10-Apr-01	Schematic		
A4-KE-0123-871-2-A	INRUSH CONTROL BOARD	A	08-Jan-00	PCB Layers	Approved	

Drawing Number	**Title**	**Issue**	**Date**	**Type**	**Approval Status**	**Comments**
Electrical						
A4-KE-0123-872-1-A	INRUSH CONTROL BOARD	A	23-Dec-99	Drill Drawing	Approved	
A3-KE-0123-873-1-C	INRUSH CONTROL BOARD	C	10-Apr-01	Top Assembly		
A2-KE-0123-874-1-B	BUS BAR SUB-ASSEMBLY	B		Assembly	Approved	
A1-KE-0123-875-00-B	CONNECTOR PANEL HARNESS SCHEM.	B		Schematic	Approved	
A3-KE-0123-876-01-A	AD590 TEMPERATURE SENSOR & Resistor Assembly	A		Assembly	Approved	
A1-KE-0123-877-1-E	+X PLATE HARNESS SCHEMATIC	E		Schematic	Approved	
A1-KE-0123-878-1-E	-X PLATE HARNESS SCHEMATIC	E		Schematic	Approved	
A1-KE-0123-879-0-B	BASEPLATE HARNESS SCHEMATIC	B		Schematic	Approved	Excel spreadsheet
KE-0123-880-00-B	HIRDLS PCU OUTPUT SOFT START -X	B		Schematic	Approved	
KE-0123-883-00-B	HIRDLS PCU OUTPUT SIFT START –X (ASSY)	B		Assembly	Approved	
KE-0123-884-00-A	HIRDLS RELAY DIODE BOARD –X	A		Schematic	Approved	
KE-0123-887-00-A	HIRDLS RELAY DIODE BOARD –X (ASSY)	A		Assembly	Approved	
KE-0123-888-00-A	HIRDLS PCU OUTPUT SOFT START +X	A		Schematic	Approved	
KE-0123-891-00-A	HIRDLS PCU OUTPUT SOFT START +X (ASSY)	A		Assembly	Approved	
KE-0123-892-00-A	HIRDLS RELAY DIODE BOARD +X	A		Schematic	Approved	
KE-0123-895-00-A	HIRDLS RELAY DIODE BOARD +X (ASSY)	A		Assembly	Approved	
KE-0123-896-00-A	PCU INDUCTOR FILTER BOARD	A		Schematic	Approved	
KE-0123-899-00-B	PCU INDUCTOR FILTER BOARD (ASSY)	B		Assembly	Approved	
KE-0123-900-00-A	HIRDLS SPU OUTPUT SOFT START	A		Schematic	Approved	
KE-0123-903-00-A	HIRDLS SPU OUTPUT SOFT START (ASSY)	A		Assembly	Approved	

2.3 Test Plans and Procedures

Document Ref.	Document Title	Issue	Date	Approval Status	Comments
TP-RAL-093	Test Procedure for the HIRDLS PCU GEU Relay Board	First		Approved	
TP-RAL-099	Test Procedure for the HIRDLS PCU TEU(A) Relay Board	First		Approved	
TP-RAL-100	Test Procedure for the HIRDLS PCU IPU A/B Relay Board	First		Approved	
TP-RAL-101	Test Procedure for the HIRDLS PCU QB Relay Driver Relay Board	First		Approved	
TP-RAL-102	Test Procedure for the HIRDLS PCU EEA Relay Board	First		Approved	
TP-RAL-103	Test Procedure for the HIRDLS PCU QBC Dist. Relay Board	First		Approved	
TP-RAL-104	Integration and Test Procedure for SRL1 Power Board	First		Approved	
TP-RAL-105	Integration and Test Procedure for SRL2 Power Board	First		Approved	
TP-RAL-117	Integration Test procedure for SRL A	First	Feb-99	Approved	
TP-RAL-118	Test Procedure for HIRDLS PCU CSS Noisy Bus 28V Relay Board	First	Feb-99	Approved	
TP-RAL-160	Preliminary Test Procedure for PCB PC19150, PCU Internal PSU (Dual Output).	First	Oct-99	Approved	
TP-RAL-161	Preliminary Test Procedure for PCB PC19151, SPU PSU (Single Output).	First	Oct-99	Approved	

Document Ref.	Document Title	Issue	Date	Approval Status	Comments
TP-RAL-162	Preliminary Test Procedure for PCB PC19152, SPU Monitoring and PCU Direct Control PCB.	First	Oct-99	Approved	
TP-RAL-163	Preliminary Test Procedure for PCB PC19171, Opto Board.	First	Oct-99	Approved	
TP-RAL-173	Limited Performance test Procedure	First	10-Jan-00	Approved	
TP-RAL-174	Comprehensive Performance Test Procedure.	First	10-Jan-00	Approved	
TP-RAL-184B	Busbar Sub-assembly test specification	B	11-Feb-00	Approved	
TP-RAL-185B	Connector Plate assembly test specification	B	11-Feb-00	Approved	
TP-RAL-200	±X Relay Plate Test Specification	First	30-Apr-00	Approved	
TP-RAL-201B	PFM PCU Vibration Test Procedure	B	16-May-00	Approved	
TP-RAL-202C	PFM PCU Thermal Vacuum Test Procedure	C		Approved	
TP-RAL-203	PFM PCU EMC/EMI Test Procedure	First	17-May-00	Approved	
TP-RAL-204	PCU External Electrical Interface Test Procedure	First	22-May-00	Approved	
TP-RAL-205C	Mechanical Interface Test Procedure.	C	27-Apr-01	Approved	
TP-RAL-206	Base Plate Assembly Test Procedure	First	22-May-00	Approved	
TP-RAL-207	Procedure Driver Instructions (for PCU/IPU Emulator)	First	22-May-00	Approved	
TP-RAL-208	HIRDLS PCU Mass & COG Test Procedure	First	22-May-00	Approved	
TP-RAL-210A	Vertical Shelf Test Specification	A	30-Apr-00	Approved	
TP-RAL-215	PCU Thermal Balance Test Plan	First	10-Jul-00	Approved	
TP-RAL-217	PFM PCU Workmanship Vibration Test Procedure	First	04-Aug-00	Approved	
TC-RAL-154	HIRDLS Balun Manufacturing Procedure	First	Oct-99	Approved	

2.4 Lists

Document Ref.	Document Title	Issue	Date	Approval Status	Comments
PA-RAL-115A	HIRDLS Declared Materials List	A	16-Aug-00	Approved	Includes Z306 paint
PA-RAL-116A	HIRDLS Declared Processes List	A	16-Aug-00	Approved	Includes Z306 painting process
PL-RAL-227B	PFM PCU As-built EEE Parts List	B	30-Apr-01	Approved	Updated to include re-work parts

SECTION 10
Serialised Components List

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: N Morris/ J Firth/ P Hayward

Date: 30-Apr-01

Subject / Title: PFM Power Converter Unit As-built EEE Parts List

Contents / Description / Summary:

List of EEE Parts used in the as-built PCU.

Key Words: EEE Parts PCU

Purpose (20 characters maximum): EEE Parts List

Approved By: S Jaroslawski

Date (yy–mm–dd): 01-05-11

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

CHANGE RECORD PAGE

Revision	Date	Section affected	Description of Change
First	15-Aug-00	-	-
A	24-Apr-01	All	Update, Components used in Re-Work
B	30-Apr-01	2.8	Add Magnetic Cores for Inductors
C	11-May-01	2.2	Military numbers added
		2.3	Positronic Space Quality added
		2.3	Correction to part number
		2.4	MTR2815 converter added
		2.8	Inductors added
		2.8	Terminal pins added
		2.11	RNC90Y resistors removed

CONTENTS

1.0 INTRODUCTION

This document lists the EEE parts used on the as-built PFM Power Converter Unit.

2.0 EEE PARTS

2.1 Analogue Parts

class	Description	Part Number
analogue		
	Dual Precision, Low Power BiFET Op Amp	AD648TQ/883B
	Quad Operational Amplifier	OP400AY/883

2.2 Capacitors

class	Description	Part Number
capacitor		
	Capacitor, Ceramic Chip, CDR33, 1210_100nF	CDR33BX104AKWS
	Capacitor, Ceramic NPO, 100pF	CCR05CG101FS
	Capacitor, Ceramic X7R, 1nF	M39014/01-1357
	Capacitor, Ceramic X7R, 10nF	M39014/01-1557
	Capacitor, Ceramic X7R, 100nF	M39014/01-1353
	Capacitor, Ceramic X7R, 100nF	M39014/01-1350
	Capacitor, Ceramic X7R, 330nF	M39014/01-1358
	Capacitor, Tantalum CLR79, 6.8uF, 10%, 75V, S	M39006/22-0605H
	Capacitor, Tantalum CLR81, 27uF, 10%, 60V, S	M39006/25-0234H
	Capacitor, Tantalum CLR81, 22uF, 10%, 60V, S	M39006/25-0241H
	Capacitor, Ceramic X7R, 100p, 10%, 200V, S	M39014/01-1339
	Capacitor, Ceramic X7R, 10n, 10%, 100V, S	M39014/01-1575
	Capacitor, Ceramic X7R, 390p, 10%, 200V, S	M39014/02-1350

2.3 Connectors

class	Description	Part Number
connector		
	AMP D type connector, 15 way socket	311-P409-2S-B12
	Positronic D type Crimp Sockets	FC6020D-50-1202.1
	Positronic D type Crimp Sockets	FC8022D-50-1202.0
	Hypertac 48 way connector	HPF048UFCL8070
	Hypertac 48 way connector	HPF048UFXE0070
	Hypertac 48 way connector	HPF048UMBK0070
	Hypertac 48 way connector	HPF048UMX90070
	Crimp pin (D-Type), Positronic Space Quality	MC8022D-50S
	Connector, Circular	MS27468T11F98S
	Connector, Circular	MS27468T11F99P
	Connector, Circular	MS27468T11F99PA
	Connector, Circular	MS27468T13F98P
	Connector, Circular	MS27468T13F98PA
	Positronic D type connector, 15 way socket	SDD15F0000G
	Positronic D type connector, 15 way plug, right angle	SDD15M4R70T2G
	Positronic D type connector, 25 way socket, double density, right angle	SND25F0000T2G
	Positronic D type connector, 26 way socket, double density	SDD26F0000G
	Positronic D type connector, 26 way socket, double density, right angle	SDD26F4R70T2G
	Positronic D type connector, 26 way plug, double density	SDD26M0000G
	Positronic D type connector, 26 way plug, double density, right angle	SDD26M4R70T2G
	Positronic D type connector, 62 way socket, double density	SDD62F0000G
	Positronic D type connector, 62 way plug, double density	SDD62M0000G
	Positronic D type connector, mounting post	SND00000T2G
	Positronic D type connector, 9 way socket	SND9F0000G
	Positronic D type connector, 9 way plug	SND9M3P0T2G
	Positronic D type connector, 15 way socket	SND15F0000G
	Positronic D type connector, 25 way socket	SND25F0000G

2.4 Converter

class	Description	Part Number
converter		
	Interpoint converter, MTR2805SF	9306801HZC
	Interpoint converter, MTR2815SF	9307001HZC
	Interpoint converter, MFL2815D	9319301HXC
	Interpoint converter, MTR2815DF/883	9307201HZC

2.5 Digital

class	Description	Part Number
digital		
	Actel RH1020CQ84V	5962F9096505QTC
	Harris HS9-26C32KMSR	5962F9568901VXC
	Harris HS9-26C31KMSR	5962F9666301VXC
	Harris HS9S-117RH-Q	5962F9954701QXC
	Harris HS1-1840RH-Q	5962R9563002VXA
	Harris 54HC244DMSR	5962R9573101VRC
	Harris CD4098BDMSR	5962R9661401VEC

2.6 Diode

class	Description	Part Number
diode		
	Diode, Voltage Reference, SMT	JANTXV1N4107UR-1
	Zener Diode	JANTXV1N4109-1
	Small Signal diode	JANTXV1N4148-1
	Rectifier Diode	JANTXV1N4249
	Zener Diode	JANTXV1N4465
	Zener Diode	JANTXV1N4571A-1
	Schottky Diode	JANTXV1N5711-1
	Zener Diode	JANTXV1N6324
	Zener Diode	JANTXV1N6336
	Small Signal diode	JANTXV1N649-1

2.7 Filter

class	Description	Part Number
filter		
	Interpoint Filter, FMC-461F	5962-9401001HXC
	Interpoint filter,FME28-461	95004-01HXC

2.8 Miscellaneous

class	Description	Part Number
misc.		
	Analog Devices Temperature transducer, AD590LF	5962-8757103XA
	Micropac Opto Coupler (Hi Rel 4N49)	66099-105
	Hewlett-Packard, Quad Opto Coupler	HP6N140A/883B (8302401EA)
	Micrometal Core, Iron Powder Toroid, BFi Optilas	T106-8/90
	Micrometal Core, Iron Powder Toroid, BFi Optilas	T90-8/90
	Inductor – local manufacture @RAL Inductor – local manufacture @RAL Inductor – local manufacture @RAL Inductor – Power bus inductor type 1 (made @RAL) Inductor – Power bus inductor type 2 (made @RAL) Inductor – Power bus inductor type 3 (made @RAL)	Balun 2SMA Balun 3SLA Balun 3SMA A3-KE-0123-906 A3-KE-0123-907 A3-KE-0123-908
	Terminal Pins, Barb Cone Lock, Oxley	BCL156SOAT
	Terminal Pins, Oxley “Kinky Pins”	030/30/30PKP2L
	Terminal Pins, Harwin	H2061-01
	Terminal Pins, Harwin	H207-Z01
	Terminal Pins, Spartan	160-2034-02-0100

2.9 Relay

class	Description	Part Number
relay		
	Relay, 2 pole, 2A Latching	M39016/45-017M
	Relay, 2 pole, Non-latching	M39016/9-060P
	Relay, 2 pole, 10A Latching	M83536/13-004L
	Relay, 3 pole, 25A, Leach, KC-J2A-003 (MS27743-5)	M83536/32-005M

2.10 Transistor

class	Description	Part Number
transistor		
	P channel Hexfet	IRHM9150
	Transistor, NPN	JANTXV2N2222A
	Transistor, NPN, SMT	JANTXV2N2222AUB
	Transistor, PNP	JANTXV2N2907A
	Transistor, PNP, SMT	JANTXV2N2907AUB
	Power MOSFET	JANS2RN7292
	Power MOSFET, FRF9150R3	JANS2N7403
	AD Matched Transistor Pair, NPN	MAT-02AH/883
	AD Matched Transistor Pair, PNP	MAT-03AH/883

2.11 Resistors

class	Description	Part Number
resistor		
	Resistor, Thin Film Chip, 100K	D55342KB100ER
	Resistor, Wilbrecht, 20K	G311P813A20K000TN
	Resistor, Wilbrecht, 30K1	G311P813A30K100TN
	Resistor, Wilbrecht, 46K4	G311P813A46K4000AN
	Resistor, Wilbrecht, 5K7	G311P813A5K7000AN
	Resistor, Thin Film Chip, 150K	D55342KB150ER
	Resistor, Thin Film Chip, 24K3	D55342KB24E3R
	Resistor, Thin Film Chip, 2K43	D55342KB2E43R
	Resistor, Thin Film Chip, 30K1	D55342KB30E1R
	Resistor, Thin Film Chip, 432K	D55342KB432ER
	Resistor, Thin Film Chip, 82K5	D55342KB82E5R
	Resistor, Thin Film Chip, 9K09	D55342KB9E09R
	Resistor network, 9 x 10k commoned	M8340109K1002FC
	Resistor network, 9 x 10k commoned	M8340109K1002GC
	Resistor network, 9 x 100k commoned	M8340109K1003FC
	Resistor network, 9 x 100k commoned	M8340109K1003GC
	Resistor network, 9 x 4k7 commoned	M8340109K4701GC
	Resistor, Wirewound, 0R1	RER65FR100R
	Resistor, Metal Film, 100R	RLR05C1000FS
	Resistor, Metal Film, 1k00	RLR05C1001FS
	Resistor, Metal Film, 10k0	RLR05C1002FS
	Resistor, Metal Film, 100k	RLR05C1003FS
	Resistor, Metal Film, 1M00	RLR05C1004FR
	Resistor, Metal Film, 10R0	RLR05C10R0FS
	Resistor, Metal Film, 121R	RLR05C1210FS
	Resistor, Metal Film, 133k	RLR05C1333FS
	Resistor, Metal Film, 14k7	RLR05C1472FS
	Resistor, Metal Film, 150R	RLR05C1500FS
	Resistor, Metal Film, 15k0	RLR05C1502FS
	Resistor, Metal Film 15R0	RLR05C15R0FS
	Resistor, Metal Film, 19k1	RLR05C1912FS
	Resistor, Metal Film, 20k0	RLR05C2002FS
	Resistor, Metal Film, 200k	RLR05C2003FS
	Resistor, Metal Film, 221k	RLR05C2213FS
	Resistor, Metal Film, 243R	RLR05C2430FS
	Resistor, Metal Film, 2k61	RLR05C2611FS
	Resistor, Metal Film 27R4	RLR05C27R4FS
	Resistor, Metal Film, 30k1	RLR05C3012FS
	Resistor, Metal Film, 332R	RLR05C3320FS
	Resistor, Metal Film, 3k32	RLR05C3321FS
	Resistor, Metal Film, 33k2	RLR05C3322FS
	Resistor, Metal Film, 3k57	RLR05C3571FS
	Resistor, Metal Film, 4k75	RLR05C4751FS
	Resistor, Metal Film 47k5	RLR05C4752FS
	Resistor, Metal Film, 48k7	RLR05C4872FS
	Resistor, Metal Film, 511k	RLR05C5113FS
	Resistor, Metal Film, 681R	RLR05C6810FS

	Resistor, Metal Film, 68R1	RLR05C68R1FS
	Resistor, Metal Film, 732R	RLR05C7320FS
	Resistor, Metal Film, 8k25	RLR05C8251FS
	Resistor, Metal Film, 9k09	RLR05C9091FS
	Resistor, Metal Film, 10k0	RLR07C1002FS
	Resistor, Metal Film, 10M0	RLR07C1005FR
	Resistor, Metal Film, 10R0	RLR07C10R0FS
	Resistor, Metal Film, 19k1	RLR07C1912FS
	Resistor, Metal Film, 100k	RNC50J1003BS
	Resistor, Metal Film, 2k00	RNC50J2001BS
	Resistor, Metal Film, 24k9	RNC50J2492BS
	Resistor, Metal Film, 267k	RNC50J2673BS
	Resistor, Metal Film, 604k	RNC50J6043BS
	Resistor, Metal Film, 1M00	RNC55J1004BS
	Resistor, Metal Film, 20k00	RNC90Y20K000TR
	Resistor, Metal Film, 30k10	RNC90Y30K100TR
	Resistor, Metal Film, 46k40	RNC90Y46K400TR
	Resistor, Metal Film, 5k76	RNC90Y5K7600TR
	Resistor, Wirewound, 4R75	RWR80S4R75FS
	Resistor, Wirewound, 33R2	RWR81N33R2FS
	Resistor, Wirewound, 15R	RWR81N15R0FS
	Resistor, Wirewound 1R00	RWR81S1R00FS
	Resistor, Wirewound, 22R1	RWR81S22R1FS
	Resistor, Wirewound, 68R1	RWR81S68R1FS
	Resistor, Wirewound, 475R	RWR81S4750FS
	Resistor, Wirewound, 549R	RWR81S5490FS
	Resistor, Wirewound, 68R1	RWR81S68R1FS

2.12 Wire

class	Description	Part Number
wire	Raychem Spec 55A 22AWG	55A0112229
	Raychem Spec 55A 24AWG	55A0114249
	Raychem Spec 55A 26AWG	55A0114269

SECTION 11
List of Waivers

List of Requests for Waivers/Deviations

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Rutherford Appleton Laboratory

Spacecraft/Project:		Originator:	RAL/SSTD/PA
Instrument:	Model: All	Document No	PA-RAL-266 Issue: 1
Subsystems:		Date:	31-May-01

RFW Serial No.	*Waiver or Deviation*	*Subsystem*	*Model*	*RFW Title*	*Issue Date*	*Status / Remarks*	*Approval Reference*	*Approval Date*
HIR-PA-RAL-RW- 0	Waiver					Pending		
1	Waiver	PCU	PFM	PCU TURN ON TRANSIENT	01-Sep-00	Approved Current spike at the poweer input at the PCU switch on with loads present at the outjput	NCR50 + PSR sign off, 27/4/01	27-Apr-01
2	Deviation	PCU	PFM	UK HIRDLS Project Manager	30-Apr-01	Pending Impact on schedule3-4 weeks if not approved!!!!!!!		
3	Waiver	PCU	PFM	UK HIRDLS Project Manger	01-May-01	Pending PCU EMC Test Failures, against DRWG A0-KE-0123-500		
4	Waiver	PCU	PFM	HIRDLS UK Project Manager	01-May-01	Pending PCU Mass Increase, against A0-KE-0123-500		

END OF LIST

SECTION 12
Copies of Waivers

HIRDLS Request for Deviation / Waiver

HIRDLS Request for Deviation / Waiver	1. Date Initiated: 1st September 2000

2. Deviatio Waiver X	3. Dev. / Waiv. No. **HIR-RA-RAL-RW-001**	4. Level I Level II Level III X

5. Title/Description: PCU turn-on transient current exceeds requirement stated in SP-HIR-036B (section 3.2.1.2.2)	6. Originator (Name/Organization or Company/Phone): Stan Jaroslawski/ RAL

7. Contract Affected (Provide Contract Number & Contracting Officers):

8. Documents Affected (List Documents affected and paragraph or specific requirement):
SP-HIR-036B Power Subsystem Specification Document

9. Statement of Problem:
Current spike at the power input (QA or QB) at the PCU switch ON with no loads present on the outputs. Test data showed that the spike duration was less than 5µseconds and the amplitude was between 14 and 17 Amps.
At the switch on all input capacitances of the PCU present a short circuit to the power supply. This results in a momentary high input current which reduces as capacitors charge up.

10. Proposed Solution:
Due to latency existing in any circuit with capacitors, it is not thought possible to provide a solution to this problem. The recommendation is to request a waiver to the GIRD.

11. Impact on Cost / Price If Approved: None If Disapproved: Hard to estimate without an identifiable solution.	12. Impact on Schedule / Delivery If Approved: None If Disapproved: Again, hard to estimate but a minimum delay of 2 to 3 months can be expected.

13. Trace to Originating and Follow-on Documentation (Lists VRIC, DR, CR #, GSFC CCR, and other relevant documents):

See attached NCR from RAL (No. HIR-AR-RAL-085/50)

14. **LMSSC Disposition:**		15. Approving Official Name/Title. Signature and Date:
Approved		
Disapproved		
Returned for Rework		Stephen Richard, HIRDLS Program Manager

16. **Follow-on Action:**		17. Originator Contracting Office [Name & Title], Signature and Date
Provide Direction to Sub-Contractor		
Attach to Current Specification or ICD		
Forward to GSFC for Level I Approval		

18. Close Out Activity:	19. CMO Signature:

Document is a WORD Table with fixed column heights for most fields.

<table>
<tr><td colspan="4">HIRDLS Request for Deviation / Waiver</td><td colspan="2">1. Date: 3rd April 2001</td></tr>
<tr><td colspan="2">2. Deviation ➨ Waiver</td><td colspan="2">3. Dev. / Waiv. No.
HIR-RA-RAL-RW-002</td><td colspan="2">4. Level I Level II ➨ Level III</td></tr>
<tr><td colspan="3">5. Baseline Affected: [GSFC to determine]
Functional: Product: Allocated: N/A:</td><td colspan="3">6. Other System Config. Affected: [Check]
Yes: No:</td></tr>
<tr><td colspan="4">7. Title:
PCU +Z panel thermal finish change</td><td colspan="2">8. Originator: [Check one or modify field]
LMMS RAL ➨ Oxford PO:</td></tr>
<tr><td colspan="2">9. Contract No. & Line Item
NAS5-99244 Other</td><td colspan="2">10. Rqmts Affected
SP-HIR-111 section 4.9.1.2.1 Radiative Thermal Properties.</td><td colspan="2">11. Contracting Officer:</td></tr>
<tr><td colspan="3">12. Config. Item Nomenclature
Power Converter Unit (PCU)</td><td colspan="3">13. Lowest Part/Assembly Affected:
PCU +Z Panel</td></tr>
<tr><td colspan="2">14. Part No. or Type
A1-KE-0123-181-D</td><td colspan="2">15. Effectivity [Date/Serial #]</td><td colspan="2">16. Recurring
Yes No ➨</td></tr>
<tr><td colspan="3">18. Impact on Cost / Price
If Approved
None
If Disapproved</td><td colspan="3">19. Impact on Schedule / Delivery
If Approved
None
If Disapproved
3-4 weeks</td></tr>
<tr><td colspan="6">20. Impact on Integrated Logistics Support, Interfaces or Software: [GSFC to Determine]</td></tr>
<tr><td colspan="6">21. Description of Deviation / Waiver:
The PCU +Z panel is required to be black anodized. Due to difficulties finding companies in the UK and Europe who can do this treatment to the required space standards, it has been necessary to paint the panel using Chemglaze Z306.</td></tr>
<tr><td colspan="6">22. Need for Deviation / Waiver [Include corrective Action Taken]
The thermal finish on the +Z panel permits heat to be dissipated from the PCU to the surrounding environment. If this panel does not have a high emissivity surface there is a slight risk the PCU could overheat.</td></tr>
<tr><td colspan="4">23a Originator Contracting Officer: [Name & Title]
Nigel Morris
UK HIRDLS Project Manager</td><td colspan="2">23b. Signature:</td></tr>
<tr><td colspan="6">Disposition:</td></tr>
<tr><td colspan="6">24. Approved Disapproved Returned for Rework</td></tr>
<tr><td colspan="3">25.a Name / Title:</td><td colspan="2">25b. Signature:</td><td>25c. Date:</td></tr>
</table>

HIRDLS Request for Deviation / Waiver

HIRDLS Request for Deviation / Waiver	1. Date: 1st May 2001

2. Deviation Waiver ➨	3. Dev. / Waiv. No. **HIR-RA-RAL-RW-003**	4. Level I Level II ➨ Level III

5. Baseline Affected: [GSFC to determine] Functional: Product: Allocated: N/A:	6. Other System Config. Affected: [Check] Yes: No:
7. Title: PCU EMC Test Failures	8. Originator: [Check one or modify field] LMMS RAL ➨ Oxford PO:

9. Contract No. & Line Item NAS5-99244 Other	10. Rqmts Affected SP-HIR-036B section 3.2.6.4.1 EMC	11. Contracting Officer:

12. Config. Item Nomenclature Power Converter Unit (PCU)	13. Lowest Part/Assembly Affected: n/a

14. Part No. or Type A0-KE-0123-500	15. Effectivity [Date/Serial #]	16. Recurring Yes No ➨

18. Impact on Cost / Price If Approved None If Disapproved ~£100k	19. Impact on Schedule / Delivery If Approved None If Disapproved 12 weeks

20. Impact on Integrated Logistics Support, Interfaces or Software: [GSFC to Determine]

21. Description of Deviation / Waiver:
The PFM PCU failed the CS06 conducted susceptibility, spike injection, and the CE01 conducted emissions, power lines. Test report number TR-RAL-258 contains all the data relevant to these failures.

22. Need for Deviation / Waiver [Include corrective Action Taken]
Rectification of these problems would require significant re-work of the PCU. The advise given by a GSFC test engineer who witnessed the tests, was that the failures were not a serious problem and that a waiver should be requested.

23a Originator Contracting Officer: [Name & Title] Nigel Morris UK HIRDLS Project Manager	23b. Signature: N. M

Disposition:

24. Approved Disapproved Returned for Rework

25.a Name / Title:	25b. Signature:	25c. Date:

Document is a WORD Table with fixed column heights for most fields.

HIRDLS Request for Deviation / Waiver

1. Date: 1st May 2001

2. Deviation ➨ Waiver	3. Dev. / Waiv. No. **HIR-RA-RAL-RW-004**	4. Level I Level II ➨ Level III

5. Baseline Affected: [GSFC to determine] Functional: Product: Allocated: N/A:	6. Other System Config. Affected: [Check] Yes: No:
7. Title: PCU Mass Increase	8. Originator: [Check one or modify field] LMMS RAL ➨ Oxford PO:

9. Contract No. & Line Item NAS5-99244 Other	10. Rqmts Affected SP-HIR-036B section 3.3.9.1 Mass	11. Contracting Officer:

12. Config. Item Nomenclature Power Converter Unit (PCU)	13. Lowest Part/Assembly Affected: n/a

14. Part No. or Type A0-KE-0123-500	15. Effectivity [Date/Serial #]	16. Recurring Yes No ➨

18. Impact on Cost / Price If Approved None If Disapproved Impossible to estimate!	19. Impact on Schedule / Delivery If Approved None If Disapproved 52 weeks minimum!

20. Impact on Integrated Logistics Support, Interfaces or Software: [GSFC to Determine]

21. Description of Deviation / Waiver:
Following the fitting of input filters and soft start circuits, the PCU mass increased to 10.61kg

22. Need for Deviation / Waiver [Include corrective Action Taken]
At this late stage of the project, reducing the mass of the PCU will be near impossible if the schedule is to be maintained.

23a Originator Contracting Officer: [Name & Title] Nigel Morris UK HIRDLS Project Manager	23b. Signature:

Disposition:

24. Approved Disapproved Returned for Rework

25.a Name / Title:	25b. Signature:	25c. Date:

SECTION 13
Operations Manual

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: Stan Jaroslawski Date: 2001-05-31

Subject / Title: PCU Operations Manual

Contents / Description / Summary:

An outline of “doos and donts” in using the PCU

Key Words: PCU, IPU, Command and Telemetry Handbook, Input Power

Purpose (20 characters maximum): Outline of methodology for using the PCU. A few trouble shooting recommendations in the unlikely event of a malfunction.

Approved By: N.Morris

Date (yy–mm–dd): 2001-05-31

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

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Document Change Record

Issue	Date	Page	Par.	Change Description
First	2001-05-31			

CONTENTS

1. INTRODUCTION

This Technical Note must be regarded as a living document to be updated in the course of integration, test, and calibration at LMMSC and Oxford. Users who were also involved in its design and built have dominated the operational history of the PCU to date. In the subsequent period of integration with the instrument, and then as part of the instrument, users may not be as well informed and, therefore, it is prudent to provide lists of recommended doos and donts regarding how to use the PCU and how to troubleshoot. These lists must be updated in the course of instrument integration and in the light of operational information generated by different groups of users.

1.1 Scope

This document is intended to serve as a guide to users in operating the PCU and is providing a check sequences/list in the event of a suspected malfunction.

1.2 HIRDLS PCU Identification

HIRDLS PFM PCU, Part No. A0-KE-0123-500 Issue A

2. DOCUMENT REFERENCES

The latest released versions of documents apply

2.1 Applicable Documents

AD1	SP-HIR-036C;	Power Subsystem Specifications
AD2	SP-HIR-169G;	HIRDLS Power Distribution and Switching
AD3	SP-HIR-103;	Command and Telemetry Handbook (C&TH)
AD4	SP-HIR-279C;	IPS to PSS ICD
AD4	SP-HIR-249;	TSS to PSS ICD
AD5	SP-HIR-237;	GSS to PSS ICD
AD6	TP-RAL-xxx;	RAL EGSE Operational Instructions
AD7	TC-RAL-255;	PCU Operational Constraints

2.2 Information Documents

ID1	GSFC-422-11-12-01;	GIRD
ID2	SP-HIR-13T;	Instrument Technical Specifications

3. DESCRIPTION OF THE PCU

The PCU provides a single Quiet Bus and Noisy Bus power interface between the spacecraft and HIRDLS.

3.1 Functionality.

The PCU provides Primary Power to the IPS, TSS, GSS and CSS, and Secondary Power to the TSS, GSS, SPU (part of the IPS) and EEA (classed as part of the TSS). With the exception of the Primary Power to the IPS all power lines are switched. Switching of power lines is controlled by the IPS. This control is implemented by a set of commands, generated by the IPS and supplied to the PCU through a cable. The PCU decodes the commands and activates appropriate controls for realising the required power link. The IPS is also responsible for collecting engineering housekeeping telemetry. This is done by another set of commands. Typically all relays are commanded ON/OFF. Exceptions are four 25Amp. relays switching the QA and the QB power lines onto an internal Power Bus designated QC. These relays are turned ON by a command but drop out when Primary Power is turned OFF. There is no command to turn any of these relays OFF
Transfer of all data between the IPS and the PCU is based on the Master/Slave principle and in all these operations the PCU acts as the Slave and the IPS as the Master. No specialised interrupts are required to be generated by the PCU alerting the Master about a particular condition.
The IPS is also responsible for setting redundant configurations for the PCU internal Power.

The functionality of the PCU is shown in the RAL Drawing A1-KE-904-00-B

3.2 Configuration.

The PCU is housed in an enclosure 200mm. tall, with the footprint 315mm. long and 283mm. wide and weighing just over 10kg. In its operational life in Space it will be secured to the baseplate (shelf) with six bolts. All cable links with subsystems and the spacecraft will be made through connectors mounted on one of the end faces of the enclosure facing the instrument and designated Connector Panel. The other end face designated the Radiator Panel, will be directly exposed to Space. The Radiator Panel is 322mm. wide and 240mm. tall. Its bottom edge is mounted in line with the PCU base and overlaps by equal amounts both PCU Side Panels, also overlaps PCU Top Panel.
The design of the PCU was based on a premise of surviving one internal fault and, as a consequence, comprises redundant sets of converter modules that can be switched into the operating state by commands sent by the PCU. In a typical operation one set of converters is powered and the other set being kept unpowered and in the standby mode.
The principle of redundant converters was used in designing PCU’s internal power and internal controls. Redundant power and control sides are designated A and B; each side has its own power converter and its own command and decoding circuits based on separate FPGAs. The telemetry readout, on the other hand, comprises of a single control circuit powered by both Side A and Side B. Switching either Side On/Off is controlled by the IPS through a set of direct commands. A single direct command operates relays in both sides switching power off for one PCU Side and switching power ON for the other PCU Side.

PCU is supplied with Primary Power from both Quiet Bus A (QA) and Quiet Bus B (QB), and from both Noisy Bus A (NA) and Noisy Bus B (NB).

PCU implements a direct link between the QA and the IPU_A , the QB and IPU_B. Other power lines are, typically, switched ON/OFF, including the lines leading to the PCU internal power converters.
The PCU also implements direct Data and Control interfaces with the IPU_A and the IPU_B and, therefore, is operationally independent of which of the Quite Buses is active.
PCU internal wiring implements the exclusive nature of the Side A and of the Side B connections with Primary Power;

- QA connected to the Side A, QB connected to the Side B;
- QA connected to the Side B, QB connected to the Side A

Switching between these two conditions is done by two separate direct commands from the IPU_A and by two separate commands from the IPU_B.

QA and QB power lines are switched in the PCU onto a single Power Bus designated QC. This is done by a set of 25Amp. relays (known. as "chunky relays). There are two such relays in parallel for the QA and two for the QB (Prime and Redundant relays). Each chunky relay is the 3PDT type, is connected in a self-latching configuration and switches both the PWR and the RTN lines.
The QC bus power is supplied to the on board converters and to both sides of the TSS (TEU_A and TEU_B) and to GSS on switched lines. In the case of the subsystems only PWR lines are switched. Each power line is switched by two relays connected in parallel.
In the case of the on board converters both the PWR and the RTN lines are switched.

On board converters generating Secondary Power for subsystems are configured in converter groups designated SYS1, SYS2 and SPU. Standby redundancy is implemented in each group and that results in further subdivision. SYS1 comprises SYS1A and SYS1B; SYS2 comprises SYS2A and SYS2B; SPU comprises SPU A and SPU B. The SPU group provides dedicated power for the SPU subsystem and the SYS groups are shared by the IPS, TSS, GSS, and EEA.

Following power rails are generated:

- SPU: +5.5Volts (nominal), +/-15Volts (nominal)
- SYS1: +5Volts (nominal), +30Volts (nominal) for the IPS only
- SYS2: +/-15Volts (nominal)

Each PWR line of the Secondary Power leading to a subsystem is switched by a latching relay.

Noisy Bus Power supplied on two separate buses NA and NB are switched in the PCU onto a common bus designated NC. Both PWR and RTN lines are switched. 10Amp do switching. latching relays and is commanded by the IPS. The NC power is supplied to the CSS.

The PCU comprises 54 relays and 16 converters.

4. OPERATIONAL FEATURES

The PCU has been designed to operate within the constraints defined in PSS SSD (AD1). It has no internal intelligence and is totally controlled by the IPS. That control is based on operational commands and arranged into sequences. These sequences are documented in Command and Telemetry Handbook (AD3) as macros. In principle it is possible to generate alternative set of commands that may serve a given circumstance better than the operational macros. The PCU will respond to commands providing they are consistent with the approved format. However any such operational deviations from macros defined in Command and Telemetry Handbook should be examined and approved by RAL.
In the event of having to generate alternative macros it the following constraints should be observed

4.1 Commanding

- Starting from Power up direct commands should be issued to switch PCU Internal Power to the correct Quiet Bus port. This should be done as the first instruction.
- In the course of operating it may be prudent to embed the direct command above in the macro.
- Only one 25Amp. Chunky relay to be switched ON at any time.
- Only one side of the SYS and the SPU converter groups to be powered at any one time. Precede any Turn ON command with the Turn OFF commands of the input relays of the other side
- Only one set of relays supplying input power to subsystems must be switched ON at any one time. The other side must be switched OFF. Precede the ON command with the OFF command to the other side.
- A command sequence creating a repetitive Turn ON/Turn OFF sequence for any relay to generate a continuous waveform effect is not allowed. (in such an event hands being cut off is well justified).

4.2 Configuring Hardware

- The four post shorting bar on the Connector Panel bar must not be removed when the PCU is powered ON. The PCU MUST NOT be run with the shorting bar disconnected. (another body mutilation justified). Note that the final configuration is with a two post shorting bar (posts 3 and 4) at the Connector Panel BUT another shorting bar is envisaged at the spacecraft connector panel in that circumstance.
- Any hot connections of external cables are not allowed.
- In the event of using external loads emulating subsystems the SPU loads must be provided with a Star point and connected to chassis Ground at the load end of cable.
- In the event of using external loads Do NOT use de-coupling capacitor in attempt to simulate given subsystem input capacitance. If it absolutely necessary get in touch with RAL.
- Avoid running with both QA and QB turned ON. This state is not fatal but is not preferred.

5. FINAL PERSONAL COMMENTS

Comments above are based on operational experience during testing and integration. There is no doubt that in the course of the HIRDLS AIT programme other new issues will come to light. My personal wish and hope is that such new issues are resolved multilaterally.
At RAL we have experienced a difficulty of correlating names of the redundant sides. Names “ Side A and Side B”, “Prime and Redundant”, “Active and Standby” have given us a few

happy moments in general confusion that they had created. I am afraid that these names have been left in various documents and drawings.

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: S. Jaroslawski **Date: 30th April 2001.**

Subject / Title:	**HIRDLS PCU Operational Constraints**

Contents / Description / Summary:

Examples of operational constraints are described for the PCU operating outside its flight configuration and outside the command macro's defined in Command and Telemetry Handbook SP-HIR-103

Key Words: PCU Operational Constraints

Purpose (20 characters maximum): Command and Telemetry Handbook, shorting strap

Approved By: S Jaroslawski

Date: 2001-04-30

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-04-30	-	-	First Issue

Content

1 Scope.

The objective of this note is to reduce the risk of human error apparently reasonable practices in using the PCU that may de-rate its performance and in the limit could destroy it. It is proposed that operational constraints are reviewed periodically and the list of “ don’ts” updated.

2 Introduction

Operations of the PCU are totally controlled by commands generated by the IPU. These commands are sent to the PCU in the form of approved and well-tested macro (consistent with SP-HIR-103, Command and Telemetry Handbook, Vol. 1.) and, normal set of circumstances, these macros ensure that the PCU functions within its designed operational constraints. In the course of integration of the instrument, or in attempting to recover from the unforeseen malfunction whilst in flight, there is a very remote possibility of configuring the PCU in a very undesirable and unacceptable way leading to overstressing EEE parts. It is not possible to highlight all possibilities and the examples described below are the result of operational experience and FMEA in the design phase.

3 Operational Constraints

It is considered mandatory that any operational deviations from macro are defined in Command and Telemetry Handbook must be approved by RAL. Changes to the PCU hardware configuration are classed to be in the same category.

3.1 Commanding.

- Only one set of relays, Prime or Redundant, supplying input power to the Converter Groups must be switched ON and the other set must be switched OFF. In any pair of such relays it is very important to precede the ON command for one of the pair with the OFF command of the other of the pair.

- Only one set of relays, Prime or Redundant, supplying input power to subsystems must be switched ON and the other set must be switched OFF. In any pair of such relays it is very important to precede the ON command for one of the pair with the OFF command of the other of the pair.

- In the event of an enforced shutdown followed by a power UP all relays must be turned OFF before command to turn the 25Amp. QA or QB relays are issued.

3.2 Hardware Configuration.

- PCU must NOT be powered with the four post shorting strap removed. This strap can be removed only when the PCU is switched OFF.

- Connecting cables must not be mated to the PCU external connectors with the Power ON.

- In the event of using external loads emulating subsystems the SPU loads must be provided with a Star point and connected to chassis Ground at the “SPU” end of cable.

SECTION 14
Historical Record

CLRC

Historical Record

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT

RUTHERFORD APPLETON LABORATORY

SPACECRAFT/PROJECT: CHEM 1	**DRAWING NO.:**
SYSTEM/EXPERIMENT: HIRDLS	**SERIAL NO.:**
UNIT / ASSEMBLY: PCU	**SHEET 1 OF 2**

NO.	DESCRIPTION OF ACTIVITY / EVENT	OPERATING TIME	REMARKS / REF. DOC.	PERFORMED BY	DATE
	Setting up for inrush measurements			AP	20/3/01
	Base-plate lacing, staking			ABP	21/3/01
	Base plate –controller board set up test			AP/ABP	22/3/01
	-15 volt connections added to base plate			AP/ABP	23/3/01
	PCU assembled			AP/ABP	24/3/01
	LPT on QBB			AP/ABP	25/3/01
	+/- 15 VOLTS SET UP			AP/ABP	26/3/01
	PIN MATRIX TEST			AP/ABP	27/3/01
	CONTINUED			AP/ABP	28/3/01
	CONTINUED			AP/ABP	29/3/01
	CONTINUED			AP/ABP	30/3/01
	PCU moved to EMC Chamber			AP/ABP	31/3/01
	PCU Set up in chamber for EMC			AP/ABP	1/4/01
	Ground checks			AP/ABP	2/4/01
	Controller pcb mods			AP/ABP	3/4/01
	PCU Grounding fault finding continues			AP/ABP	4/4/01
	PC19173 modified			AP/ABP	5/4/01
	PCU ASSEMBLED			AP/ABP	6/4/01
	Tests on isolation			AP/ABP	7/4/01

Historical Record

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT

RUTHERFORD APPLETON LABORATORY

SPACECRAFT/PROJECT: CHEM 1	**DRAWING NO.:**
SYSTEM/EXPERIMENT: HIRDLS	**SERIAL NO.:**
UNIT / ASSEMBLY:PCU	**SHEET 2 OF 2**

NO.	DESCRIPTION OF ACTIVITY / EVENT	OPERATING TIME	REMARKS / REF. DOC.	PERFORMED BY	DATE
	LPT tests			AP	8/4/01
	LPT tests			ABP	9/4/01
	CPT tests			AP/ABP	10/4/01
	CPT tests			AP/ABP	11/4/01
	CPT tests			AP/ABP	12/4/01
	BAKEOUT			AP/ABP	13/4/01
	REMOVE FORM BAKE-OUT			AP/ABP	14/4/01
	Vibration tests failure			AP/ABP	15/4/01
	PCU into AIV Area for inspection			AP/ABP	16/4/01
	Testing			AP/ABP	17/4/01
	Re assembled			AP/ABP	18/4/01
	Full LPT			AP/ABP	19/4/01
	Re vibrated			AP/ABP	20/4/01
	T/V PCU in chamber			AP/ABP	21/4/01
	T/V tests			AP/ABP	25/4/01
	LPT tests back in chamber for final tqcm test			AP/ABP	26/4/01
	Inspect pack and ship!!!!			AP/ABP /NM	28/4/01

SECTION 15
Logbook / Diary Of Events

Logbook / Diary of Events

Information contained within the logbooks is summarised within the Historical Log (Section 14), however if more detailed information is required, then the logbooks can be obtained from the Product Assurance Section at RAL.

SECTION 16
Operating Time / Cycle Record

SECTION 17
Connector Mating Record

CONNECTOR MATE DEMATE LOG FOR HIRDLS PCU

Pages 1 to 26

NEW LOGS TO BE STARTED AT DELIVERY

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No. J911	Unit	Function QBA

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	2-3-01	3-3-01	TEST CABLE N.A.K.
2.	✓	✓	
3.	✓	30/3/01	
4.	30/3/01	30/3/01	
5.	30/3/01	31/03/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
Nil	Nil	OK	✓		[signature]

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	31/03/01	2/4/01	
7.	2/4/01	3/4/01	Connector Saver.
8.	8/4/01	11/4/01	
9.	16/4/01	16/04/01	Test Cable Vibration Test
10.	16/4/01	16/04/01	Test Cable Vibration Test.

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
0	0	OK	✓		N. M[illegible]

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	16/4/01	16/4/01	Vibration test
12.	16/4/01	19/4/01	Vibration Test / AIT
13.	19/4/01	25/04/01	TVAC test
14.	25/04/01	26/04/01	Saver
15.	28/04/01	28/04/01	Noise measurement.

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No. J912	Unit	Function OBB

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	2-3-01	3-3-01	TEST CABLE N.A.K.
2.	✓	✓	
3.	✓	30/3/01	
4.	30/3/01	~~30/3/01~~ ✓	
5.	2/4/01	3/4/01	Connector Saver.

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
NIL	NIL	OK	✓		[signature]

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	8/4/01	11/4/01	
7.	18/4/01	18/4/01	Vibe Test
8.	18/4/01	18/4/01	"
9.	16/4/01	16/4/01	
10.	18/4/01	19/4/01	AIT

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
NIL	NIL	OK	✓		N. M[illegible]

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	19/4/01	25/04/01	TVAC test
12.	25/04/01	26/04/01	Saver
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

ASSEMBLY INTEGRATION AND TEST INDEX

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
RUTHERFORD APPLETON LABORATORY

PROJECT: CHEM-1	PAGE:
INSTRUMENT: HIRDLS	UNIT: CONN R PANEL
ITEM: PCU	DRAWING NO:
~~SERIAL~~ CONN NO: J913	IPU CONN R

DATE	ACTIVITY NCRs TO BE NOTED			SIGNATURE
MATE / DEMATE No	MATE DATE	DEMATE DATE		
1	?	?		
2	?	30/3/01		
3	30/3/01	31/03/01		
4	31/03/01	2/4/01		
5				
	2/4/01		Connector Saver.	
	8/4/01			
	16/4/01	16/4/01	Vibration test.	
	16/4/01	16/4/01	-"-	
	16/4/01	16/4/01	-"-	
	~~16~~ 16/4/01	19/4/01		
	19/4/01	28/04/01	Connector Saver (TUK)	W.M.
	28/04/01		Mass measurement.	

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT

Connector Mate / Demate Log

RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT/PROJECT: CHEM-1 / HIRDLS	SUBSYSTEM: PCU
INSTRUMENT: HIRDLS	UNIT: PCU.
ASSEMBLY: PCU.	IDENTITY NO.:

Connector No. J914	Unit CONN PANEL	Function 78 WAY.

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.			
2.		28/03/01	
3. ~~28/3/01~~	28/3/01 saver on	30/3/01	
4.	30/3/01	30/3/01	
5.	30/3/01	2/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	2/4/01	?	Connector Saver '
7.	8/4/01	16/4/01.	
8.	16/4/01	16/4/01	
9.	16/4/01	16/4/01	
10.	16/4/01	19/4/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	19/4/01	28/04/01	Connector saver (TVAC).
12.	28/04/01		Mass measurement
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

NB: IN CASE OF FAILURE AN NCR MUST BE RAISED

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No.	Unit	Function
J915	CONNECTOR PANEL	

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	SAVER REMOVED
2.			
3.	28/03/01	~~30~~ 3/01	Saver on
4.	30/3/01	31/3/01	EMC
5.	31/3/01	2/4/01	EMC

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	2/4/01	?	Connector Saver '
7.	8/4/01	16/4/01	
8.	16/4/01	16/4/01	Vibe test
9.	16/4/01	16/4/01	
10.	16/4/01	19/04/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	19/04/01	28/04/01	Saver (TVAC)
12.	28/04/01		Mass measurement
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT/PROJECT: CHEM-1/HIRDLS	SUBSYSTEM: PCU
INSTRUMENT: HIRDLS	UNIT: PCU
ASSEMBLY: J916	IDENTITY NO.: TCU

Connector No.	Unit	Function TCU

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.			
2.		28/03/01	
3.	28/03/01	30/03/01	EMC
4.	30/03/01	30/03/01	EMC
5.	30/03/01	31/03/01	EMC

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	31/03/01	2/4/01	EMC
7.	2/4/01	?	Connector Saver
8.	8/4/01	16/4/01	
9.	16/4/01	16/4/01	
10.	16/4/01	16/4/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	16/4/01	19/04/01	
12.	19/04/01	28/04/01	Saver (TVAC)
13.	28/04/01		Mass measurement
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

NB: IN CASE OF FAILURE AN NCR MUST BE RAISED

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No. J917	Unit	Function NBC .

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	2-3-01	3-3-01	TEST CABLE - N.A.K.
2.			
3.		30/3/01	
4.	30/3/01	31/3/01	
5.	2/4/01	3/4/01	Connector Saver .

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
Nil	Nil	OK	✓		[signature]

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	8/4/01	11/4/01	
7.	16/4/01	16/4/01	Vibration test
8.	16/4/01	16/4/01	
9.	16/4/01	16/4/01	
10.	16/4/01	19/04/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	19/04/01	25/04/01	TVAC
12.	25/04/01	26/04/01	Saver
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No. J918	Unit	Function

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	———	3.3.01	-X REMOVED.
2.		28/3/01	
3.	28/3/01 SAVER ON	~~30~~ 30/3/01	
4.	30/3/01	2/4/01	
5.	2/4/01	?	Connector Saver:

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	8/4/01	~~[illegible]~~ 16/4/01	
7.	16/4/01	16/4/01	Vibe test
8.	16/4/01	16/4/01	
9.	16/4/01	19/04/01	
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	19/04/01	28/04/01	Saver TVAC
12.	28/04/01		Mass measurement
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No. J919	Unit	Function

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	3.3.01	REMOVED -X PANEL
2.			
3.		30/3/01	
4.	30/3/01	2/4/01	
5.	2/4/01	?	Connector Saver.

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	8/4/01	16/4/01	
7.	16/4/01	16/4/01	Vib test
8.	16/4/01	16/4/01	
9.	16/4/01	19/4/01	
10.	19/04/01	28/04/01	Saver (TUAC)

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	28/04/01		Mass measurement.
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No. J920	Unit	Function NBA

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	2.3.01	3.3.01	TEST CABLE – N.A.K.
2.	✓	✓	
3.	✓	30/3/01	
4.	30/3/01	30/3/01	
5.	30/3/01	31/3/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
NIL	NIL	OK	✓		

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	31/3/01	31/03/01	
7.	31/03/01	31/03/01	
8.	31/03/01	?	
9.	2/4/01	3/4/01	Connector Saver.
10.	8/4/01	11/4/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
NIL	NIL	OK	✓		

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	16/4/01	16/4/01	Vib test
12.	16/4/01	16/4/01	
13.	16/4/01	16/4/01	
14.	18/4/01	19/4/01	AIT
15.	19/04/01	25/04/01	TUAC

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Demate No.	Mate	Demate	Remarks
16	25/04/01	26/04/01	Saver

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 /HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No. J921	Unit	Function NBB

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	2.3.01	3.3.01	TEST CABLE. N.A.K.
2.	✓	✓	
3.	✓	? 30/3/01	
4.	30/3/01	?.	
5.	2/4/01	3/4/01	. Connector Saver.

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
NIL	NIL	OK	✓		A.P. Peace

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	8/4/01	11/4/01	
7.	16/4/01	16/4/01	
8.	16/4/01	16/4/01	Vib test
9.	16/4/01	16/4/01	
10.	18/4/01	19/4/01	ATT

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	19/4/01	25/04/01	TVAC
12.	25/04/01	26/04/01	Saver
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU B11M	**IDENTITY NO:**

Connector No.	Unit	Function
+X RELAY DRIVER	S/N 1	+X RELAY DRIVER PCB HYPC.

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	
2.	03/3/01	7/4/01	WITH SAVER
3.	7/4/01	7/4/01	
4.	7/4/01	7/4/01	
5.	18/4/01	18/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01		
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No.	Unit	Function
A16F -XSIDE		-X PLATE DRIVE HYPERTAC.

DUPLICATED - See other sheet

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	*Add in mate/demate cycle on 8/3/01.
2.	7/4/01	7/4/01	
3.	7/4/01	7/4/01	
4.	7/4/01	17/4/01	
5.	18/4/01	18/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01	*	
7.	*		
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU -X RELAY DRIVER	**IDENTITY NO:**

Connector No.	Unit	Function
B16M & CON.		-X RELAY DRIVER DRIVE AMPS

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	
2.	7/4/01	7/4/01	
3.	7/4/01	7/4/01	
4.	7/4/01	17/4/01	
5.	18/4/01	18/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01		
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	SUBSYSTEM: PCU
INSTRUMENT: HIRDLS.	UNIT: PCU
ASSEMBLY: PCU	IDENTITY NO:

Connector No.	Unit	Function
A1M	RAD PLATE	~~TO~~ ~~RAD PLATE~~ +X SIDE PLATE

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	6/3/2001	↑	BOX TRIAL FIT
2.	↑	8/3/2001	
3.	9/3/2001	9/3/200	SIDE PLATE FIT CHECK
4.	12/3/2001	12/3	RAD PLATE ~~MATED~~ CHECK
5.	17/3/2001	12/3	"

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
X	X	O.K	✓	–	[illegible]

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	12/3/2001	12/3/2001	RAD PLATE MATE CHECK.
7.	~~7/4/01~~ ~~7/4/01~~ ?	7/4/01	~~Connector~~
8.	~~7~~/4/01	8/4/01	
9.	8/4/01	17/4/01	
10.	18/4/01	18/4/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	18/4/01	~~19/04/01~~	
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No.	Unit	Function
A2M	RAD PLATE	TO -X SIDE PLATE

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1. ~~6/3/2000~~	6/3/2000	8/3/2000	SHELL ONLY (NO PINS in B2F) BOX TRIAL
2.	12/3/2001	~~8/3/2000~~ 12/3	MATE TEST
3.	12/3/2001	12/3/2001	" "
4.	12/3/2001	12/3/2001	"
5.	13/3/2001	14/3/2001	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
			✓		

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	14/3/2001	15/3/2001	
7.	15/3/2001	15/3/2001	
8.	15/3/2001	7/4/01	
9.	7/4/01	8/4/01	
10.	8/4/01	7/4/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	18/4/01	18/4/01	
12.	18/4/01	~~19/4/01~~	
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU A11F ~~[illegible]~~ +X SIDE	**IDENTITY NO:**

Connector No.	Unit	Function
A11F	S/N 001	+X DRIVE HYPERTAC

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	6/3/2001	BOX DISMANTLE.
2.	7/4/01	7/4/01	
3.	7/4/01	7/4/01	
4.	7/4/01	~~[illegible]~~ 17/4/01	
5.	18/4/01	18/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01	18/4/01	
7.	18/4/01		
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	SUBSYSTEM: PCU
INSTRUMENT: HIRDLS.	UNIT: PCU
ASSEMBLY: PCU	IDENTITY NO:

Connector No.	Unit	Function
B1F	+X SIDE PLATE	TO RAD PLATE

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	6/3/2001		BOX TRIAL FIT
2.		8/3/2001	
3.	9/3/2001	9/3/2001	BOX TRIAL FIT
4.	12/3/2001	12/3/2001	MATE TEST
5.	12/3/2001	12/3/2001	MATE TEST

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
			✓		

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	12/3/2001	12/3/2001	MATE TEST
7.	15/3/2001	~~7/4/01~~ ?	
8.	7/4/01	8/4/01	
9.	8/4/01	17/4/01	
10.	18/4/01	18/4/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	18/4/01	~~19/4/01~~	
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No.	Unit	Function
B2F	-X SIDE PLATE	RAD PLATE

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	6/3/2000	8/3/2000	SHELL ONLY BOX TRIAL FIT
2.	12/3/2001	8/3/2000	12/3 MATE CHECK
3.	12/3/2001	12/3/2001	MATE CHECK
4.	12/3/2001	12/3/2001	MATE CHECK
5.	13/3/01		SYS/PCHECK

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature
			✓		

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	14/3/2001	15/3/2001	
7.	15/3/2001	15/3/2001	
8.	15/3/2001	7/4/01	
9.	7/4/01	8/4/01	
10.	8/4/01	17/4/01	

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.	18/4/01	18/4/01	
12.	18/4/01	~~19/04/01~~	
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU A14F +X SIDE	**IDENTITY NO:**

Connector No. A14F	Unit S/N 001	Function +X PLATE TELEMETRY HYPERTAC

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	
2.			
3.			
4.		17/4/01	
5.	18/4/01	18/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01	18/4/01	
7.	18/4/01		
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU B14M - CONTROLLER	**IDENTITY NO:**

Connector No. B14M	Unit CONTROLLER.	Function +X TO CONTROLLER TELEMETRY HYPS

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	
2.	3/3/01	~~[illegible]~~	WITH SAVER
3.			
4.		17/4/01	
5.	18/4/01	18/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01		
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	SUBSYSTEM: PCU
INSTRUMENT: HIRDLS.	UNIT: PCU
ASSEMBLY: PCU BUS-BAR	IDENTITY NO:

Connector No. B17F	Unit	Function

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	BOX DISMANTLE
2.			
3.			
4.			
5.			

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.			
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

CLRC

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU	**IDENTITY NO:**

Connector No.	Unit	Function
A17M	S/N 002	

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	08/03/01	08/03/01	WITH TEST CONNECTOR
2.	13/03/01		WITH TEST CONN
3.			
4.			
5.			

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.			
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU -X SIDE	**IDENTITY NO:**

Connector No.	Unit	Function
A17M	SW 001	

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	–	03-MAR-01	
2.	~~08/03/01~~	~~08/03/01~~	~~WITH TEST CONNECTOR~~
3.			
4.			
5.			

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.			
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	SUBSYSTEM: PCU
INSTRUMENT: HIRDLS.	UNIT: PCU
ASSEMBLY: PCU -XSIDE	IDENTITY NO:

Connector No.	Unit	Function
A19F	-x PLATE	-x PLATE TELEMETRY HYPC-

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	
2.	8/3/01	8/3/01	Relay test (with test connr)
3.	?	?	
4.	?	17/4/01	
5.	18/4/01	18/04/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01.		
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Connector Mate / Demate Log
RUTHERFORD APPLETON LABORATORY

CLRC

SPACECRAFT / PROJECT: CHEM-1 / HIRDLS	**SUBSYSTEM:** PCU
INSTRUMENT: HIRDLS.	**UNIT:** PCU
ASSEMBLY: PCU ~~[illegible]~~ CONTROLLER	**IDENTITY NO:**

Connector No.	Unit	Function
B19M	−X RELAY DRIVER PCB	TO CONTROLLER −X ~~[illegible]~~ TELEMETRY HPC.

Mate/ Demate No.	Mate Date	Demate Date	Remarks
1.	—	03-MAR-01	
2.			
3.			
4.		17/4/01	
5.	18/4/01	18/4/01	

Visual Inspection after 5 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
6.	18/4/01		
7.			
8.			
9.			
10.			

Visual Inspection after 10 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

Mate/ Demate No.	Mate Date	Demate Date	Remarks
11.			
12.			
13.			
14.			
15.			

Visual Inspection after 15 Mate/Demate Cycles

Debris	Bent Pins	Comments	Pass	Fail	Signature

SECTION 18
Age Sensitive Items Record

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: N Morris **Date: 1st May 2001.**

Subject / Title: **HIRDLS PCU Limited Life Items List**

Contents / Description / Summary:

This document contains a list of limited life items used in the HIRDLS PFM Power Converter Unit

Key Words: Limit Life Items

Purpose (20 characters maximum): Required for final ADP.

Approved By: S Jaroslawski

Date: 2001-05-01

Rutherford Appleton Laboratory
Chilton, Didcot
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EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-05-01	-	-	First Issue

1 Scope

This document contains a list of limit life items used in the HIRDLS PFM Power Converter Unit (part no. A0-KE-0123-500).

2 Applicable Documents

AD1 GSFC 424-11-13-01 Mission Assurance Requirements for HIRDLS

3 Limited Life Items

The HIRDLS Power Converter Unit (PCU) does not use any components that may be classified as limit life items. The relays used in the PCU have a life expectancy at least twice that required when considering the fabrication, test, storage and mission operation phases combined.

SECTION 19
Pressure Vessel History / Test Record

(Not Applicable)

SECTION 20
Calibration Data Record

HIRDLS TR-RAL-240

High Resolution Dynamics Limb Sounder

Originator: AB Pearce Date: 20th Nov. 2000

Subject/Title: PFM PCU Calibration Data

Description/summary/contents:

This spreadsheet documents the calibration data for the PFM PCU
It also includes data from the EM PCU for comparison.

Keywords : PFM PCU Calibration Data

Purpose of this Document:

(20 Characters Maximum)

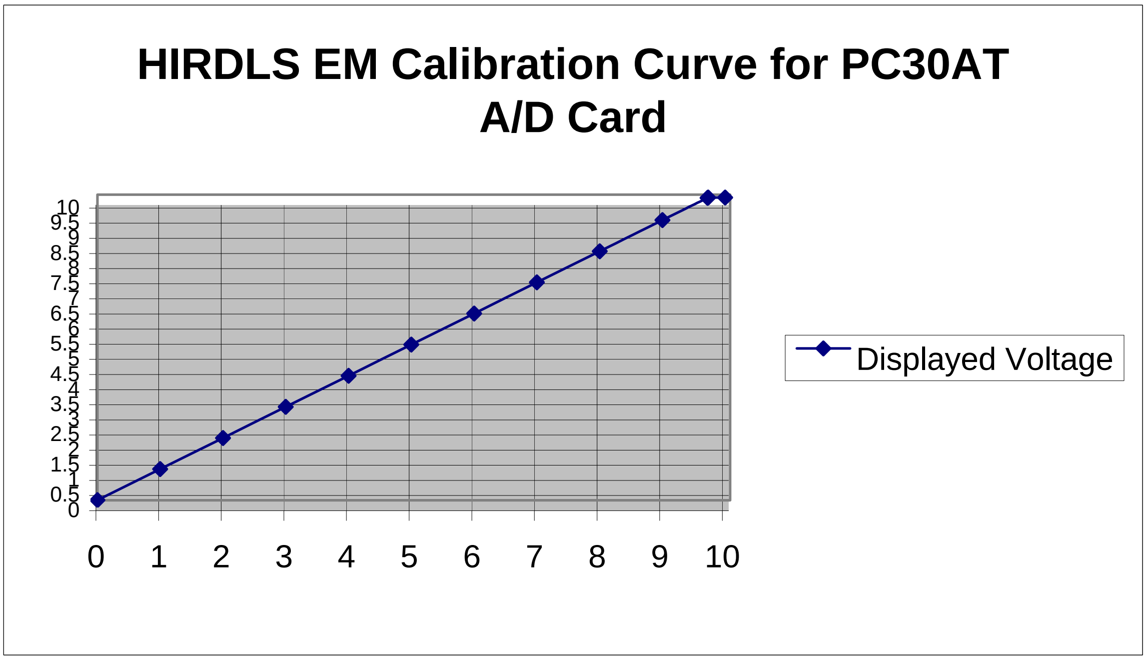
Reviewed/Approved By **date (day-mon-yr)**	11/20/00		

Rutherford Appleton Laboratory
Chilton, DIDCOT, OX11 0QX
United Kingdom

EOS

PC30AT Calibration curve as used for HIRDLS EM

Input Voltage	Displayed Voltage
0	0.005
1.0016	1.031
2.004	2.057
3.0064	3.087
4.0082	4.113
5.01	5.144
6.0128	6.17
7.0153	7.201
8.0176	8.227
9.0197	9.257
9.7407	9.995
9.7508	10.005
10.0218	10.005



HIRDLS PCU EM Calibration Values

Function No.	Function Name	Nom Scale Factor (Input/Telemetry)	Original Telemetry Data	@Input Level	Revised Input Level	Revised Telemetry Data	Original Telemetry Scaling Factor	Revised Telemetry Scaling Factor
0	+28QA I/P Current	2.5A/V	3.014	6.9			2.2893	2.2893
1	+5V PCU Supply	1V/V	4.724	4.858			1.0284	1.0284
2	+15V PCU Supply	2V/V	4.396	14.235	14.241	6.674	3.2382	2.1338
3	-15V PCU Supply	2V/V	-4.485	-14.519	-14.496	-6.802	3.2372	2.1311
7	+28 QB I/P Current	2.5A/V	Not Fitted					
17	+5V SYS A Volts	1V/V	4.951	5.165			1.0432	1.0432
18	+15V SYS A Volts	2V/V	4.689	15.213	15.255	7.113	3.2444	2.1447
19	-15V SYS A Volts	2V/V	-3.415	-15.154	-15.176	-7.106	4.4375	2.1357
20	+28V SYS A Volts	3V/V	8.565	27.772			3.2425	3.2425
21	+5V SPU A Volts	1V/V	5.376	5.507			1.0244	1.0244
22	+15V SPU A Volts	2V/V	9.408	14.95	15.031	7.413	1.5891	2.0277
23	-15V SPU A Volts	2V/V	-9.48	-15.223	-14.968	-7.31	1.6058	2.0476
25	+5V SYS B Volts	1V/V	4.921	5.1357			1.0436	1.0436
26	+15V SYS B Volts	2V/V	4.704	15.254	15.294	7.145	3.2428	2.1405
27	-15V SYS B Volts	2V/V	-3.422	-15.18	-15.202	-7.125	4.4360	2.1336
28	+28V SYS B Volts	3V/V	8.645	27.999			3.2388	3.2388
29	+5V SPU B Volts	1V/V	Not Fitted					
30	+15V SPU B Volts	2V/V	Not Fitted					
31	-15V SPU B Volts	2V/V	Not Fitted					
32	PCU Conv A Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
33	+5V SYS A Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
34	+15V SYS A Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
35	-15V SYS A Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
36	+28V SYS A Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
37	+5V SPU A Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
38	+/-15V SPU A Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
39	PCU Conv B Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
41	+5V SYS B Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
42	+15V SYS B Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
43	-15V SYS B Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
44	+28V SYS B Temp	(10mV/^{o}K)	Not Cal. for EM				2.7315V = 0^{o}C	2.7315V = 0^{o}C
45	+5V SPU B Temp	(10mV/^{o}K)	Not Fitted					
46	+/-15V SPU B Temp	(10mV/^{o}K)	Not Fitted					

HIRDLS PCU EM Shipping Calibration Values

Function No.	Function Name	Input Level	Telemetry Data	As Shipped Telemetry Scaling Factor
0	+28QA I/P Current	6.9	3.014	2.2893
1	+5V PCU Supply	4.858	4.724	1.0284
2	+15V PCU Supply	14.241	6.674	2.1338
3	-15V PCU Supply	-14.496	-6.802	2.1311
7	+28 QB I/P Current		Not Fitted	
17	+5V SYS A Volts	5.165	4.951	1.0432
18	+15V SYS A Volts	15.255	7.113	2.1447
19	-15V SYS A Volts	-15.176	-7.106	2.1357
20	+28V SYS A Volts	27.772	8.565	3.2425
21	+5V SPU A Volts	5.507	5.376	1.0244
22	+15V SPU A Volts	15.031	7.413	2.0277
23	-15V SPU A Volts	-14.968	-7.31	2.0476
25	+5V SYS B Volts	5.1357	4.921	1.0436
26	+15V SYS B Volts	15.294	7.145	2.1405
27	-15V SYS B Volts	-15.202	-7.125	2.1336
28	+28V SYS B Volts	27.999	8.645	3.2388
29	+5V SPU B Volts		Not Fitted	
30	+15V SPU B Volts		Not Fitted	
31	-15V SPU B Volts		Not Fitted	
32	PCU Conv A Temp		Not Cal. for EM	2.7315V = 0^{o}C
33	+5V SYS A Temp		Not Cal. for EM	2.7315V = 0^{o}C
34	+15V SYS A Temp		Not Cal. for EM	2.7315V = 0^{o}C
35	-15V SYS A Temp		Not Cal. for EM	2.7315V = 0^{o}C
36	+28V SYS A Temp		Not Cal. for EM	2.7315V = 0^{o}C
37	+5V SPU A Temp		Not Cal. for EM	2.7315V = 0^{o}C
38	+/-15V SPU A Temp		Not Cal. for EM	2.7315V = 0^{o}C
39	PCU Conv B Temp		Not Cal. for EM	2.7315V = 0^{o}C
41	+5V SYS B Temp		Not Cal. for EM	2.7315V = 0^{o}C
42	+15V SYS B Temp		Not Cal. for EM	2.7315V = 0^{o}C
43	-15V SYS B Temp		Not Cal. for EM	2.7315V = 0^{o}C
44	+28V SYS B Temp		Not Cal. for EM	2.7315V = 0^{o}C
45	+5V SPU B Temp		Not Fitted	
46	+/-15V SPU B Temp		Not Fitted	

Telemetry Scaling Factor is the value to multiply the Telemetry Data by to get the original Input Level, except for the Temperature Sensing, which is directly calibrated.

Shipping Calibration Values **TR-RAL-240**

Telemetry Scaling Factor is the value to multiply the Telemetry Data by to get the original Input Level, except for the Temperature Sensing, which is directly calibrated.

Note 1: **As Shipped scaling factors shown here are calculated purely on the ratio of input voltage to output voltage without including effects of offsets shown on unused channels.**

Note 2: **Temperature Offsets shown are empirical measurements seen at turn on from a known temperature before self heating due to internal dissipation losses. Individual calibration of sensors has not been done.**

Function No.	Hex Code	Function Name	Input Level	Telemetry Ch A	Analogue Telemetry Ch B	As Shipped Telemetry scaling factor, Ch A	As Shipped Telemetry Scaling Factor, Ch B	Offset (TBV)	Emulator Cal Value
0	0000	** Not Used **	0.000	-0.010	-0.009	0.0000	0.0000		0.000
1	0001	PSSV15	5.100	4.072	4.074	1.2525	1.2518		1.252
2	0002	PSSV16	14.220	3.863	3.8647	3.6812	3.6795		3.680
3	0003	PSSV17	-14.691	-4.015	-4.0132	3.6590	3.6607		3.660
4	0004	PSSV18	5.082	4.060	4.062	1.2517	1.2511		1.251
5	0005	PSSV19	5.077	4.054	4.056	1.2523	1.2517		1.252
6	0006	QA Primary Current		See Qa, QB Calibration Sheet for table of values					2.000
7	0007	QB Primary Current		See Qa, QB Calibration Sheet for table of values					2.000
8	0008	PSSV09	5.548	4.433	4.435	1.2515	1.2510		1.251
9	0009	PSSV11	15.468	4.222	4.2239	3.6636	3.6620		3.663
10	000A	PSSV13	-15.502	-4.235	-4.2332	3.6604	3.6620		3.661
11	000B	PSSV01	30.066	4.265	4.2669	7.0493	7.0463		7.048
12	000C	PSSV10	5.556	4.439	4.441	1.2516	1.2511		1.251
13	000D	PSSV12	15.466	4.204	4.206	3.6787	3.6771		3.678
14	000E	PSSV14	-15.455	-4.228	-4.2266	3.6550	3.6566		3.656
15	000F	PSSV02	30.021	4.256	4.2575	7.0543	7.0513		7.053
16	1000	** Not Used **	0.000	-0.010	-0.008	0.0000	0.0000		0.000
17	1001	PSSV03	5.611	3.972	3.974	1.4126	1.4119		1.412
18	1002	PSSV05	15.286	3.129	3.1303	4.8859	4.8832		4.885
19	1003	PSSV07	-15.253	-3.142	-3.14	4.8549	4.8576		4.856
20	1004	** Not Used **	0.000	-0.010	-0.009	0.0000	0.0000		0.000
21	1005	PSSV04	5.575	3.940	3.942	1.4150	1.4143		1.415
22	1006	PSSV06	15.298	3.132	3.1333	4.8850	4.8824		4.884
23	1007	PSSV08	-15.283	-3.147	-3.1454	4.8561	4.8588		4.857

Function No.	Hex Code	Function Name	Input Level	Telemetry Ch A	Analogue Telemetry Ch B	As Shipped Telemetry scaling factor, Ch A	As Shipped Telemetry Scaling Factor, Ch B	Offset (TBV)	Emulator Cal Value
24	1008	Temperature	10mV/K						
25	1009	Temperature	10mV/K				2.7315V = 0^oC		
26	100A	Temperature	10mV/K				2.7315V = 0^oC	+0.5C	
27	100B	Temperature	10mV/K				2.7315V = 0^oC	-1.0C	
28	100C	Temperature	10mV/K				2.7315V = 0^oC	+0.6C	
29	100D	Temperature	10mV/K				2.7315V = 0^oC	-0.6C	
30	100E	Temperature	10mV/K				2.7315V = 0^oC	-1.1C	
31	100F	Temperature	10mV/K				2.7315V = 0^oC		
32	2000	Temperature	10mV/K				2.7315V = 0^oC		
33	2001	Temperature	10mV/K				2.7315V = 0^oC	-0.8C	
34	2002	Temperature	10mV/K				2.7315V = 0^oC		
35	2003	Temperature	10mV/K				2.7315V = 0^oC	-0.3C	
36	2004	Temperature	10mV/K				2.7315V = 0^oC		
37	2005	Temperature	10mV/K				2.7315V = 0^oC		
38	2006	Temperature	10mV/K				2.7315V = 0^oC	-1.1C	
39	2007	Temperature	10mV/K				2.7315V = 0^oC	+0.7C	
40	2008	** Not Used **	10mV/K				2.7315V = 0^oC		
41	2009	** Not Used **							
42	200A	Temperature	10mV/K				2.7315V = 0^oC		
43	200B	Temperature	10mV/K				2.7315V = 0^oC	+0.7C	
44	200C	Temperature	10mV/K				2.7315V = 0^oC		
45	200D	Temperature	10mV/K				2.7315V = 0^oC		
46	200E	Temperature	10mV/K				2.7315V = 0^oC		
47	200F	Temperature	10mV/K				2.7315V = 0^oC		

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.999992961
R Square	0.999985922
Adjusted R Square	0.999984839
Standard Error	0.006262895
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	36.21956182	36.21956182	923406.5115	6.34111E-33
Residual	13	0.00050991	3.92239E-05		
Total	14	36.22007173			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.010551837	0.002607337	-4.046978663	0.001384208	-0.016184645	-0.004919029	-0.016184645	-0.004919029
X Variable 1	0.498643126	0.000518912	960.9404308	6.34111E-33	0.497522086	0.499764166	0.497522086	0.499764166

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.999992283
R Square	0.999984566
Adjusted R Square	0.999983378
Standard Error	0.006557267
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	36.21553396	36.21553396	842265.7212	1.15291E-32
Residual	13	0.000558971	4.29978E-05		
Total	14	36.21609293			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.008575883	0.002729888	-3.141477478	0.007798547	-0.014473447	-0.002678319	-0.014473447	-0.002678319
X Variable 1	0.498615399	0.000543302	917.7503589	1.15291E-32	0.497441667	0.499789131	0.497441667	0.499789131

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.999992283
R Square	0.999984566
Adjusted R Square	0.999983378
Standard Error	0.006557267
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	36.21553396	36.21553396	842265.7212	1.15291E-32
Residual	13	0.000558971	4.29978E-05		
Total	14	36.21609293			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.008575883	0.002729888	-3.141477478	0.007798547	-0.014473447	-0.002678319	-0.014473447	-0.002678319
X Variable 1	0.498615399	0.000543302	917.7503589	1.15291E-32	0.497441667	0.499789131	0.497441667	0.499789131

Formula required for QA abd QB Telemetry curves.
Note: Scale factors shown do not take account of offset voltages at zero current.
The scale factor of 2.000 is used for both channels on the PCU IPU Emulator.

Input QA	Input QB	Analogue Telemetry A	Analogue Telemetry B	Scale Factor A	Scale Factor B	Average Emulator Calibration Factor
0.131		0.072	0.075	1.819	1.747	1.783
0.251		0.121	0.123	2.074	2.041	2.058
0.337		0.152	0.154	2.217	2.188	2.203
0.403		0.186	0.188	2.167	2.144	2.155
0.496		0.233	0.234	2.129	2.120	2.124
1.987		0.976	0.978	2.036	2.032	2.034
2.722		1.343	1.345	2.027	2.024	2.025
3.684		1.823	1.824	2.021	2.020	2.020
5.536		2.745	2.747	2.017	2.015	2.016
5.740		2.850	2.852	2.014	2.013	2.013
6.528		3.243	3.245	2.013	2.012	2.012
6.711		3.336	3.338	2.012	2.010	2.011
7.873		3.917	3.918	2.010	2.009	2.010
8.145		4.054	4.056	2.009	2.008	2.009
8.579		4.272	4.274	2.008	2.007	2.008
	0.145	0.056	0.058	2.589	2.500	2.545
	0.264	0.114	0.116	2.316	2.276	2.296
	0.352	0.158	0.16	2.228	2.200	2.214
	0.419	0.192	0.194	2.182	2.160	2.171
	0.511	0.238	0.24	2.147	2.129	2.138
	1.982	0.97	0.971	2.043	2.041	2.042
	2.712	1.332	1.334	2.036	2.033	2.035
	3.666	1.807	1.808	2.029	2.028	2.028
	5.527	2.732	2.733	2.023	2.022	2.023
	5.732	2.837	2.838	2.020	2.020	2.020
	6.527	3.232	3.234	2.019	2.018	2.019
	6.712	3.325	3.327	2.019	2.017	2.018
	7.888	3.911	3.912	2.017	2.016	2.017
	8.163	4.05	4.052	2.016	2.015	2.015
	8.604	4.271	4.273	2.015	2.014	2.014

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.999999538
R Square	0.999999076
Adjusted R Square	0.999999005
Standard Error	0.001602676
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	36.12860594	36.12860594	14065647.85	1.30082E-40
Residual	13	3.33914E-05	2.56857E-06		
Total	14	36.12863933			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.017492287	0.00066782	-26.19312375	1.23413E-12	-0.018935024	-0.01604955	-0.018935024	-0.01604955
X Variable 1	0.498064055	0.000132802	3750.41969	1.30082E-40	0.497777153	0.498350957	0.497777153	0.498350957

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.999999355
R Square	0.999998709
Adjusted R Square	0.99999861
Standard Error	0.001893766
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	36.12356538	36.12356538	10072518.45	1.13987E-39
Residual	13	4.66225E-05	3.58635E-06		
Total	14	36.123612			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.015688482	0.000789114	-19.88113135	4.09497E-11	-0.017393259	-0.013983705	-0.017393259	-0.013983705
X Variable 1	0.498029309	0.000156923	3173.723121	1.13987E-39	0.497690299	0.49836832	0.497690299	0.49836832

SECTION 21
Temporary Installation Record
(Not Applicable)

SECTION 22
Open Work / Deferred Work / Open Tests

(Not Applicable)

SECTION 23
List of Non-Conformance Reports
(Document No. PA-RAL-267, Issue 1)

List of RAL Non-Conformances

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT
Rutherford Appleton Laboratory

Spacecraft/Project: CHEM-1	Originator: RAL/SSD/PA
Instrument: HIRDLS Model:FM1	Document No Issue :4
Subsystems:	Date: 01-Jun-01

NCR Serial No. HIR-AR-RAL-085/	*Level*	*Subsystem Assembly/ Part*	*Model*	*NCR Title*	*Issue Date*	*Disposition/Corrective Actions*	*References*	*Close Out Date*
1		PSS PCU	EM	PCB out of specification.	27-Jan-98	Investigation		12-Jan-00
10	2	TEU interface PCU	EM	MISSING WIRING	05-Feb-99	Investigation		11-Jan-00
11	2	PCU RADIATOR P PCB	PFM	PC19148P OUT OF SPEC	20-Aug-99	Use As Is NCR DETAILS TO BE COPIED TO MANUFACTURER		26-Aug-99
12	2	PCU	PFM	PLATE 2-AMP RELAY INTERFACE	07-Oct-99	Rework		11-Oct-99
13	2	PCU RELAY DIOD	PFM	Harwin H2121 terminal pin fiting problem. Hole size incorrectly specified	11-Oct-99	Remake Correct Design information and PCB shape. Remake PCBs.		10-Nov-99
14	2	PCU PCU Enclosur 2 Amp relay fl	PFM	2 AMP RELAY FLANGE	20-Oct-99	Design Modified The new flange will be made from 1.2mm material		01-Feb-00
15	2	PCU PCU Enclosur Control Board	PFM	Control Board Strap	09-Nov-99	Rework The control board strap will be modified to 7.5mm wide.		11-Jan-00

Spacecraft/Project:	CHEM-1		Originator:	RAL/SSD/PA	
Instrument:	HIRDLS	Model:FM1	Document No		Issue :4
Subsystems:			Date:	01-Jun-01	

NCR Serial No. HIR-AR-RAL-085/	*Level*	*Subsystem Assembly/ Part*	*Model*	*NCR Title*	*Issue Date*	*Disposition/Corrective Actions*	*References*	*Close Out Date*
16	2	PCU All PCBs with Balun washer	PFM	BALUN WASHER ERRORS	12-Nov-99	Rework Drill 3 additional 0.9mm holes on a 3.8mm PCD between existing holes, file semicircular notches approx. 1mm rad. each side of washer on axis of existing holes.		15-Nov-99
17	2	PCU Conv. PCBs	PFM	Wrong Capacitors fitted	08-Dec-99	Rework		12-Jan-00
18	2	PCU PC19173M1 P D14, D18	PFM	D14, D18 PT HOLES TOO SMALL	06-Jan-00	Rework CADNETIX COMPONENT SHAPE WRONG: SHAPE NAME/COMPONENT SHAPE DID NOT MATCH. NO SHAPE TO BE ALTERED WITHOUT FLAGGING UP		12-Feb-00
19	2	PCU PC19173M1 FL1-FL26 INC	PFM	STRAIN RELIEF HOLES TOO SMALL	06-Jan-00	Rework DRILL OUT 1.0MM STRAIN RELIEF HOLES TO 1.2MM USING HAND DRILL BEFORE LOADING PCB		10-Mar-00
2	2	PCU interpoint conv	EM	FAILURE OF CONVERTER	09-Dec-98	b) Replace capacitor and converter.		11-Jan-00
20	2	PCU PCU ENCLOS -X,+X CONTR	PFM	PLATE ANODISING AND ALOCHROMING	09-Dec-99	Rework		25-Jan-00
21	2	PCU CONVERTER ALL LEADED	PFM	LEAD ENDS TOO LONG	27-Jan-00	Rework CUT ENDS TO 0.7-1.0MM FROM SURFACE		31-Jan-00
22	2	PCU PC19151	PFM	SOLDERING OF EXTRA COMPONENTS	31-Jan-00	Rework REWORK TO ACCEPTABLE QUALITY		14-Mar-00
23	2	PCU VARIOUS M2.5 CAP HE	PFM	TORQUE SETTINGS FOR SCREW FASTENERS	02-Feb-00	Documents reissued THIS WAS A SIMPLE OMISSION		28-Feb-00

Spacecraft/Project: CHEM-1	Originator: RAL/SSD/PA
Instrument: HIRDLS Model:FM1	Document No Issue :4
Subsystems:	Date: 01-Jun-01

NCR Serial No. HIR-AR-RAL-085/	Level	Subsystem Assembly/ Part	Model	NCR Title	Issue Date	Disposition/Corrective Actions	References	Close Out Date
24	2	PCU BASE PLATE CONVERTER	PFM	L BRACKET HOLE SIZES	09-Feb-00	Rework DRILL OUT HOLES TO SUIT M3 SCREWS, CLEAN BRACKETS		18-Feb-00
25	2	PCU PC19160M2	PFM	U5-U8 TRACKED INCORRECTLY ON +X RELAY DRIVER BOARD	20-Feb-00	Rework Remove U5, U6, U7, U8, using an oven to preheat the pcb to +60C. Scrap the removed i.c.'s. Use the replacement i.c.'s provided. Pins 4 and 13 on the		14-Mar-00
26	2	PCU PC19159M2	PFM	IC's U5 -U8 TRACKED INCORRECTLY	20-Feb-00	Rework Remove U5, U6, U7, U8, using an oven to preheat the pcb to +60C. Scrap the removed i.c.'s. Use the replacement i.c.'s provided. Pins 6 and 17 on the		14-Mar-00
27	2	PCU PC19159M2	PFM	10A DRIVERS COLLECTOR RESISTORS	27-Feb-00	Rework Replace all 33R2 resistors driving 10A relays with 22R1 RWR81 resistors. These are:- R66, R67, R70, R93, R11, R39, R95,		23-Mar-00
28	2	PCU PC19160M2	PFM	10A DRIVERS COLLECTOR RESISTORS	25-Feb-00	Rework Replace all 33R2 resistors driving 10A relays with 22R1 RWR81 resistors. These are:- R126, R127, R99, R128, R63, R64, R35,		23-Mar-00
29	2	PCU BASE PLATE SPU MONITO	PFM	COLLISION BETWEEN REG AND PCB MTG BRKT	03-Mar-00	Rework MOUNT REGULATOR TO OPPOSITE SIDE OF PCB MTG BRKT. SMALL SECTION OF BRKT TO BE MILLED.		13-Mar-00
3	2	SPU , SLR PCU	EM	TELEMETRY BIT POLARITY	22-Jan-99	Investigation		28-Feb-00
30	2	PCU SPU PCU CO	PFM	BRACKET INTERFERES WITH COMPONENTS	12-Mar-00	Rework MIL OUT SECTION OF THE FOOT OF THE LOOM SLOT. MILL OUT SECTION OF SADDLE PORTION AT BRKT TOP.		14-Mar-00
31	2	PCU PCU	PFM	L BRACKET NOT FITTING DUE TO PCB THICKNESS	13-Mar-00	Rework DRILL OUT HOLES PLUS 1.2MM		15-Mar-00

Spacecraft/Project: CHEM-1	Originator: RAL/SSD/PA
Instrument: HIRDLS Model:FM1	Document No Issue :4
Subsystems:	Date: 01-Jun-01

NCR Serial No. HIR-AR-RAL-085/	*Level*	*Subsystem Assembly/ Part*	*Model*	*NCR Title*	*Issue Date*	*Disposition/Corrective Actions*	*References*	*Close Out Date*
32	2	PCU TOP PLATE	FM2	FITTING OF TOP PLATE TO CONNECTOR PLATE	16-Mar-00	Rework MILL REBATE TO ALLOW TOP PLATE TO FIT INTO EDGE OF CONNECTOR PLATE		07-Apr-00
33	2	PCU	PFM	UNACCEPTABLE SOLDER JOINTS	27-Mar-00	Rework REMAKE ALL UNACCEPTABLE JOINTS		04-Apr-00
34	2	IEU PCU	PFM	UNACCEPTABLE CRIMPS	22-Mar-00	Rework REWORK ON SITE		04-Apr-00
35	2	PCU 1-KE-0123-20 N/A	PFM	BUSBAR SUB ASSY TURRET TAG	20-Mar-00	Use As Is SWAGE THE POST WITH A CIRCULAR TOOL. FILLET THE SWAGE WITH SCOTCH WELD 2216 ON THE SOLDER SIDE OF THE BOARD.		08-May-00
36	2	PCU 1-KE-0123-20 3-KE-0123-20	PFM	VERTICAL SHELF FIXING	29-Mar-00	Use As Is USE M2.5 X 5MM SCREWS		08-May-00
37	2	PCU PCU SPU PCU CO	PFM	BRKT AT PCU SUPPLY END OF PC19152 DOES NOT HAVE ENOUGH ROOM FOR LOOMING	06-Apr-00	Rework MAKE NEW BRACKETS		08-May-00
38	2	PCU PCU SPU PCU CO	PFM	RADIATOR PANEL LAYOUT ERROR	06-Apr-00	Rework ESTABLISH CORRECT LAYOUT FOR CONVERTOR MODULES AND ISSUE FORMAL DRAWING		15-Mar-00
39	2	PCU PC19173M/1	PFM	BACKFEEDING OF +5V ONTO -15V LINES	26-Apr-00	Rework FIT ZENER DIODES/RES. AS SHOWN ON PAGE 2 OF FORM		08-May-00
4	2	PCU	EM	NO TELEMETRY BITS	23-Jan-99	Investigation	KE-122-513-00-D	10-Jan-00

Spacecraft/Project: CHEM-1	Originator: RAL/SSD/PA
Instrument: HIRDLS Model:FM1	Document No Issue :4
Subsystems:	Date: 01-Jun-01

NCR Serial No. HIR-AR-RAL-085/	Level	Subsystem Assembly/ Part	Model	NCR Title	Issue Date	Disposition/Corrective Actions	References	Close Out Date
40	2	PCU PC19159M2	PFM	WRONG 244 BUFFERS LOADED	01-Mar-00	Rework REMOVE ICS AND REPLACE WITH CORRECT PARTS		08-May-00
41	2	PCU CONTROLLE	PFM	A/B_TEU_28VQC ACTEL LINES	17-Jul-00	Rework TRANSPOSE PINS ON +XPLATE CONN. A11F. DRAWING CHANGES ALSO. MOD SHEETS KE-3205, KE-3210, KE-3209 REFER.	Drawing to be updated	04-Aug-00
42	2	PCU BASE PLATE WIRING LOO	PFM	INCORRECT LOOM WIRING	12-May-00	Rework WIRES REMOVED FROM TERMINAL AND RELOOMED, AND OTHER WIRES CONNECTED TO CORRECT PLACES		15-May-00
43	2	PCU BASE PLATE	PFM	BRACKETS FOULS FLYING LEAD PAD	12-May-00	Rework REMOVE WIRE AND CUT TRACK TO PAD.		15-May-00
44	2	PCU BASEPLATE PC19151P AN	PFM	NOISY SPU CONVERTOR OUTPUTS	19-Jul-00	Rework CHANGE TO LOCAL SENSE. INSERT 1nF CKR05 FROM MTR "POSITIVE OUTPUT" PIN5 TO CHASSIS. REROUTE SPU B CONV. RETURNS TO SAME ROUTE	Drawing to be updated	30-May-01
45	1	PCU PC19152P TR9/TR10	PFM	TRANSISTOR FAILURE	13-Jun-00	Investigation FIT NEW TRANSISTORS, FIT 1 RES ANS 1 CAP TODAMP OSCILLATION, UPDATE DRAWINGS.	Drawing to be updated	30-May-01
46	2	PCU CONTROLLE PC19153M	PFM	QA CURRENT MONITOR FAILURE	19-Jul-00	Investigation REMOVE LID OF PCU AND INVESTIGATE FUNCTION OF QA MONITOR CHANNEL IN SITU, OR REMOVE AS NEEDED.	Drawing to be updated	04-Aug-00
46.1	2	PCU PC19153M	PFM	QA CURRENT MONITOR FAILURE DURING TV TEST	09-Aug-00		Drawing to be updated	20-Apr-01
47	2	PCU +X Panel CONNECTOR	PFM	TEU_+V & REDUNDANT SWAPPED	19-Jul-00	Rework MAKE CORRECTION ON RAD. PLATE CONN. A1M. SE DETAILS		22-Nov-00

Spacecraft/Project: CHEM-1	Originator: RAL/SSD/PA
Instrument: HIRDLS Model:FM1	Document No Issue :4
Subsystems:	Date: 01-Jun-01

NCR Serial No. HIR-AR-RAL-085/	Level	Subsystem Assembly/ Part	Model	NCR Title	Issue Date	Disposition/Corrective Actions	References	Close Out Date
48	2	PCU	PFM	AMUX PCB FOULS RADIATOR D-TYPES	27-Jul-00	Rework TIE HARNESSES BACK. REFIX D-TYPES WITHOUT SPACER WASHERS. FIT FIBRE TAPE TO PCB EDGE. ONLY REMAINING OPTION IS REMOVE APPROX 1MM		04-Aug-00
49	2	PCU ALL BOX SID	PFM	BOX PANELS ANODISED ON MATING SURFACES	27-Jul-00	Rework REMOVE THE ANODISING FROM THOSE MATING SURFACES CURRENTLY WITHIN REACH (RADIATOR, LID, TOP AND REAR EDGES OF +/- X PLATES		22-Nov-00
5	2	QBA PCU	EM	POWER CONNECTOR PINOUT	23-Jan-99	Investigation		11-Jan-00
50	2	PCU Connector Pa	PFM	In Rush effect on Switching PCU ON	31-Aug-00	) A transient limiter circuit has been provided at the power input to the PCU to suppress the Inrush effect. This circuit has a latency of a few microseconds which is consistent	Drawing to be updated	20-Apr-01
51	2	PCU Radiator panel	PFM	MTR CONVERTER CHIRPING	30-Aug-00	insert RC circuit audible chirping of MTR Converters under low voltage bus conditions	KE-0123-804-00-A 830-00-A	20-Apr-01
52	2	PCU	PFM	Load relay current exceeded during switching of subsystem loads	18-Oct-00	Relays to be changed	Drawing to be updated	20-Apr-01
53	2	PCU 5V CONVERT	PFM	CONV. MODULE FAILS TO FIT	19-Oct-00	drill new mounting holes Remove brackets and re drill holes		22-Nov-00
54	2	PCU X Side Panel	FM	Hypertac Crimping	19-Jan-01	Hypertac have agreed that the wrong positioner is specified on their documentation,Are re-introducing HPD-309B in the mean time will supply modified positioner		28-Feb-01
55	2	PCU + X Plate	FM	Wiring Rubbing +X Side plate	28-Feb-01	Chamfer Corner of 10 Amp Relay support on that one support and update Drawing register and Produce Drawing 3-KE-0123-126-A		30-May-01

Spacecraft/Project: CHEM-1		Originator: RAL/SSD/PA	
Instrument: HIRDLS	Model:FM1	Document No	Issue :4
Subsystems:		Date: 01-Jun-01	

NCR Serial No. HIR-AR-RAL-085/	*Level*	*Subsystem Assembly/ Part*	*Model*	*NCR Title*	*Issue Date*	*Disposition/Corrective Actions*	*References*	*Close Out Date*
56	2	PCU	PFM	NOT USED	07-Mar-01			30-May-01
57	2	PCU	PFM	Controller supports	06-Mar-01	Remove studs from holes. Manufacture 6 spacers from StSt. Fit inserts if found to be necessary. Hardware required 14 March.		20-Apr-01
58	2	PCU Connector Pa 0123-218-A	PFM	Inductor Bracket modification	07-Mar-01	Rework Amend drawing A1-KE-0123-218-00-A to show the spindle orientation holes as per the spindle base plate drawings. Redrill the existing inductor bracket with new		30-May-01
59	2	PCU	PFM	Fit RC filter netwoeks to SPU converters	12-Mar-01	Fit RC Filter networks to SPU converters	CR-RAL-176/15	30-May-01
6	2	SPU A PCU	EM	DAMAGED WIRE	25-Jan-99	Investigation		11-Jan-00
60	2	PCU +X Plate KE-0123-121	PFM	Holes for Noisy Bus Relays wrong position.	17-Mar-01	Rework Drill new holes in more suitable positions. Modify drawing and raise to issue D.		30-May-01
61	2	PCU	PFM	Holes in old modified top panel	15-Mar-01	Determine whether holes have been drilled in correct position with respect to drawing, or bracket is not in position expected.		20-Apr-01
62	2	PCU	PFM	5 Volt Problem	21-Mar-01	Reissue after update.		20-Apr-01
63	2	PCU	PFM	Interference between AMUX pillars and Screw Heads in assembly	21-Mar-01	Existing stainless steel pillars modified. Drawing up-isssued to C. M Whalley & D Smart examined the threads on the studs, all were damaged to some extent.		20-Apr-01

Spacecraft/Project: CHEM-1		Originator: RAL/SSD/PA	
Instrument: HIRDLS	Model:FM1	Document No	Issue :4
Subsystems:		Date: 01-Jun-01	

NCR Serial No. HIR-AR-RAL-085/	*Level*	*Subsystem Assembly/ Part*	*Model*	*NCR Title*	*Issue Date*	*Disposition/Corrective Actions*	*References*	*Close Out Date*
64	2	PCU	PFM	Holes in +X plate require filling	29-Mar-01	Rework Fill in holes where possible with:- a screw with nut fitted to rear, or gluing a screw in hole as required.		29-Mar-01
65	2	PCU	PFM	Top Plate not annodised. - Thermal requirement SP-HR-111.	29-Mar-01	Paint Top Panel with Black Z306, this meets the Thermal specification SP-HR-111.		20-Apr-01
66	1	PCU	PFM	Earth Stud Problem		See NCR & continuation Sheet		05-Apr-01
66.1	1	PCU Base Plate	PFM	Earth Stud problem.	03-Mar-01	Design Modified Cut all overlong solder tails on the Controller Board in areas at risk of touching items below back to the recommended 1.5mm length.		05-Apr-01
67	2	PCU X-Plate	PFM	EEA TELEMENTARY MISWIRE	09-Apr-01	Rework Rewire the EEA_+5V_OP (from pin 29, A19F) and EEA_+15V_OP (from pin 32, A19F) telemetry lines iaw -X plate electrical schematic A3-KE-0123-878-00-E.		20-Apr-01
68.1	2	PCU +X Plate	PFM	Transistor Failure	17-Apr-01	Rework Take Top Panel of the PCU off and carry out basic measurement to characterise the fault.		30-May-01
69	2	PCU Radiator Pane	FM	MFL Converter "CHIRPING"	06-Mar-01	Design Modified Increase FME-46 filter storage capacitance by adding two 22uf 75V CLR81 capacitors in parrallel across its output.		30-May-01
7	2	internal sup. PCU	EM	ADDITTIONAL WIRING NEED	25-Jan-99	Investigation		11-Jan-00
70	2	PCU -X plate, Conn PC19194P	FM	Fixing holes Misalignment	16-Mar-01	Rework Drill out fixing holes on H1,H2 on PC19194 with 2.0mm drill to accommodate the misalignment.		30-May-01

Spacecraft/Project:	CHEM-1	Originator:	RAL/SSD/PA
Instrument:	HIRDLS Model:FM1	Document No	Issue :4
Subsystems:		Date:	01-Jun-01

NCR Serial No. HIR-AR-RAL-085/	*Level*	*Subsystem Assembly/ Part*	*Model*	*NCR Title*	*Issue Date*	*Disposition/Corrective Actions*	*References*	*Close Out Date*
71	2	PCU -X Plate, Conn PC19194P	FM	Solder Tails too Long	16-Mar-01	Rework Amend assembly drawing and rework the component tails.		30-May-01
8	2	IPU inface PCU	EM	MISSING NUT	05-Feb-99	Investigation		11-Jan-00
9	2	IPU interface PCU	EM	CLOCK PHASE INCORRECT	05-Feb-99	Investigation		11-Jan-00

END OF LIST

SECTION 24
Copies of Non-Conformance Reports

CLRC

Non-Conformance Report (NCR)

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT

RUTHERFORD APPLETON LABORATORY

Spacecraft / Project: EOS/CHEM-1 System / Experiment: HIRDLS Sub-System: PCU Assembly: PC19152P Sub-Assembly: INT. SUPPLY I/P SWITCHING Part No.: TR9, TR10 Serial No.: 1 Model: PFM	NCR Number: HIR-AR-RAL-085/45 Originator's Name: S.JAROSLAWSKI/A.PREECE Signature: Date: 13/6/00 Sheet ...1.. of ..9... (excluding attachments, list separately).

NCR Title (25 chars. max.): +5VC CURRENT TRIP TRANSISTORS BLOWN

NCR Occurred During:	M/FAC [ ]	INSPEC [ ]	TEST [X]	INTEG [ ]	OTHER [ ]

Document or Drawing affected. Title/Number/Issue: A3-KE-0123-820-02-B

NCR Description: Transistors TR9 and TR10 in the +5VC current trip circuit both failed sometime between 28th May and 9th June in unknown circumstances. A non-flight telemetry Actel on the EM controller PCB (PC19173M) also failed taking high current. These transistors were replaced but a second double failure took place during testing of the trip circuit and the same Actel failed even further.
(use continuation sheet if necessary)

a) Cause of NCR b) Disposition / Corrective Action	Level:	1 Major	2 Minor	Corrective Action Carried Out Name Date

a) Cause unproven, but the trip circuit was found to exhibit oscillatory behaviour during turn-off, delaying it by up to 15 seconds, and had done during initial testing. The test technician not realising this was unusual behaviour (the test spec. did not mention time).

TR10 is assumed to have failed due to this plus some unknown insult, TR9 shows signs of having been shorted with a probe. The second pair of failures show evidence of being caused by shorting with a probe also. The Actel failure is thought to result from the shorting incident.

(b) Fix oscillation with 2n2 CCR05 capacitor over R70. Also reduce current limit to 166mA at +22C to reduce power stress under unusual fault conditions. Fit series resistor RWR81S 22R1 in line with LM117 to reduce power stress during turn-off. Replace LM117 as precaution, and replace TR9,TR10. Run life-test on facsimile circuit to establish the reliability of TR10 under turn-off stress. See attached report.
(use continuation sheet if necessary)

Corrective Action Carried Out: Final modification carried out 29/06/00 by A.P.Preece (but subject to review by Goddard)

MRB Action Participants	Date: Location:	Responsible for Corrective Actions: A.P.Preece

Name	Signature	Department	Date	Distribution
N. Morris	N. M[illegible]	SSTD	30/5/01	
	[illegible]			

Corrective Actions Carried Out. NCR Closed: Project PA Manager.	Date 30/5/01	Name E A CLARK	Signature [illegible]

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT

Non-Conformance Report (NCR)

CLRC

RUTHERFORD APPLETON LABORATORY

Spacecraft / Project: EOS/CHEM-1 System / Experiment: HIRDLS Sub-System: PCU Assembly: PC19152P Sub-Assembly: INT. SUPPLY I/P SWITCHING Part No.: TR9, TR10 Serial No.: 1 Model: PFM	NCR Number: HIR-AR-RAL-085/45 Originator's Name: S.JAROSLAWSKI/A.PREECE Signature: Date: 13/6/00 Sheet ...1.. of ..9... (excluding attachments, list separately).

NCR Title (25 chars. max.): +5VC CURRENT TRIP TRANSISTORS BLOWN

NCR Occurred During:	M/FAC [ ]	INSPEC [ ]	TEST [X]	INTEG [ ]	OTHER [ ]

Document or Drawing affected. Title/Number/Issue: A3-KE-0123-820-02-B

NCR Description: Transistors TR9 and TR10 in the +5VC current trip circuit both failed sometime between 28th May and 9th June in unknown circumstances. A non-flight telemetry Actel on the EM controller PCB (PC19173M) also failed taking high current. These transistors were replaced but a second double failure took place during testing of the trip circuit and the same Actel failed even further.
(use continuation sheet if necessary)

a) Cause of NCR b) Disposition / Corrective Action	Level:	1 Major	2 Minor	Corrective Action Carried Out Name Date
a) Cause unproven, but the trip circuit was found to exhibit oscillatory behaviour during turn-off, delaying it by up to 15 seconds, and had done during initial testing. The test technician not realising this was unusual behaviour (the test spec. did not mention time). TR10 is assumed to have failed due to this plus some unknown insult, TR9 shows signs of having been shorted with a probe. The second pair of failures show evidence of being caused by shorting with a probe also. The Actel failure is thought to result from the shorting incident. (b) Fix oscillation with 2n2 CCR05 capacitor over R70. Also reduce current limit to 166mA at +22C to reduce power stress under unusual fault conditions. Fit series resistor RWR81S 22R1 in line with LM117 to reduce power stress during turn-off. Replace LM117 as precaution, and replace TR9,TR10. Run life-test on facsimile circuit to establish the reliability of TR10 under turn-off stress. See attached report. (use continuation sheet if necessary)				Final modification carried out 29/06/00 by A.P.Preece (but subject to review by Goddard)

MRB Action Participants	Date: Location:	Responsible for Corrective Actions: A.P.Preece

Name	Signature	Department	Date	Distribution

Corrective Actions Carried Out. NCR Closed: Project PA Manager.	Date	Name	Signature

INVESTIGATION INTO FAILURE OF PC19152 CURRENT LIMIT FAILURE

A.P.Preece Draft

Circuit Operation

As a result of an FMECA, the HIRDLS PCU was divided into A and B sides, each with its own independent power supply. Resources could not accommodate duplicated telemetry, so the telemetry circuitry was supplied by diode-ORed +15VA and +15VB supplies. To prevent a telemetry failure dragging both supplies down, a current limit was placed in series with the telemetry circuitry supply after the diode-ORing. After passing through an LM117 linear regulator, the result was the +5VC telemetry supply.

The current limit circuit relies on a pass transistor TR10 that normally supplies the LM117 regulator with about +14.3V. The pass transistor is biased so that if more than 200mA is drawn it is pulled out of saturation, and above a TR10 collector-emitter voltage of 1.4V, the switch transistor TR9 is forward biased via R67, R68 33k2). A 100nF slugging capacitor C9 delays the voltage rise on the base of TR9 to allow reliable turn-on of the circuit at power up.

When TR9 turns on it robs TR10 of its base current, and positive feedback occurs, with TR10 turning off harder as TR9 on harder. Once tripped the circuit can only be reset by removing power. The turn-off time of the circuit is load dependent, but is ~900uS at the trip limit of 200mA, and 200uS into a dead short. TR9/TR10 are JANTXV2N2907A pnp transistors. The normal load current supplied by the trip is ~ 45mA.

Circumstances of the Failures

The first failure was noticed on 9th July 2000 when the Baseplate assembly (of which the current trip forms a sub-assembly) was switched on after some rework. Note that the baseplate had been extensively worked on to debug a noise problem in the SPU supplies. On switch-on, after a problem with a rack power supply current limit having been set too low (it induced squealing in one of the SPU supply Interpoint converters) had been dealt with, it was noticed the telemetry display on the EGSE was nonsense.

The baseplate design engineer tested the baseplate PCU Internal power supplies and found that the telemetry supply +5VC was not working. A check of the transistors TR9/10 in the +5VC current trip circuit revealed anomalous base-emitter voltages and they were removed. Replacing these transistors restored the +5VC supply but did not restore the telemetry functionality. Further tests revealed the telemetry FPGA (Actel RH1020B) on the non-flight controller pcb was taking a high current and was not responding.

In order to set the current trip limit an SOT (R70) has to be selected. This sets the base current to TR10. In order to set R70 the trip circuit has to be loaded up to see at what point tripping occurs. There was some confusion over the trip level, and extensive testing was performed on the circuit to see how it behaved with varying values of R70. Eventually the confusion was resolved and R70 was set to 2k61 (the same as originally).

However, during trip testing it was noticed that the trip did not turn off cleanly, but rather +5VC would drift down over several seconds to ~2V, then cut off suddenly. This was traced to a 2MHz oscillation in the trip circuit, which interfered with the action of TR9 and did not allow it to snap the circuit into tripping cleanly. The voltage over the collector-emitter of TR10 would drift from ~ 500mV to 9 or 10 volts, whilst the collector current reduced in a similar fashion from 200mA down slowly. The oscillations were about 2V pk-pk, non-sinusoidal at 2MHz.

On investigating the operation of the circuit during its initial testing after assembly, it was clear from the documentation that the trip circuit had always had this problem, and the test technician had not recognised it to be a problem as the test specification only mentioned current trip levels, not turn-off times. The trip took some 15 seconds to turn-off completely according to the documentation traces.

The oscillation was traced to parasitics/poor power trace layout on the trip PCB. Placing groundplane near the trip circuit would restore normal operation. As this was impractical, the chosen fix was to decouple the collector of TR9 to a power rail using a 1nF capacitor. This effectively reduced the HF gain of the first stage of the current trip circuit.

After the capacitor and final value of R70 were installed the trip circuit was tested for its trip level by placing dummy loads across the +5VC line (as well as the non-flight controller PCB with the damaged Telemetry Actel). After about five minutes of testing and several load tests the trip level was determined to be in the 200mA region. During one load test, the trip circuit tripped out, and unlike usual, would not reset when the load was removed and the power was recycled. Several futile attempts were made to reset the trip circuit by recycling the power.

Then, attempts were made to measure voltages on the back of the trip circuit PCB to determine the state of the transistors TR9/10. Although no records were made at the time, the integration engineer remembers that the voltages seemed consistent with the circuit being in an operative, but tripped, state. Continuing to probe saw the voltages change to 6.3V across the base emitter of TR9, and TR10 base-emitter voltage showed high too.

TR9/10 were removed and were found to have failed again. Also, the Telemetry Actel was found to have changed its current consumption to 201mA. It is therefore construed, given the limits of memory, that the Actel somehow failed further, and tripped the current trip circuit, and that is why it could not be reset when the power was recycled. Thus the voltages read correctly for a tripped state when the circuit was probed, but somehow during the probing, the trip circuit transistors failed.

After this the transistors were replaced, and the trip circuit has been studied wrt its performance and waveforms under various different circumstances, including turn-on/turn-off into normal load, having dead shorts and other less drastic loads put on the +5VC line whilst it is working, and turning on into a dead short on the +5VC line (and other resistive loads). The voltage and current waveforms recorded give no indication of any untoward or reliability-threatening circumstances, and no oscillations are seen.

Mode of Failure of the Devices

Initial Failure:

TR9;

The base bond wire had melted in the middle (see fig. 1).

Error! Not a valid embedded object.

Figure 1; TR9 Decapped after initial Failure

The emitter wire had not completely melted, but had visibly slumped and distorted. The die showed no visible signs of damage under x 80 magnification. Electrical measurements (made by probing the die where necessary) showed the following:-

BE	OK*
CE	HI-Z
CB	OK

MSG-RAL-GE-NC-045 PAGE 4

* Where "OK" means that a diode drop of about 0.66V was seen.

TR10

Both bond wires were in position and of normal appearance. However, the emitter metallisation pattern had ruptured, or nearly ruptured, on the die adjacent the emitter bond wire pad, and a purple discolouration of the die reached out halfway into the die from the area of the emitter rupture. See fig. 2. This looks like a die overpower failure.

Electrical measurements (made by probing the die where necessary) showed the following:-

BE	HI-Z	(probing not possible due to damage, but consistent with ruptured bond wire pad)
CE	HI-Z	(normal)
CB	79 Ohms	(abnormal)

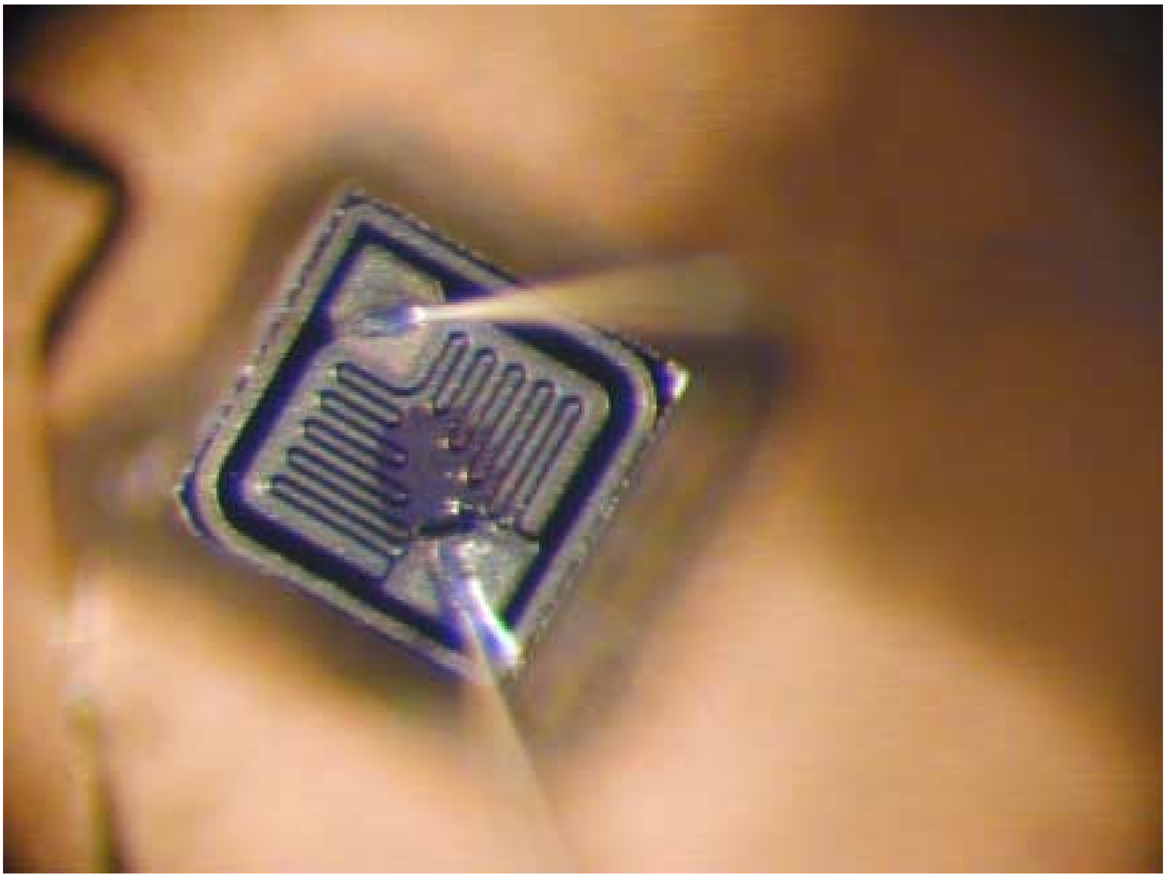


Fig. 2; TR10 Decapped after Initial Failure.

Actel 1020B

The Actel that TR9 and TR10 supply with power had ceased to function properly and was taking at least 70mA more current than normal (the current varied). No investigation took place into the nature of the Actel failure at this time except to note it was not functional.

Failure #2

NB; The transistors in the second failure turn out to have a different die than those that suffered the first failure, although they are the same part number and from the same manufacturer.

TR9;

The emitter bond wire had melted in the middle (see fig. 3). The base wire had not completely melted, but had visibly slumped and distorted.

The die showed no visible signs of damage under x 80 magnification. Electrical measurements (made by probing the die where necessary) showed the following:-

BE	OK
CE	HI-Z
CB	OK

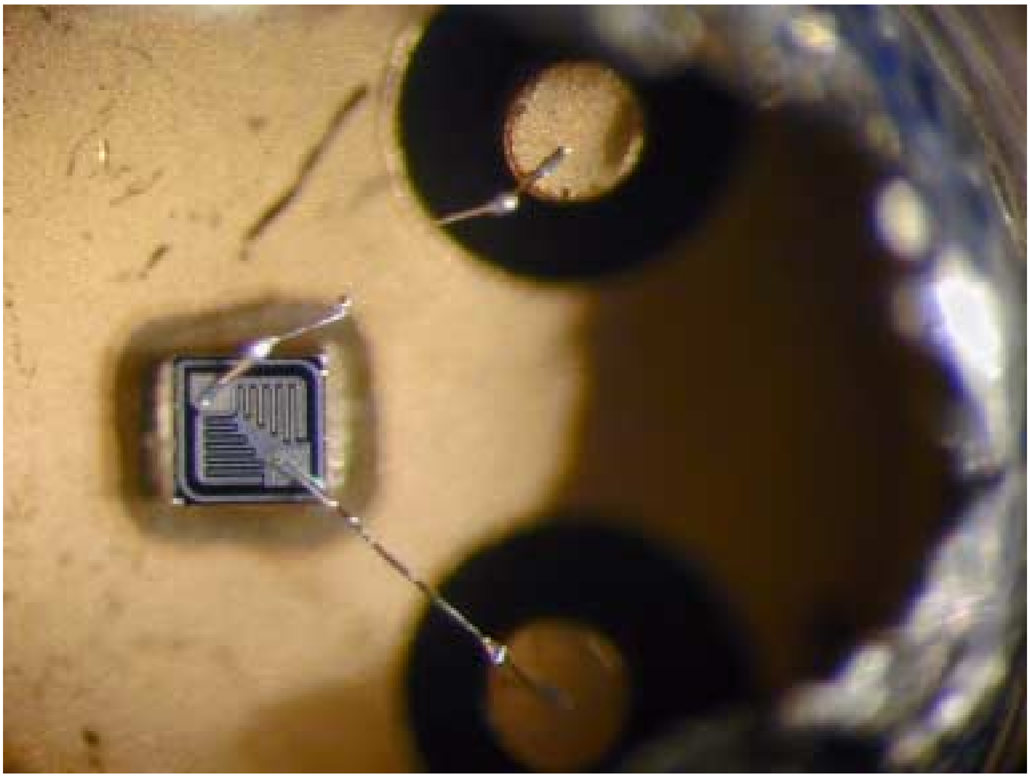


Fig 3; TR9 Decapped after Second Failure.

TR10;

Decapping TR10 revealed both bond wires blown in the middle with balled ends, with no visible distortion of the remaining wires. See fig. 4.

The die showed no visible signs of damage under x 80 magnification. Electrical measurements (made by probing the die where necessary) showed the following:-

BE	OK

CE	HI-Z
CB	OK

Actel 1020B;

This had failed further and was now taking some 145mA more than normal. However, the sequence of events (as described in the appropriate section) suggests that the Actel actually failed during the overcurrent trip tests on the replacement TR9 and TR10, and that these failed minutes later, whilst measurements with a DVM were being made to determine why the trip circuit would not reset when the power supply was recycled.

The Actel failed by drawing excessive current on pins 14 and 56, two of the VCC pins (there are seven). The Actel had also lost functionality.

Recreating the Current Trip Oscillation Problem

A representative circuit was built up of an Interpoint 2815 converter and a +5VC current trip circuit, but minus the 1nF capacitor modification used to cure the oscillations that occurred when the current limit tripped on the flight model. This circuit reproduced the 2Mhz turn-off oscillations and the excessively long turn-off times (up to 10 seconds). The pass transistor TR10 did warm up considerably, though its case never reached as high as +100C, and it did not seem to suffer any ill-effect from the oscillations.

Measurements on the test circuit showed that instead of TR10 turning off fast, as intended, TR10 turned off partway until about its Vce was on average ~13V, and the collector current was a 2MHz half-sine wave, 325mA peak. The LM117 regulator cleaned the oscillations up so that the +5VC waveform did not show the oscillation, and the +5VC load current appeared to slowly fall from 150mA to 100mA over a period of ~10 seconds, until final turn-off occurred.

Approximating the current wave-form to a half sine-wave gives an RMS power during turn-off of 0.5 x 0.707 x 0.325 x 13 = 1.5W. Approximating the collector current to the average DC value seen on +5VC, gives dissipated power = 0.15 x 13 = 2W. These two methods of calculating TR10 power during turn-off give good agreement considering the approximations, and it can be said that in the original Flight current limit circuit, TR10 suffered ~2W of power for 10 -15 seconds each time it was tested. The number of tests recorded is 3, but as a number of load tests are needed to converge on a useful result, the actual number of tests would be in the 10-20 region.

Failure Characteristics of 2N2907A Transistors & Actel RH1020B

The failures are assumed to be due to external influences rather than intrinsic device failures. The nature of the failures supports this, plus the fact that the datecodes of the two pairs of failed transistors are different, and so is the die inside them. The datecode of the initial pair of failed transistors was 9828, that of the subsequent pair was 9807. The manufacturer was NES.

Failures of 2N2907A’s can be divided into two types, based on observation and experiment:-

(1) Overcurrent
(2) Overpower

The two failure modes are however, not necessarily exclusive. The overcurrent mode is characterised by blown bond wires, whereas the overpower mode is characterised by a damaged die. We can say that an overpower failure can only occur when the device current fails to exceed 1A.

We can further subdivide the overcurrent failure mode into three categories (where the overcurrent is applied between base and emitter, forward biased):-

1.1 Exceeding the device current limit (600 mA) but the bond wires not actually suffering any visible damage. The bond wires seem to survive up to about 1A continuous current. A slow melt (seconds), at about the 1A level, seems to produce a characteristic pitted surface on the bond wire and sputtering of aluminium particles before the wire fails, without balling of the ends. This has not been observed on any of the failures.

1.2 Exceeding the capacity of the bond wires to the point that one of them melts relatively quickly (sub-second). Tests show that typically one will melt before the other. At an overcurrent of 1.5A the bond wire that doesn't melt may show no visible damage. At an overcurrent of >1.5A the bond wire that doesn't actually blow may slump a little and show distortion. A crude calculation using the specific heat of aluminium, its resistivity, melting point and the bond wire dimensions (0.0254mm dia., 2mm length) gives a minimum time to failure of ~2mS assuming no significant heat conduction from the mid point of the wire for a 2A overcurrent. Note that at a 480mA (max.) overcurrent the trip circuit responds in 200uS.

1.3 Exceeding the bond wire capacity to such an extent that both bond wires fail by rupture in the middle, where heat conduction is at its least. The ends of the failed wire ball up.

The <u>overpower failure mode</u> (which may occur with the overcurrent, or on its own) requires that the die overheats. The die is rated at 400mW, and with 13V across the die (the maximum possible) the overpower state could be reached with only 31mA collector current at room temperature. Thus an overpower die failure can occur without stressing the bondwires at all*.

An Actel 1020 was subjected to an overvoltage in an attempt to discover its failure characteristics. It failed at Vcc = 11.5 V and the load current increased in lurches at this voltage, up to 200mA at which point the voltage was reduced to +5V. The current also reduced to 65mA. When the Actel was again subjected to an overvoltage of about 13V this time (via a transistor base-emitter junction), the current increased up to just over 1 amp, at which the transistor bond wire blew.

*[However, an experiment where a 2N2907A was reverse biased across the base-emitter junction (which requires at least 5.5V applied) resulted in colour changes to the die as it heated up, followed after about five seconds by the simultaneous melting of both bond wire die attachment points. Both bond wires sprang up as they straightened out. The bond wire current must have been less than 1A during this, but the power dissipation in the die was ~ > 6 Watts].

<u>Conclusions on Immediate Cause of Failure of TR9, TR10</u>

Both the initial and the second TR9 failed due to an overcurrent, probably in the 1.5 - 2.0 Amp region. As the base bond wire failed and the emitter bond wire slumped in the initial TR9, and the emitter bond wire failed and the base bond wire slumped in the second TR9, we conclude the failures to be identical.

As the bond wires which did not fail, but slumped, were so close to failure, we conclude the primary path for the failure current was via the base and emitter, the collector current being insignificant. Pushing the conclusion a little, we also can say (following on from an experimental result mentioned above) that with no die damage the base-emitter junction was forward biased into failure. With no plausible mechanism for getting >1A through the base bond wire in normal circuit operation, we postulate a short to the +5VC line, which is 1mm away from the TR9 base pcb pad.

The initial TR10 seems to have failed due to a die overpower. As the bond wires did not fail (except the emitter metallisation at the die) then the current through them was always less than 1 Amp. There is no sign of similar damage at the base bond wire pad as there is at the emitter bond wire pad. This *may* indicate that the fault current ran from emitter to collector (i.e. in the normal mode); in any event there is 100 Ohms in the base circuit which should prevent currents larger than 150mA flowing in the base.

To achieve a potentially damaging overpower we need to dissipate >400mW. It is likely that the critical value for collector current to produce an overpower is about 250mA @ Vce = 2V. However, the current trip circuit is designed to cope with these currents and should turn off in time to prevent damage. For some reason TR10 did not respond to an overcurrent of <1.0A and heated itself to destruction, probably over at least a few seconds. It is possible that the slow turn-off response due to the oscillation problems contributed to or caused this.

The second TR10 failed in a completely different way to the first. The die appears functional, but both base and emitter bond wires suffered a large overcurrent and blew rapidly. Again, the circuit should have responded in time and shut down, but it didn't. We speculate that the base-emitter junction was forward biased somehow and the fault current ran by and large via this route. The problem here is that the 100 Ohms on the base should stop any current large enough to blow the base wire. This leaves the theory that an accidental short on the base of TR10 caused the bond wires to blow.

The Actel failure almost certainly has to be associated with the transistor failure, but in the initial failure, we have no way of knowing whether the Actel was operational but had simply lost +5VC or it failed at the same time as the transistors. If TR9 was damaged by shorting its base to +5VC, it has been demonstrated that the Actel would have suffered an overvoltage by the same mechanism.

Conclusions

No completely satisfying theory of how the failures occurred has been found. Not enough information is available to determine this. The present circuit is working perfectly, and investigations into its various modes i.e. on start-up or shut-down, low input volts etc have revealed nothing of concern. It is considered pivotal though, that is has been determined that the original circuit had a serious flaw in its tripping behaviour that went unnoticed before the first failure i.e. the oscillations.

The initial failure was probably due to TR10 failing after having been overstressed by oscillations during trip testing. All other transistors failures were due to human error; there is simply no other way they could have occurred. The energy needed to blow a bond wire is at least 1.6mJ (and probably a good deal more), and capacitors (in-circuit, or those used temporarily for testing) cannot even approach that energy, nor can the resistors feeding into the bases of TR9 and TR10 have supplied but a fraction of the current necessary to blow a bond wire.

The Actel failed due to a ~ 13V overvoltage on the +5VC line due to a probe shorting between TR9 base and +5VC, which also caused TR9 to blow. The base of TR9 and the +5VC conductors are very close on the pcb. The base of TR10 and the ground track are not so close but a short is still feasible.

Actions

(1) Add a capacitor across R70 to reduce the loop gain during the linear part of the circuit operation. This has already been done, a 1nF being used. However, the estimated safety margin here is about a factor of 2, and it is considered safer to increase the margin by increasing the capacitor to 2.2nF.

(2) Reduce the peak turn-off power in the output transistor TR10 by inserting a 22.1 Ohm series resistor in line with the LM117 regulator. Note that no evidence that the transistor is degraded by the peak turn-off power has been found. This will reduce peak power but not alter the switching point of TR10 (presently set at 200 mA). The peak turn-off power in TR10 will reduce from 6.1W for 200uS as at present (for a dead short), to 1.75W for 500uS (dead short).

While this is still outside the MIL-975 limits of the die (400mW for no heatsink), in fact the die is rated for 1.8W *continuous* (NES data sheet) for Tc = +25C. For a pulse of 500uS duration, the case is effectively held at +25C, so the maximum DC operating conditions are not exceeded. The effect of pulses this short is less than that of equivalent DC conditions, but no SOAR curves have been found for this transistor.

(3) Replace the LM117 regulator on the output of the current trip circuit. It is assumed that this regulator had +15V placed on its output during an accidental short. Whilst the device shows no signs of damage it is being replaced as a precaution.

(4) Conformal coating of the PCB should reduce the chance of any more accidental shorts. Test probes are to be shrouded for the same reason.

(5) Run life test on facsimile circuit to establish reliability of TR10 under turn-off stress. See Appendix A

Note that this circuit should never operate in the turn-off mode unless a fault condition occurs.

CLRC

Non-Conformance Report (NCR)

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT

RUTHERFORD APPLETON LABORATORY

Spacecraft / Project: CHEM 1 System / Experiment: HIRDLS Sub-System: PCU Assembly: Base Plate Sub-Assembly: Item: Serial No.: Model: PFM	NCR No.:HIR-AR-RAL-085/66 Originator's Name: S Jaroslawski Date: 3 Mar 01 Signature: Sheet ..1.... of ..5....

NCR Title (25 chars. max.): Earth stud problem

NCR Occurred During: M/FAC [ ] INSPEC [ ] TEST [ ] INTEG [*] OTHER [*]

Ref. Doc. / Drg No.: KE-0123-837-00-A

NCR Description: When earth strap removed from stud after EMC testing stud to chassis resistance should be > 1M ohm. Highly variable resistance as low as 5 ohms measured. Flexing the +X-plate, or the Controller Board, slightly can vary the resistance.

a) Cause of NCR b) Disposition / Corrective Action	Level:	1 Major	2 Minor	Corrective Action Carried Out Name Date

See also continuation sheet

a) One of the solder tails on the underside of the Controller Board was touching on SPU converter bracket, located directly below (see photos). The offending pin on the Controller Board is a ground pin (OC3, pin 7). Applying pressure to the X plates was just enough to cause the Controller Board to bend slightly allowing the over-long solder tail to touch the converter bracket.

b) 1. Cut all overlong solder tails on the Controller Board in areas at risk of touching items below back to the recommended 1.5mm length. Inspect solder joints at > x10 magnification for evidence of solder cracking.
2. Re-solithane board to cover exposed copper areas.
3. Bond FR4 pads on top of converter bracket to prevent underside of Controller Board touching the brackets.
4. Reposition wire staking on AD590 temp sensors to improve clearance between converter bracket(s) and Controller Board.
5. Continue with environmental test programme after PCU has been re-assembled.

MRB Action Participants — Date: 03/Apr 01 — Location: G 1.13 — Responsible for Corrective Actions:

Name	Signature	Department	Date	Distribution
S Jaroslawski	[signature]	SSTD	3.4.01	
Eric Clark	[signature]	SSTD	5/04/01	
A Preece	A. Preece			
N Morris	N. M	SSTD	5/04/01	

All Corrective Action Carried Out NCR Closed:	Date	Name	Signature
	5/4/01	D. KERSH	[signature]

Non-Conformance Report (NCR)	PRODUCT ASSURANCE SPACE SCIENCE DEPARTMENT RUTHERFORD APPLETON LABORATORY

CLRC

Spacecraft / Project: CHEM 1 System / Experiment: HRDLS Sub-System: PCU Assembly: Sub-Assembly: Item: Serial No.: Model: PFM	NCR No.:HIR-AR-RAL-085/66 Originator's Name: S Jaroslawski Date: 3 Mar 01 Signature: Sheet ..1.... of ..1....

NCR Title (25 chars. max.): Earth stud problem

NCR Occurred During:	M/FAC [ ]	INSPEC [ ]	TEST [ ]	INTEG [*]	OTHER [*]

Ref. Doc. / Drg No.: KE-0123-837-00-A

NCR Description: When earth strap removed from stud after EMC testing stud to chassis resistance should be < 1M ohm. Resistance of around 38 ohms measured. Flexing the X-plate slightly can vary the Resistance.

a) Cause of NCR b) Disposition / Corrective Action	Level:	1 Major	2 Minor	Corrective Action Carried Out Name Date
a) One of the solder tails on the underside of the Controller Board was touching the SPU converter bracket, located directly below (see photos). The offending pin on the Controller Board is a ground pin (OC3, pin 7). Applying pressure to the X plates was just enough to cause the Controller Board to bend slightly allowing the over-long solder tail to touch the converter bracket. b) 1. Cut all overlong solder tails on the Controller Board back to the recommended 1.5mm length. Inspect solder joints at x10 magnification for evidence of solder cracking. 2. Re-solithane board to cover exposed copper areas. 3. Bond FR4 pads on top of converter bracket to prevent underside of Controller Board touching the brackets. 4. Reposition wire staking on AD590 temp sensors to improve clearance between converter bracket(s) and Controller Board. 5. Continue with environmental test programme after PCU has been re-assembled.				See also continuation sheet

MRB Action Participants	Date: 03/Apr 01 Location: G 1.13			Responsible for Corrective Actions:
Name	Signature	Department	Date	Distribution
S Jaroslawski		SSTD	3.4.01	
Eric Clark				
A Preece				
N Morris				

All Corrective Action Carried Out NCR Closed:	Date	Name	Signature

Sequence of events

Removed Radiator Plate: Measurement – Short between earth 2 and 3 still present

Removed –X Plate to isolate the problem: Measurement – Short between earth 2 and 3 still present

Short could still be induced by slight mechanical pressure of the +X PANEL or Base plate.

+X Plate and Connector Panel disassembled from the Base Plate, some electrical connections remained.

FAULT DISAPPEARED

The fault was identified as being on the Base plate and slight pressure applied on PC19173 Controller Board

Conclusion:

PCB removed, fault clearly identified to OC3 PIN 7 (GROUND) to converter mounting bracket (CHASSIS)

Solder tails were uncut, therefore too long and gap between converter bracket +1mm too high (should have been 3mm but is only 2mm). Design fault plus over-long solder tails producing a near zero clearance.

Damage Estimate:

As pin7 was a ground pin, a short to chassis would not have resulted in any damage to the Controller Board or any other part of the PCU. During the course of the EMC/EMI testing when this fault was present, no degradation in the performance of the PCUU was observed.

AD590 Temperature Sensors Wire Staking

During disassembly of the PCU, the wire staking for the AD590s situated on the SPU converters, was not ideal and contact could occur between the wires and the underside of the Controller Board.

Rectification needed: Re-position AD590s so that wire routing is not over the top of the converter brackets, or stake wires (2 off) so that they lie side by side rather than on top of each other.

Abrasion Marks
When disassembled slight abrasion marks under the heads of the fixing screws was noticed (6 off).
Fit protection washer under the head of the screws when re-assembled.

Non-Conformance Report (NCR)

PRODUCT ASSURANCE
SPACE SCIENCE DEPARTMENT

RUTHERFORD APPLETON LABORATORY

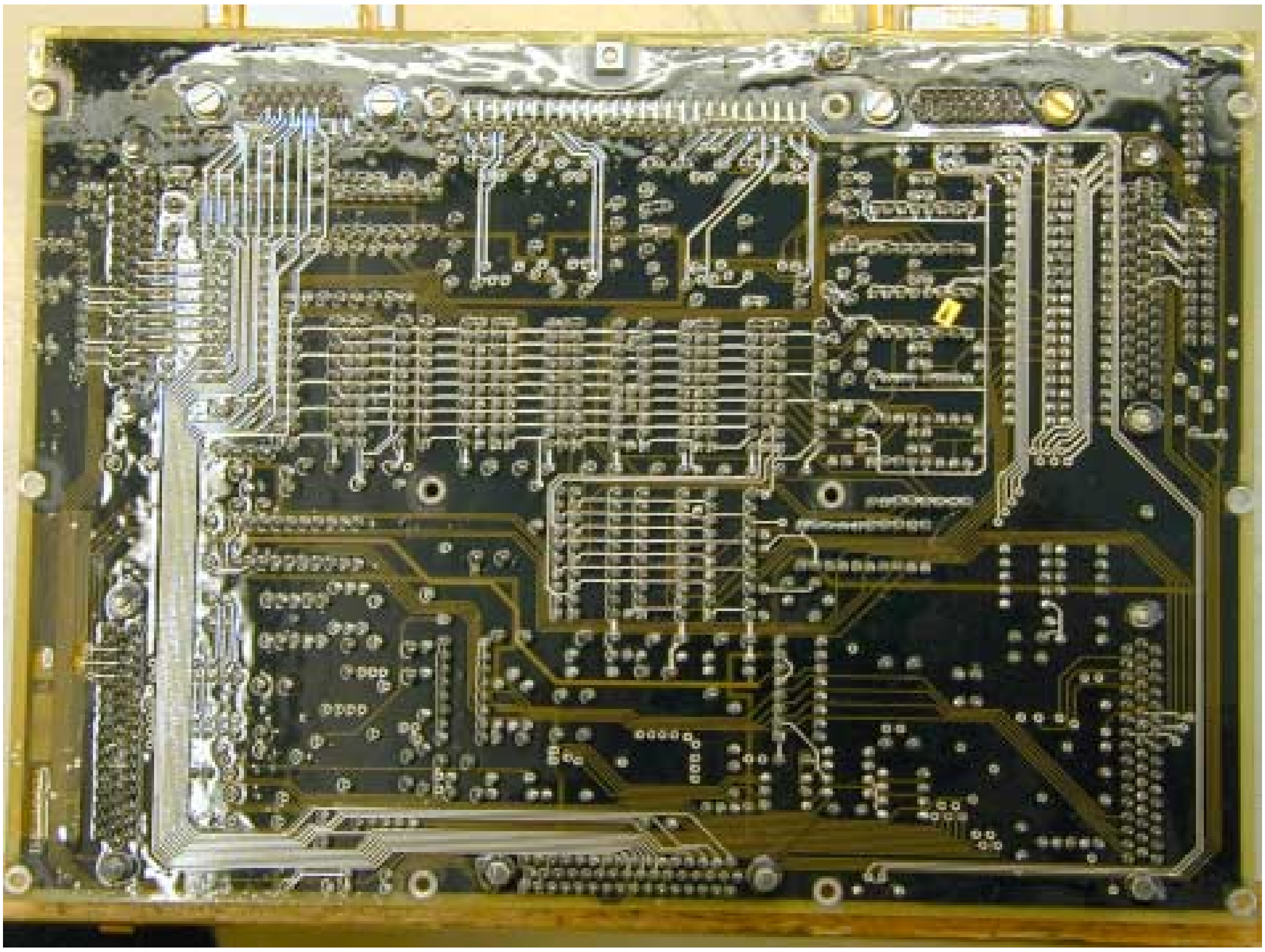


Photo 1 - Underside of Controller Board (PC19173)

Pin 7 on OC3 is marked with an black arrow on a yellow background.

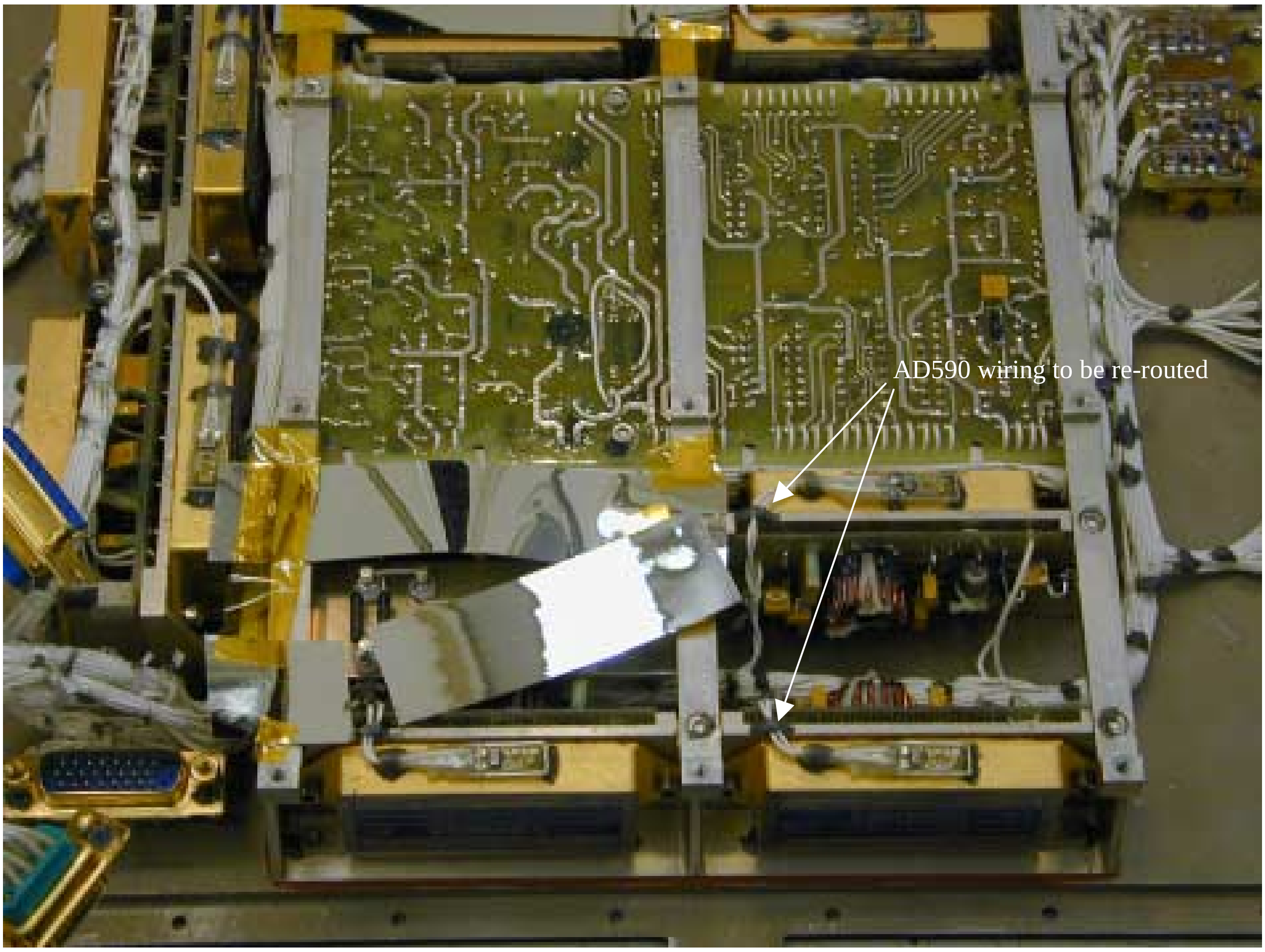


Photo 2 – Converter Brackets located below the Controller Board

The foil tape (covering one of the SPU converter brackets) was used as a witness marker to identify which pin on the Controller Board was touching the bracket.

The AD590 wire staking is also highlighted. This will have to be re-routed to improve clearance on underside of Controller Board.

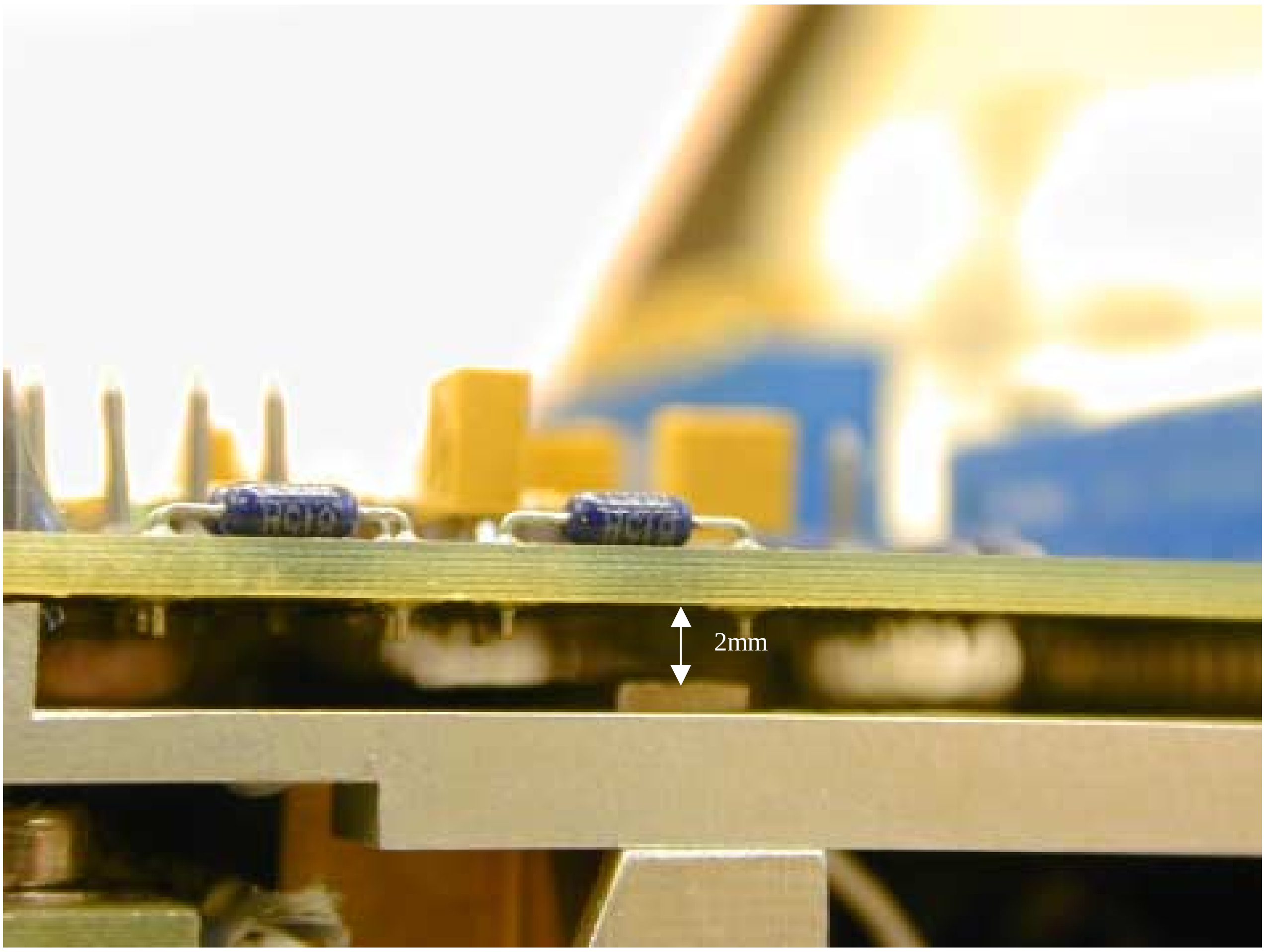


Photo 3 – Clearance between the Controller Board and the Converter Brackets

This photo shows the clearance between the underside of the Controller Board and the top of the converter brackets.

SECTION 25
Test Reports

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HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: A. Pearce Date: 15-04-2001

Subject / Title: Limited Performance Test Procedure

Contents / Description / Summary:

Key Words: PCU Performance Test

Purpose (20 characters maximum):

Approved By:

Date (yy–mm–dd):

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

		Name	Signature	Date
Prepared by		**Alan B. Pearce**		9/12/99
Checked by	-	-		
Issued	Issue A	Alan B. Pearce		28/6/2000
Updated	Issue B	Alan B. Pearce		4/8/2000
Updated	Issue C	Alan B. Pearce		5/8/2000
Updated	Issue D	Alan B. Pearce		7/8/2000
Revised	Issue E	Alan B. Pearce		7/8/2000
Updated	Issue F	Alan B. Pearce		8/8/2000
Updated	Issue G	Alan B. Pearce		9/8/2000
Updated	Issue H	Alan B. Pearce		15/11/2000
Updated	Issue J	Alan B. Pearce		06/04/2001
Updated	Issue J-2	Alan B. Pearce		08/04/2001
Updated	Issue J-3	Alan B. Pearce		14-04-2001
Updated	Issue J-4	Alan B. Pearce		15-04-2001

Issue A – Initial release.

Issue B – Corrections to incorrect Mnemonics. Add captions for plots, not all had them. Change parameters for reading currents so oscilloscope triggers properly. Added more oscilloscope initialisation instructions. Change table field widths to better suit entries. Added internal supply change over check to verify operation under TVAC temperature extremes on both Quiet Bus supplies. Add NA and NB off instructions to PSM-02 macros. Reversed order of PSM-01 and PSM-02 macros to better observe actions on the load box. Corrected SPU temperature measurements (SPU A –15 being measured twice instead of A and B each once). Added instructions to establish A/D offset using unused AMUX instructions. Added test for 28QC_PWR Low Volts signal at end of first test block.

Issue C – Change Inrush Current measurement settings to get waveforms on oscilloscope screen. Add current monitoring in every test block where a load gets switched on (was done only at initial switch on, and under full load).

Issue D – remove instruction to switch on IPU Unregulated Quiet Bus load. Causes problems with power supplies as other loads are at peak values for tests, instead of average values.

Issue E – Cut down versions derived from TP-RAL-173 – D to have QA/NA test and QB/NB test versions for TVAC tests. Required to reduce testing time. No alteration to this document except revision level, to match that applied to trimmed versions. QA/NA version has been named TP-RAL-1731-E, and QB/NB version has been named TP-RAL-1732-E.

Issue F – Modifications to all – Change supply voltage at end of test to nominal (29V). Modification to TP-RAL-1732-E. Add SPU Inrush tests as otherwise only done when QA side tested. Add test for QC Low signal. Other minor changes to take account of test being split off.

Issue G – TP-RAL-1731-F remove instructions at end of test which turn off the PCU. All versions, change type of last test table from Manual to Mixed to make power supply instructions work correctly.

Issue H - Change test voltage range from 27-31 volts to 26-32 volts. Also change to use current probe with DC response.
Issue J – Make changes to suit TEK 3034 Oscilloscope, change document formatting to enable import of screen images from oscilloscope without images being clipped. Add tests for soft starts on outputs. Corrected some errors in digital telemetry registers checked. Added more instructions to change load box cables. Changes done to full version of test only.
Issue J2 - Split for "Half Procedure" versions and tidy up some minor errors.
Issue J3 – add instructions for DC coupling and full bandwidth on scope setup. Fixed problem with TEU A prime only 28V being tested (table error). Also added more voltage and trigger set points for oscilloscope.
Issue J4 Change timebase selection for initial power up waveform to 1000uS from 400uS to capture full waveform.

Document copy 038

1 INTRODUCTION

This document designed to be used as the source of commands for the automated testing of the HIRDLS PCU, using the Rutherford Appleton developed IPU Emulator that is based around a PC. The command sequences used in this document are taken from TC-RAL-119 Draft A4 dated 2000-01-03.

The IPU Emulator software reads this document, and produces a serialised copy, with the test results inserted into the table fields where appropriate. A separate serialised copy is produced each time this test document is run.

All tests specified within this document are designed to run with minimal operator intervention at the start of the test run, and to confirm as fully as possible that the PCU meets operational requirements using internal telemetry, without external operator measurements. A separate document is available giving a full Comprehensive Performance Test where operator action is required to probe external test points to confirm that the PCU meets all operational requirements.

The format of the document is designed to enable the document with test results to be supplied as a completed test procedure document in the ADP package. To understand the format of the instruction tables refer to the Procedure Driver Instructions (TP-RAL-xxx).

2 REFERENCE AND APPLICABLE DOCUMENTS

SP-HIR-36	Power Subsystem Specification Document
SP-HIR-13	Instrument Technical Specification
SP-HIR-103	Command and Telemetry Handbook (C&TH) (July 99 draft)
TC-RAL-119	Test Plan
TP-RAL-207	Procedure Driver Instructions (for PCU/IPU Emulator)
071-0381-01	Tektronix TDS3000 series Programmer Manual (with 071-0378-01 Advanced Trigger module supplement and 071-0378-01 FFT Module supplement)

3 TEST FOREWORD.

Instruction formats.

Each instruction line in the tables has a prefix for automated testing. If no prefix exists in a line, then the automatic procedure assumes a manual operation and prompts the operator. Further detail on table format can be found in the Procedure Driver Instructions. Prefixes used are as follows

DIR: Direct command used to send commands to the HIRDLS discrete commands, and to control certain operations within the emulator.

PORTA: Send this command through the "A" IPU port.

PORTB: send this command through the "B" IPU port.

QA: Operation command for the QA power supply.

QB: Operation command for the QB power supply.

NA: Operation command for the NA power supply.

NB: Operation command for the NB power supply.

SCOPE: send this command to the Oscilloscope – these take the form of the Tektronix command language used by the TDS3000 series oscilloscopes. The exception is the command to down load the screen to a file. The GSE program converts a command of the format "HARDCOPY FILENAME.BMP" to "HARDCOPY START" to send to the oscilloscope and transfers the resulting screen image into the file FILENAME.BMP on the GSE.

4 EQUIPMENT REQUIRED

Power supplies, 4 required, Thandar TSX3510 or similar IEEE 488 interface.
Oscilloscope, Tektronix TDS 3034 or similar, IEEE 488 Interface.
HIRDLS EGSE PC with emulation program and interface cards.
HIRDLS Dummy Load Box.
Appropriate connection cables for bench or TVAC testing as required.
Current Probe, Tektronix model 134 or similar.

5 CONNECTION DIAGRAM

To be supplied.

6 TEST PROCEDURE

Enter initial parameters indicating conditions at start of this test. As this test makes no provision for stopping to change the dummy load between outputs, the connection being used should be noted in the second item here, when instructed to do so by the emulator software.

STEP 1	Mixed		
Enter reason for test (Eg TVAC test 1).	TVAC LPT8		22-Apr-01 04:54:12
Connect IPU load box cable to Side A at load box.	ok		22-Apr-01 04:54:12
Connect TEU load box cable to Side A at load box.	ok		22-Apr-01 04:54:12
Connect SPU load box cable to Side A at load box.	ok		22-Apr-01 04:54:12
Verify all load switches on the load box are in the 'V' position	ok		22-Apr-01 04:54:12
Verify connection of power supplies and turn on mains power	ok		22-Apr-01 04:54:12
Verify Oscilloscope is powered on and IEEE cable connected.	ok		22-Apr-01 04:54:12
Fit current probe to QA supply lead	ok		22-Apr-01 04:54:12
Connect current probe to Oscilloscope channel 1	ok		22-Apr-01 04:54:12
Set current probe power switch to 100mA/V.	ok		22-Apr-01 04:54:12
Connect second current probe to Oscilloscope Ch2.	ok		22-Apr-01 04:54:12
Set second current probe power switch to 100mA/V.	ok		22-Apr-01 04:54:12

6.1 Oscilloscope set up.

STEP 2	Mixed		
SCOPE: CLEARMENU	SCOPE:CLEARMENU done.		22-Apr-01 04:54:28
SCOPE:DISP:GRAT FULL	SCOPE:DISP:GRAT FULL done.		22-Apr-01 04:54:28
SCOPE:DISP:FORMAT YT	SCOPE:DISP:FORMAT YT done.		22-Apr-01 04:54:28
SCOPE:HARDCOPY:FORMAT BMP	SCOPE:HARDCOPY:FORMAT BMP done.		22-Apr-01 04:54:28
SCOPE:HARDCOPY:PORT GPIB	SCOPE:HARDCOPY:PORT GPIB done.		22-Apr-01 04:54:28
SCOPE:HARDC:LAYOUT PORTR	SCOPE:HARDC:LAYOUT PORTR done.		22-Apr-01 04:54:28
SCOPE:MESSAGE:STATE ON	SCOPE:MESSAGE:STATE ON done.		22-Apr-01 04:54:28
SCOPE:MESSAGE:BOX 155,0,635,45	SCOPE:MESSAGE:BOX 155,0,635,45 done.		22-Apr-01 04:54:28
SCOPE:Select:REF1 OFF	SCOPE:SELECT:REF1 OFF done.		22-Apr-01 04:54:28
SCOPE:Select:REF2 OFF	SCOPE:SELECT:REF2 OFF done.		22-Apr-01 04:54:28
SCOPE:Select:REF3 OFF	SCOPE:SELECT:REF3 OFF done.		22-Apr-01 04:54:28
SCOPE:Select:REF4 OFF	SCOPE:SELECT:REF4 OFF done.		22-Apr-01 04:54:28
SCOPE:Select: MATH OFF	SCOPE:SELECT: MATH OFF done.		22-Apr-01 04:54:28
SCOPE:Select:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		22-Apr-01 04:54:29
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		22-Apr-01 04:54:29
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH3 OFF done.		22-Apr-01 04:54:29
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH4 OFF done.		22-Apr-01 04:54:29
SCOPE:CH1:Coupling DC	SCOPE:CH1:COUPLING DC done.		22-Apr-01 04:54:29
SCOPE:CH2:Coupling DC	SCOPE:CH2:COUPLING DC done.		22-Apr-01 04:54:29
SCOPE:CH3:Coupling DC	SCOPE:CH3:COUPLING DC done.		22-Apr-01 04:54:29

SCOPE:CH4:Coupling DC	SCOPE:CH4:COUPLING DC done.		22-Apr-01 04:54:29
SCOPE:CH1:Bandwidth Full	SCOPE:CH1:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE:CH2:Bandwidth Full	SCOPE:CH2:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE:CH3:Bandwidth Full	SCOPE:CH3:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE:CH4:Bandwidth Full	SCOPE:CH4:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		22-Apr-01 04:54:29
SCOPE: CH2:POS -3	SCOPE:CH2:POS -3 done.		22-Apr-01 04:54:29

STEP 3	Mixed		
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:MODE AUTO	SCOPE:TRIG:A:MO DE AUTO done.		22-Apr-01 04:54:50
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:54:50
Verify Zero offset of current probe on CH1 (Trace in line with left hand arrow).	ok		22-Apr-01 04:54:50
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 04:54:50
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 04:54:50
Verify Zero offset of current probe on CH2 (Trace in line with left hand arrow).	ok		22-Apr-01 04:54:50
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 04:54:50
SCOPE:HOR:DELAY:STATE OFF	SCOPE:HOR:DELA Y:STATE OFF done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:MODE NORMAL	SCOPE:TRIG:A:MO DE NORMAL done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:EDGE:SLOPE RISE	SCOPE:TRIG:A:ED GE:SLOPE RISE done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:EDGE:COUP DC	SCOPE:TRIG:A:ED GE:COUP DC done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:LEVEL 0.5E-1	SCOPE:TRIG:A:LEV EL 0.5E-1 done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOL D:TIM 2.0E-2 done.		22-Apr-01 04:54:51
SCOPE:ACQ:STOPAFTER SEQ	SCOPE:ACQ:STOPA FTER SEQ done.		22-Apr-01 04:54:51
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:P OS 20 done.		22-Apr-01 04:54:51
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 04:54:51
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 04:54:51
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 04:54:51

6.2 Initial Power On conditions

Do initial operations to set the PCU to be powered from QA. The PCU is to be left powered up in the last test mode during TVAC testing (except where the test specifically requires it to be powered off), while the temperature is changed between test temperatures. The NB is left powered off during initial procedures.

STEP 4	Mixed		
QA: OFF	QA: OFF Done		22-Apr-01 04:55:36
QB: OFF	QB: OFF Done		22-Apr-01 04:55:36
NA: OFF	NA: OFF Done		22-Apr-01 04:55:36
NB: OFF	NB: OFF Done		22-Apr-01 04:55:36
QA: I=10	QA: I=10 Done		22-Apr-01 04:55:36
QB: I=10	QB: I=10 Done		22-Apr-01 04:55:36
NA: I=10	NA: I=10 Done		22-Apr-01 04:55:36
NB: I=10	NB: I=10 Done		22-Apr-01 04:55:36
QA: OV=35.0v	QA: OV=35.0v Done		22-Apr-01 04:55:36
QB: OV=35.0v	QB: OV=35.0v Done		22-Apr-01 04:55:36
NA: OV=35.0v	NA: OV=35.0v Done		22-Apr-01 04:55:36
NB: OV=35.0v	NB: OV=35.0v Done		22-Apr-01 04:55:36
QA: V=29v	QA: V=29v Done		22-Apr-01 04:55:36
QB: V=29v	QB: V=29v Done		22-Apr-01 04:55:36
NA: V=29v	NA: V=29v Done		22-Apr-01 04:55:36
NB: V=29v	NB: V=29v Done		22-Apr-01 04:55:37
QA: ON	QA: ON Done		22-Apr-01 04:55:37
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 04:55:37
QA: OFF	QA: OFF Done		22-Apr-01 04:55:37
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:55:37
SCOPE:MESS:SHOW 'QA Prime Converter Power On \nInrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QA Prime Converter Power On \nInrush Current Waveform, 500mA/Div' done.		22-Apr-01 04:55:37
QA: ON	QA: ON Done		22-Apr-01 04:55:37
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 04:55:37
SCOPE: HARDCOPY INRUSHAP.BMP	INRUSHAP.BMP written to Appendix.		22-Apr-01 04:55:37
QA: IO?	Current 0.14A		22-Apr-01 04:55:37

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.06A, Channel B = 0.07A		22-Apr-01 04:55:37
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 04:55:37

6.3 Set PCU start mode conditions.
This table issues commands as defined by PSM-01 and PSM-02 macros in C&TH Table 2.9.4.4-1.

This table is PSM-02 macro.

STEP 5	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 04:56:34
PORTA: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 04:56:34
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 04:56:34
PORTA: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 04:56:34
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 04:56:34
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 04:56:34
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 04:56:34
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 04:56:34
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 04:56:34
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 04:56:35
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 04:56:35
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 04:56:35
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 04:56:35
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 04:56:35
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 04:56:35
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 04:56:35
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 04:56:35
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 04:56:35
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 04:56:35
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 04:56:35
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 04:56:35
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 04:56:35
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 04:56:35
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 04:56:35
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 04:56:35
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 04:56:35
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 04:56:35
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 04:56:35
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 04:56:35
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 04:56:35
PORTA: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 04:56:35
PORTA: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 04:56:35
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 04:56:35
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 04:56:35

This table is PSM-01 Macro.

STEP 6	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 04:56:46
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 04:56:46
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 04:56:46
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 04:56:46
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 04:56:46
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 04:56:46

6.4 Telemetry verification after PSM-01 and PSM-02 macros.

STEP 7	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 04:57:12
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 04:57:12
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.63V, Channel B = -14.63V		22-Apr-01 04:57:12
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 04:57:12
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.34V		22-Apr-01 04:57:12
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 04:57:12

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 04:57:12
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 04:57:12
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 04:57:13
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		22-Apr-01 04:57:13

6.5 QC power on with Prime relay
Carries out PSM-58 macro, and then relevant telemetry.

STEP 8	Mixed		
PORTA: QA (PR) ON	IFC Echo = F00A		22-Apr-01 04:57:31
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 04:57:31
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 04:57:31
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 04:57:31
QA: IO?	Current 0.29A		22-Apr-01 04:57:31
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.21A, Channel B = 0.21A		22-Apr-01 04:57:31

6.6 Turn on System Converters – prime set.
Turn on Prime set of converters using PSM-13 and PSM-15. Outputs need to be selected using prime relay set. Telemetry checks done between and after macros.

STEP 9	Mixed		
NA: ON	NA: ON Done		22-Apr-01 04:58:57
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 04:58:58
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 04:58:58
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 04:58:58
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:58:58
SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 04:58:58
PORTA: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		22-Apr-01 04:58:58
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		22-Apr-01 04:58:58
SCOPE: HARDCOPY SYS1AQA.BMP	SYS1AQA.BMP written to Appendix.		22-Apr-01 04:58:58
PORTA: PSSV09;+5Volt DC-DC Converter SYS A	IFC Echo = 0008, Telemetry Channel A =5.34V, Channel B = 5.34V		22-Apr-01 04:58:58
PORTA: PSSV01;28Volt DC-DC Converter Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		22-Apr-01 04:58:58
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.28A, Channel B = 0.28A		22-Apr-01 04:58:58
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 04:58:58
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 04:58:58
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 04:58:58

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:58:59
SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 04:58:59
PORTA: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		22-Apr-01 04:58:59
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 5009		22-Apr-01 04:58:59
SCOPE: HARDCOPY SYS2AQA.BMP	SYS2AQA.BMP written to Appendix.		22-Apr-01 04:58:59
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.35A, Channel B = 0.36A		22-Apr-01 04:58:59
PORTA: PSSV11;+15Volt DC-DC Converter SYS A	IFC Echo = 0009, Telemetry Channel A =15.14V, Channel B = 15.14V		22-Apr-01 04:58:59
PORTA: PSSV13;-15Volt DC-DC Converter SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.25V		22-Apr-01 04:58:59
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 04:58:59
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 04:58:59
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 04:58:59

6.7 TEU A Prime relays – 28V and 5V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through prime relays. This carries out PSM-18, PSM42, and PSM-45 macros with telemetry checks between macros.

STEP 10	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:00:39
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:00:39
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:00:39
PORTA: A_TEU_+28QC (PR) ON	IFC Echo = F014		22-Apr-01 05:00:39
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0006		22-Apr-01 05:00:39
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.0A, Channel B = 1.0A		22-Apr-01 05:00:39
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:00:39
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:00:39
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:00:39
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:00:39
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:00:39
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:00:39
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:00:39
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:00:40
SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:00:40
PORTA: A_TEU_+5 (PR) ON	IFC Echo = F00C		22-Apr-01 05:00:40
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500F		22-Apr-01 05:00:40
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:00:40
SCOPE:HARDCOPY TEUAC2.BMP	TEUAC2.BMP written to Appendix.		22-Apr-01 05:00:40
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.3V, Channel B = 5.3V		22-Apr-01 05:00:40

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.27A, Channel B = 1.27A		22-Apr-01 05:00:40
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:00:40
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:00:40
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:00:40
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:00:40
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:00:40
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:00:40

6.8 TEU A – Prime relays – +/-15V

STEP 11	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:02:32
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:02:32
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:02:32
SCOPE:MESS:SHOW 'TEU A +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:02:32
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		22-Apr-01 05:02:32
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:02:32
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:02:32
SCOPE:HARDCOPY TEUAC3.BMP	TEUAC3.BMP written to Appendix.		22-Apr-01 05:02:32
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:02:32
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:02:32
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 05:02:32
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:02:32
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:02:32
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:02:33
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:02:33
SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:02:33
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		22-Apr-01 05:02:33
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:02:33
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:02:33

SCOPE:HARDCOPY TEUAC4.BMP	TEUAC4.BMP written to Appendix.		22-Apr-01 05:02:33
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:02:33
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 05:02:33
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.66A, Channel B = 1.66A		22-Apr-01 05:02:33
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:02:33

6.9 Turn on EEA
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply EEA through prime relays. This carries out PSM-54 macro, with telemetry checks between 5V and 15V operations

STEP 12	Mixed		
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:05:42
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:05:42
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:05:42
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:05:42
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:05:42
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:05:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:05:42
SCOPE:MESS:SHOW 'EEA 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:05:42
PORTA: EEA_+5 (PR) ON	IFC Echo = F008		22-Apr-01 05:05:42
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		22-Apr-01 05:05:42
SCOPE:HARDCOPY EEA5VPR.BMP	EEA5VPR.BMP written to Appendix.		22-Apr-01 05:05:42
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.76A, Channel B = 1.76A		22-Apr-01 05:05:42
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:05:42
Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:05:42
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:05:43
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:05:43
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:05:43
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:05:43

SCOPE:MESS:SHOW 'EEA +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:05:43
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		22-Apr-01 05:05:43
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:05:43
SCOPE:HARDCOPY EEA15PPV.BMP	EEA15PPV.BMP written to Appendix.		22-Apr-01 05:05:43
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:05:43
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:05:43
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:05:43
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:05:43
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:05:43
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:05:43
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:05:43
SCOPE:MESS:SHOW 'EEA -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:05:44
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		22-Apr-01 05:05:44
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:05:44
SCOPE:HARDCOPY EEA15NPV.BMP	EEA15NPV.BMP written to Appendix.		22-Apr-01 05:05:44
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.85A, Channel B = 1.85A		22-Apr-01 05:05:44
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 05:05:44
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:05:44

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.24V		22-Apr-01 05:05:44
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:05:44

6.10 Turn on IPU 28 volt regulated supply

Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through prime relays. This carries out PSM-24 macro.

STEP 13	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:06:49
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:06:49
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:06:49
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:06:49
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:06:49
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:06:49
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:06:49
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:06:49
SCOPE:MESS:SHOW 'IPU A 28VReg (Prime) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU A 28VReg (Prime) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 05:06:49
PORTA: A_IPU_+28REG (PR) ON	IFC Echo = F002		22-Apr-01 05:06:49
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 500F		22-Apr-01 05:06:50
SCOPE:HARDCOPY IPUA1.BMP	IPUA1.BMP written to Appendix.		22-Apr-01 05:06:50
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.77V, Channel B = 29.79V		22-Apr-01 05:06:50
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.71A, Channel B = 3.71A		22-Apr-01 05:06:50
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 05:06:50

6.11 Turn on SPU A Supplies.
Turns on SPU supplies in order specified in C&TH Vol1 Part 2 section 5.5.5 to power SPU side A. This carries out PSM-10 and PSM-38 macros.

STEP 14	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:09:23
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:09:23
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:09:23
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:09:23
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:09:23
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 05:09:23
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:09:23
SCOPE:MESS:SHOW 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:09:23
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		22-Apr-01 05:09:23
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.8A, Channel B = 3.8A		22-Apr-01 05:09:24
SCOPE: HARDCOPY SPUAQA.BMP	SPUAQA.BMP written to Appendix.		22-Apr-01 05:09:24
PORTA:PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:09:24
PORTA: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:09:24
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:09:24
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 05:09:24
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 05:09:24
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		22-Apr-01 05:09:24

SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:09:24
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:09:24
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:09:24
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:09:24
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:09:24
SCOPE:MESS:SHOW 'SPU A +15V \nSoft Start Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'SPU A +15V \nSoft Start Current Waveform, 500mA/Div' done.		22-Apr-01 05:09:24
PORTA: SPU_+/-15A ON	IFC Echo = F019		22-Apr-01 05:09:24
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C0F		22-Apr-01 05:09:25
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:09:25
SCOPE: HARDCOPY SPUAC15P.BMP	SPUAC15P.BMP written to Appendix.		22-Apr-01 05:09:25
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:09:25
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:09:25
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:09:25
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:09:25
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:09:25
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:09:25
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:09:25
SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:09:25
PORTA: SPU_+/-15A ON	IFC Echo = F019		22-Apr-01 05:09:25
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C0F		22-Apr-01 05:09:25

PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:09:25
SCOPE: HARDCOPY SPUAC15N.BMP	SPUAC15N.BMP written to Appendix.		22-Apr-01 05:09:25
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =4.92A, Channel B = 4.92A		22-Apr-01 05:09:25

6.12 SPU A 5V Output.

STEP 15	Mixed		
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:10:38
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:10:38
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:10:39
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:10:39
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:10:39
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:10:39
SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:10:39
PORTA: SPU_+5A ON	IFC Echo = F018		22-Apr-01 05:10:39
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.12A, Channel B = 5.12A		22-Apr-01 05:10:39
SCOPE: HARDCOPY SPUAC5P.BMP	SPUAC5P.BMP written to Appendix.		22-Apr-01 05:10:39
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:10:39
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:10:39
PORTA:PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:10:39
PORTA:PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:10:39
PORTA:PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:10:39
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:10:39

6.13 Turn on GEU Supplies.
Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power GEU from prime side. This carries out PSM-33 and PSM-30 macros.

STEP 16	Mixed		
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:11:05
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 05:11:05
PORTA: GEU_+5 (PR) ON	IFC Echo = F004		22-Apr-01 05:11:05
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 500F		22-Apr-01 05:11:05
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.29A, Channel B = 5.29A		22-Apr-01 05:11:05
PORTA: GEU_+/-15 (PR) ON	IFC Echo = F005		22-Apr-01 05:11:05
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:11:05
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.96A, Channel B = 5.96A		22-Apr-01 05:11:05
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.32V, Channel B = 5.29V		22-Apr-01 05:11:05
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.13V		22-Apr-01 05:11:06
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:11:06
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:11:06
PORTA: GEU_+28QC (PR) ON	IFC Echo = F016		22-Apr-01 05:11:06
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:11:06
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =6.79A, Channel B = 6.79A		22-Apr-01 05:11:06

6.14 Turn on Noisy Bus
Turn on the Noisy Bus Output from the NA supply through the Prime Relay. This uses PSM-04 macro.

STEP 17	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:11:14
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:11:14
PORTA: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:11:14
PORTA: NA (PR) ON	IFC Echo = F01C		22-Apr-01 05:11:14
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:11:14

6.15 Do complete telemetry check of PCU.
Now all outputs are on, do Digital Telemetry first.

STEP 18	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:11:28
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:11:28
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:11:28
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:11:28

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 19	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 05:11:57
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:11:57
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:11:57
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.57V, Channel B = -14.58V		22-Apr-01 05:11:57
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:11:57
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 05:11:58
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.04A, Channel B = 8.04A		22-Apr-01 05:11:58
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		22-Apr-01 05:11:58
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.23V, Channel B = 5.23V		22-Apr-01 05:11:58
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:11:58

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.23V		22-Apr-01 05:11:58
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.77V, Channel B = 29.79V		22-Apr-01 05:11:58
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:11:58
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:11:58
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:11:58
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		22-Apr-01 05:11:58

Analogue Telemetry block 2.

STEP 20	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:12:24
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.12V, Channel B = 15.11V		22-Apr-01 05:12:24
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:12:24
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:12:24
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:12:24
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:12:24
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-30.5C, Channel B = -30.8C		22-Apr-01 05:12:24
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:12:24
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-29.6C, Channel B = -29.3C		22-Apr-01 05:12:24
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 05:12:24

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:12:25
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:12:25
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-34.9C, Channel B = -35.2C		22-Apr-01 05:12:25
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-35.5C, Channel B = -35.5C		22-Apr-01 05:12:25

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 21	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-28.7C, Channel B = -28.5C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-27.6C, Channel B = -27.9C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-26.1C, Channel B = -25.8C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-32.8C, Channel B = -32.6C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-33.1C, Channel B = -33.1C		22-Apr-01 05:12:53
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-32.0C, Channel B = -32.3C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:12:53

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-10.6C, Channel B = -10.3C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-33.4C, Channel B = -33.1C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 05:12:53

6.16 Do High Voltage Input Limit Test
Adjust the QA and NA supplies to upper operating voltage limit, and complete telemetry test. This table has input voltage change and digital telemetry.

STEP 22	Mixed		
QA: V=32.0V	QA: V=32.0V Done		22-Apr-01 05:13:08
NA: V=32.0V	NA: V=32.0V Done		22-Apr-01 05:13:08
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:13:08
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:13:08
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:13:09
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:13:09

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 23	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:13:36
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:13:36
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.59V, Channel B = -14.59V		22-Apr-01 05:13:36
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:13:36
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.34V		22-Apr-01 05:13:36
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.85A, Channel B = 7.86A		22-Apr-01 05:13:36
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.04A		22-Apr-01 05:13:36
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:13:36
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:13:36
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 05:13:37

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.79V, Channel B = 29.77V		22-Apr-01 05:13:37
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:13:37
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:13:37
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:13:37
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.14V		22-Apr-01 05:13:37

Analogue Telemetry block 2.

STEP 24	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:14:02
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.12V		22-Apr-01 05:14:02
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.2V		22-Apr-01 05:14:03
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:14:03
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 05:14:03
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-30.8C, Channel B = -31.1C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-28.5C, Channel B = -28.5C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:14:03

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-34.9C, Channel B = -34.9C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 05:14:03

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V Regulator temperature.

STEP 25	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 05:14:29
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 05:14:29
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.3C, Channel B = -29.3C		22-Apr-01 05:14:29
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-25.2C, Channel B = -25.2C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-32.0C, Channel B = -31.7C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-29.9C, Channel B = -30.2C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-33.1C, Channel B = -32.8C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:14:30

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-9.1C, Channel B = -9.4C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-33.1C, Channel B = -33.1C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-32.6C, Channel B = -32.8C		22-Apr-01 05:14:30

6.17 Do Low Operating Voltage Limit Test.
Adjust the QA and NA supplies to lower operating limit, and complete telemetry test.
This table has input voltage change and digital telemetry.

STEP 26	Mixed		
QA: V=26.0V	QA: V=26.0V Done		22-Apr-01 05:14:45
NA: V=26.0V	NA: V=26.0V Done		22-Apr-01 05:14:45
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:14:45
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:14:45
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:14:45
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:14:46
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:14:46
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:14:46
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:14:46
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:14:46

Analogue telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 27	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.08V		22-Apr-01 05:15:13
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:15:13
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.62V, Channel B = -14.62V		22-Apr-01 05:15:13
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:15:13
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:15:13
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.37A, Channel B = 8.38A		22-Apr-01 05:15:13
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		22-Apr-01 05:15:14
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:15:14
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:15:14
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 05:15:14

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.81V, Channel B = 29.79V		22-Apr-01 05:15:14
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:15:14
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:15:14
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:15:14
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.12V		22-Apr-01 05:15:14

Analogue Telemetry block 2.

STEP 28	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.58V, Channel B = 5.59V		22-Apr-01 05:15:40
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.11V		22-Apr-01 05:15:40
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:15:40
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:15:40
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:15:40
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-30.8C, Channel B = -30.5C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-28.2C, Channel B = -28.2C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:15:40

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-34.3C, Channel B = -34.3C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-34.9C, Channel B = -34.6C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-35.5C, Channel B = -35.2C		22-Apr-01 05:15:40

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 29	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-27.6C, Channel B = -27.6C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-26.7C, Channel B = -26.7C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-31.7C, Channel B = -32.0C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-31.4C, Channel B = -31.4C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-29.3C, Channel B = -29.6C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-26.4C, Channel B = -26.4C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 05:16:07

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-9.1C, Channel B = -8.8C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-32.3C, Channel B = -32.6C		22-Apr-01 05:16:07

6.18 Turn off all relays.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.
This table is PSM-02 macro.

STEP 30	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:17:06
PORTB: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:17:06
PORTB: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:17:06
PORTB: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 05:17:06
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:17:06
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 05:17:06
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 05:17:06
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:17:06
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:17:06
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 05:17:06
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:17:06
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:17:06
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:17:06
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 05:17:06
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:17:06
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:17:06
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:17:06
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:17:06
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:17:06
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:17:06
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:17:07
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:17:07
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:17:07
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:17:07
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:17:07
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:17:07
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:17:07
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:17:07
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:17:07
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:17:07
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:17:07
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:17:07
PORTB: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:17:07
PORTB: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:17:07

This table is PSM-01 Macro.

STEP 31	Mixed		
PORTB: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:17:17
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 05:17:17
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 05:17:17
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:17:17
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 05:17:17
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 05:17:17

6.19 Quiet Bus C Low Voltage Detect signal

Very the operation of the +28QC_PWR Low Volts signal. Bit 15 of PSS_STATUS_06 should go high when the voltage drops below 20 volts.

STEP 32	Mixed		
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:24
QA: V=19.8V	QA: V=19.8V Done		22-Apr-01 05:17:24
NA: OFF	NA: OFF Done		22-Apr-01 05:17:24
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:24
QA: V=29V	QA: V=29V Done		22-Apr-01 05:17:24
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:25

6.20 Status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QA (important for TVAC check at temperature extremes).

STEP 33	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:17:58
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.0V, Channel B = 14.0V		22-Apr-01 05:17:58
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.68V, Channel B = -14.68V		22-Apr-01 05:17:58
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:17:58
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:17:58
PORTB: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:17:58
PORTB: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =-34.3C, Channel B = -34.3C		22-Apr-01 05:17:58
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:17:59
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:17:59

PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:59
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:17:59
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		22-Apr-01 05:17:59
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:17:59
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 05:17:59
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:17:59
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		22-Apr-01 05:18:00
QA: OFF	QA: OFF Done		22-Apr-01 05:18:00

7 POWER ON PCU USING QA AND NA, ACTIVATE REDUNDANT RELAY SETS.
Enters with redundant internal supply already selected at end of previous table.

STEP 34	Mixed		
QA: V=29.0v	QA: V=29.0v Done		22-Apr-01 05:18:46
QB: V=29.0v	QB: V=29.0v Done		22-Apr-01 05:18:46
NA: V=29.0v	NA: V=29.0v Done		22-Apr-01 05:18:46
NB: V=29.0v	NB: V=29.0v Done		22-Apr-01 05:18:46
SCOPE:Select:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:18:46
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:18:46
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		22-Apr-01 05:18:46
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH 4 OFF done.		22-Apr-01 05:18:46
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 05:18:46
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:18:46
SCOPE:TRIG:A:EDGE:SLOPE RISE	SCOPE:TRIG:A:ED GE:SLOPE RISE done.		22-Apr-01 05:18:46
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEV EL 0.05 done.		22-Apr-01 05:18:47
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:P OS 20 done.		22-Apr-01 05:18:47
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOL D:TIM 2.0E-2 done.		22-Apr-01 05:18:47
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 05:18:47
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		22-Apr-01 05:18:47
SCOPE: CH2:POS -3	SCOPE:CH2:POS -3 done.		22-Apr-01 05:18:47
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:18:47
SCOPE:MESS:SHOW 'QA Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHO W 'QA Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		22-Apr-01 05:18:47
QA: ON	QA: ON Done		22-Apr-01 05:18:47

PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:18:47
SCOPE: HARDCOPY INRUSHAR.BMP	INRUSHAR.BMP written to Appendix.		22-Apr-01 05:18:47
QA: IO?	Current 1.42A		22-Apr-01 05:18:47
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.34A, Channel B = 1.34A		22-Apr-01 05:18:47
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 05:18:47

7.1 Power On telemetry verification.

STEP 35	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:19:14
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.03V, Channel B = 14.03V		22-Apr-01 05:19:14
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.94V, Channel B = -14.93V		22-Apr-01 05:19:14
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:19:15
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 05:19:15
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 05:19:15
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 05:19:15
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:19:15
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 05:19:16

PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		22-Apr-01 05:19:16

7.2 Turn on QC, with redundant relay

STEP 36	Mixed		
PORTA: QA (RR) ON	IFC Echo = D00A		22-Apr-01 05:19:31
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:19:32
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:19:32
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:19:32

7.3 Power on System Converters, - Redundant set.
Power on using PSM-14 and PSM-16. Outputs need to be selected using redundant relay set. Telemetry checks done between and after macros.

STEP 37	Mixed		
NA: ON	NA: ON Done		22-Apr-01 05:21:00
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 05:21:00
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:21:00
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:21:00
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:21:00
SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:21:00
PORTA: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		22-Apr-01 05:21:00
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		22-Apr-01 05:21:00
SCOPE: HARDCOPY SYS1BQA.BMP	SYS1BQA.BMP written to Appendix.		22-Apr-01 05:21:00
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.35V		22-Apr-01 05:21:01
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.85V, Channel B = 29.85V		22-Apr-01 05:21:01
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.56A, Channel B = 1.56A		22-Apr-01 05:21:01
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:21:01
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:21:01
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:21:01

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:21:01
SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:21:01
PORTA: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		22-Apr-01 05:21:01
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A012		22-Apr-01 05:21:01
SCOPE: HARDCOPY SYS2BQA.BMP	SYS2BQA.BMP written to Appendix.		22-Apr-01 05:21:01
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.64A, Channel B = 1.64A		22-Apr-01 05:21:01
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.16V, Channel B = 15.16V		22-Apr-01 05:21:01
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:21:02
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 05:21:02
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 05:21:02
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 05:21:02

7.4 TEU A – Redundant Output relays – 28V and 5V.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through redundant relays. This carries out PSM-19, PSM43, and PSM-46 macros with telemetry checks between macros.

STEP 38	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:22:51
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:22:51
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:22:51
PORTA: A_TEU_+28QC (RR) ON	IFC Echo = D014		22-Apr-01 05:22:51
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0005		22-Apr-01 05:22:51
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.27A, Channel B = 2.27A		22-Apr-01 05:22:51
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:22:51
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:22:51
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:22:51
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:22:51
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:22:51
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:22:51
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:22:51
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:22:51
SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:22:51
PORTA: A_TEU_+5 (RR) ON	IFC Echo = D00C		22-Apr-01 05:22:52
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A017		22-Apr-01 05:22:52
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:22:52
SCOPE:HARDCOPY TEUAC6.BMP	TEUAC6.BMP written to Appendix.		22-Apr-01 05:22:52

PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.3V, Channel B = 5.3V		22-Apr-01 05:22:52
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.55A, Channel B = 2.54A		22-Apr-01 05:22:52
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:22:52
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:22:52
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:22:52
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:22:52

7.5 TEU A Redundant relays - +/-15V.

STEP 39	Mixed		
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:24:54
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:24:54
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:24:54
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:24:54
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:24:54
SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:24:54
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		22-Apr-01 05:24:54
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:24:54
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:24:54
SCOPE:HARDCOPY TEUAC7.BMP	TEUAC7.BMP written to Appendix.		22-Apr-01 05:24:54
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:24:54
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:24:55
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 05:24:55
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:24:55
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:24:55
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:24:55
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:24:55

SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:24:55
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		22-Apr-01 05:24:55
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:24:55
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:24:55
SCOPE:HARDCOPY TEUAC8.BMP	TEUAC8.BMP written to Appendix.		22-Apr-01 05:24:55
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.94A, Channel B = 2.94A		22-Apr-01 05:24:55
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.15V, Channel B = 15.14V		22-Apr-01 05:24:55
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:24:56
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:24:56

7.6 EEA – Redundant Relays.

Turns on supplies in order specified in C&TH Vol1 part 2 section 5.5.1 to supply EEA through redundant relays. This carries out PSM-57 macro with interspersed telemetry checks.

STEP 40	Mixed		
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 05:28:01
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:28:01
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:28:01
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:28:02
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:28:02
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:28:02
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:28:02
SCOPE:MESS:SHOW 'EEA 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:28:02
PORTA: EEA_+5 (RR) ON	IFC Echo = D008		22-Apr-01 05:28:02
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		22-Apr-01 05:28:02
SCOPE:HARDCOPY EEA5VR.BMP	EEA5VR.BMP written to Appendix.		22-Apr-01 05:28:02
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.04A, Channel B = 3.04A		22-Apr-01 05:28:02
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:28:02
Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:28:02
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:28:02
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:28:02
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:28:02

SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:28:03
SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:28:03
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		22-Apr-01 05:28:03
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:28:03
SCOPE:HARDCOPY EEA15PRV.BMP	EEA15PRV.BMP written to Appendix.		22-Apr-01 05:28:03
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:28:03
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:28:03
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:28:03
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:28:03
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:28:03
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:28:03
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:28:03
SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:28:03
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		22-Apr-01 05:28:03
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:28:03
SCOPE:HARDCOPY EEA15NRV.BMP	EEA15NRV.BMP written to Appendix.		22-Apr-01 05:28:03
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.12A, Channel B = 3.12A		22-Apr-01 05:28:04
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 05:28:04

PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.14V, Channel B = 15.15V		22-Apr-01 05:28:04
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.22V		22-Apr-01 05:28:04
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:28:04

7.7 IPU 28 Volt Regulated supply – Redundant relay.
Turns on supply in order specified in C&TH Vol1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through redundant relays. This carries out PSM-25 macro.

STEP 41	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:29:21
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:29:21
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:29:21
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:29:22
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:29:22
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:29:22
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:29:22
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:29:22
SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 05:29:22
PORTA: A_IPU_+28REG (RR) ON	IFC Echo = D002		22-Apr-01 05:29:22
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:29:22
SCOPE:HARDCOPY IPUA2.BMP	IPUA2.BMP written to Appendix.		22-Apr-01 05:29:22
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 05:29:22
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =4.98A, Channel B = 4.98A		22-Apr-01 05:29:22
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 05:29:22

7.8 Power On SPU B Supplies

Turn on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side B using PSM-12 and PSM-40 macros.

STEP 42	Mixed		
Change SPU load box cable to Side B at load box.	ok		22-Apr-01 05:33:39
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 05:33:39
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:33:39
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:33:40
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:33:40
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:33:40
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 05:33:40
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:40
SCOPE:MESS:SHOW 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:33:40
PORTA: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		22-Apr-01 05:33:40
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry A012		22-Apr-01 05:33:40
SCOPE: HARDCOPY SPUBQA.BMP	SPUBQA.BMP written to Appendix.		22-Apr-01 05:33:40
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =5.08A, Channel B = 5.07A		22-Apr-01 05:33:40
PORTA: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 05:33:40
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:33:40
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 05:33:40
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 05:33:40

SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 05:33:41
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:33:41
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:33:41
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:33:41
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:33:41
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:41
SCOPE:MESS:SHOW 'SPU Converter B +15V \nSoft Start Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B +15V \nSoft Start Current Waveform, 500mA/Div' done.		22-Apr-01 05:33:41
PORTA: SPU_+/-15B ON	IFC Echo = D019		22-Apr-01 05:33:41
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:33:41
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		22-Apr-01 05:33:41
SCOPE: HARDCOPY SPUBC15P.BMP	SPUBC15P.BMP written to Appendix.		22-Apr-01 05:33:41
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:33:41
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:33:41
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:33:41
On Load Box select "V" position of SPU +15V load switch and remove loop.	ok		22-Apr-01 05:33:41
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:33:41
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:33:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:42
SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:33:42

PORTA: SPU_+/-15B ON	IFC Echo = D019		22-Apr-01 05:33:42
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:33:42
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		22-Apr-01 05:33:42
SCOPE: HARDCOPY SPUBC15N.BMP	SPUBC15N.BMP written to Appendix.		22-Apr-01 05:33:42
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.18A, Channel B = 6.18A		22-Apr-01 05:33:42
On Load Box select "V" position of SPU -15V load switch and remove loop.	ok		22-Apr-01 05:33:42
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:33:42
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:33:42
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:33:42
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:33:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:42
SCOPE:MESS:SHOW 'SPU Converter B 5V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B 5V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:33:42
PORTA: SPU_+5B ON	IFC Echo = D018		22-Apr-01 05:33:43
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:33:43
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE12		22-Apr-01 05:33:43
SCOPE: HARDCOPY SPUBC5.BMP	SPUBC5.BMP written to Appendix.		22-Apr-01 05:33:43
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.38A, Channel B = 6.38A		22-Apr-01 05:33:43
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 05:33:43

PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 05:33:43
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:33:43
On Load Box select "V" position of SPU 5V load switch and remove loop.	ok		22-Apr-01 05:33:43

7.9 Turn on GEU Supplies.
Turns on GEU supplies in order specified in C&TH Vol1 Part 2 section 5.5.5 to power GEU from prime side.

STEP 43	Mixed		
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 05:34:10
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:34:10
PORTA: GEU_+5 (RR) ON	IFC Echo = D004		22-Apr-01 05:34:10
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE17		22-Apr-01 05:34:10
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.56A, Channel B = 6.57A		22-Apr-01 05:34:10
PORTA: GEU_+/-15 (RR) ON	IFC Echo = D005		22-Apr-01 05:34:10
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 05:34:10
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.23A, Channel B = 7.23A		22-Apr-01 05:34:10
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:34:10
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:34:11
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.22V		22-Apr-01 05:34:11
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 05:34:11
PORTA: GEU_+28QC (RR) ON	IFC Echo = D016		22-Apr-01 05:34:11
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		22-Apr-01 05:34:11
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.04A, Channel B = 8.04A		22-Apr-01 05:34:11

7.10 Turn on Noisy Bus – Redundant relay
Turn on the Noisy Bus Output from the NA supply through the Redundant Relay.

STEP 44	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:34:20
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:34:20
PORTA: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:34:20
PORTA: NA (RR) ON	IFC Echo = D01C		22-Apr-01 05:34:20
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:34:20

7.11 Do complete telemetry check of PCU now all outputs are on.

STEP 45	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:34:34
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:34:34
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 05:34:34
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:34:34
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:34:34
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:34:34
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		22-Apr-01 05:34:34
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:34:34

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 46	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 05:35:04
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:35:04
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.02V		22-Apr-01 05:35:04
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.05V, Channel B = -15.04V		22-Apr-01 05:35:04
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.34V, Channel B = 0.33V		22-Apr-01 05:35:04
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.07V		22-Apr-01 05:35:05
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.05A, Channel B = 8.05A		22-Apr-01 05:35:05
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		22-Apr-01 05:35:05
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:35:05
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:35:05

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:35:05
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:35:05
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:35:05
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:35:05
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.21V, Channel B = -15.22V		22-Apr-01 05:35:05
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 05:35:05

Analogue Telemetry block 2.

STEP 47	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:35:32
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:35:32
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:35:32
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 05:35:32
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:35:32
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-34.9C, Channel B = -34.9C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-37.0C, Channel B = -36.7C		22-Apr-01 05:35:32

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-31.4C, Channel B = -31.4C		22-Apr-01 05:35:32

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 48	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-29.3C, Channel B = -29.3C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.8C, Channel B = -25.8C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-27.3C, Channel B = -27.0C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-25.5C, Channel B = -25.5C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.3C, Channel B = -24.3C		22-Apr-01 05:36:01
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-31.1C, Channel B = -30.8C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.0C, Channel B = -27.3C		22-Apr-01 05:36:01

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-10.9C, Channel B = -10.9C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-30.5C, Channel B = -29.9C		22-Apr-01 05:36:02

7.12 Do High Voltage Input Limit Test
Adjust the QA and NA supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 49	Mixed		
QA:V= 32.0V	QA:V= 32.0V Done		22-Apr-01 05:36:17
NA:V= 32.0V	NA:V= 32.0V Done		22-Apr-01 05:36:17
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:36:17
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:36:17
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 05:36:17
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:36:18
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:36:18
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:36:18
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		22-Apr-01 05:36:18
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:36:18

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 50	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:36:46
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.02V		22-Apr-01 05:36:46
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.04V, Channel B = -15.04V		22-Apr-01 05:36:46
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:36:46
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:36:46
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.86A, Channel B = 7.86A		22-Apr-01 05:36:46
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.03A		22-Apr-01 05:36:46
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:36:46
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.08V		22-Apr-01 05:36:47
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:36:47

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:36:47
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:36:47
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.11V, Channel B = 15.13V		22-Apr-01 05:36:47
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.23V		22-Apr-01 05:36:47
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.75V, Channel B = 29.77V		22-Apr-01 05:36:47

Analogue Telemetry block 2.

STEP 51	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.02V		22-Apr-01 05:37:13
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:37:13
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.1V		22-Apr-01 05:37:13
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.54V, Channel B = 5.55V		22-Apr-01 05:37:13
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 05:37:13
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-34.3C, Channel B = -34.6C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-35.2C, Channel B = -34.9C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-34.9C, Channel B = -34.6C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-37.0C, Channel B = -37.0C		22-Apr-01 05:37:14

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-28.5C, Channel B = -28.5C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-30.8C, Channel B = -30.2C		22-Apr-01 05:37:14

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 52	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -30.2C		22-Apr-01 05:37:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.3C, Channel B = -29.3C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.2C, Channel B = -25.2C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.7C, Channel B = -27.0C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.1C, Channel B = -23.8C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-26.4C, Channel B = -26.1C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 05:37:41

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-29.0C, Channel B = -29.3C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-10.0C, Channel B = -10.0C		22-Apr-01 05:37:42
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-31.7C, Channel B = -32.0C		22-Apr-01 05:37:42
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:37:42

7.13 Do Low Operating Voltage Limit Test.
Adjust the QA and NA supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 53	Mixed		
QA: V=26.0V	QA: V=26.0V Done		22-Apr-01 05:37:57
NA: V=26.0V	NA: V=26.0V Done		22-Apr-01 05:37:57
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:57
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 54	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:38:26
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.01V, Channel B = 14.02V		22-Apr-01 05:38:26
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.1V, Channel B = -15.1V		22-Apr-01 05:38:26
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:38:26
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.06V		22-Apr-01 05:38:26
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.37A, Channel B = 8.38A		22-Apr-01 05:38:26
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		22-Apr-01 05:38:27
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:38:27
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:38:27
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:38:27

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:38:27
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:38:27
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.11V, Channel B = 15.13V		22-Apr-01 05:38:27
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.23V		22-Apr-01 05:38:27
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 05:38:27

Analogue Telemetry block 2.

STEP 55	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:38:53
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:38:53
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 05:38:54
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 05:38:54
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 05:38:54
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-34.6C, Channel B = -34.3C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-34.9C, Channel B = -34.6C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-36.7C, Channel B = -37.0C		22-Apr-01 05:38:54

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-28.2C, Channel B = -28.2C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 05:38:54

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 56	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.6C, Channel B = -29.3C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.5C, Channel B = -28.5C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.5C, Channel B = -29.0C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.2C, Channel B = -25.2C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.7C, Channel B = -26.7C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.6C, Channel B = -24.9C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-23.5C, Channel B = -23.8C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-25.8C, Channel B = -26.1C		22-Apr-01 05:39:22

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:39:22
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-9.7C, Channel B = -9.4C		22-Apr-01 05:39:22
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-31.7C, Channel B = -31.4C		22-Apr-01 05:39:22
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:39:22

7.14 Turn off all relays.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.
This table is PSM-02 macro.

STEP 57	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:40:23
PORTB: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:40:23
PORTB: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:40:23
PORTB: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 05:40:23
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:40:23
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 05:40:23
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 05:40:23
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:40:23
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:40:23
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 05:40:23
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:40:23
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:40:23
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:40:23
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 05:40:23
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:40:23
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:40:23
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:40:23
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:40:23
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:40:23
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:40:23
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:40:23
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:40:23
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:40:23
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:40:23
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:40:23
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:40:23
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:40:23
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:40:23
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:40:23
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:40:24
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:40:24
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:40:24
PORTB: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:40:24
PORTB: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:40:24

This table is PSM-01 Macro.

STEP 58	Mixed		
PORTB:SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:40:34
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 05:40:34
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 05:40:34
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:40:35
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 05:40:35
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 05:40:35

7.15 Do status check and turn off QC bus relay.

STEP 59	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:41:03
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.03V		22-Apr-01 05:41:03
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.23V, Channel B = -15.24V		22-Apr-01 05:41:03
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 05:41:04
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 05:41:04
PORTB: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:41:04

PORTB: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:41:04
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:41:04
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:41:05
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:41:05
NA: OFF	NA: OFF Done		22-Apr-01 05:41:05
QA: OFF	QA: OFF Done		22-Apr-01 05:41:05

8 DO ALL TESTS WITH QB AND NB, SYS1 PRIMARY AND SYS2 REDUNDANT SUPPLIES.

Enters with Primary Internal Supply connected to QB from previous test block.

STEP 60	Mixed		
Move scope CH1 current probe to QB Supply lead	ok		22-Apr-01 05:43:26
Change IPU load box cable to Side B at load box.	ok		22-Apr-01 05:43:26
QA: V=29.0v	QA: V=29.0v Done		22-Apr-01 05:43:26
QB: V=29.0v	QB: V=29.0v Done		22-Apr-01 05:43:26
NA: V=29.0v	NA: V=29.0v Done		22-Apr-01 05:43:26
NB: V=29.0v	NB: V=29.0v Done		22-Apr-01 05:43:26
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 05:43:26
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:POS 20 done.		22-Apr-01 05:43:26
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 05:43:26
SCOPE: CH1:POS –3	SCOPE:CH1:POS –3 done.		22-Apr-01 05:43:26
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		22-Apr-01 05:43:26
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		22-Apr-01 05:43:26
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:43:27
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		22-Apr-01 05:43:27
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:43:27
SCOPE:MESS:SHOW 'QB Prime Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Prime Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		22-Apr-01 05:43:27
QB: ON	QB: ON Done		22-Apr-01 05:43:27
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:43:27
SCOPE: HARDCOPY INRUSHBP.BMP	INRUSHBP.BMP written to Appendix.		22-Apr-01 05:43:27
QB: IO?	Current 0.15A		22-Apr-01 05:43:27

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =0.09A, Channel B = 0.09A		22-Apr-01 05:43:27
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 05:43:27

8.1 Power On telemetry verification.

STEP 61	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:43:55
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.0V, Channel B = 14.0V		22-Apr-01 05:43:55
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.63V, Channel B = -14.63V		22-Apr-01 05:43:55
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:43:55
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:43:55
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-33.1C, Channel B = -33.4C		22-Apr-01 05:43:56
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-33.7C, Channel B = -33.4C		22-Apr-01 05:43:56
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 05:43:56
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 05:43:57

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		22-Apr-01 05:43:57

8.2 QC Power On with QB Prime relay.
Carries out PSM-60 macro, and then relevant telemetry.

STEP 62	Mixed		
PORTB: QB (PR) ON	IFC Echo = F00B		22-Apr-01 05:44:13
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:44:14
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:44:14
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:44:14
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 05:44:14
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:44:15
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:44:15
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:44:15
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 05:44:15

8.3 System Converters, Prime SYS1 and Redundant SYS2.
Power on SYS1A and SYS2B converters using PSM-13 and PSM-16. Outputs need to be selected using prime relay set for 5V and 28V, and redundant relay set for +/-15V. Telemetry checks done between and after macros.

STEP 63	Mixed		
NB: ON	NB: ON Done		22-Apr-01 05:45:44
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 05:45:44
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:45:44
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:45:44
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:45:44
SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:45:44
PORTB: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		22-Apr-01 05:45:44
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		22-Apr-01 05:45:44
SCOPE: HARDCOPY SYS1AQB.BMP	SYS1AQB.BMP written to Appendix.		22-Apr-01 05:45:45
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =0.3A, Channel B = 0.3A		22-Apr-01 05:45:45
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.34V, Channel B = 5.34V		22-Apr-01 05:45:45
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.89V, Channel B = 29.87V		22-Apr-01 05:45:45
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:45:45
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:45:45
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:45:45

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:45:45
SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:45:45
PORTB: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		22-Apr-01 05:45:45
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:45:45
SCOPE: HARDCOPY SYS2BQB.BMP	SYS2BQB.BMP written to Appendix.		22-Apr-01 05:45:45
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =0.38A, Channel B = 0.38A		22-Apr-01 05:45:45
PORTB: PSSV12;+15Volt DC-DC Converter SYS B	IFC Echo = 000D, Telemetry Channel A =15.16V, Channel B = 15.16V		22-Apr-01 05:45:45
PORTB: PSSV14;-15Volt DC-DC Converter SYS B	IFC Echo = 000E, Telemetry Channel A =-15.24V, Channel B = -15.23V		22-Apr-01 05:45:46
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 05:45:46
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 05:45:46
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 05:45:47

8.4 TEU B – Prime relays – 28V and 5V.

Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-21, PSM48, and PSM-52 macros with telemetry checks between macros.

STEP 64	Mixed		
Change TEU load box cable to Side B at load box.	ok		22-Apr-01 05:47:51
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:47:51
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:47:51
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:47:51
PORTB: B_TEU_+28QC (PR) ON	IFC Echo = F015		22-Apr-01 05:47:51
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0030		22-Apr-01 05:47:51
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.03A, Channel B = 1.03A		22-Apr-01 05:47:51
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:47:51
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:47:51
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:47:51
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:47:51
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:47:51
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:47:51
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:47:52
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:47:52
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:47:52
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:47:52
SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:47:52
PORTB: B_TEU_+5 (PR) ON	IFC Echo = F010		22-Apr-01 05:47:52
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:47:52
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0017		22-Apr-01 05:47:52
SCOPE:HARDCOPY TEUBC2.BMP	TEUBC2.BMP written to Appendix.		22-Apr-01 05:47:52

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.29A, Channel B = 1.28A		22-Apr-01 05:47:53
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.31V, Channel B = 5.31V		22-Apr-01 05:47:53
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:47:53
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:47:53
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:47:53
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:47:53

8.5 TEU B Redundant Relays - +/-15V.

STEP 65	Mixed		
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:49:59
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:49:59
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:49:59
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:49:59
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:49:59
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:49:59
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:49:59
SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:49:59
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		22-Apr-01 05:49:59
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:50:00
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:50:00
SCOPE:HARDCOPY TEUBC3.BMP	TEUBC3.BMP written to Appendix.		22-Apr-01 05:50:00
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:50:00
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:50:00
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 05:50:00
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:50:00
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:50:00
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:50:00
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:50:00

SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:50:00
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		22-Apr-01 05:50:00
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:50:00
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:50:01
SCOPE:HARDCOPY TEUBC4.BMP	TEUBC4.BMP written to Appendix.		22-Apr-01 05:50:01
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.68A, Channel B = 1.69A		22-Apr-01 05:50:01
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.14V, Channel B = 15.15V		22-Apr-01 05:50:01
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:50:01
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:50:01

8.6 Turn on EEA.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1.
Primary and Redundant measurements already made. No A or B selection.

STEP 66	Mixed		
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:50:20
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:50:20
PORTB: EEA_+5 (PR) ON	IFC Echo = F008		22-Apr-01 05:50:20
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		22-Apr-01 05:50:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.79A, Channel B = 1.79A		22-Apr-01 05:50:20
PORTB: EEA_+/-15 (RR) ON	IFC Echo = D009		22-Apr-01 05:50:20
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:50:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.87A, Channel B = 1.86A		22-Apr-01 05:50:20
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 05:50:20
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.15V, Channel B = 15.15V		22-Apr-01 05:50:20
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:50:21

8.7 Turn on IPU Regulated 28 Volt Supply

Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B Regulated 28 volts through prime relays. This carries out PSM-27 macro.

STEP 67	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:51:58
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:51:58
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:51:58
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:51:58
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:51:58
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:51:58
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:51:58
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:51:58
SCOPE:MESS:SHOW 'IPU B 28VReg (Prime) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU B 28VReg (Prime) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 05:51:58
PORTB: B_IPU_+28REG (PR) ON	IFC Echo = F003		22-Apr-01 05:51:58
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5039		22-Apr-01 05:51:59
SCOPE:HARDCOPY IPUB1.BMP	IPUB1.BMP written to Appendix.		22-Apr-01 05:51:59
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.73V, Channel B = 29.73V		22-Apr-01 05:51:59
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.72A, Channel B = 3.72A		22-Apr-01 05:51:59
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 05:51:59

8.8 Power on SPU A Supplies from QB.
Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-10 and PSM-38 macros.

STEP 68	Mixed		
Change SPU load box cable to Side A at load box.	ok		22-Apr-01 05:56:51
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:56:51
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:56:51
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:56:51
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:56:51
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:56:51
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 05:56:51
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:56:51
SCOPE:MESS:SHOW 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:56:51
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		22-Apr-01 05:56:52
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		22-Apr-01 05:56:52
SCOPE: HARDCOPY SPUAQB.BMP	SPUAQB.BMP written to Appendix.		22-Apr-01 05:56:52
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.82A, Channel B = 3.82A		22-Apr-01 05:56:52
PORTB: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:56:52
PORTB: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:56:52
PORTB: SPU_+/-15A ON	IFC Echo = F019		22-Apr-01 05:56:52
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C39		22-Apr-01 05:56:52

PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		22-Apr-01 05:56:52
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =4.92A, Channel B = 4.92A		22-Apr-01 05:56:52
PORTB: SPU_+5A ON	IFC Echo = F018		22-Apr-01 05:56:52
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 05:56:52
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		22-Apr-01 05:56:53
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.12A, Channel B = 5.12A		22-Apr-01 05:56:53
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:56:53
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:56:53
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:56:53

8.9 GEU Supplies – Prime and Redundant relays.
Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5.
This carries out PSM-34 and PSM-30 macros.

STEP 69	Mixed		
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:57:19
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:57:19
PORTB: GEU_+5 (PR) ON	IFC Echo = F004		22-Apr-01 05:57:19
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		22-Apr-01 05:57:19
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.3A, Channel B = 5.29A		22-Apr-01 05:57:19
PORTB: GEU_+/-15 (RR) ON	IFC Echo = D005		22-Apr-01 05:57:19
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:57:19
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.96A, Channel B = 5.96A		22-Apr-01 05:57:19
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.25V, Channel B = 5.26V		22-Apr-01 05:57:19
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:57:20
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.21V		22-Apr-01 05:57:20
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:57:20
PORTB: GEU_+28QC (PR) ON	IFC Echo = F016		22-Apr-01 05:57:20
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 05:57:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.78A, Channel B = 6.78A		22-Apr-01 05:57:20

8.10 Turn on Noisy Bus.
Turn on the Noisy Bus Output from the NB supply through the Prime Relay.

STEP 70	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:57:29
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:57:29
PORTB: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:57:29
PORTB: NB (PR) ON	IFC Echo = F01D		22-Apr-01 05:57:29
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 05:57:29

8.11 Do complete telemetry check of PCU.

STEP 71	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 05:57:43
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:57:43
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:57:43
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 05:57:43
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:57:43
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:57:43
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 05:57:43
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 05:57:43

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 72	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 05:58:12
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:58:12
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 14.0V		22-Apr-01 05:58:12
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.56V, Channel B = -14.56V		22-Apr-01 05:58:12
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:58:12
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 05:58:12
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 05:58:12
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.03A, Channel B = 8.03A		22-Apr-01 05:58:12
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.27V, Channel B = 5.27V		22-Apr-01 05:58:12
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:58:12

PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:58:13
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.75V, Channel B = 29.75V		22-Apr-01 05:58:13
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:58:13
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:58:13
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.22V		22-Apr-01 05:58:13
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		22-Apr-01 05:58:13

Analogue Telemetry block 2.

STEP 73	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:58:38
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.11V		22-Apr-01 05:58:38
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:58:38
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:58:38
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:58:39
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-33.1C, Channel B = -33.1C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-33.7C, Channel B = -33.7C		22-Apr-01 05:58:39

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-36.1C, Channel B = -36.1C		22-Apr-01 05:58:39

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 74	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-29.0C, Channel B = -28.7C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-22.6C, Channel B = -22.9C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.4C, Channel B = -26.7C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-25.5C, Channel B = -25.2C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:59:07
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-32.8C, Channel B = -32.6C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:59:07

PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 05:59:08
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:59:08
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-14.1C, Channel B = -13.8C		22-Apr-01 05:59:08
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 05:59:08

8.12 Do High Voltage Input Limit Test
Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 75	Mixed		
QB: V=32.0V	QB: V=32.0V Done		22-Apr-01 05:59:22
NB: V=32.0V	NB: V=32.0V Done		22-Apr-01 05:59:22
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 05:59:22
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:59:22
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:59:23
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 05:59:23
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:59:23
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:59:23
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 05:59:23
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 05:59:23

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 76	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:59:50
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:59:50
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.58V, Channel B = -14.58V		22-Apr-01 05:59:50
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:59:50
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:59:50
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 05:59:50
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.85A, Channel B = 7.85A		22-Apr-01 05:59:50
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:59:50
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:59:50
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:59:50

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.73V, Channel B = 29.75V		22-Apr-01 05:59:50
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:59:50
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:59:50
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.22V		22-Apr-01 05:59:50
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.12V		22-Apr-01 05:59:51

Analogue Telemetry block 2.

STEP 77	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.58V, Channel B = 5.59V		22-Apr-01 06:00:16
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.12V		22-Apr-01 06:00:16
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 06:00:16
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.03V		22-Apr-01 06:00:16
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:00:16
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-32.3C, Channel B = -32.6C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-32.6C, Channel B = -32.6C		22-Apr-01 06:00:16

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-35.2C, Channel B = -35.5C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-36.4C, Channel B = -36.4C		22-Apr-01 06:00:17

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 78	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-22.3C, Channel B = -22.3C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.1C, Channel B = -25.8C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.6C, Channel B = -27.6C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-28.2C, Channel B = -28.5C		22-Apr-01 06:00:43

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 06:00:43
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 06:00:43
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-13.2C, Channel B = -13.2C		22-Apr-01 06:00:43
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:00:44

8.13 Do Low Operating Voltage Limit Test.
Adjust the QB and NB supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 79	Mixed		
QB: V=26.0V	QB: V=26.0V Done		22-Apr-01 06:00:59
NB: V=26.0V	NB: V=26.0V Done		22-Apr-01 06:00:59
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 06:00:59
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 06:00:59
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 06:00:59
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 06:00:59
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:00:59
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:00:59
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 06:00:59
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 06:00:59

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 80	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:01:26
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.98V, Channel B = 13.99V		22-Apr-01 06:01:26
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.61V, Channel B = -14.61V		22-Apr-01 06:01:26
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 06:01:26
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 06:01:26
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:01:26
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.35A, Channel B = 8.35A		22-Apr-01 06:01:26
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:01:26
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.08V		22-Apr-01 06:01:26
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.06V		22-Apr-01 06:01:27

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.75V, Channel B = 29.75V		22-Apr-01 06:01:27
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 06:01:27
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 06:01:27
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.23V		22-Apr-01 06:01:27
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		22-Apr-01 06:01:27

Analogue Telemetry block 2.

STEP 81	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.58V		22-Apr-01 06:01:52
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.11V		22-Apr-01 06:01:52
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 06:01:52
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.03V		22-Apr-01 06:01:52
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:01:52
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:01:52
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-32.0C, Channel B = -31.7C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:01:53

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.5C, Channel B = -35.8C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-36.7C, Channel B = -36.7C		22-Apr-01 06:01:53

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 82	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-24.3C, Channel B = -24.3C		22-Apr-01 06:02:18
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.7C, Channel B = -28.5C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-22.0C, Channel B = -22.0C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-25.8C, Channel B = -25.8C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-29.3C, Channel B = -29.6C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-26.4C, Channel B = -26.7C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 06:02:19

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:02:20
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:02:20
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-12.3C, Channel B = -12.3C		22-Apr-01 06:02:20
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 06:02:20

8.14 Turn of all relays ready to activate alternate relay set.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTA to verify alternate channel communication.
This is PSM-02

STEP 83	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 06:03:18
PORTA: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 06:03:18
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 06:03:18
PORTA: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 06:03:18
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 06:03:18
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 06:03:18
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 06:03:18
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 06:03:18
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 06:03:18
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 06:03:18
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 06:03:18
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 06:03:18
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 06:03:18
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 06:03:18
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 06:03:18
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 06:03:18
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 06:03:18
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 06:03:18
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 06:03:18
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 06:03:18
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 06:03:18
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 06:03:18
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 06:03:18
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 06:03:18
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 06:03:18
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 06:03:18
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 06:03:18
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 06:03:19
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 06:03:19
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 06:03:19
PORTA: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 06:03:19
PORTA: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 06:03:19
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 06:03:19
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 06:03:19

This is PSM-01

STEP 84	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 06:03:29
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 06:03:29
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 06:03:29
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 06:03:29
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 06:03:29
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 06:03:29

8.15 Do status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QB (important for TVAC check at temperature extremes).

STEP 85	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:04:02
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.0V, Channel B = 14.0V		22-Apr-01 06:04:03
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.63V, Channel B = -14.62V		22-Apr-01 06:04:03
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 06:04:03
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 06:04:03
PORTA: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 06:04:03
PORTA: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 06:04:03
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 06:04:03
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 06:04:03

PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 06:04:04
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 06:04:04
NB: OFF	NB: OFF Done		22-Apr-01 06:04:04
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 06:04:04
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:04:04
DIR: (IPU B) HIR_PSS_DISCRETE(2)	(IPU B) HIR_PSS_DISCRETE(2) Enabled		22-Apr-01 06:04:04
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 06:04:04
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 06:04:04
QB: OFF	QB: OFF Done		22-Apr-01 06:04:04

9 POWER ON PCU USING QB AND NB, SYS1 REDUNDANT AND SYS2 PRIMARY.
Enters with Redundant Internal Supply connected to QB from previous test block.

STEP 86	Mixed		
QA: V=29.0v	QA: V=29.0v Done		22-Apr-01 06:04:46
QB: V=29.0v	QB: V=29.0v Done		22-Apr-01 06:04:46
NA: V=29.0v	NA: V=29.0v Done		22-Apr-01 06:04:46
NB: V=29.0v	NB: V=29.0v Done		22-Apr-01 06:04:46
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 06:04:46
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:POS 20 done.		22-Apr-01 06:04:46
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 06:04:46
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		22-Apr-01 06:04:47
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		22-Apr-01 06:04:47
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		22-Apr-01 06:04:47
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 06:04:47
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		22-Apr-01 06:04:47
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:04:47
SCOPE:MESS:SHOW 'QB Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		22-Apr-01 06:04:48
QB: ON	QB: ON Done		22-Apr-01 06:04:48
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:04:48
SCOPE: HARDCOPY INRUSHBR.BMP	INRUSHBR.BMP written to Appendix.		22-Apr-01 06:04:48
QB: IO?	Current 1.42A		22-Apr-01 06:04:48
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.37A, Channel B = 1.36A		22-Apr-01 06:04:48

SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 06:04:48

9.1 Power On telemetry verification.

STEP 87	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:05:14
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.03V, Channel B = 14.03V		22-Apr-01 06:05:15
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.93V, Channel B = -14.92V		22-Apr-01 06:05:15
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 06:05:15
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 06:05:15
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-33.1C, Channel B = -32.8C		22-Apr-01 06:05:15
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.0C, Channel B = -34.0C		22-Apr-01 06:05:16
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 06:05:16
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 06:05:16

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		22-Apr-01 06:05:17

9.2 QC Power On with QB Redundant relay.
Carries out PSM-61 macro, and then relevant telemetry.

STEP 88	Mixed		
PORTB: QB (RR) ON	IFC Echo = D00B		22-Apr-01 06:05:33
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 06:05:34
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 06:05:35
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 06:05:35
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:05:35
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:05:35
SCOPE: CH2:VOLT 0.2	SCOPE:CH2:VOLT 0.2 done.		22-Apr-01 06:05:35

9.3 Turn on System Converters - Redundant SYS1 and Prime SYS2.
Power on SYS1B and SYS2A converters using PSM-14 and PSM-15. Outputs need to be selected using redundant relay set for 5V and 28V, and prime relay set for +/-15V. Telemetry checks done between and after macros.

STEP 89	Mixed		
NB: ON	NB: ON Done		22-Apr-01 06:07:01
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 06:07:01
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:07:01
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 06:07:02
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:07:02
SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 06:07:02
PORTB: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		22-Apr-01 06:07:02
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		22-Apr-01 06:07:02
SCOPE: HARDCOPY SYS1BQB.BMP	SYS1BQB.BMP written to Appendix.		22-Apr-01 06:07:02
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.58A, Channel B = 1.58A		22-Apr-01 06:07:02
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.35V		22-Apr-01 06:07:02
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.83V, Channel B = 29.87V		22-Apr-01 06:07:02
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 06:07:02
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:07:02
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 06:07:02

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:07:02
SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 06:07:03
PORTB: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		22-Apr-01 06:07:03
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:07:03
SCOPE: HARDCOPY SYS2AQB.BMP	SYS2AQB.BMP written to Appendix.		22-Apr-01 06:07:03
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.66A, Channel B = 1.66A		22-Apr-01 06:07:03
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.15V, Channel B = 15.16V		22-Apr-01 06:07:03
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.26V, Channel B = -15.26V		22-Apr-01 06:07:03
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		22-Apr-01 06:07:03
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH2 ON done.		22-Apr-01 06:07:04
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 06:07:04

9.4 TEU B – Redundant relays – 28V and 5V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-22, PSM49, and PSM-51 macros with telemetry checks between macros.

STEP 90	Mixed		
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 06:09:14
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 06:09:14
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 06:09:14
PORTB: B_TEU_+28QC (RR) ON	IFC Echo = D015		22-Apr-01 06:09:14
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0028		22-Apr-01 06:09:14
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.29A, Channel B = 2.29A		22-Apr-01 06:09:14
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 06:09:14
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 06:09:14
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 06:09:14
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 06:09:14
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 06:09:14
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 06:09:14
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 06:09:14
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 06:09:15
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 06:09:15
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:09:15
SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 06:09:15
PORTB: B_TEU_+5 (RR) ON	IFC Echo = D010		22-Apr-01 06:09:15
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:09:15
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 000F		22-Apr-01 06:09:15
SCOPE:HARDCOPY TEUBC6.BMP	TEUBC6.BMP written to Appendix.		22-Apr-01 06:09:16

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.56A, Channel B = 2.56A		22-Apr-01 06:09:16
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.31V, Channel B = 5.31V		22-Apr-01 06:09:16
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 06:09:16
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 06:09:16
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 06:09:16
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 06:09:16
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 06:09:16

9.5 TEU B – Prime relays – +/-15V.

STEP 91	Mixed		
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 06:11:23
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 06:11:23
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 06:11:23
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 06:11:23
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 06:11:23
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:11:23
SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 06:11:23
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		22-Apr-01 06:11:24
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:11:24
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:11:24
SCOPE:HARDCOPY TEUBC7.BMP	TEUBC7.BMP written to Appendix.		22-Apr-01 06:11:24
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 06:11:24
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 06:11:24
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 06:11:24
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 06:11:24
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 06:11:24
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 06:11:24
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:11:24

SCOPE:MESS:SHOW 'TEU B -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 06:11:24
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		22-Apr-01 06:11:24
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:11:24
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:11:24
SCOPE:HARDCOPY TEUBC8.BMP	TEUBC8.BMP written to Appendix.		22-Apr-01 06:11:24
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.95A, Channel B = 2.95A		22-Apr-01 06:11:25
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.14V, Channel B = 15.15V		22-Apr-01 06:11:25
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.26V		22-Apr-01 06:11:25
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 06:11:25

9.6 Power on EEA.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1
Primary and Redundant measurements already made. No A or B selection.

STEP 92	Mixed		
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 06:11:44
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 06:11:44
PORTB: EEA_+5 (RR) ON	IFC Echo = D008		22-Apr-01 06:11:44
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		22-Apr-01 06:11:44
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.05A, Channel B = 3.05A		22-Apr-01 06:11:44
PORTB: EEA_+/-15 (PR) ON	IFC Echo = F009		22-Apr-01 06:11:45
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:11:45
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.14A, Channel B = 3.14A		22-Apr-01 06:11:45
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 06:11:45
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.14V, Channel B = 15.14V		22-Apr-01 06:11:45
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.25V		22-Apr-01 06:11:46

9.7 Turn on IPU regulated 28 Volt Supply.
Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B side regulated 28 Volts through redundant relays.

STEP 93	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 06:12:54
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 06:12:54
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 06:12:54
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 06:12:54
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 06:12:54
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 06:12:55
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 06:12:55
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:12:55
SCOPE:MESS:SHOW 'IPU B 28VReg (Redundant) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU B 28VReg (Redundant) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 06:12:55
PORTB: B_IPU_+28REG (RR) ON	IFC Echo = D003		22-Apr-01 06:12:55
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:12:55
SCOPE:HARDCOPY IPUB2.BMP	IPUB2.BMP written to Appendix.		22-Apr-01 06:12:56
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =4.99A, Channel B = 4.99A		22-Apr-01 06:12:56
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.79V, Channel B = 29.79V		22-Apr-01 06:12:56
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 06:12:56

9.8 Power on SPU B supplies from QB.
Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5. to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-12 and PSM-40 macros.

STEP 94	Mixed		
Change SPU load box cable to Side B at load box.	ok		22-Apr-01 06:14:41
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 06:14:41
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 06:14:41
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 06:14:41
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 06:14:41
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:14:41
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 06:14:41
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:14:41
SCOPE:MESS:SHOW 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 06:14:41
PORTB: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		22-Apr-01 06:14:41
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry A00A		22-Apr-01 06:14:42
SCOPE: HARDCOPY SPUBQB.BMP	SPUBQB.BMP written to Appendix.		22-Apr-01 06:14:42
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.09A, Channel B = 5.09A		22-Apr-01 06:14:42
PORTB: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 06:14:42
PORTB: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 06:14:42
PORTB: SPU_+/-15B ON	IFC Echo = D019		22-Apr-01 06:14:42
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:14:42
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC0A		22-Apr-01 06:14:42

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.19A, Channel B = 6.19A		22-Apr-01 06:14:42
PORTB: SPU_+5B ON	IFC Echo = D018		22-Apr-01 06:14:42
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:14:42
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0A		22-Apr-01 06:14:42
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.39A, Channel B = 6.39A		22-Apr-01 06:14:42
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 06:14:42
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 06:14:42
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.19V		22-Apr-01 06:14:43

9.9 Turn on GEU supplies.
Turn on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5.

STEP 95	Mixed		
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 06:15:07
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 06:15:07
PORTB: GEU_+5 (RR) ON	IFC Echo = D004		22-Apr-01 06:15:07
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0F		22-Apr-01 06:15:07
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.57A, Channel B = 6.57A		22-Apr-01 06:15:07
PORTB: GEU_+/-15 (PR) ON	IFC Echo = F005		22-Apr-01 06:15:07
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.23A, Channel B = 7.23A		22-Apr-01 06:15:07
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:15:07
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:15:07
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 06:15:08
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 06:15:08
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 06:15:08
PORTB: GEU_+28QC (RR) ON	IFC Echo = D016		22-Apr-01 06:15:08
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:15:08

9.10 Turn on Noisy Bus.
Turn on the Noisy Bus Output from the NB supply through the Redundant Relay.

STEP 96	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 06:15:17
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 06:15:17
PORTB: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 06:15:17
PORTB: NB (RR) ON	IFC Echo = D01D		22-Apr-01 06:15:17
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:15:17

9.11 Do complete telemetry check of PCU now all outputs are on.

STEP 97	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:15:31
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:15:31
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:15:31
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:15:31
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:15:31
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:15:31
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:15:31
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:15:31

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 98	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 06:16:00
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.08V		22-Apr-01 06:16:00
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.02V		22-Apr-01 06:16:00
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.99V, Channel B = -14.99V		22-Apr-01 06:16:00
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 06:16:00
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.07V		22-Apr-01 06:16:00
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:16:00
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.04A, Channel B = 8.05A		22-Apr-01 06:16:00
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 06:16:00
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 06:16:00

PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 06:16:01
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.12V, Channel B = -0.14V		22-Apr-01 06:16:01
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:16:01
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 06:16:01
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 06:16:01
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.79V, Channel B = 29.79V		22-Apr-01 06:16:01

Analogue Telemetry block 2.

STEP 99	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 06:16:26
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:16:26
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 06:16:26
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 06:16:26
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.12V		22-Apr-01 06:16:26
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 06:16:26
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-35.5C, Channel B = -35.8C		22-Apr-01 06:16:26
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-36.1C, Channel B = -36.1C		22-Apr-01 06:16:26
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-35.8C, Channel B = -36.1C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-37.8C, Channel B = -37.8C		22-Apr-01 06:16:27

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-31.4C, Channel B = -31.4C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-31.7C, Channel B = -31.4C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-33.4C, Channel B = -33.4C		22-Apr-01 06:16:27

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 100	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.7C, Channel B = -28.5C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.2C, Channel B = -25.5C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.3C, Channel B = -24.6C		22-Apr-01 06:16:55
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-32.8C, Channel B = -32.6C		22-Apr-01 06:16:55
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.9C, Channel B = -28.2C		22-Apr-01 06:16:55

PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 06:16:55
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 06:16:56
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:16:56
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 06:16:56
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-15.6C, Channel B = -15.6C		22-Apr-01 06:16:56

9.12 Do High Voltage Input Limit Test
Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 101	Mixed		
QB: V=32.0V	QB: V=32.0V Done		22-Apr-01 06:17:11
NB: V=32.0V	NB: V=32.0V Done		22-Apr-01 06:17:11
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:17:11
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:17:11
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:17:11
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:17:11
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:17:11
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:17:11
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:17:11
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:17:11

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 102	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:17:38
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.01V, Channel B = 14.01V		22-Apr-01 06:17:38
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.08V, Channel B = -15.08V		22-Apr-01 06:17:38
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 06:17:38
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 06:17:38
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:17:38
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.86A, Channel B = 7.86A		22-Apr-01 06:17:38
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 06:17:38
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 06:17:38
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.25V		22-Apr-01 06:17:38

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		22-Apr-01 06:17:39
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:17:39
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.06V		22-Apr-01 06:17:39
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.06V		22-Apr-01 06:17:39
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 06:17:39

Analogue Telemetry block 2.

STEP 103	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 06:18:04
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:18:04
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:18:04
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.54V, Channel B = 5.55V		22-Apr-01 06:18:04
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 06:18:04
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-36.1C, Channel B = -36.4C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-36.1C, Channel B = -35.8C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-38.1C, Channel B = -38.1C		22-Apr-01 06:18:04

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 06:18:05
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-32.3C, Channel B = -32.0C		22-Apr-01 06:18:05

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 104	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-24.1C, Channel B = -24.1C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-26.7C, Channel B = -27.0C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.2C, Channel B = -28.5C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-24.9C, Channel B = -24.6C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.1C, Channel B = -23.8C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 06:18:30

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 06:18:31
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:18:31
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:18:32
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-14.7C, Channel B = -14.7C		22-Apr-01 06:18:32

9.13 Low Operating Voltage Limit Test.
Adjust the QB and NB supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 105	Mixed		
QB: V=26.0V	QB: V=26.0V Done		22-Apr-01 06:18:46
NB: V=26.0V	NB: V=26.0V Done		22-Apr-01 06:18:46
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:18:46
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:18:46
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:18:46
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:18:46
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:18:47
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:18:47
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:18:47
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:18:47

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 106	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:19:14
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.01V, Channel B = 14.02V		22-Apr-01 06:19:14
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.13V, Channel B = -15.13V		22-Apr-01 06:19:14
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.34V		22-Apr-01 06:19:14
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 06:19:14
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:19:14
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.37A, Channel B = 8.37A		22-Apr-01 06:19:14
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 06:19:14
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 06:19:14
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.24V		22-Apr-01 06:19:14

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		22-Apr-01 06:19:14
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:19:14
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 06:19:14
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 06:19:14
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.79V, Channel B = 29.79V		22-Apr-01 06:19:15

Analogue Telemetry block 2.

STEP 107	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.02V		22-Apr-01 06:19:40
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:19:40
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:19:40
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 06:19:40
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 06:19:40
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-35.8C, Channel B = -36.1C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-38.1C, Channel B = -37.8C		22-Apr-01 06:19:40

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-31.4C, Channel B = -31.1C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-32.3C, Channel B = -31.7C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-29.6C, Channel B = -29.9C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:19:40

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 108	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-24.1C, Channel B = -24.1C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-26.4C, Channel B = -26.7C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.2C, Channel B = -28.2C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-24.3C, Channel B = -24.6C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-27.0C, Channel B = -26.7C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-23.8C, Channel B = -23.5C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-25.5C, Channel B = -25.8C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-26.7C, Channel B = -26.4C		22-Apr-01 06:20:06

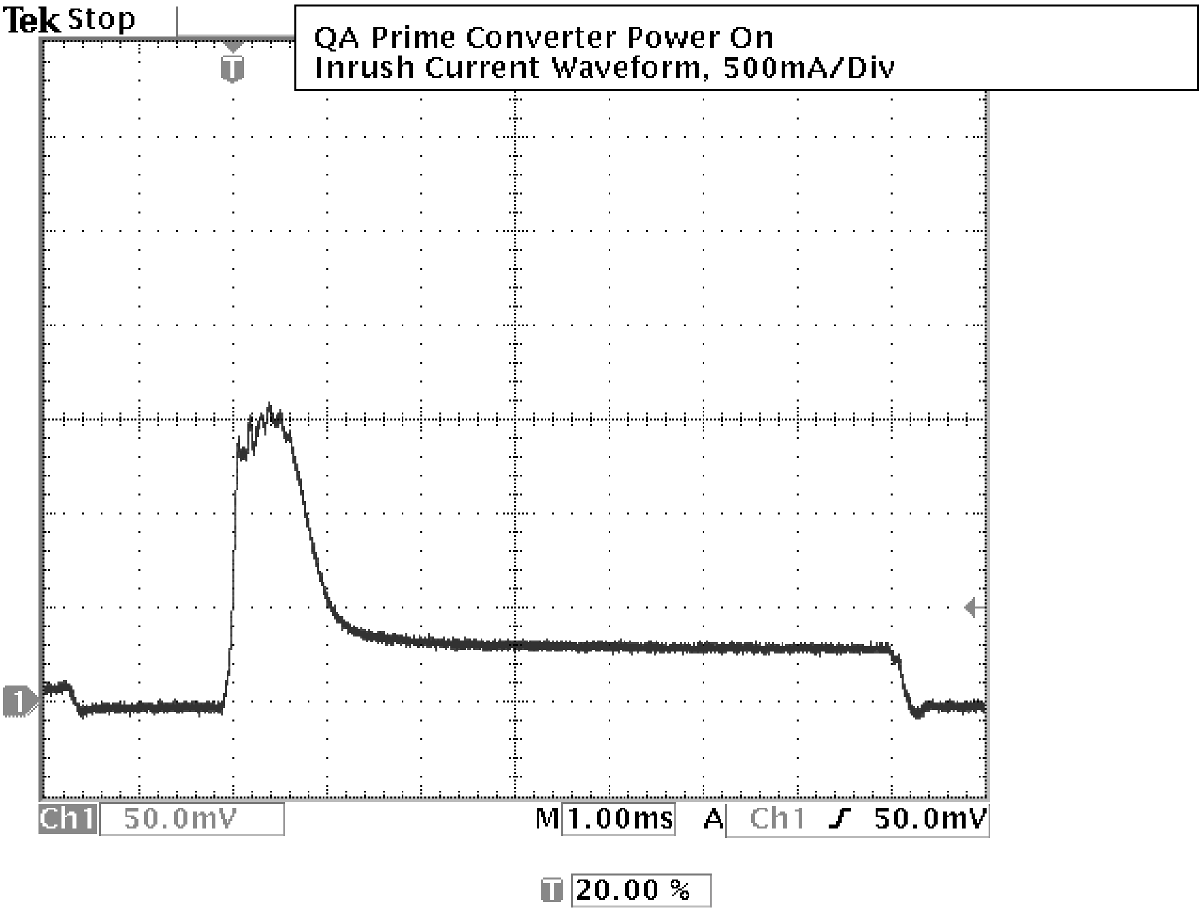
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.0C, Channel B = -32.3C		22-Apr-01 06:20:07
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:20:07
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:20:08
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-13.8C, Channel B = -13.8C		22-Apr-01 06:20:08

9.14 End Of Test. – Leave PCU Powered Up.

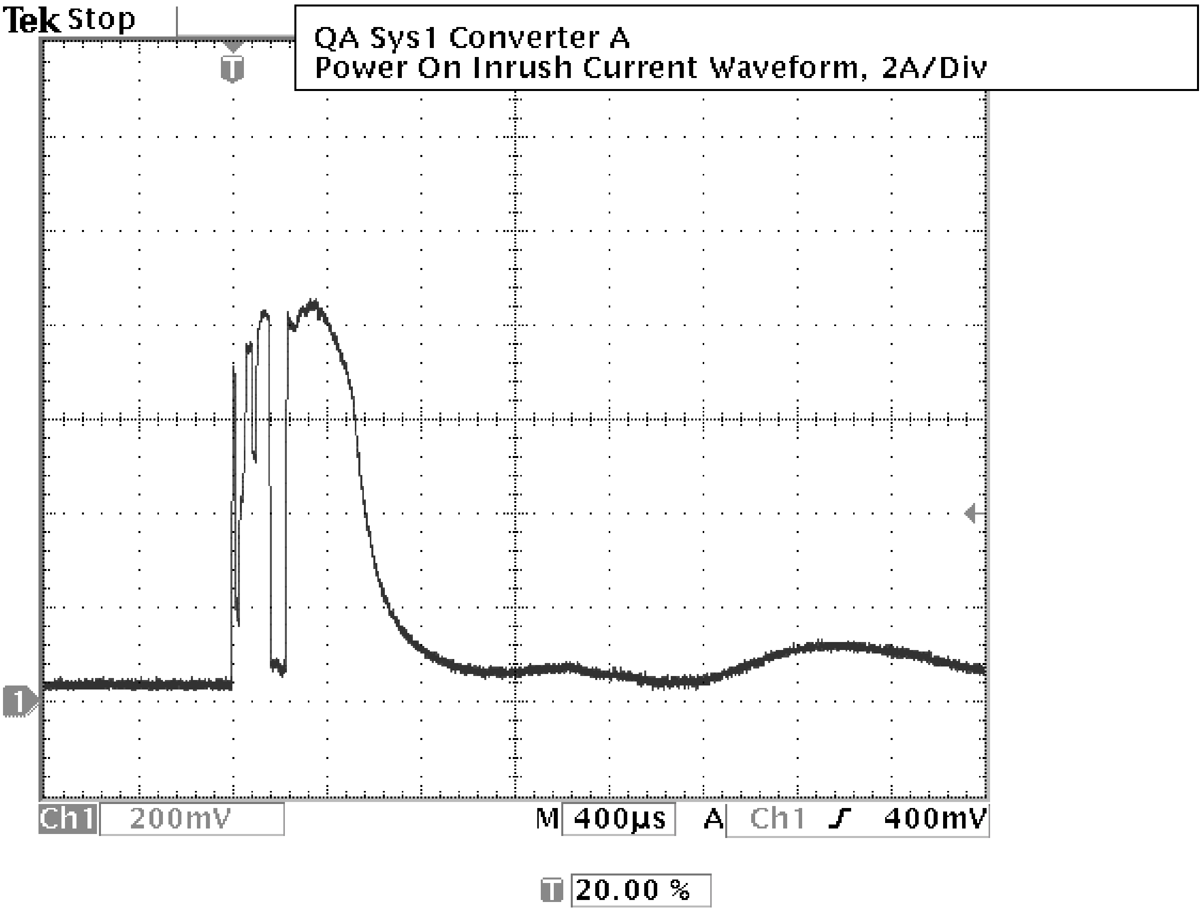
STEP 109	Mixed		
QB: V=29.0V	QB: V=29.0V Done		22-Apr-01 06:21:02
NB: V=29.0V	NB: V=29.0V Done		22-Apr-01 06:21:02
Turn off Current Probes	ok		22-Apr-01 06:21:02
Ensure all test certification is signed and annotated on diary cards.	ok		22-Apr-01 06:21:02
Ensure QA are notified of file name and test number for archiving.	ok		22-Apr-01 06:21:02
PCU left powered for TVAC test. Power down using Shutdown_PCU macro if required.	ok		22-Apr-01 06:21:02

10 APPENDIX

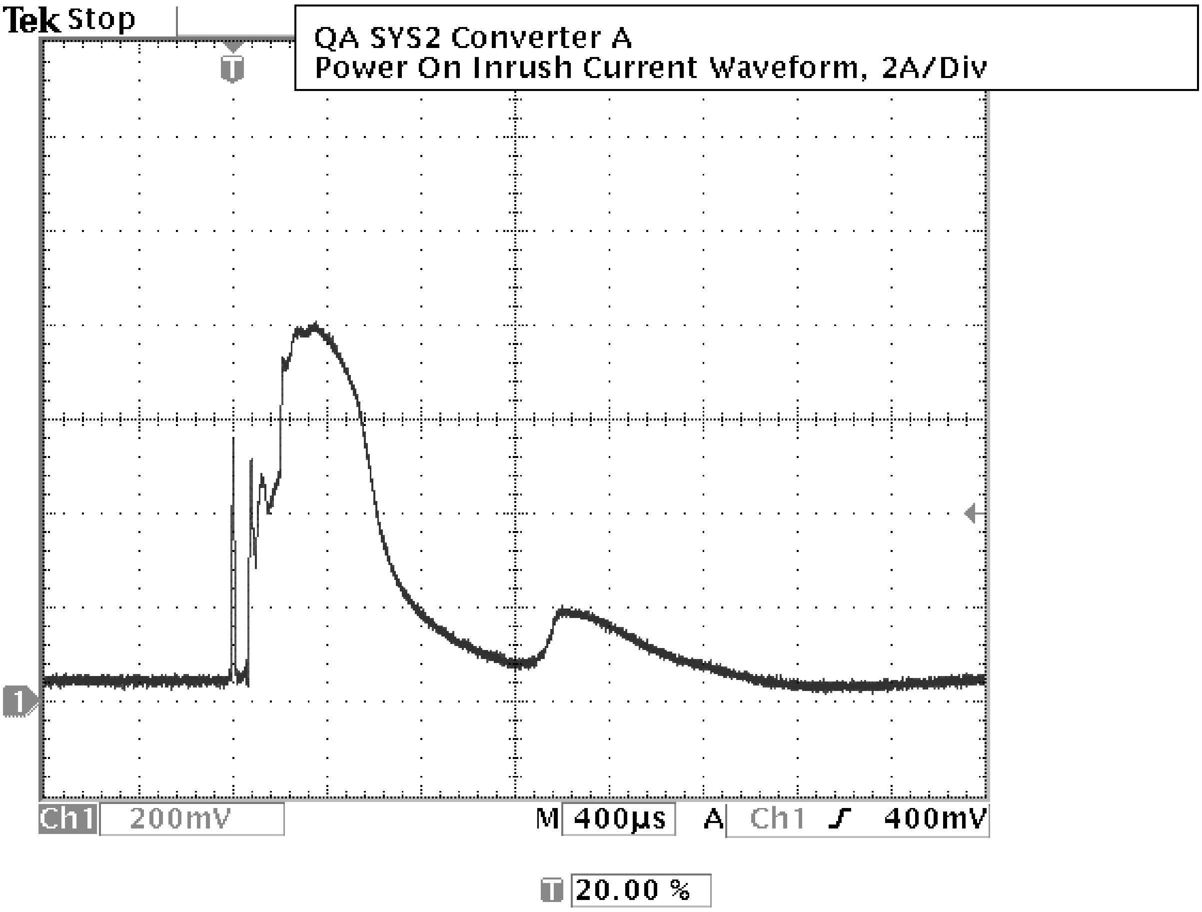
10.1 Waveform INRUSHAP.BMP



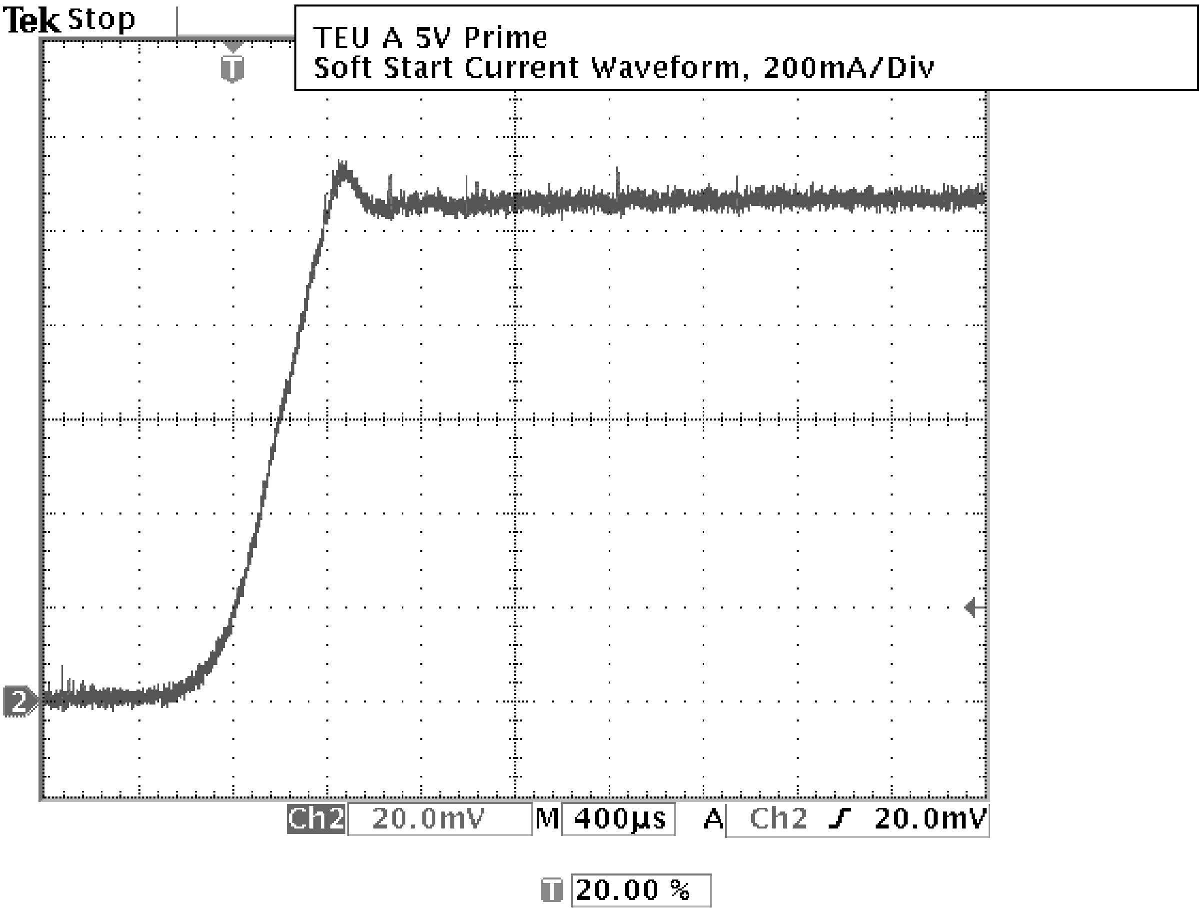
10.2 Waveform SYS1AQA.BMP



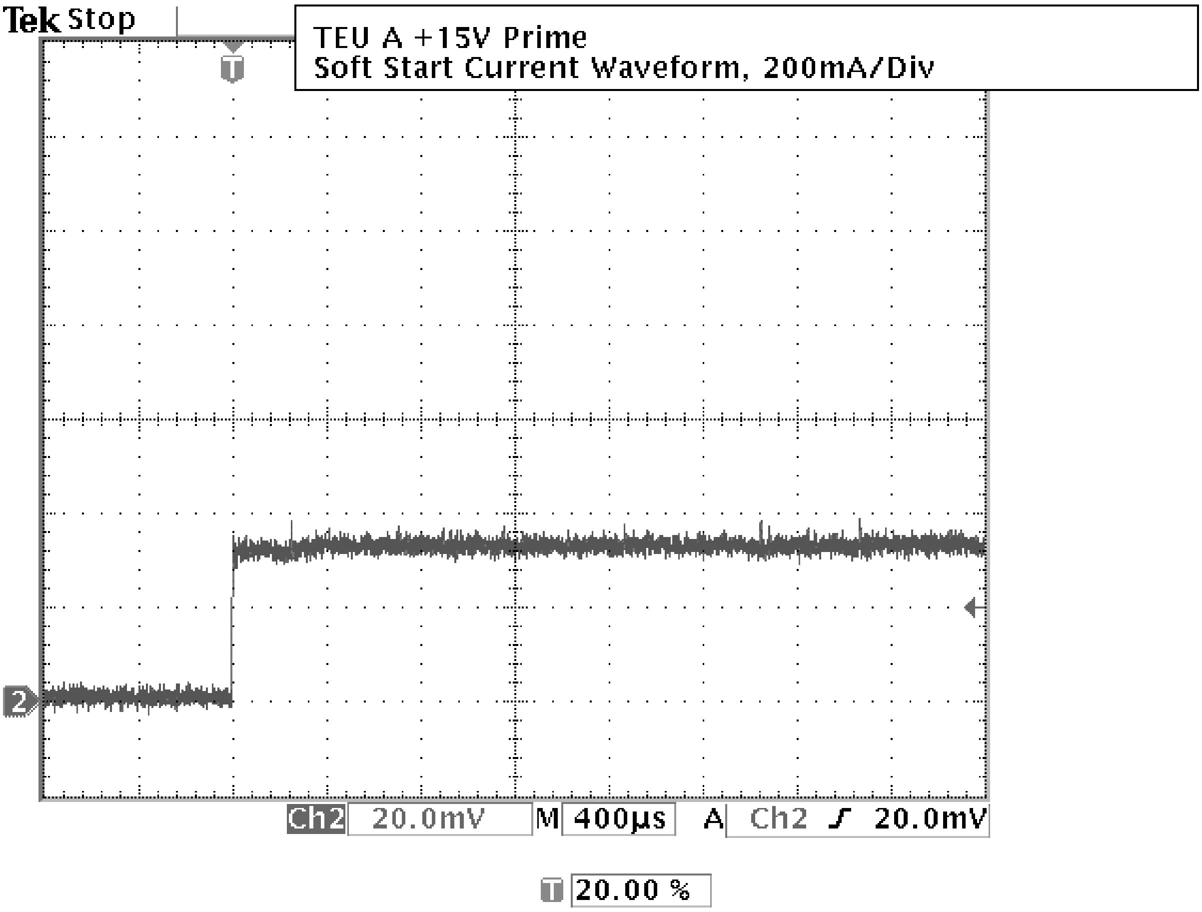
10.3 Waveform SYS2AQA.BMP



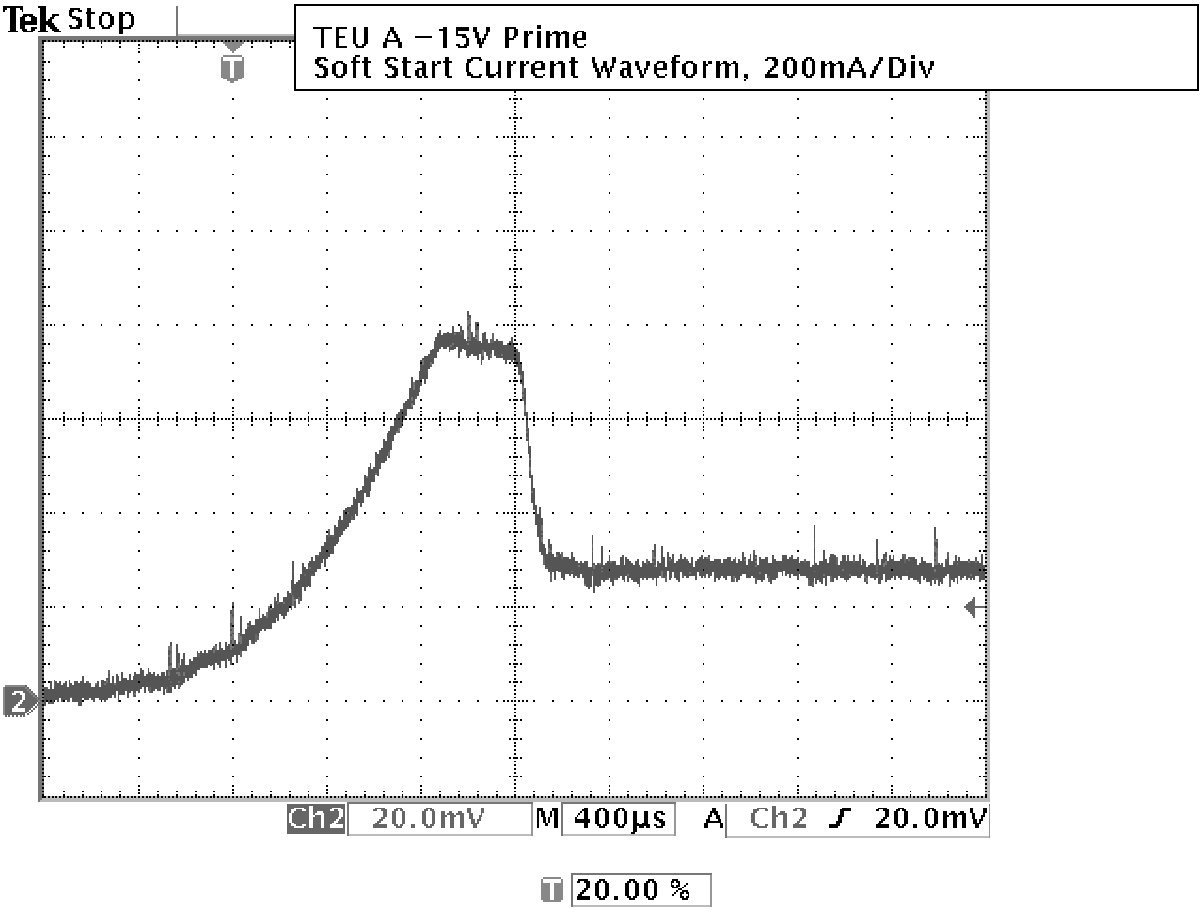
10.4 Waveform TEUAC2.BMP



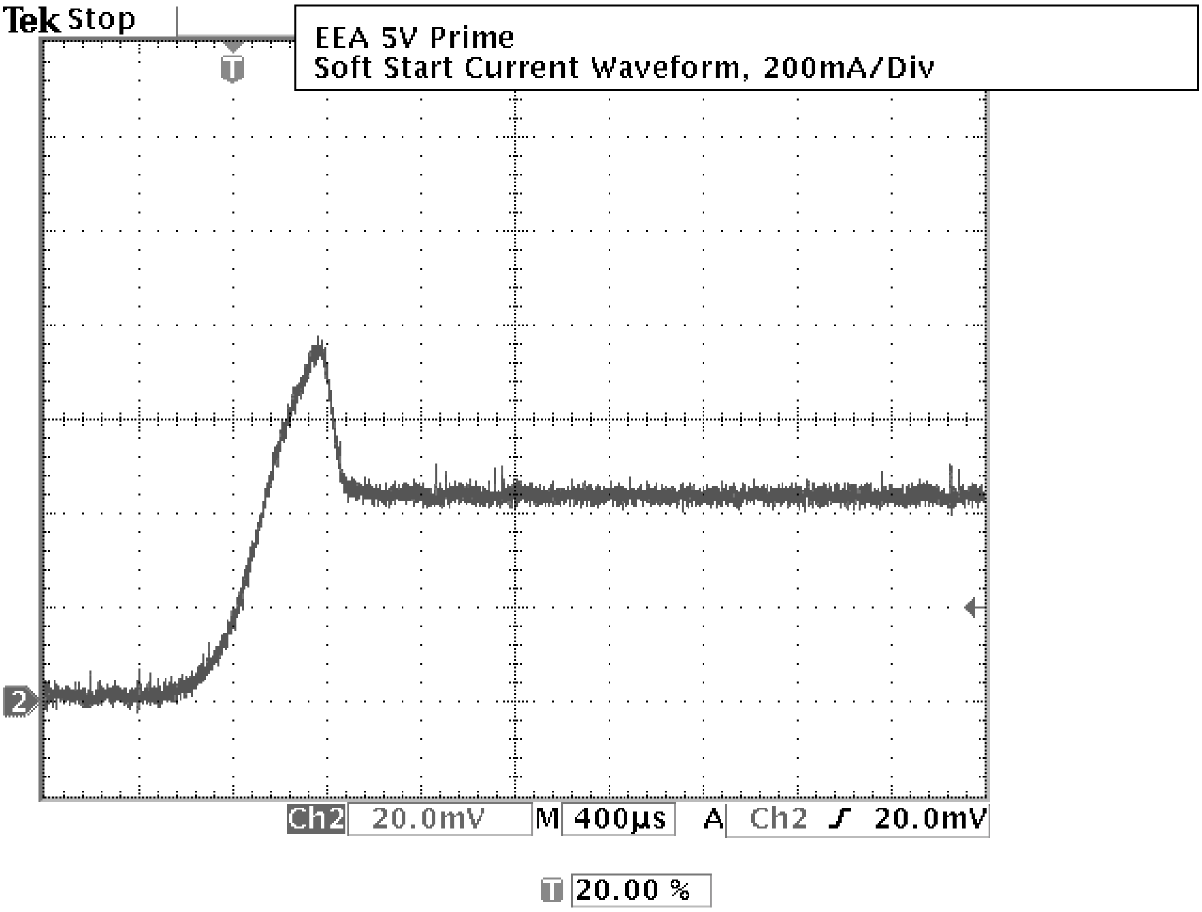
10.5 Waveform TEUAC3.BMP



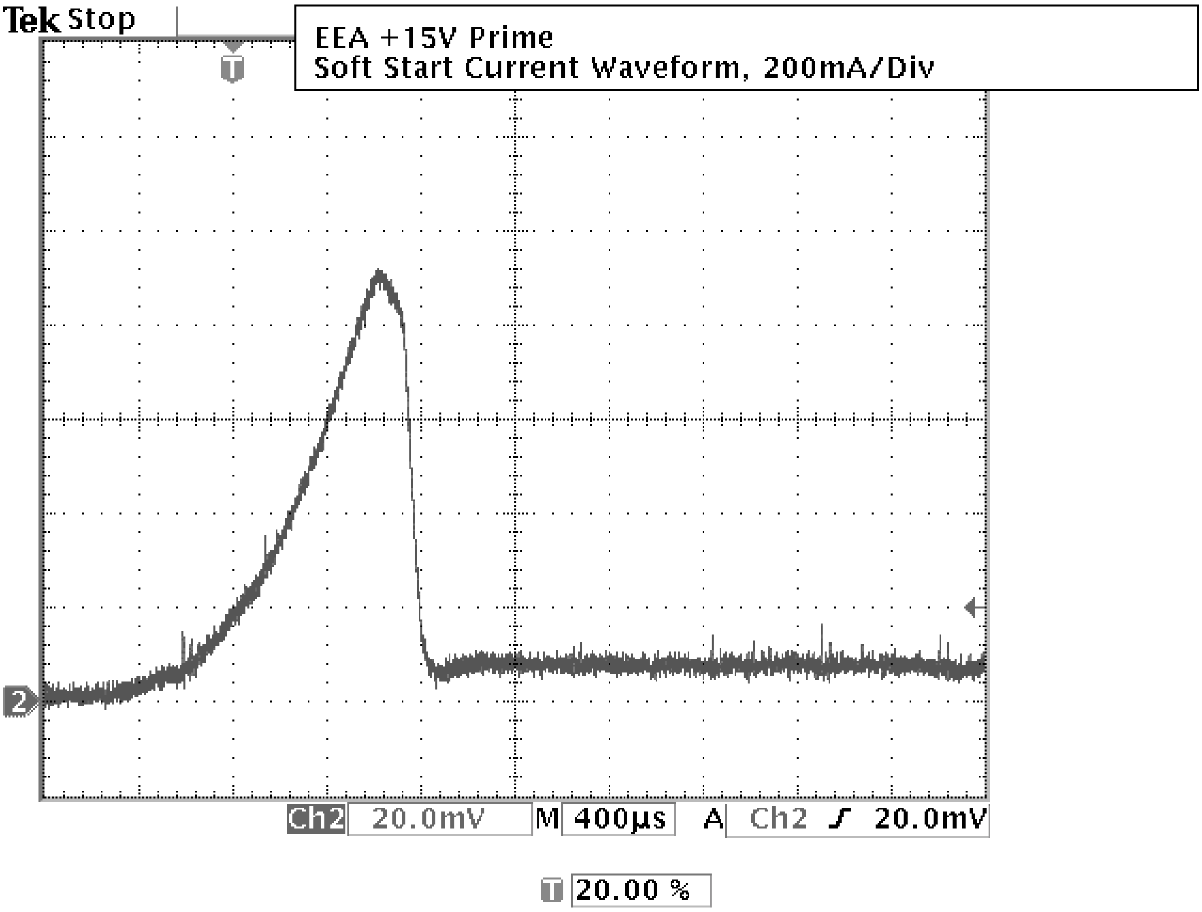
10.6 Waveform TEUAC4.BMP



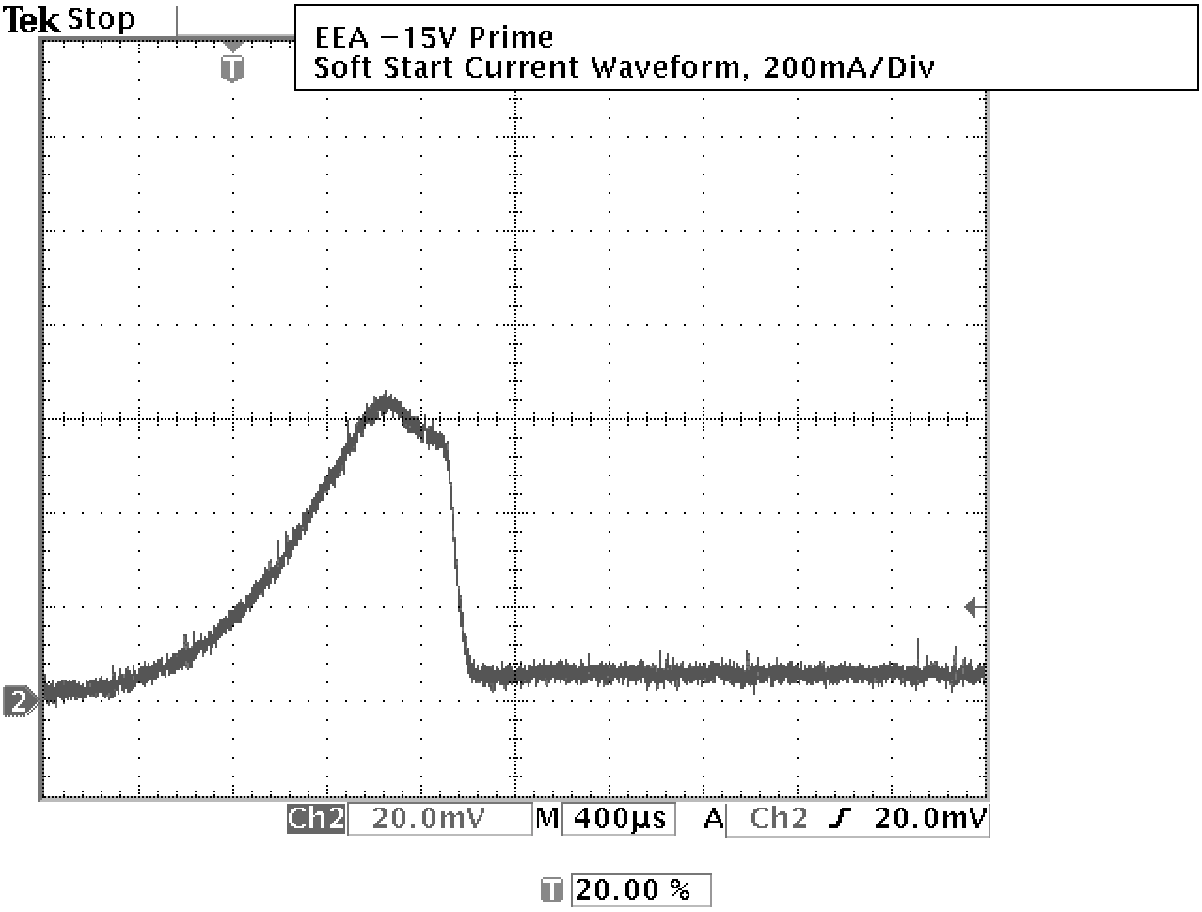
10.7 Waveform EEA5VPR.BMP



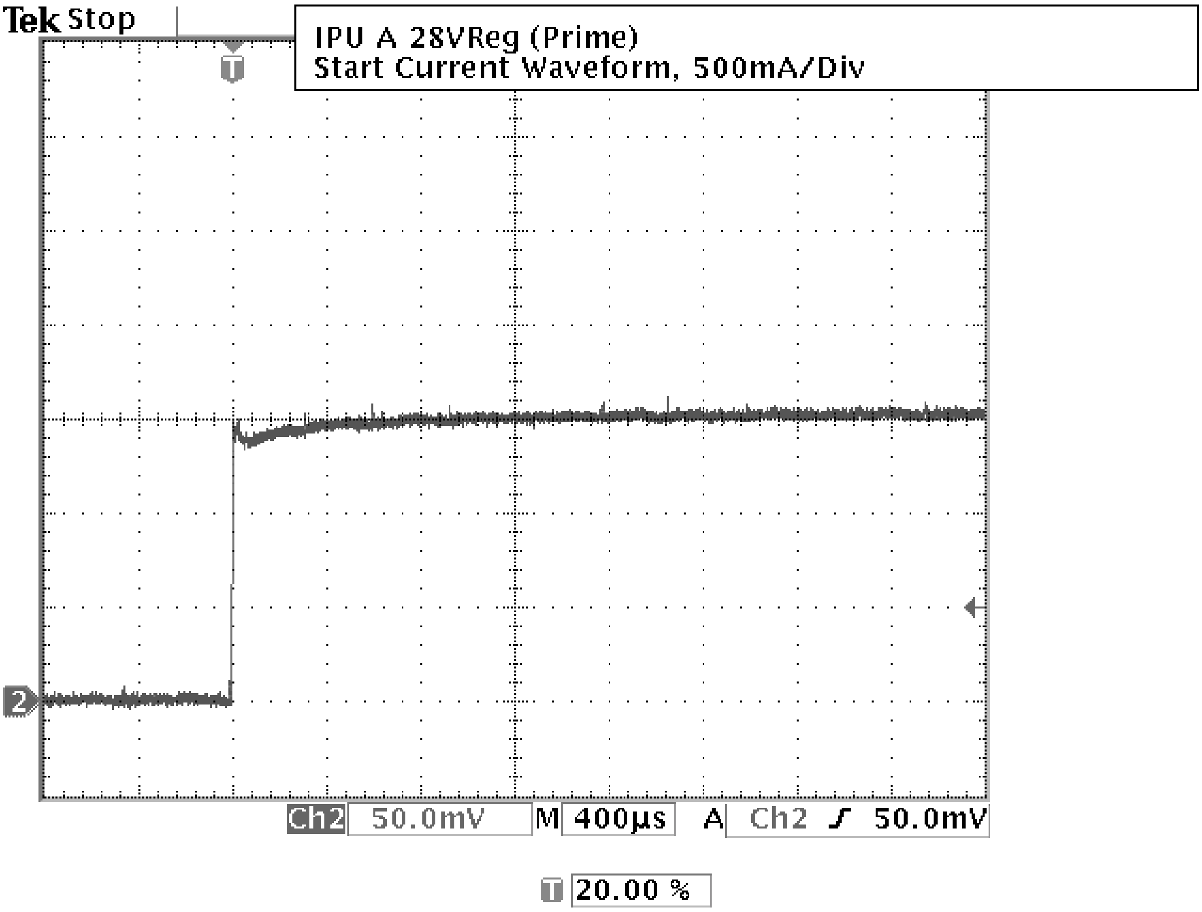
10.8 Waveform EEA15PPV.BMP



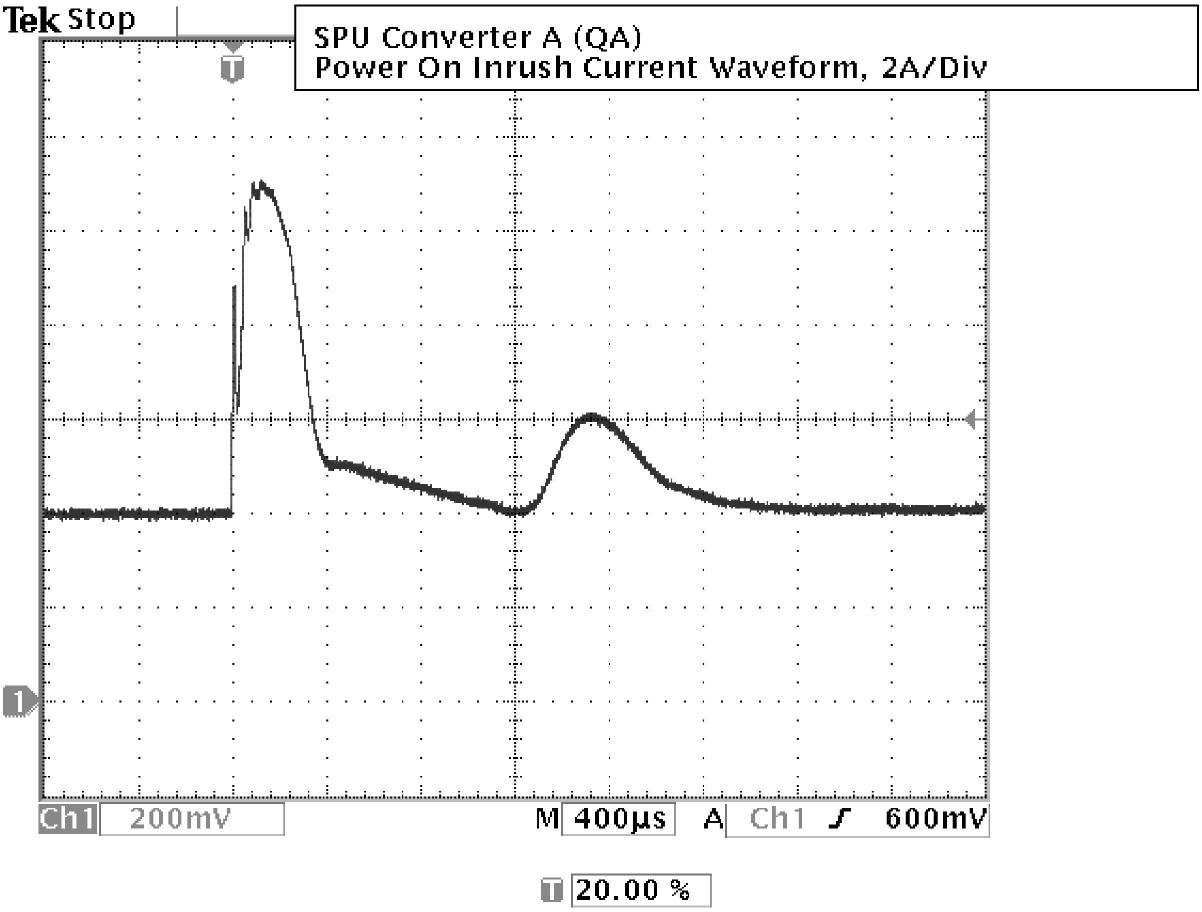
10.9 Waveform EEA15NPV.BMP



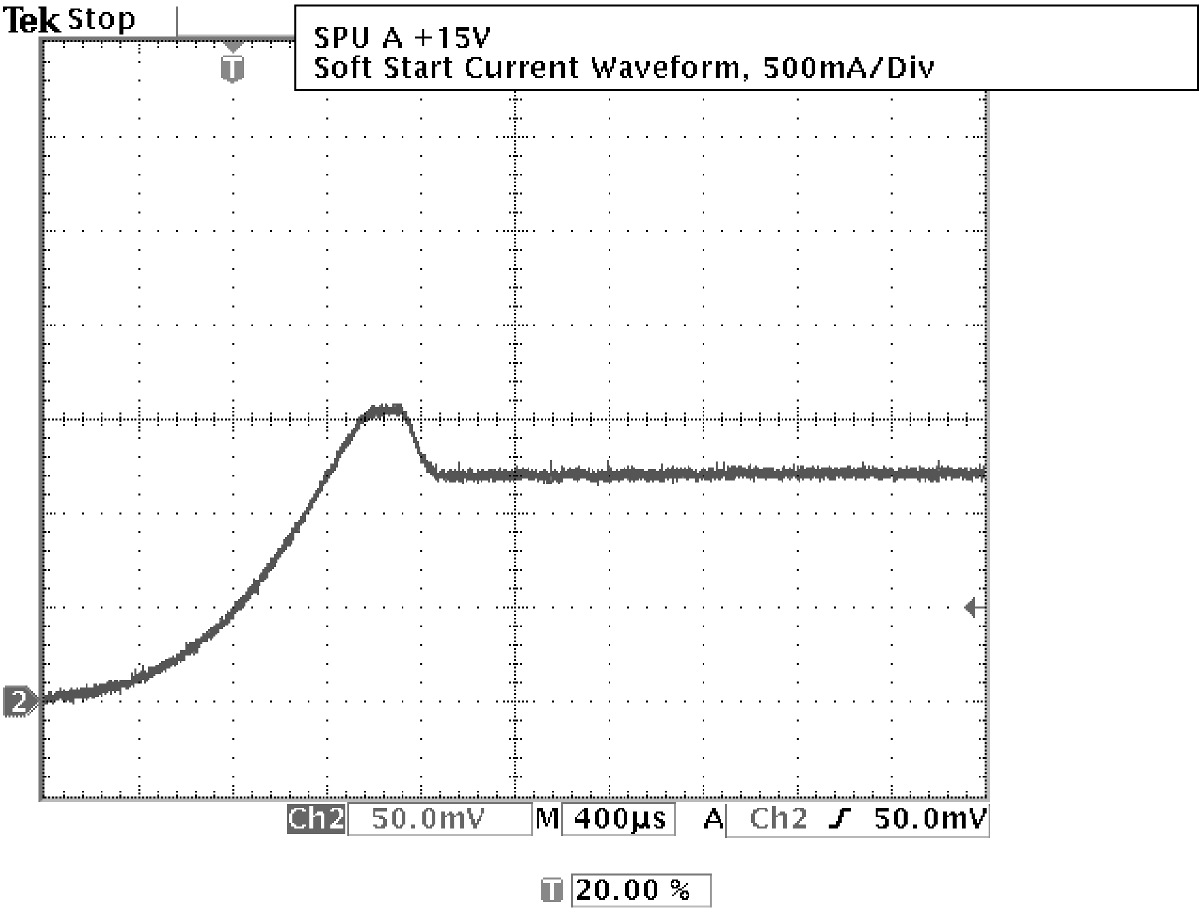
10.10 Waveform IPUA1.BMP



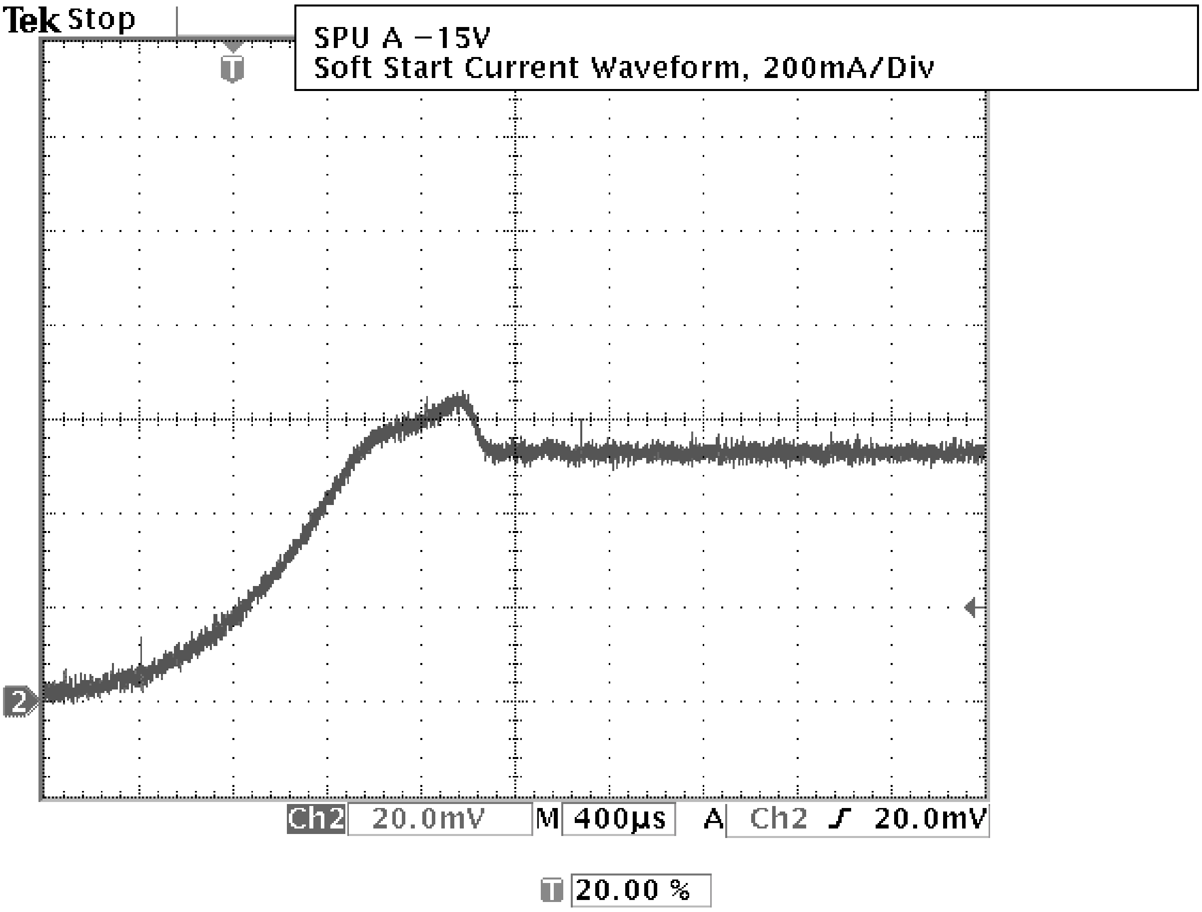
10.11 Waveform SPUAQA.BMP



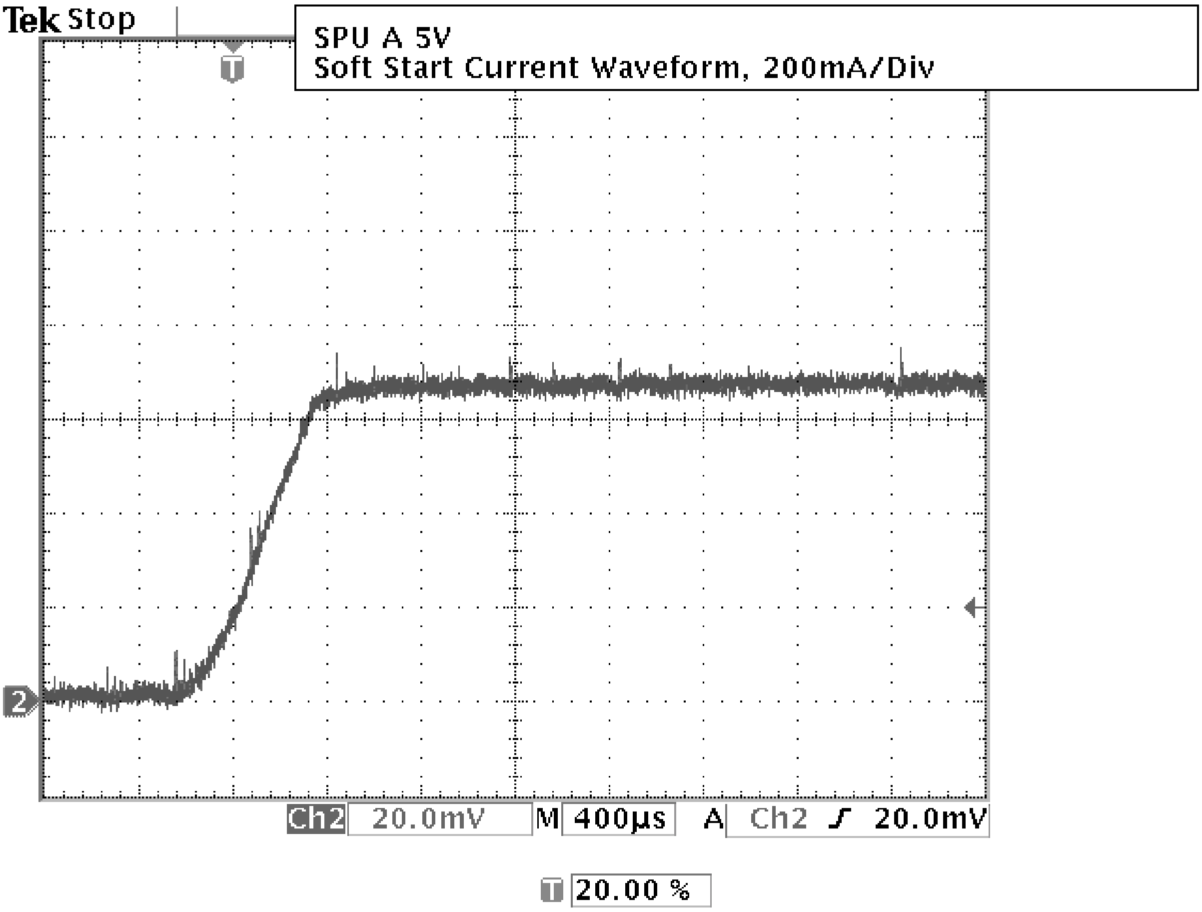
10.12 Waveform SPUAC15P.BMP



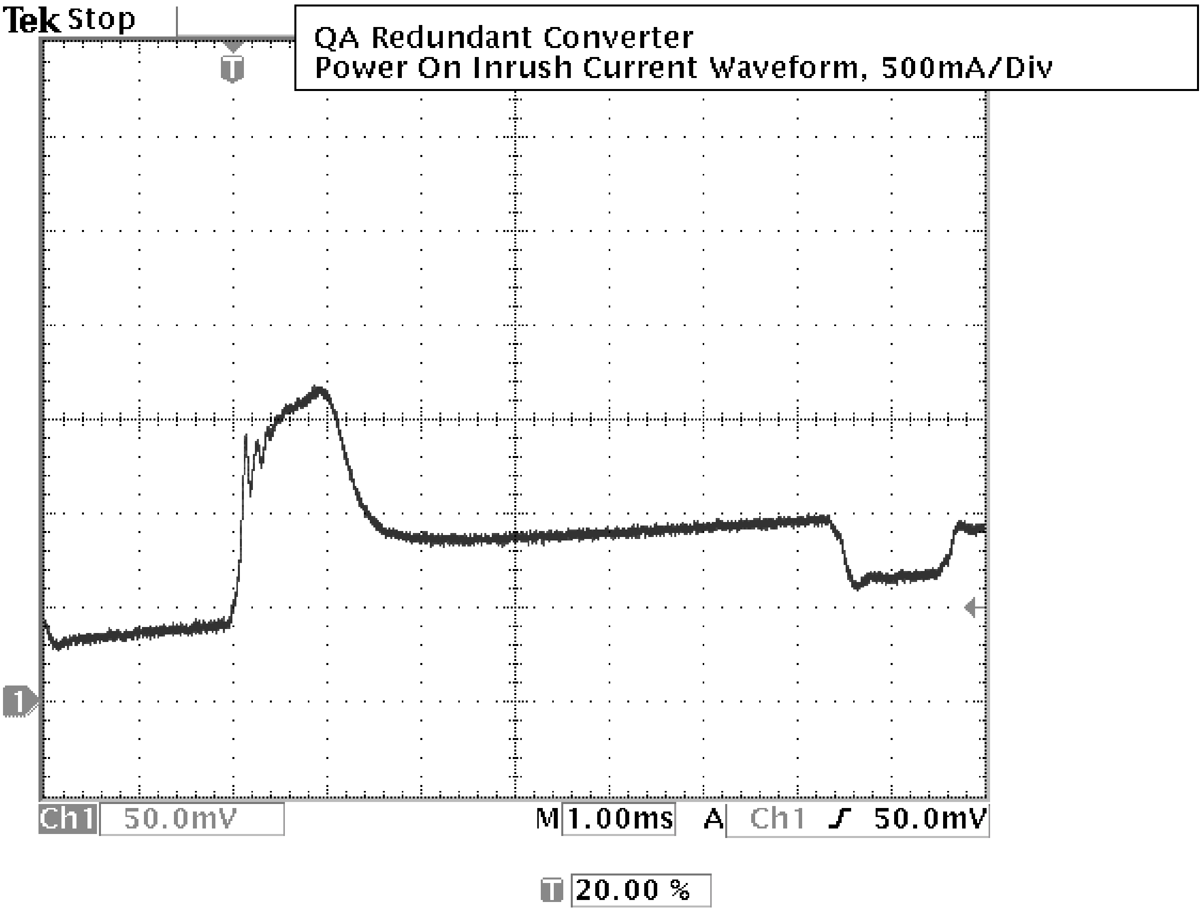
10.13 Waveform SPUAC15N.BMP



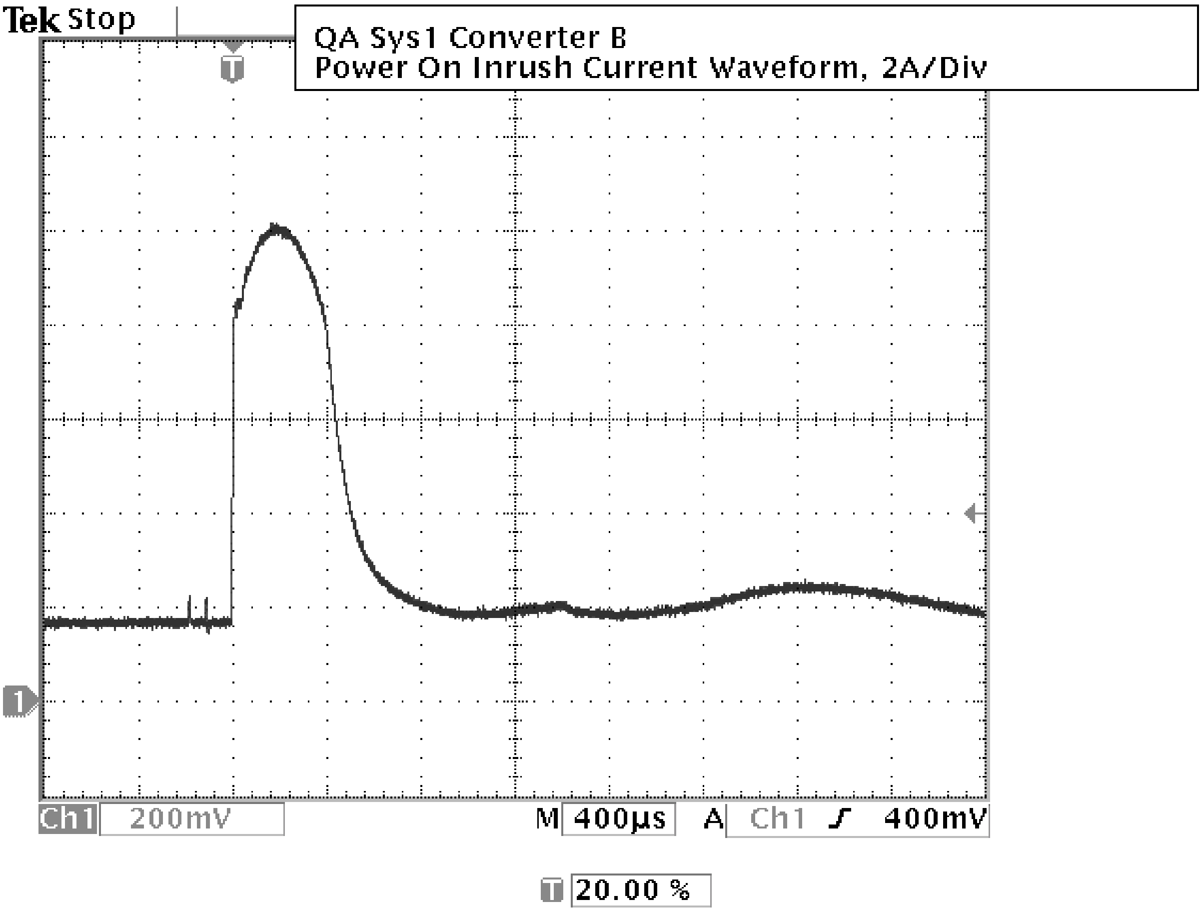
10.14 Waveform SPUAC5P.BMP



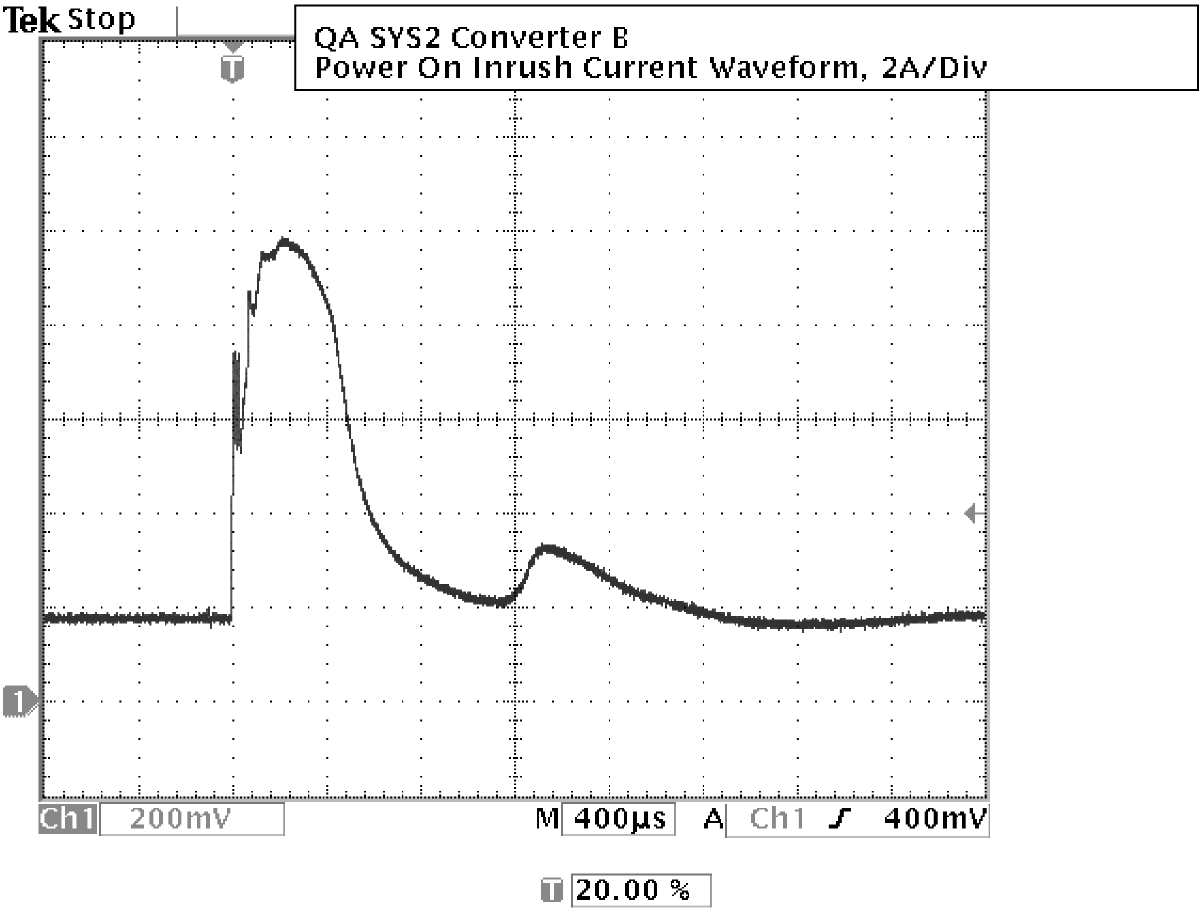
10.15 Waveform INRUSHAR.BMP



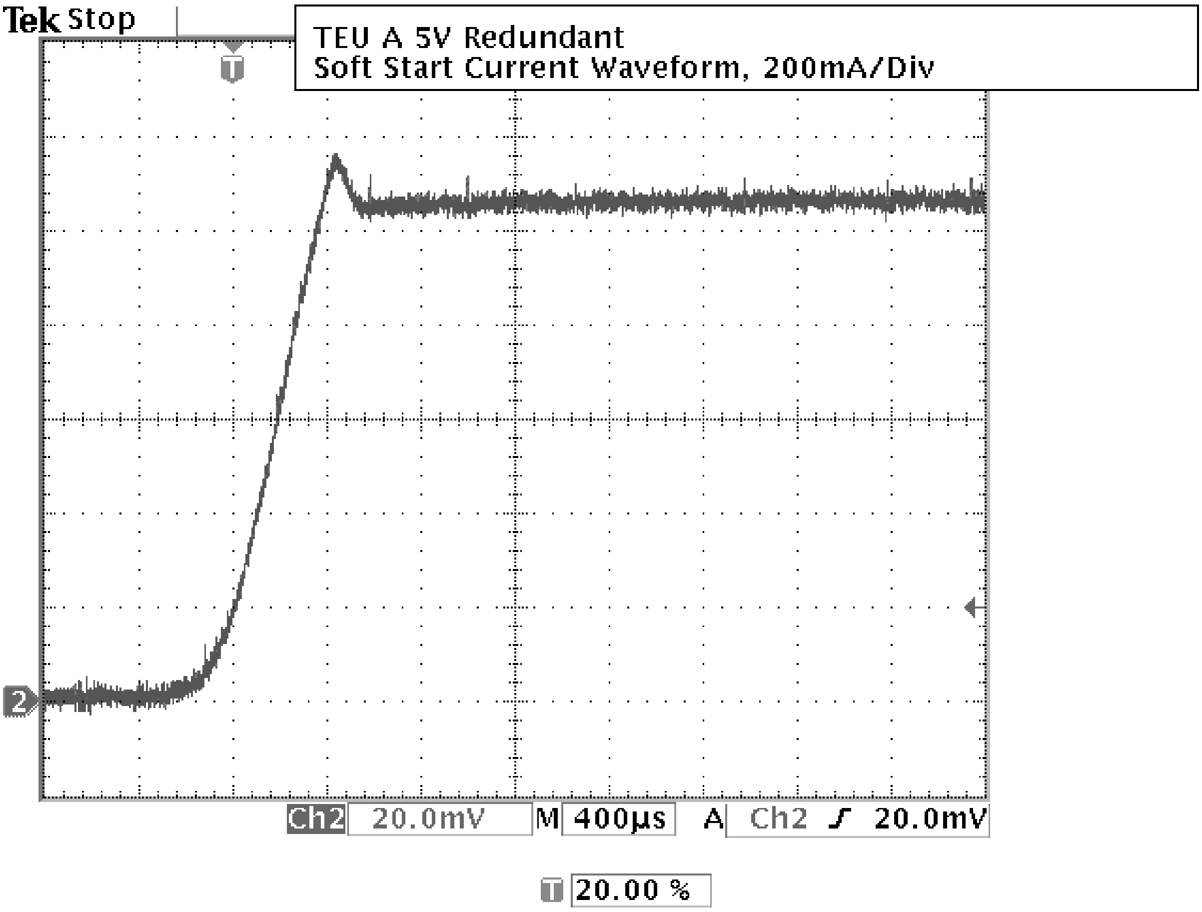
10.16 Waveform SYS1BQA.BMP



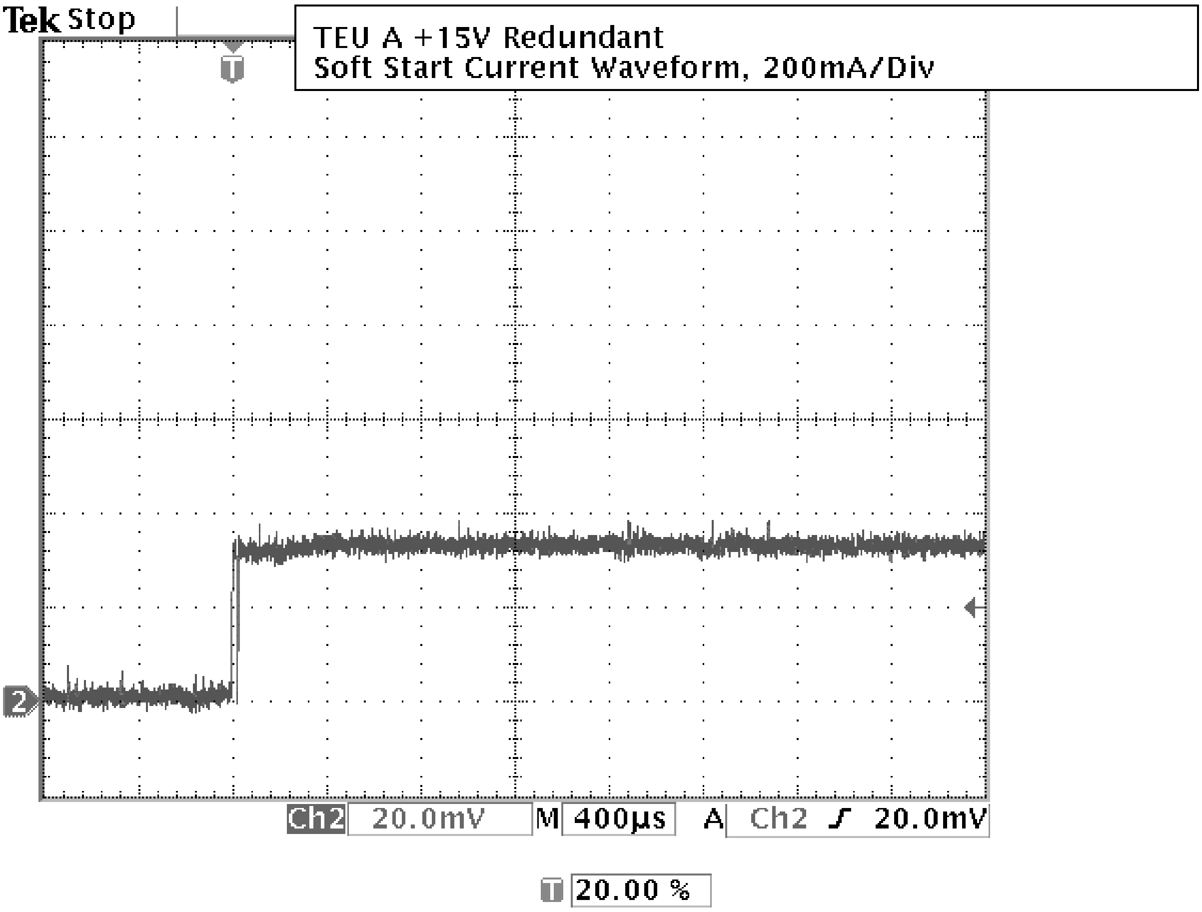
10.17 Waveform SYS2BQA.BMP



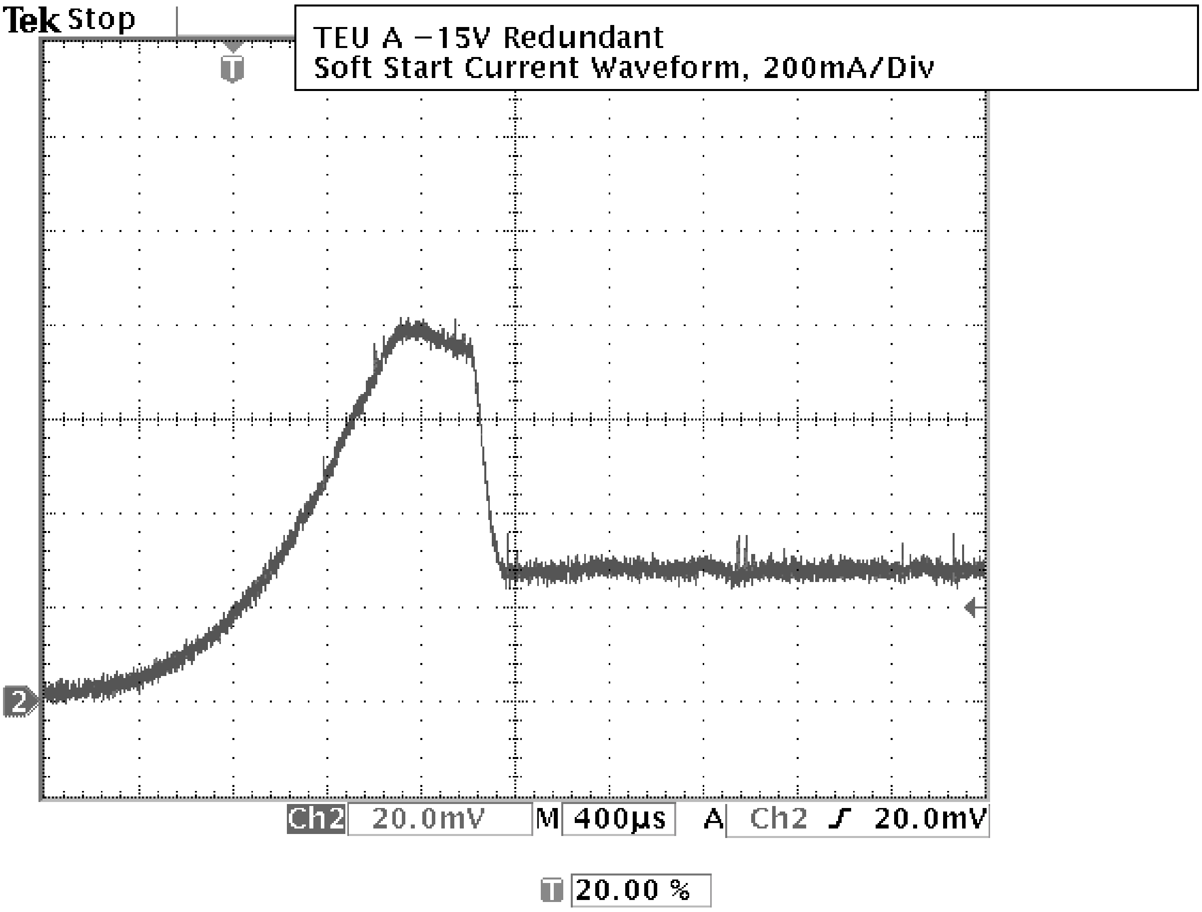
10.18 Waveform TEUAC6.BMP



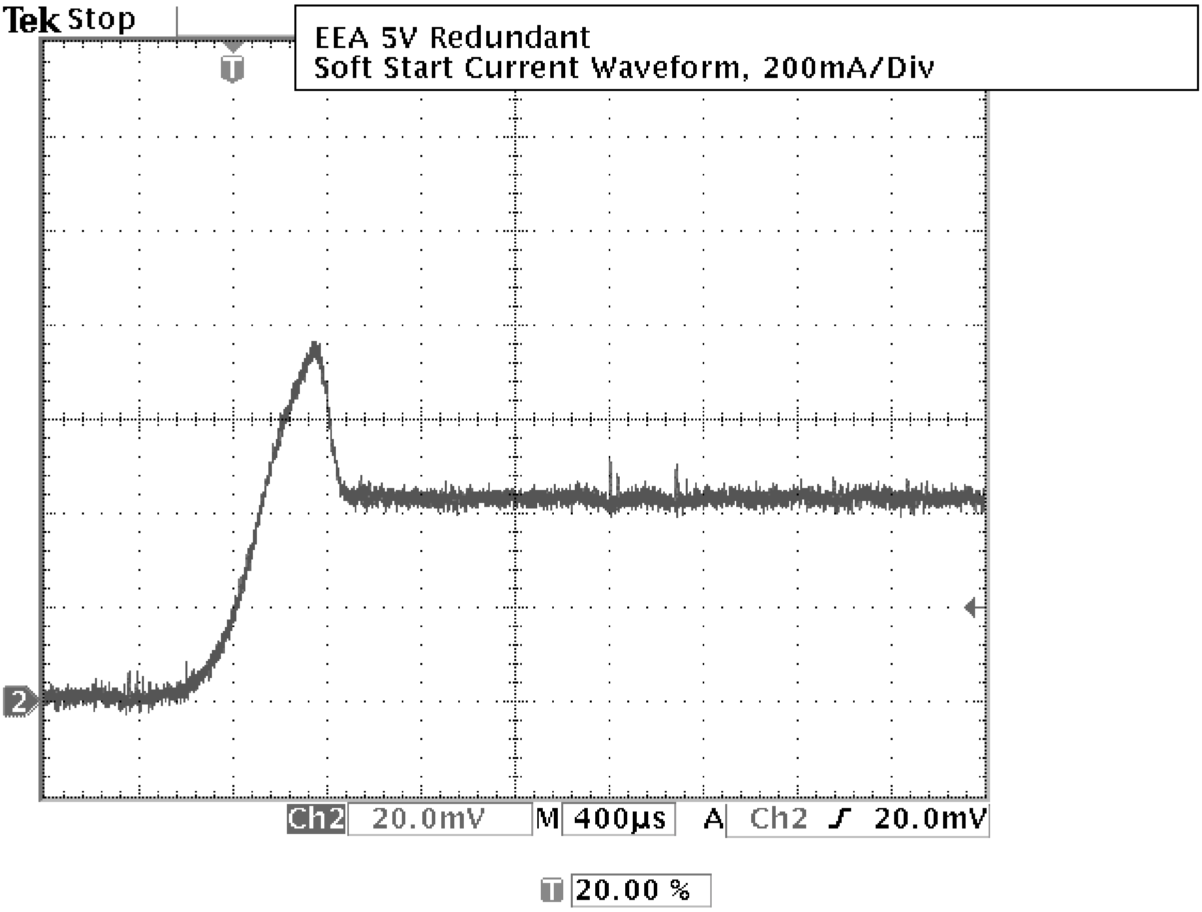
10.19 Waveform TEUAC7.BMP



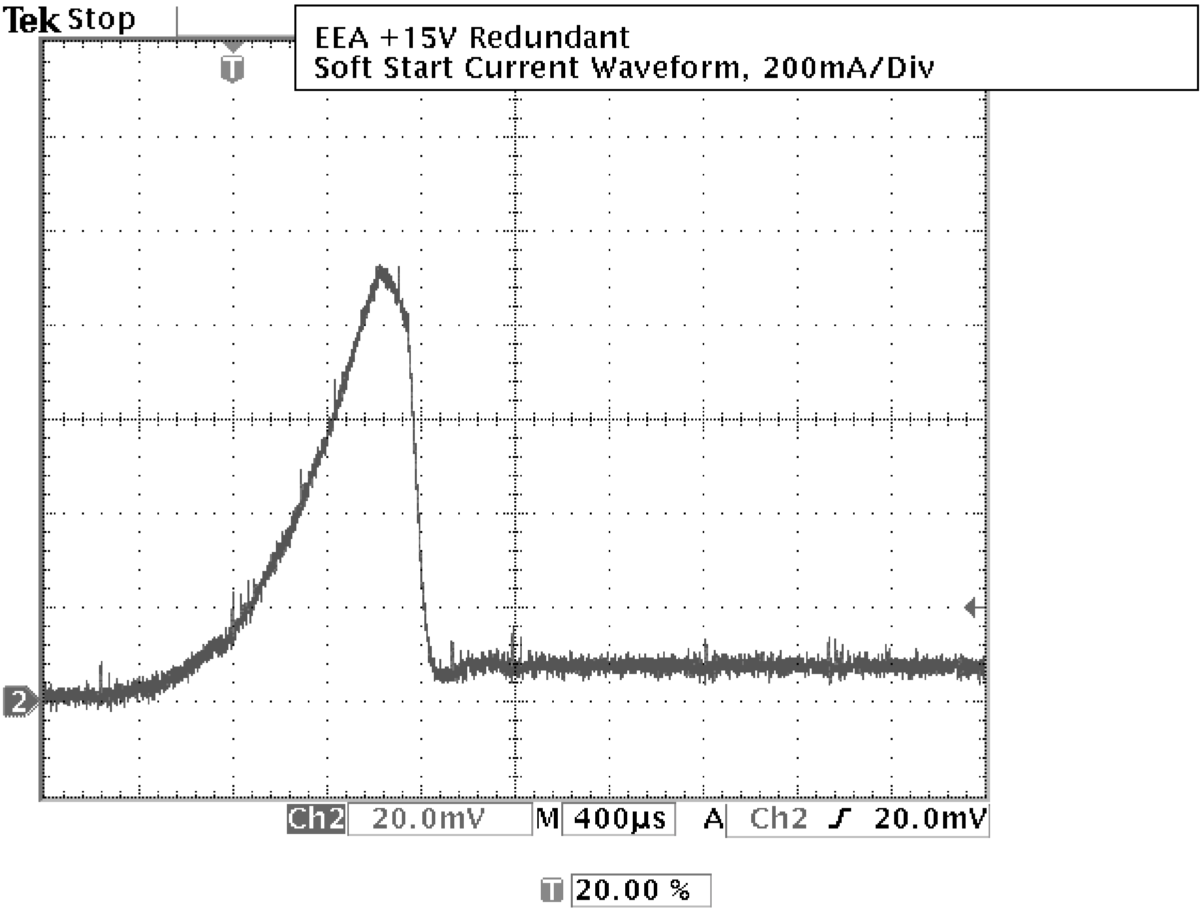
10.20 Waveform TEUAC8.BMP



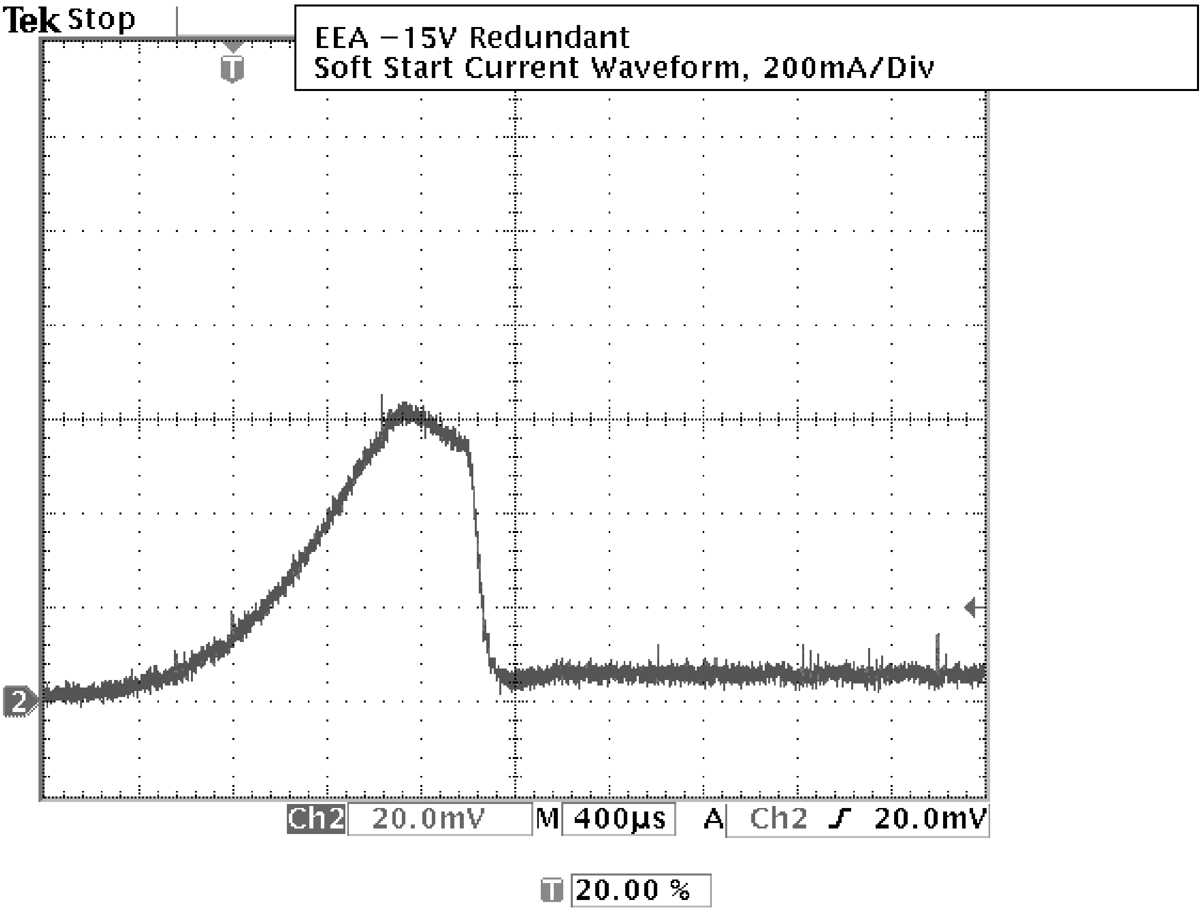
10.21 Waveform EEA5VR.BMP



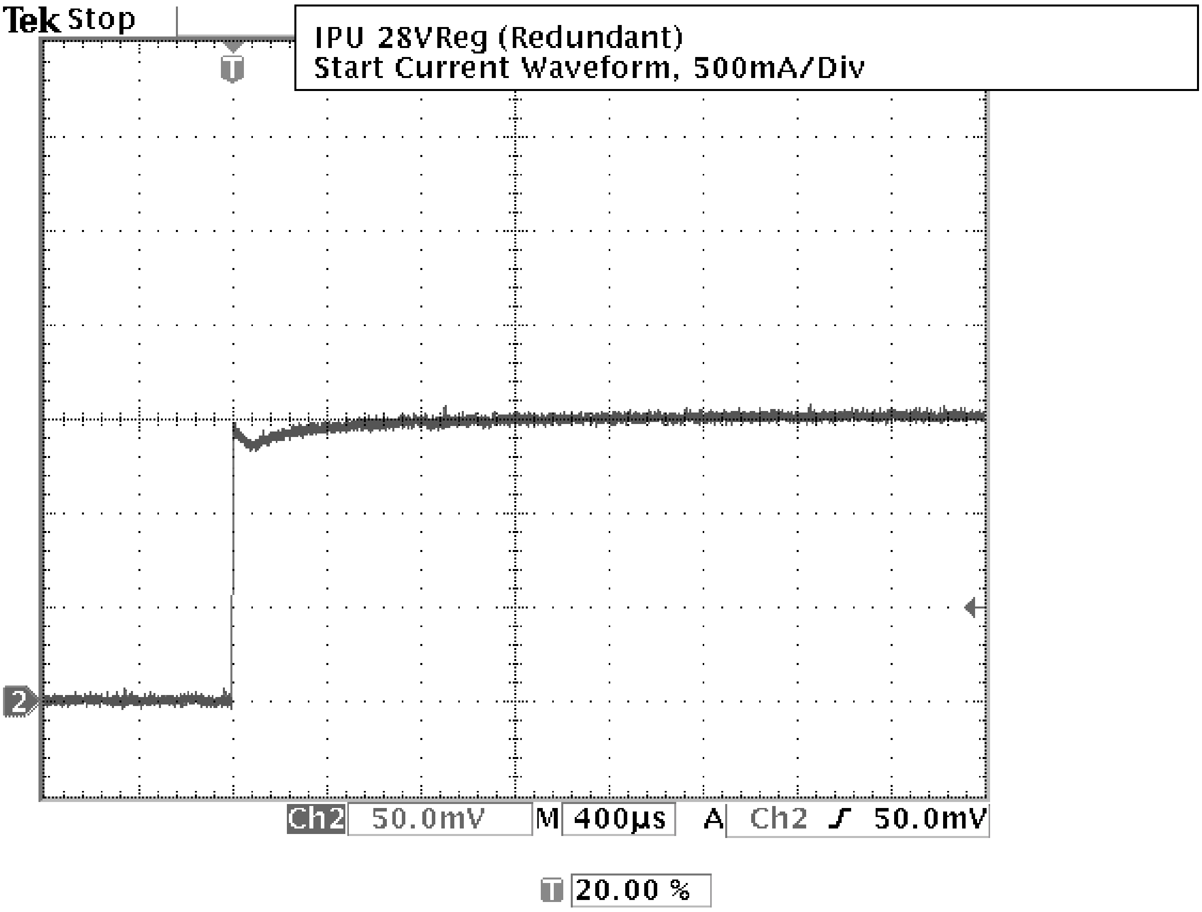
10.22 Waveform EEA15PRV.BMP



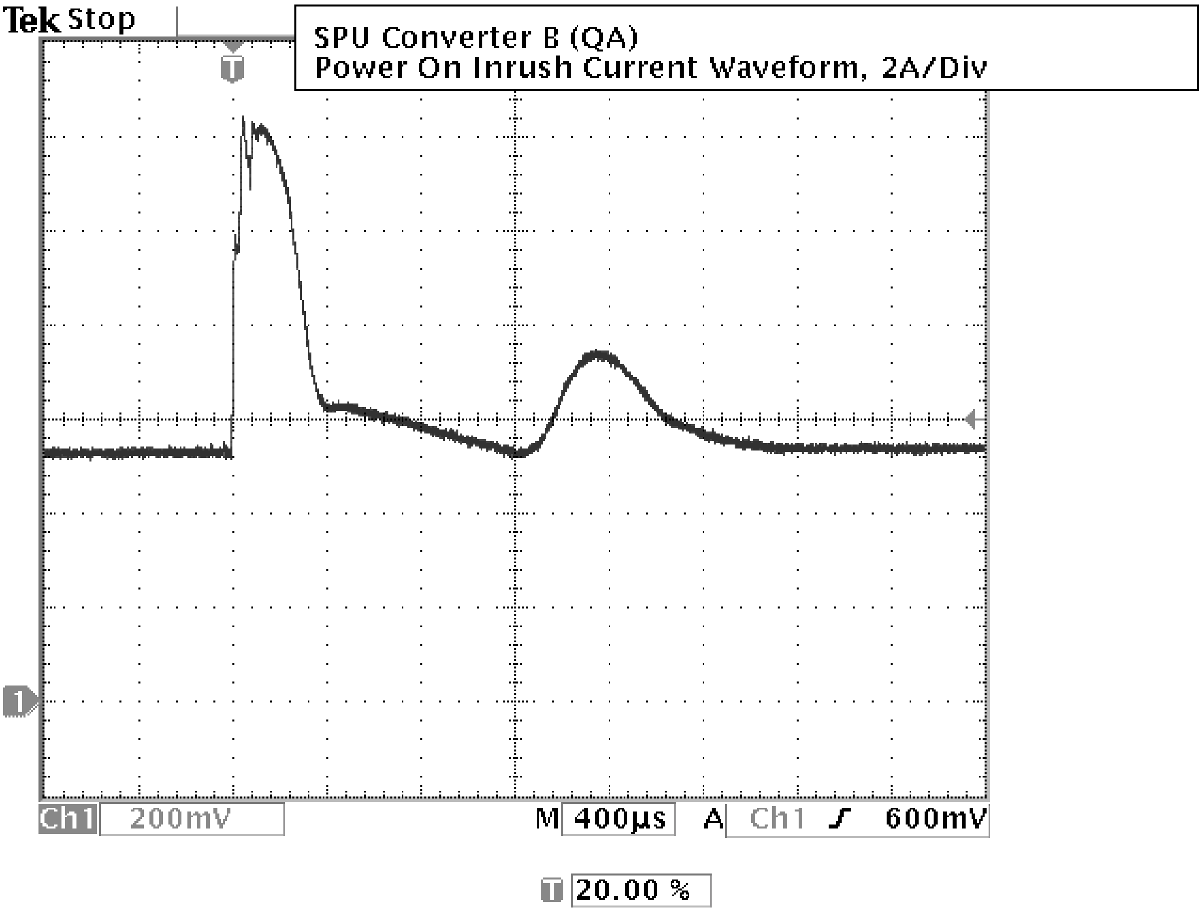
10.23 Waveform EEA15NRV.BMP



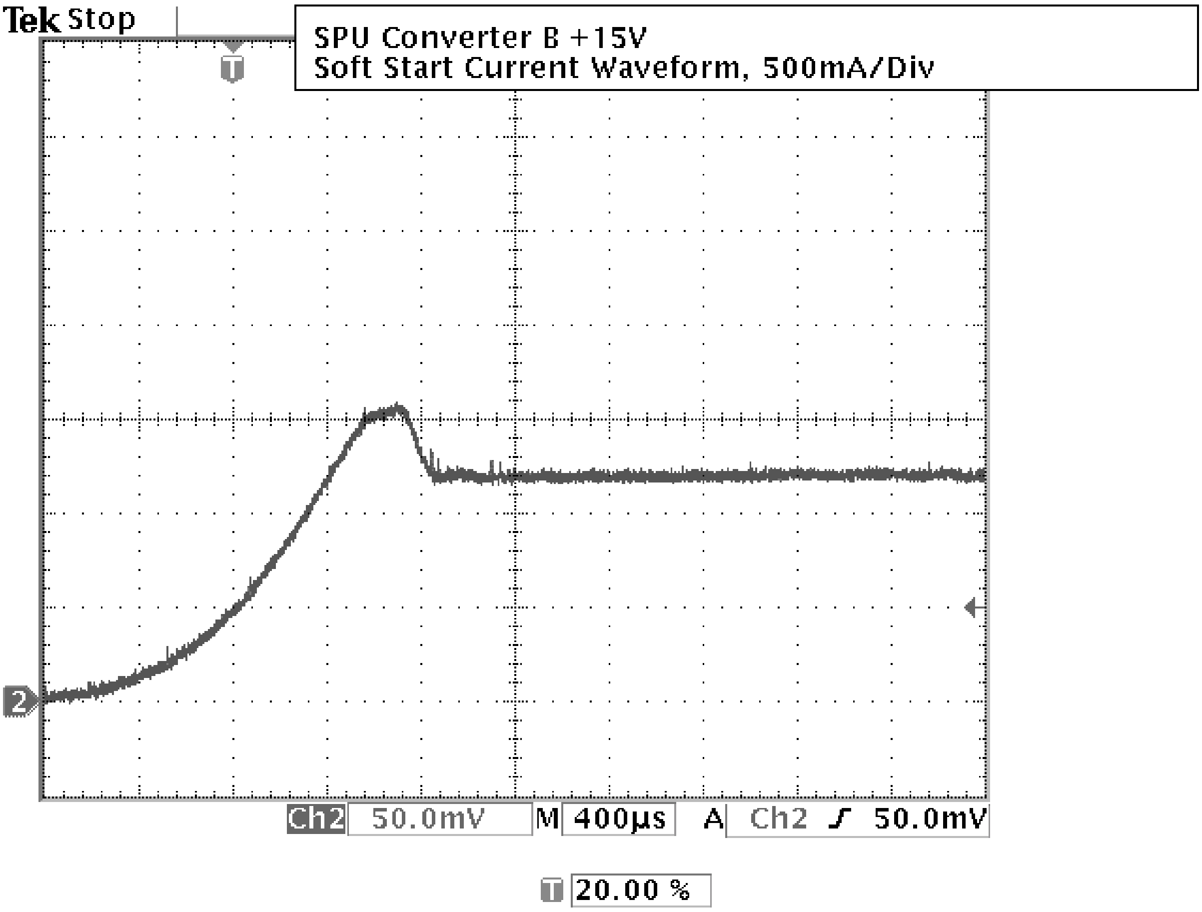
10.24 Waveform IPUA2.BMP



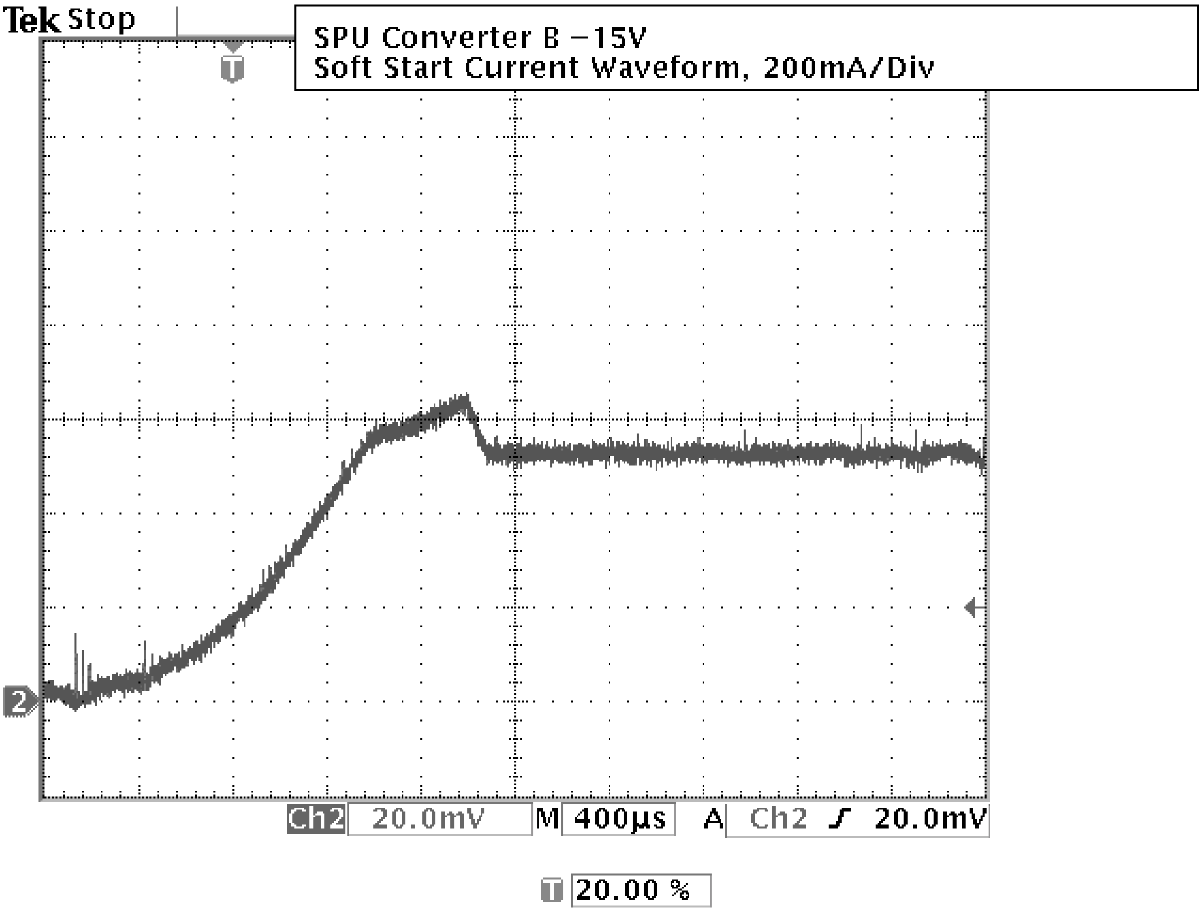
10.25 Waveform SPUBQA.BMP



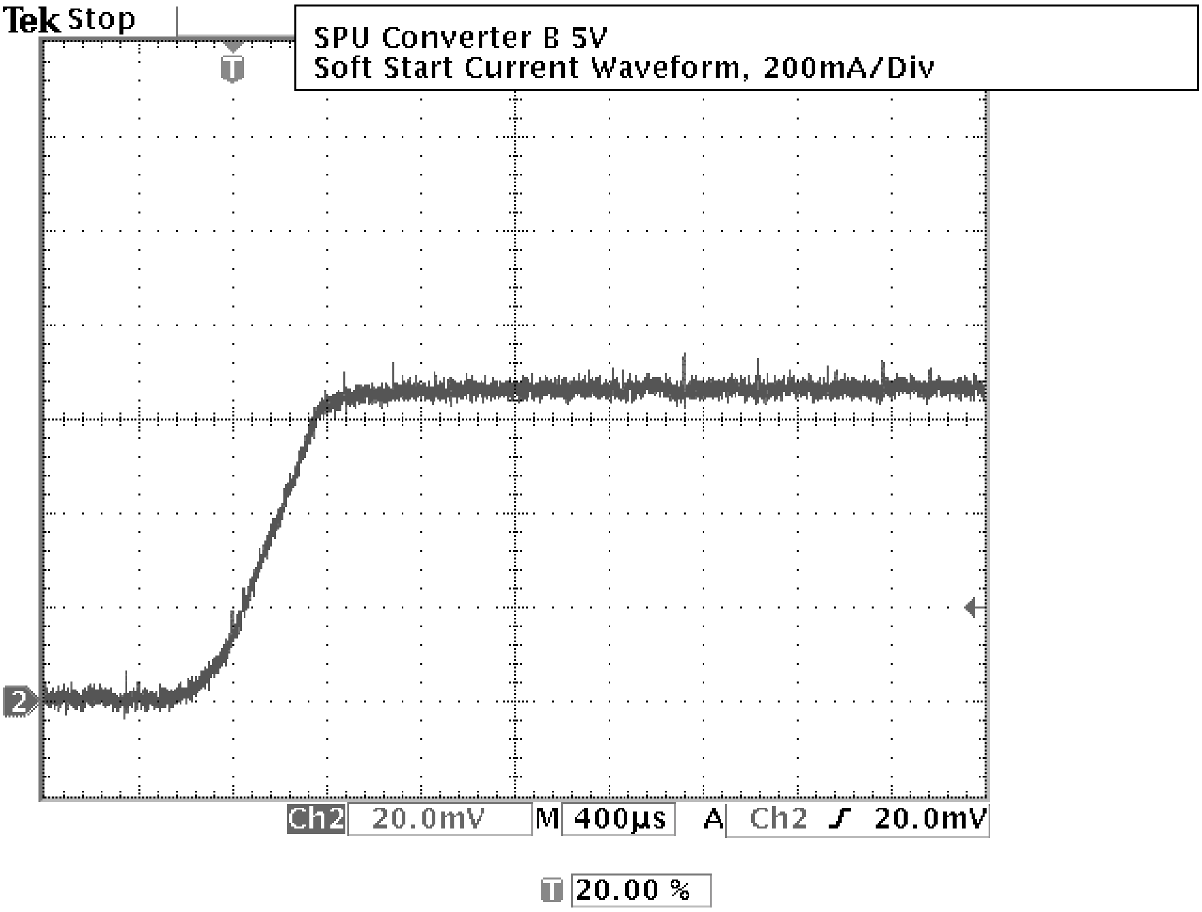
10.26 Waveform SPUBC15P.BMP



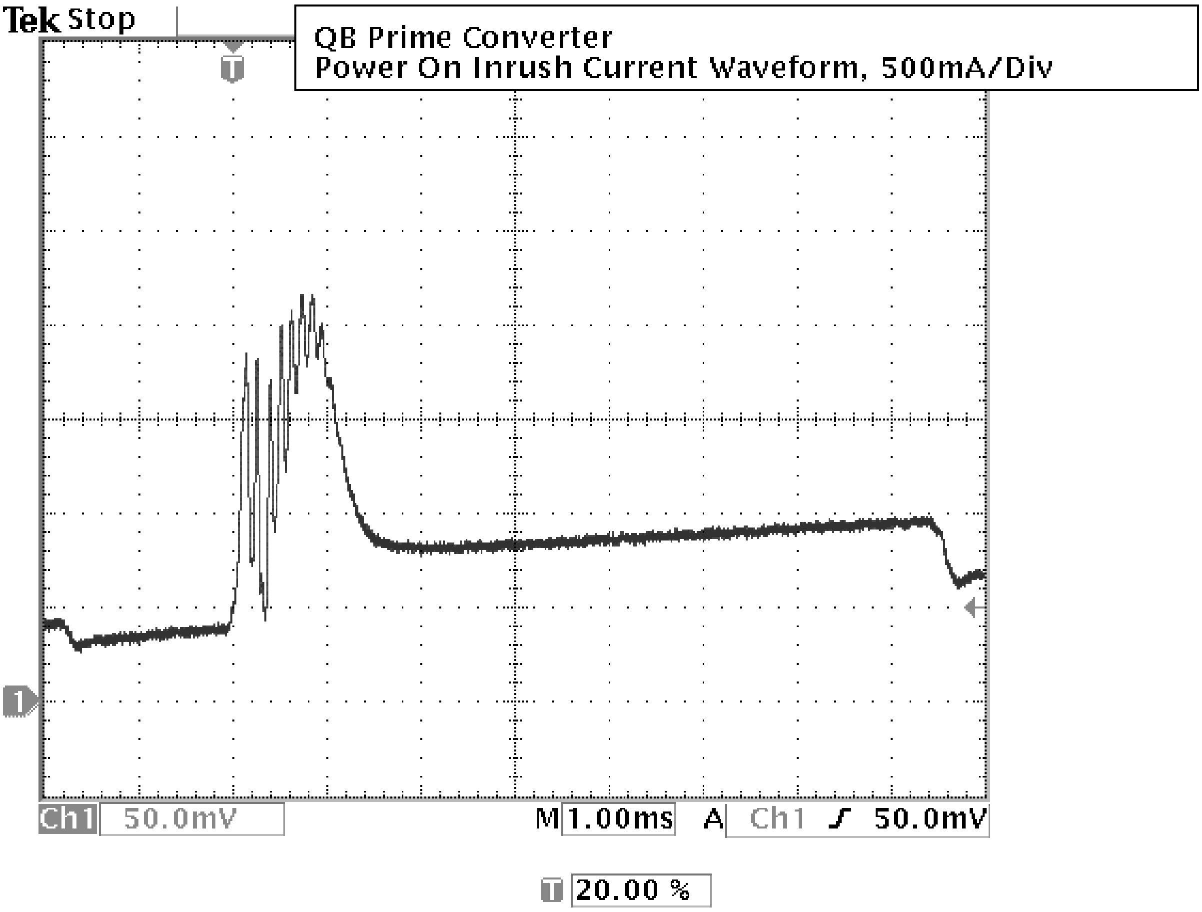
10.27 Waveform SPUBC15N.BMP



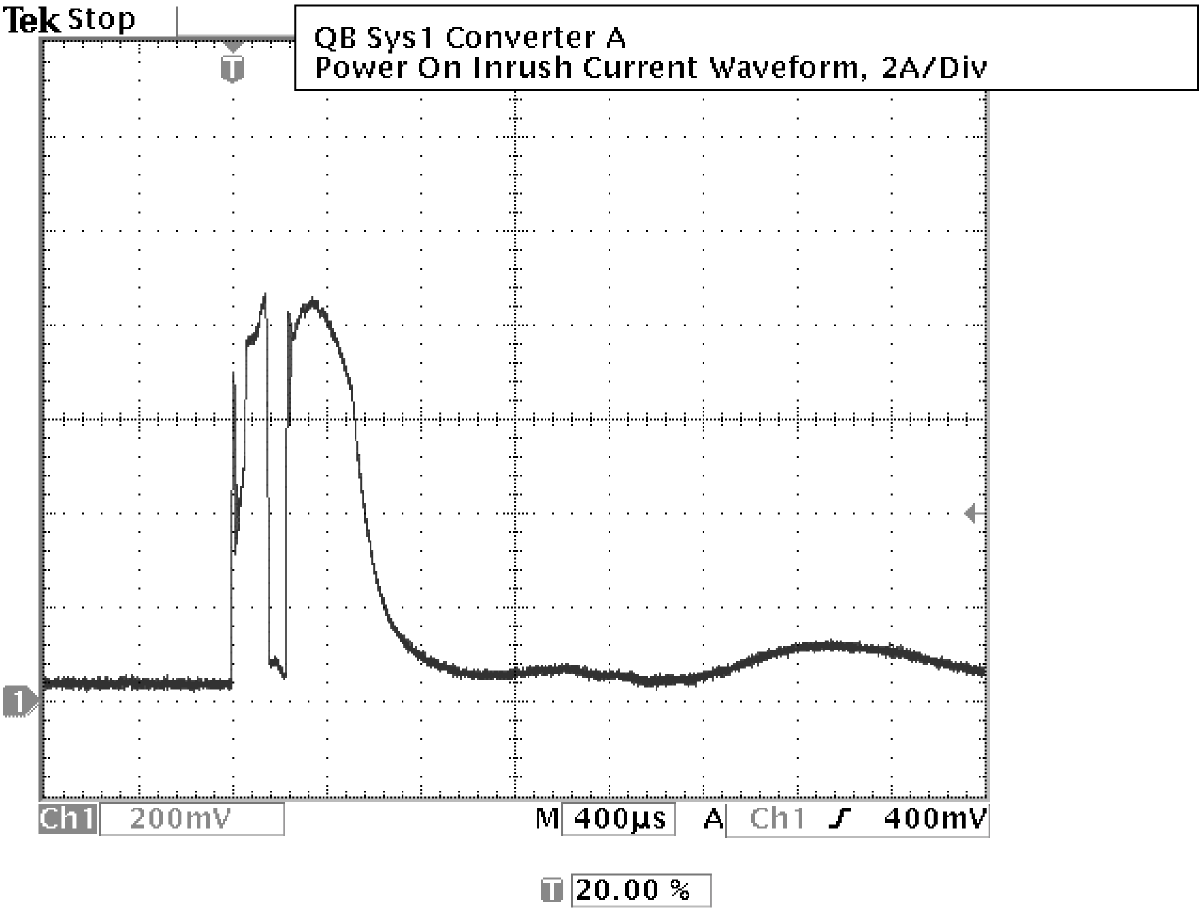
10.28 Waveform SPUBC5.BMP



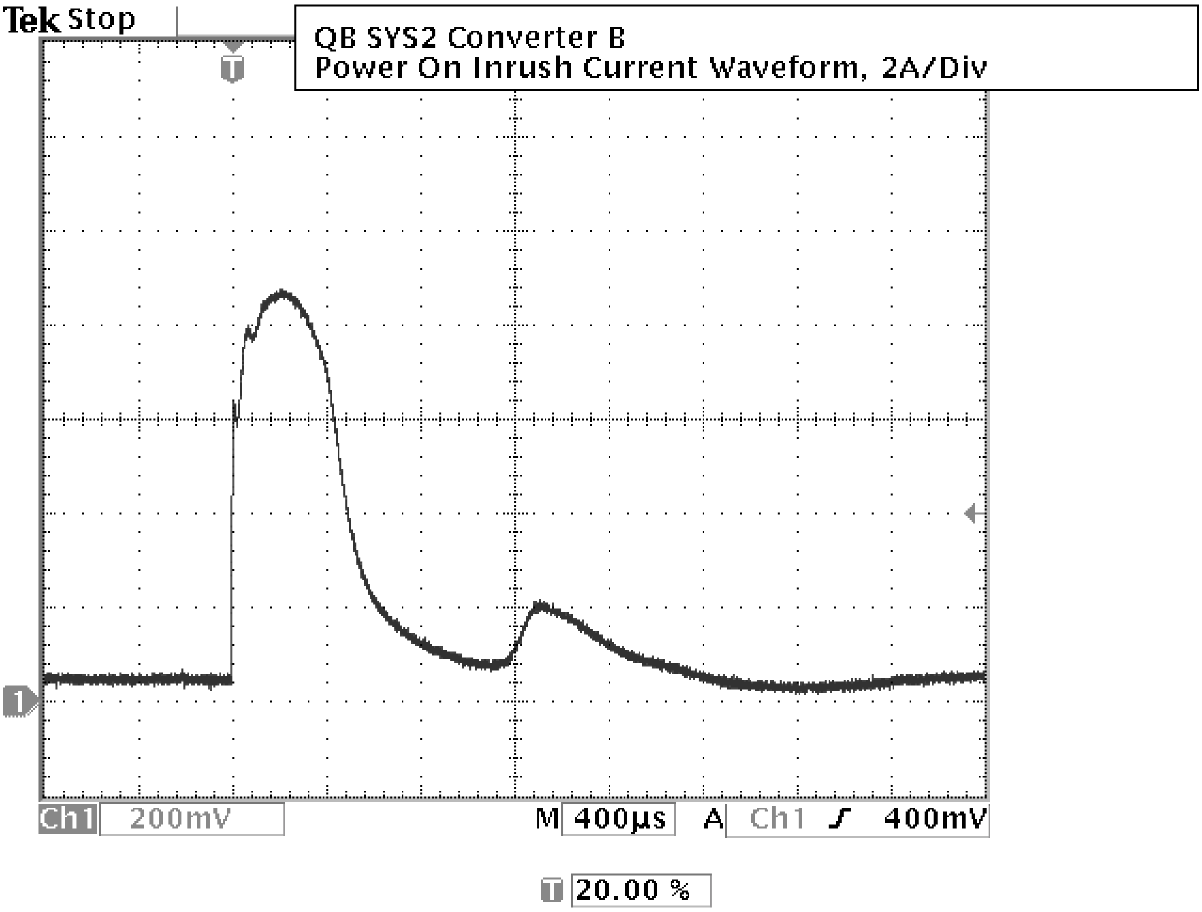
10.29 Waveform INRUSHBP.BMP



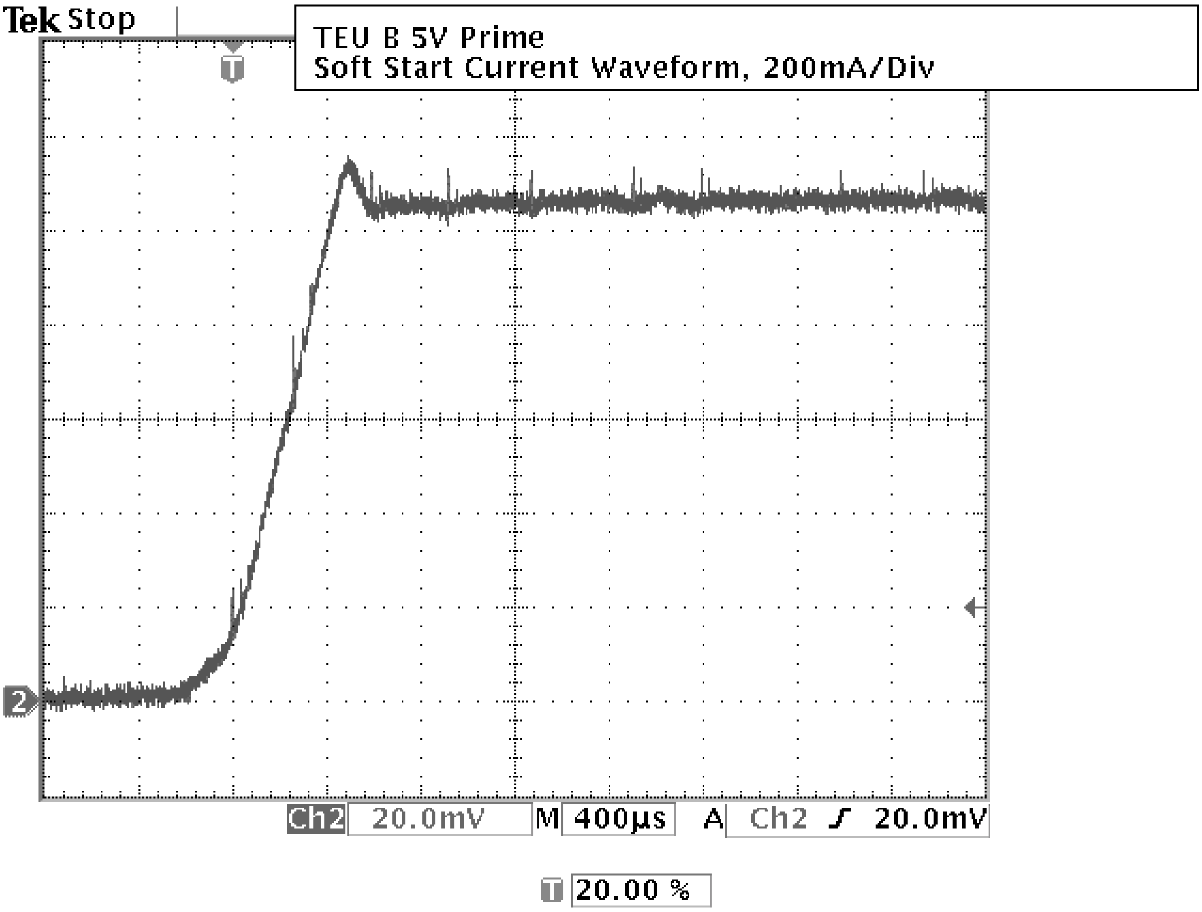
10.30 Waveform SYS1AQB.BMP



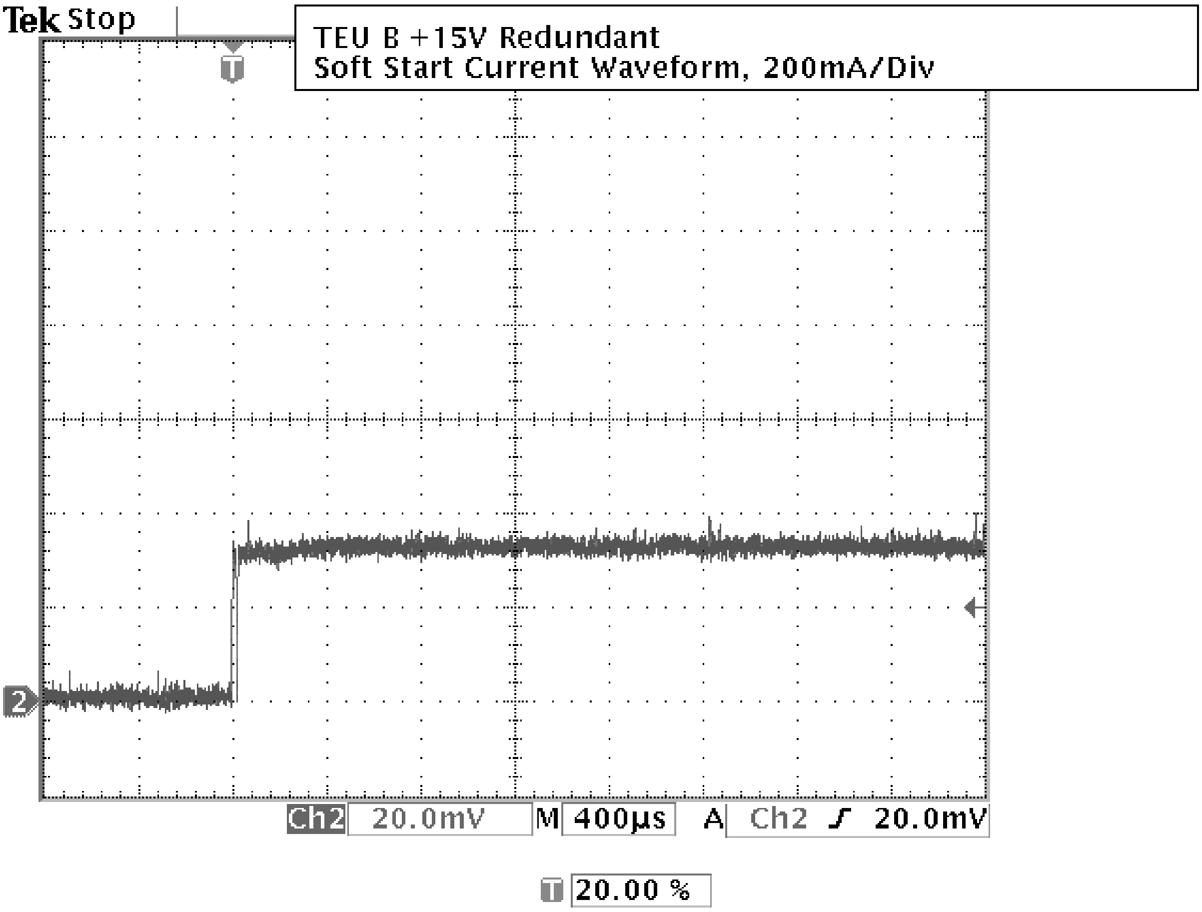
10.31 Waveform SYS2BQB.BMP



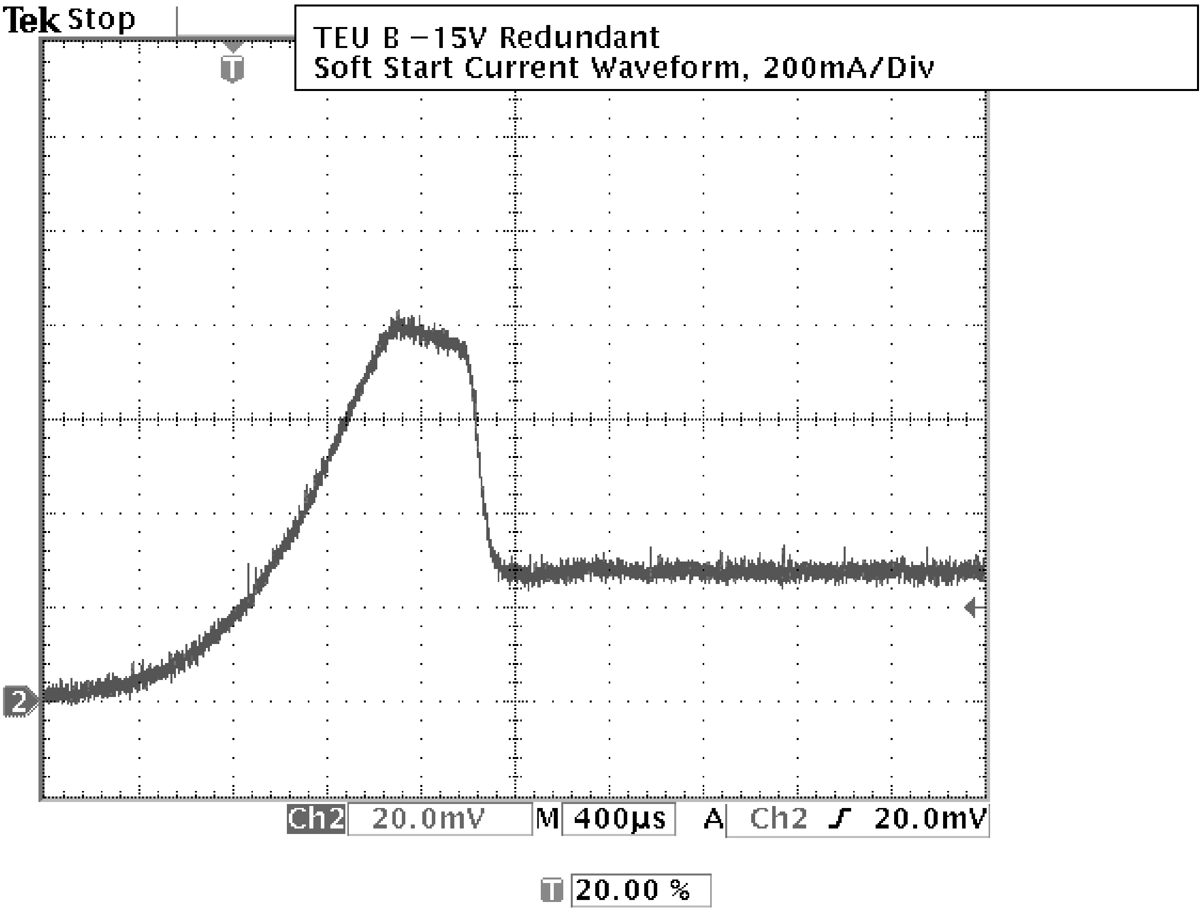
10.32 Waveform TEUBC2.BMP



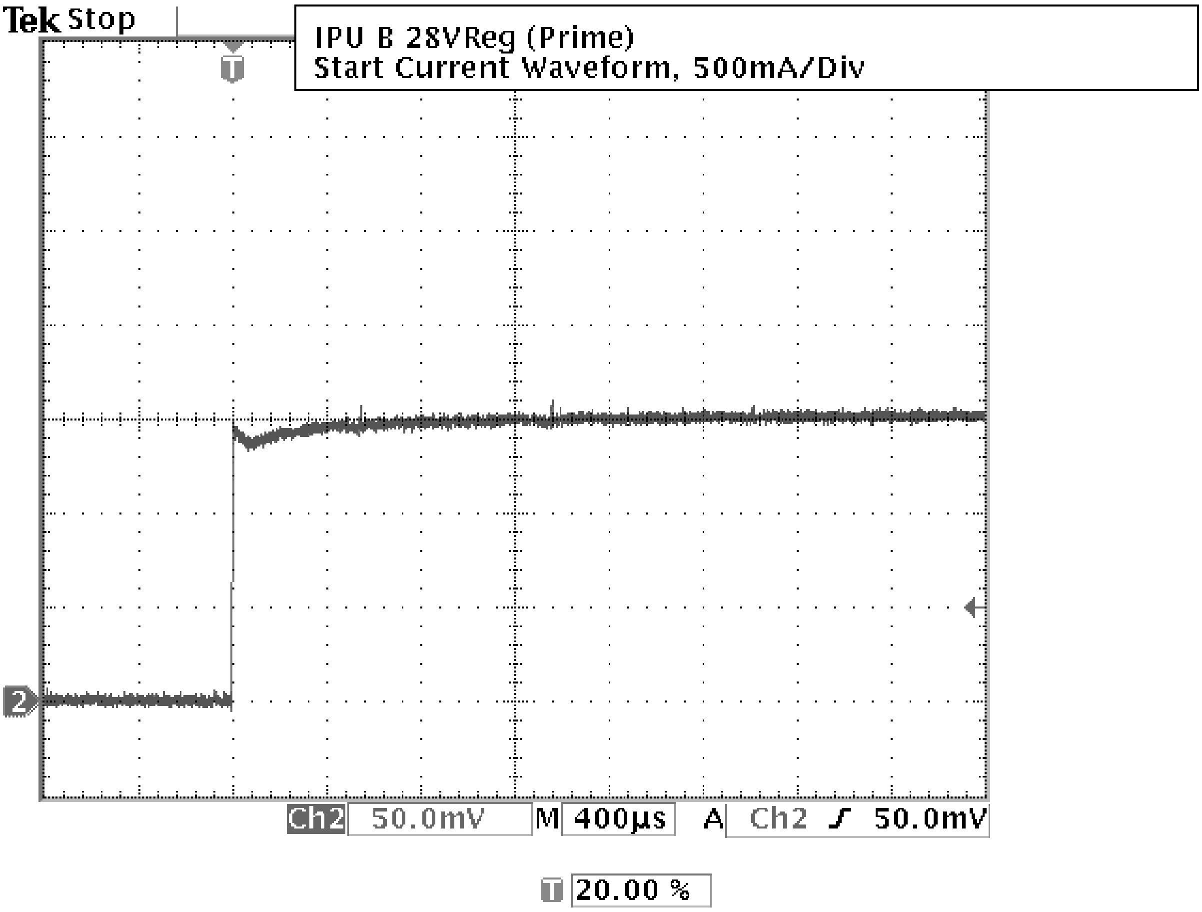
10.33 Waveform TEUBC3.BMP



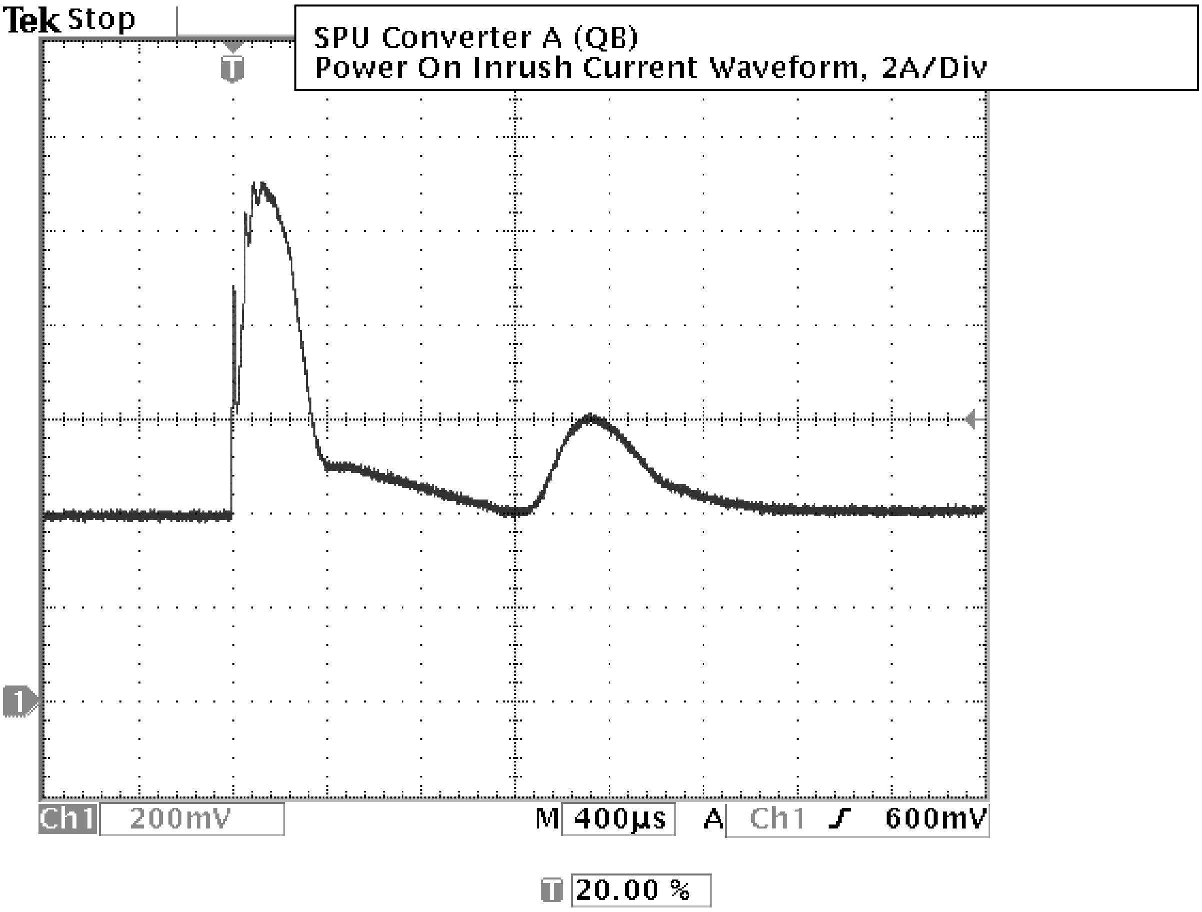
10.34 Waveform TEUBC4.BMP



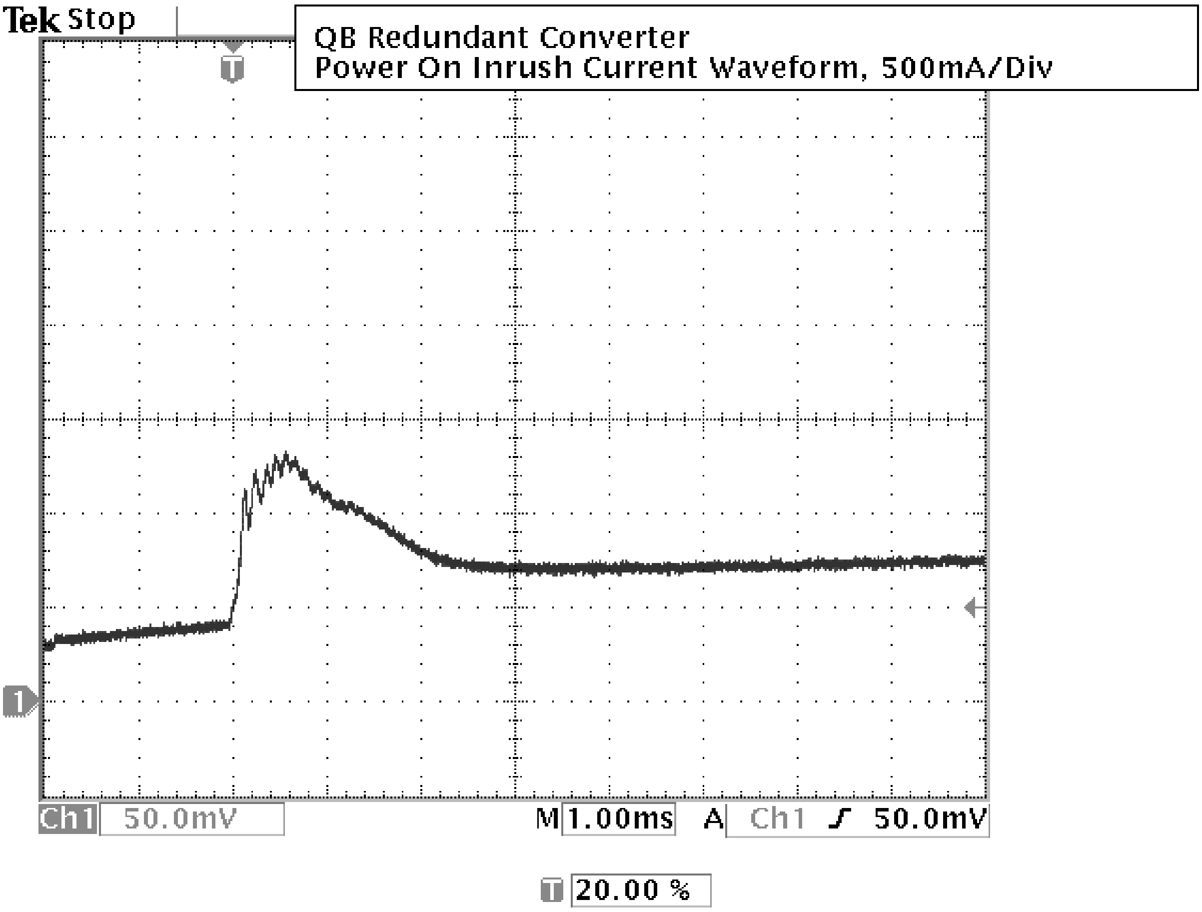
10.35 Waveform IPUB1.BMP



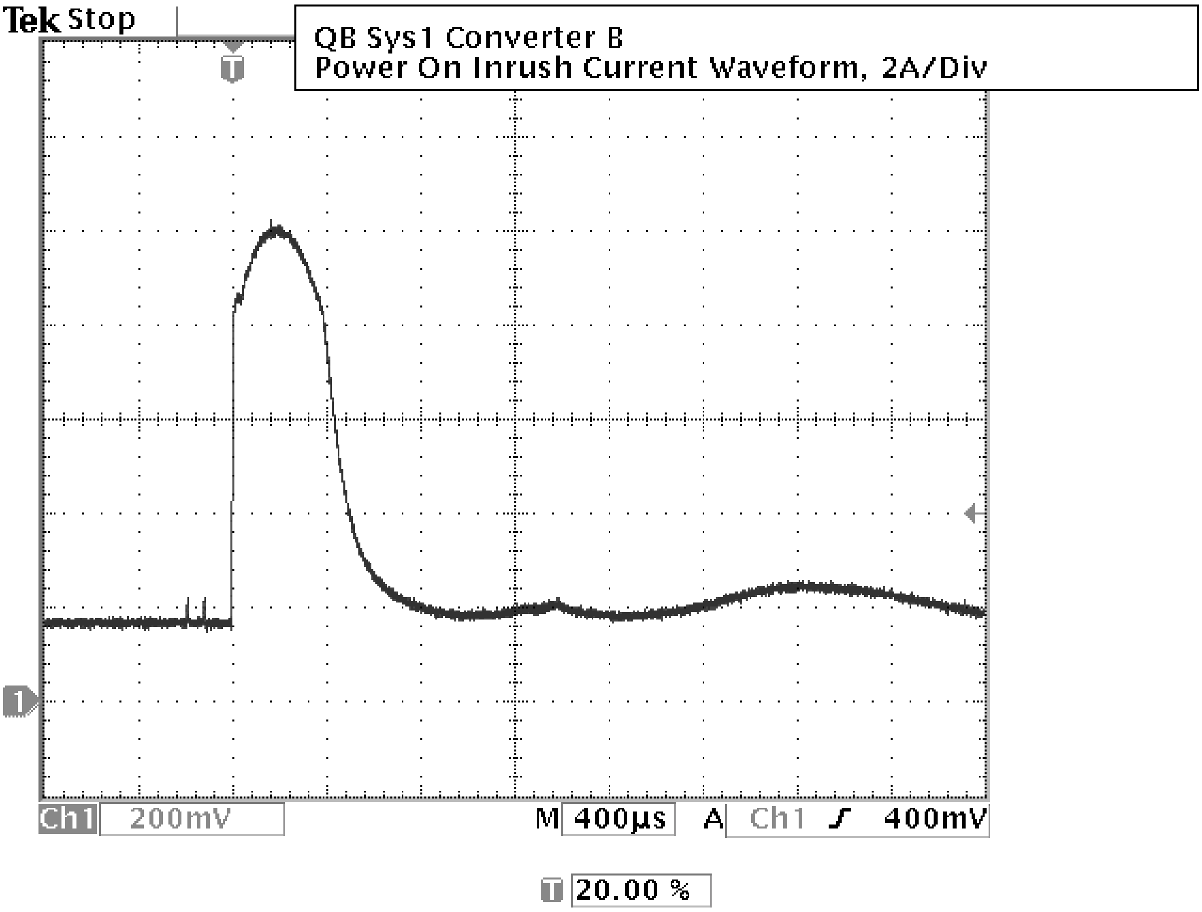
10.36 Waveform SPUAQB.BMP



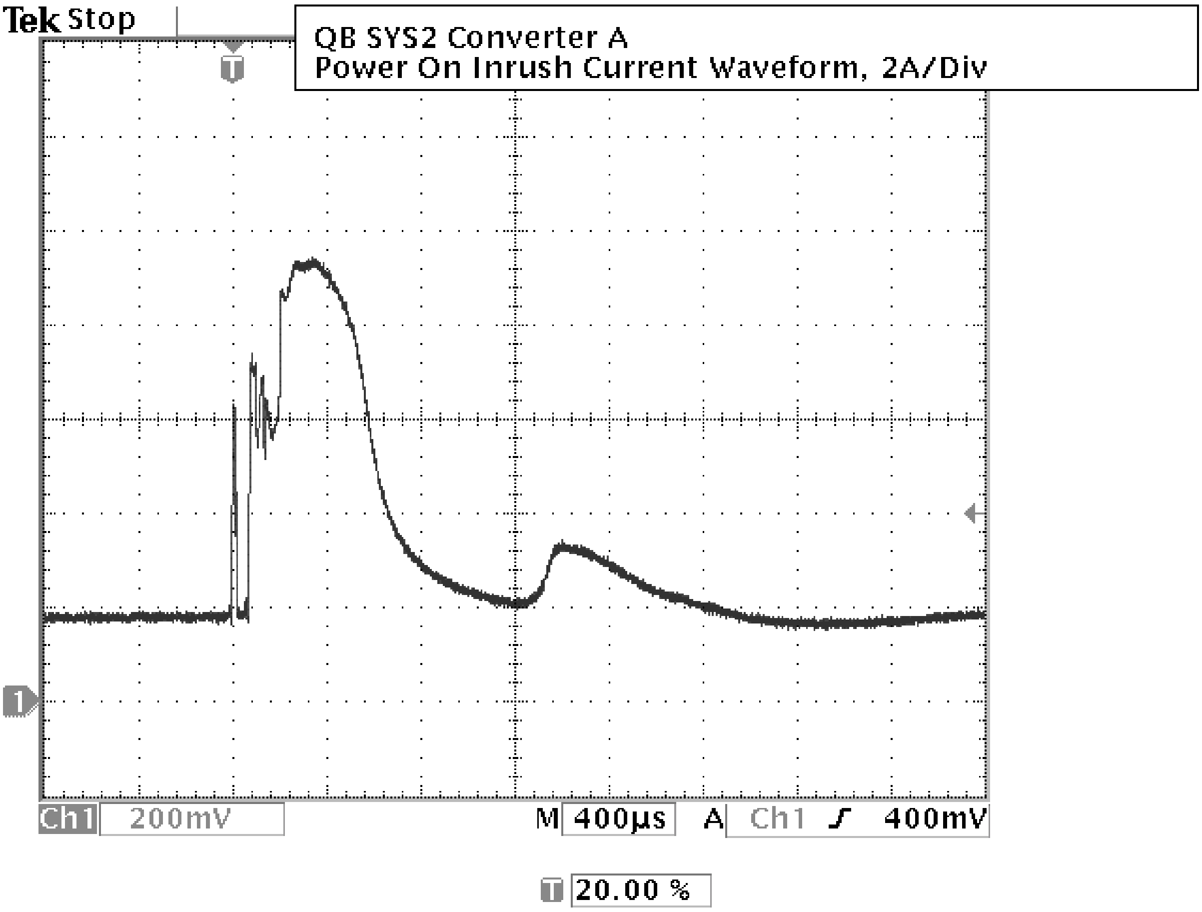
10.37 Waveform INRUSHBR.BMP



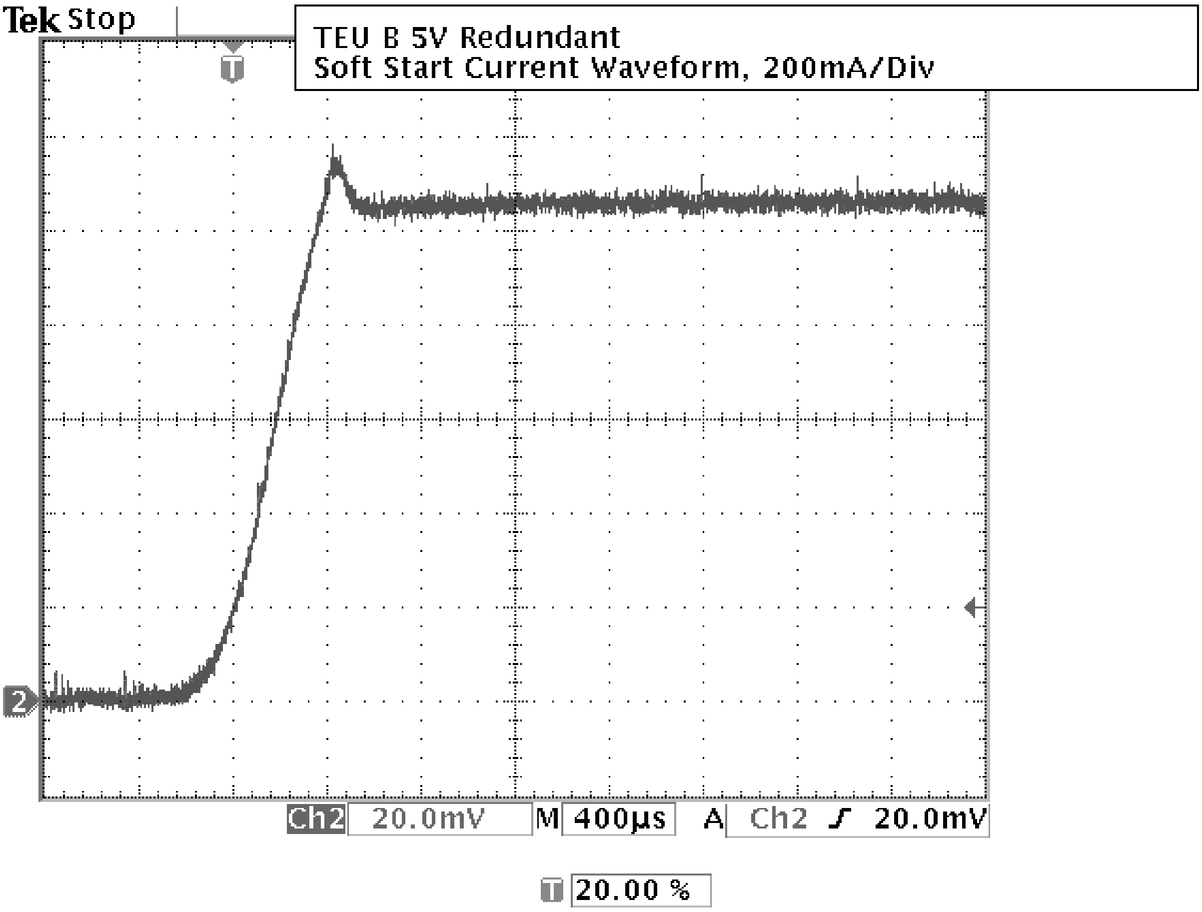
10.38 Waveform SYS1BQB.BMP



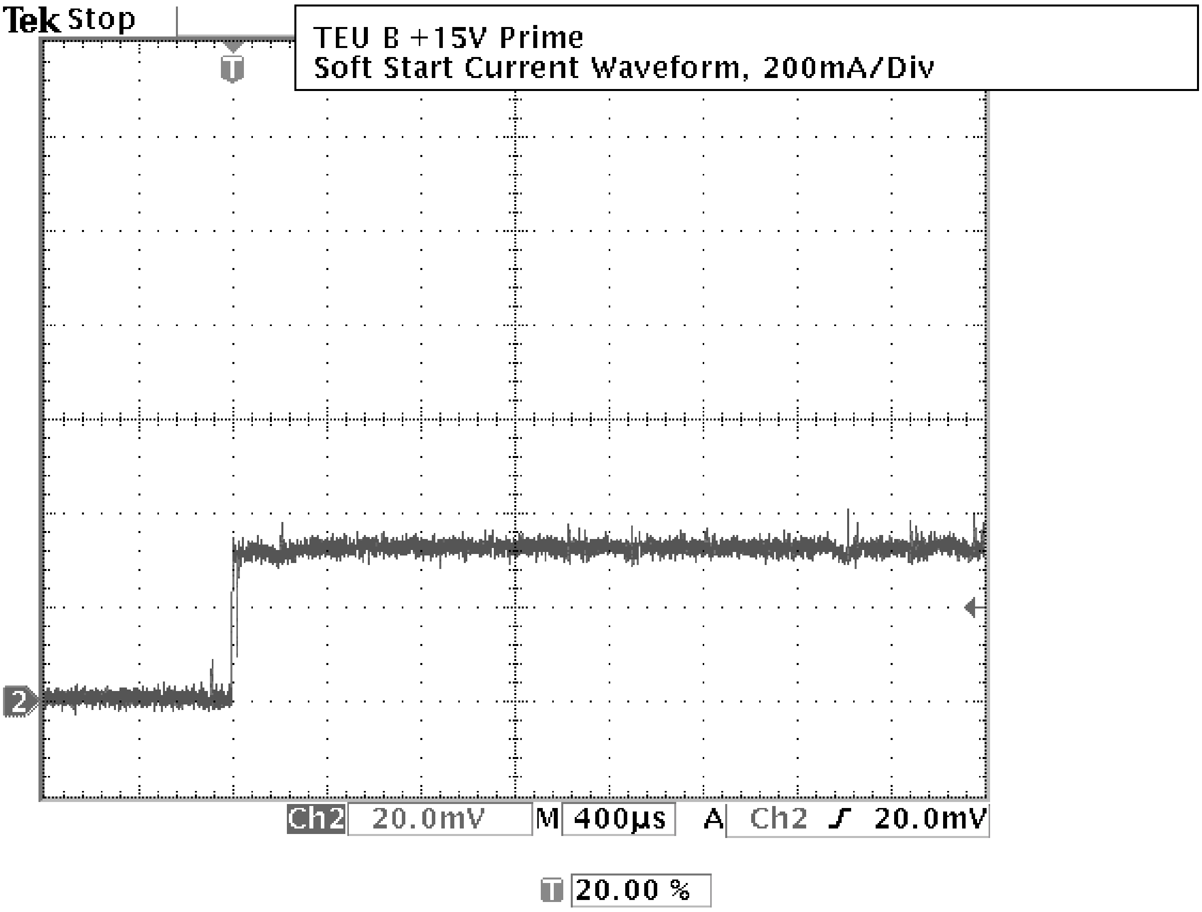
10.39 Waveform SYS2AQB.BMP



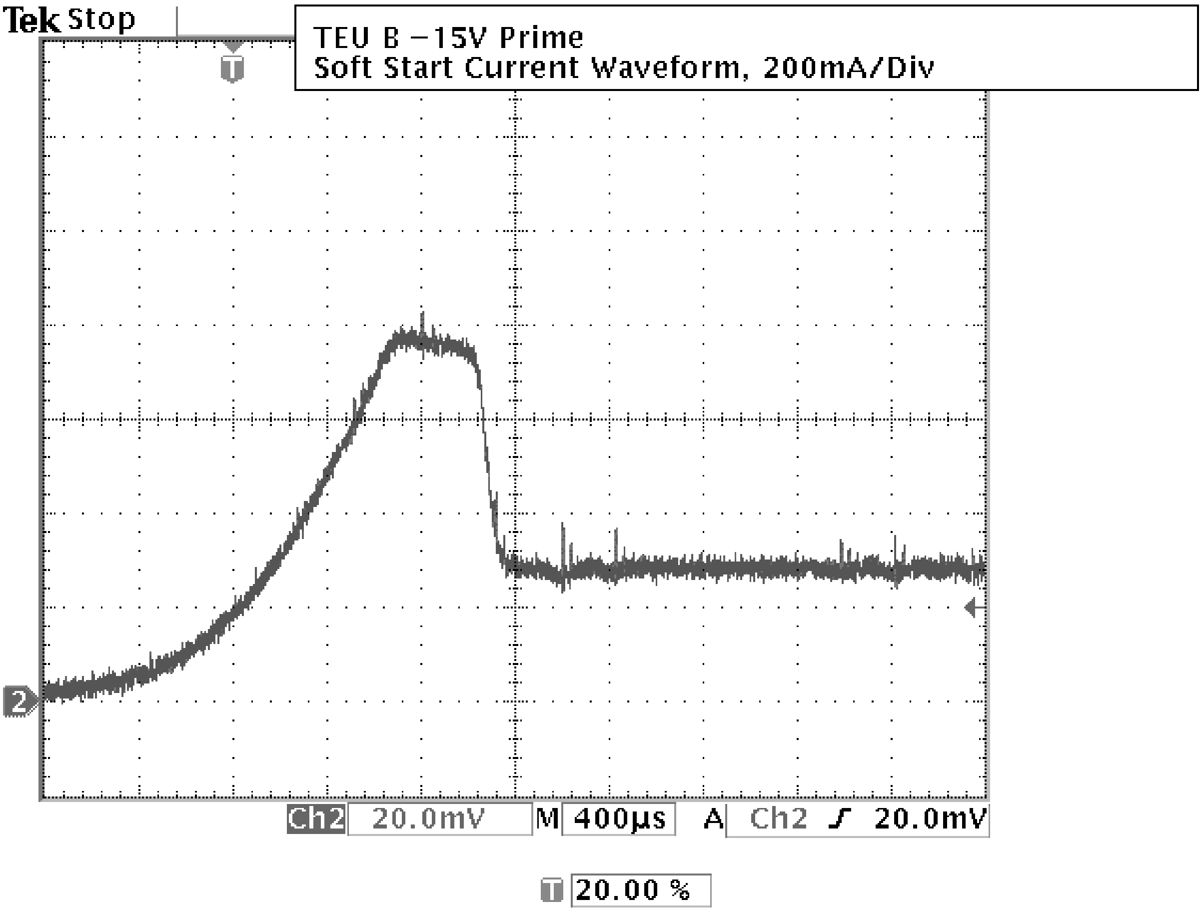
10.40 Waveform TEUBC6.BMP



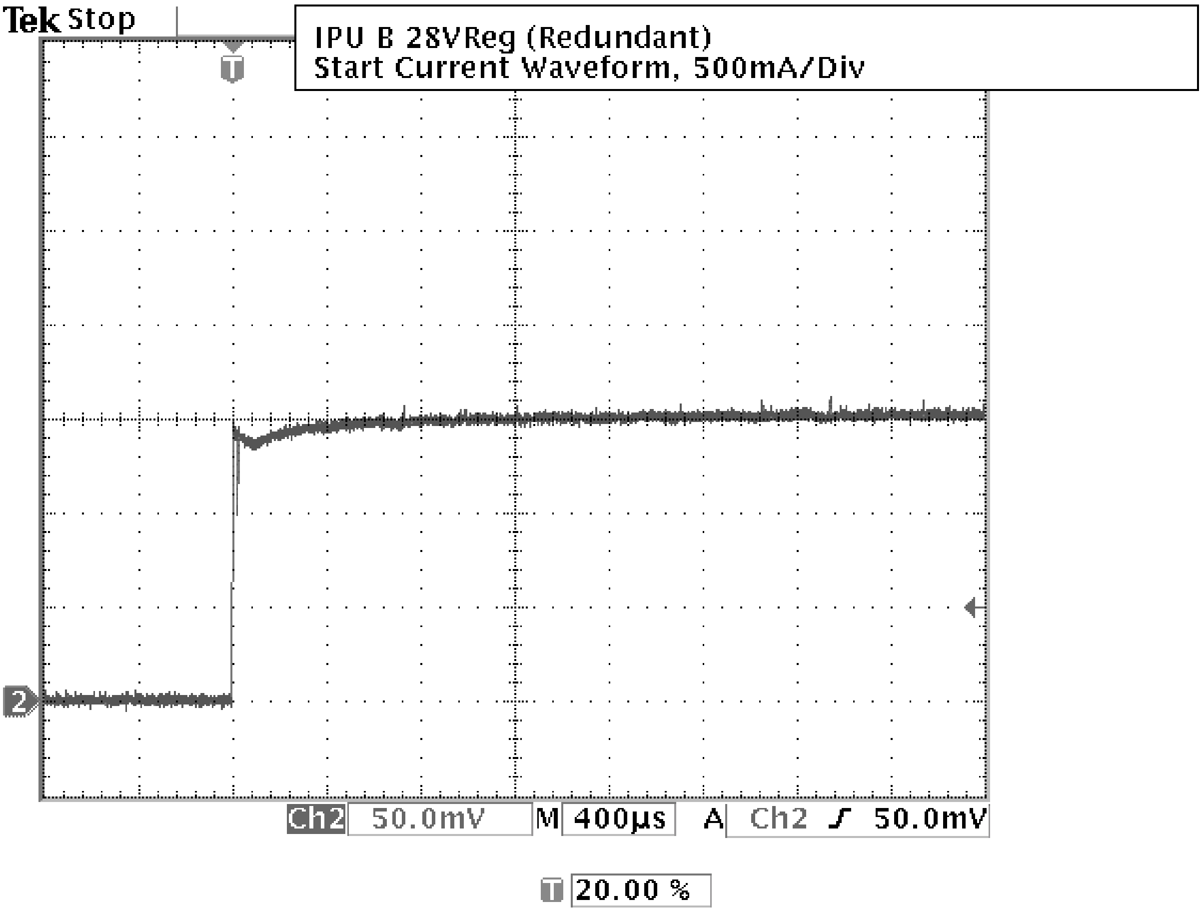
10.41 Waveform TEUBC7.BMP



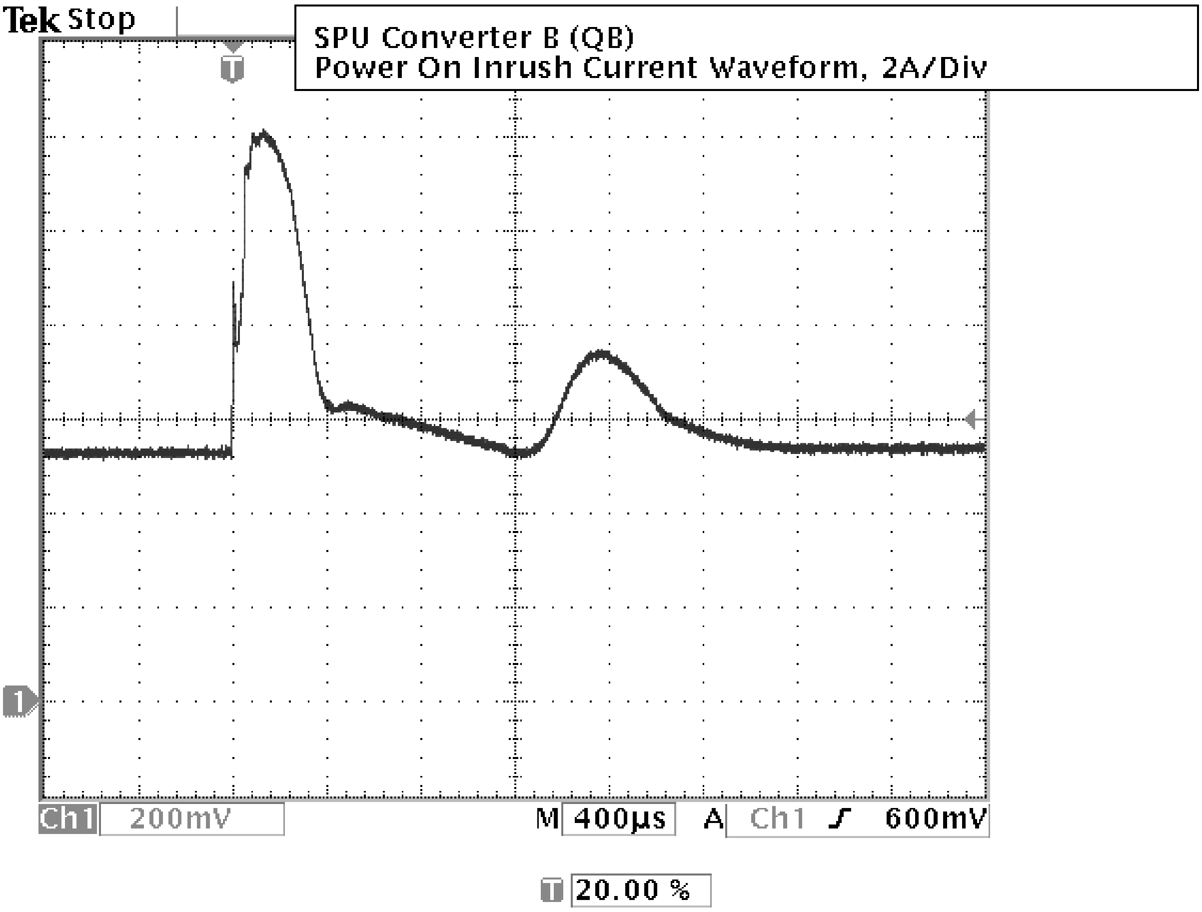
10.42 Waveform TEUBC8.BMP



10.43 Waveform IPUB2.BMP



10.44 Waveform SPUBQB.BMP



HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: A. B. Pearce Date: 2-04-2001

Subject / Title: Comprehensive Performance Test Procedure

Contents / Description / Summary:

Key Words: PCU Performance Test

Purpose (20 characters maximum):

Approved By:

Date (yy–mm–dd):

Rutherford Appleton Laboratory
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EOS

		Name	Signature	Date
Prepared by		**Alan B. Pearce**		
Checked by	-	-		
Issued	Issue A	Alan B. Pearce		28/4/2000
Updated	Issue B	Alan B. Pearce		29/6/2000
Updated	Issue C	Alan B. Pearce		4/08/2000
Updated	Issue D	Alan B. Pearce		11/8/2000
Updated	Issue E	Alan B. Pearce		21/9/2000
Updated	Issue F	Alan B. Pearce		02/4/2001
Updated	Issue F –2	Alan B. Pearce		04/04/2001
Updated	Issue F-3	Alan B. Pearce		09/04/2001

Issue A – Initial release.

Issue B – Added test of emulator waveforms to beginning of test. Added captions to all printouts. Sorted out some issues with setting up oscilloscope for data capture and printing.

Issue C – Correct instructions that give errors with the Emulator.
Change column spacing to make more room for telemetry replies.
Add NA and NB off instructions to PSM-02 macros.
PSM-01 and PSM-02 macro order reversed so operation can be better observed on the load box – order had supplies switched off before output relays. Added test for 28QC_PWR Low Volts signal at end of first test block.

Issue D – Incorporate various changes from Limited Performance Test changes, current settings for Inrush measurement, and inserted current telemetry instructions through test.

Issue E - Added analogue telemetry switching test. Change QA and QB limits from 29 +/-2 volts to 29 +/-3 volts. Moved pin matrix test to beginning of test. Add in low voltage start test.

Issue F – Change formatting to allow importing of Oscilloscope screen images without pictures being clipped. Other changes to instructions for oscilloscopes to allow for change to Tek 3034. Add instructions to do capacitance measurements.
Issue 2 – added Test Foreword giving explanation of instruction format, and reference to Tektronix programming manuals under Applicable Documents.
Issue 3 – add instructions for DC Coupling and full bandwidth in scope setup. Adjust scope trigger settings to get current waveforms triggering correctly.

Document copy 011

1 SCOPE

This document designed to be used as the source of commands for the automated testing of the HIRDLS PCU, using the Rutherford Appleton developed IPU Emulator that is based around a PC. The command sequences used in this document are taken from TC-RAL-119 Draft A4 dated 2000-01-03.

The IPU Emulator software reads this document, and produces a serialised copy, with the test results inserted into the table fields where appropriate. A separate serialised copy is produced each time this test document is run.

All tests specified within this document are designed to provide a full Comprehensive Performance Test where operator interaction is required to probe external test points to confirm that the PCU meets all operational requirements.

The format of the document is designed to enable the document with test results to be supplied as a completed test procedure document in the ADP package. To understand the format of the instruction tables refer to the Procedure Driver Instructions (TP-RAL-207).

2 REFERENCE AND APPLICABLE DOCUMENTS

SP-HIR-36	Power Subsystem Specification Document
SP-HIR-13	Instrument Technical Specification
SP-HIR-103	Command and Telemetry Handbook (C&TH) (July 99 draft)
SP-HIR-239A	GSS to PSS Interface Control Document
SP-HIR-249	TSS to PSS Interface Control Document
SP-HIR-279	IPS to PSS Interface Control Document
SP-HIR-289	CSS to PSS Interface Control Document
TC-RAL-119	Test Plan
TP-RAL-207	Procedure Driver Instructions (for PCU/IPU Emulator)
071-0381-01	Tektronix TDS3000 series Programmer Manual (with 071-0378-01 Advanced trigger module supplement and 071-0378-01 FFT Module supplement)

3 TEST FOREWORD.

Instruction formats.

Each instruction line in the tables has a prefix for automated testing. If no prefix exists in a line, then the automatic procedure assumes a manual operation and prompts the operator. Further detail on table format can be found in the Procedure Driver Instructions. Prefixes used are as follows

DIR: Direct command used to send commands to the HIRDLS discrete commands, and to control certain operations within the emulator.

PORTA: Send this command through the “A” IPU port.

PORTB: send this command through the ”B” IPU port.

QA: Operation command for the QA power supply.

QB: Operation command for the QB power supply.

NA: Operation command for the NA power supply.

NB: Operation command for the NB power supply.

SCOPE: send this command to the Oscilloscope – these take the form of the Tektronix command language used by the TDS3000 series oscilloscopes. The exception is the command to down load the screen to a file. The GSE program converts a command of the format "HARDCOPY FILENAME.BMP" to "HARDCOPY START" to send to the oscilloscope and transfers the resulting screen image into the file FILENAME.BMP on the GSE.

4 INSTRUMENTATION REQUIREMENTS AND SETUP.

4.1 Required instrumentation

Thandar Power Supplies, IEEE 488 controlled, model TX3510 or similar, 4 required.
Oscilloscope, IEEE controlled, Tektronix TDS3034 or similar, 1 required.
Multimeter, Fluke model 89 or similar, x2.
Current Probe, Chauvinoux or similar, x2.

4.2 Connection Diagram.

To be supplied.

5 INITIAL VERIFICATION TESTS AND CHECKS.

Carry out various unpowered tests required.

5.1 Pin Matrix, capacitance and resistance checks.

STEP 1	Mixed		
PROCedure TR224B.XLS	done		10-Apr-01 10:56:16
Remove Ground Bonding Strap from common earth bolts.	ok		10-Apr-01 10:56:16
Using DVM measure and record the capacitance between Chassis Star Point Bolt (bolt 3) connection and IPU 28Vreg Bolt (Bolt 1).	150nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (bolt 3) connection and IPU 28Vreg Bolt (Bolt 1).	O/C		10-Apr-01 10:56:16
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and 5/15V Star Point Bolt (Bolt 2).	151nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and 5/15V Star Point Bolt (Bolt 2).	O/C		10-Apr-01 10:56:16
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and IPU Common Ground Star Point (Bolt 4).	159nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and IPU Common Ground Star Point (Bolt 4).	O/C		10-Apr-01 10:56:16
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J911 Pin A.	39nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J911 Pin A.	9.3M		10-Apr-01 10:56:16

Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J911 (QA) Pin D.	38.5nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J911 (QA) Pin D.	9.3M		10-Apr-01 10:56:16
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J912 (NA) Pin A.	35.4nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J912 (NA) Pin A.	9.4M		10-Apr-01 10:56:16
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J912 (NA) Pin D.	37.5nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J912 (NA) Pin D.	9.4M		10-Apr-01 10:56:16
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J920 (QB) Pin A.	0.27nF		10-Apr-01 10:56:16
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J920 (QB) Pin A.	O/C		10-Apr-01 10:56:17
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J920 (QB) Pin D.	0.28nF		10-Apr-01 10:56:17
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J920 (QB) Pin D.	O/C		10-Apr-01 10:56:17
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J921 (NB) Pin A.	0.27nF		10-Apr-01 10:56:17

Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J921 (NB) Pin A.	O/C		10-Apr-01 10:56:17
Using DVM measure and record the capacitance between Chassis Star Point Bolt (Bolt 3) connection and J921 (NB) Pin D.	0.26nF		10-Apr-01 10:56:17
Using DVM measure and record the resistance between Chassis Star Point Bolt (Bolt 3) connection and J921 (NB) Pin D.	O/C		10-Apr-01 10:56:17

5.2 Connector Shell bonding checks.

STEP 2	Mixed		
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J911	3.7mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J912	3.1mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J913	2.7mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J914	2.8mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J915	2.4mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J916	2.5mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J917	2.9mohm		10-Apr-01 11:26:13

Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J918	2.8mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J919	3.0mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J920	2.7mohm		10-Apr-01 11:26:13
Using DVM measure and record the resistance between Chassis Star Point Bolt connection and the outer shell of J921	2.6mohm		10-Apr-01 11:26:13
Refit Ground Bonding Strap to earth bolts.	ok		10-Apr-01 11:26:13

6 TEST PROCEDURE.

Set up initial parameters for the start of powered testing.

STEP 3	Mixed		
Verify connection of IEEE cables to Oscilloscope and Power Supplies.	done		10-Apr-01 11:30:02
Verify Oscilloscope and Power Supplies are set to use IEEE as active interface.	ok		10-Apr-01 11:30:02
Connect HIRDLS load box to PCU output connectors. Where there is an option, connect to the appropriate A connectors on the load box.	ok		10-Apr-01 11:30:02
Verify all load box switches are in the 'V' position.	ok		10-Apr-01 11:30:02
Verify connection of correct power supplies to QA, QB, NA and NB inputs.	ok		10-Apr-01 11:30:02
Turn on mains power to QA, QB, NA, and NB supplies	ok		10-Apr-01 11:30:02
QA: OFF	QA: OFF Done		10-Apr-01 11:30:02
QB: OFF	QB: OFF Done		10-Apr-01 11:30:02
NA: OFF	NA: OFF Done		10-Apr-01 11:30:02
NB: OFF	NB: OFF Done		10-Apr-01 11:30:02
QA: OV=35.0v	QA: OV=35.0v Done		10-Apr-01 11:30:02
QB: OV=35.0v	QB: OV=35.0v Done		10-Apr-01 11:30:02
NA: OV=35.0v	NA: OV=35.0v Done		10-Apr-01 11:30:02
NB: OV=35.0v	NB: OV=35.0v Done		10-Apr-01 11:30:02
QA: I=10	QA: I=10 Done		10-Apr-01 11:30:02
QB: I=10	QB: I=10 Done		10-Apr-01 11:30:02
NA: I=10	NA: I=10 Done		10-Apr-01 11:30:02
NB: I=10	NB: I=10 Done		10-Apr-01 11:30:02
QA: V=26v	QA: V=26v Done		10-Apr-01 11:30:02
QB: V=26v	QB: V=26v Done		10-Apr-01 11:30:03
NA: V=26v	NA: V=26v Done		10-Apr-01 11:30:03
NB: V=26v	NB: V=26v Done		10-Apr-01 11:30:03

6.1 Set up Oscilloscope for measurements

STEP 4	Mixed		
SCOPE: CLEARMENU	SCOPE:CLEARMEN U done.		10-Apr-01 11:30:23
SCOPE:DISP:GRAT FULL	SCOPE:DISP:GRAT FULL done.		10-Apr-01 11:30:23
SCOPE:DISP:FORMAT YT	SCOPE:DISP:FORM AT YT done.		10-Apr-01 11:30:23
SCOPE:HARDCOPY:FORMAT BMP	SCOPE:HARDCOPY :FORMAT BMP done.		10-Apr-01 11:30:23
SCOPE:HARDCOPY:PORT GPIB	SCOPE:HARDCOPY :PORT GPIB done.		10-Apr-01 11:30:23
SCOPE:HARDC:LAYOUT PORTR	SCOPE:HARDC:LA YOUT PORTR done.		10-Apr-01 11:30:23
SCOPE:MESSAGE:STATE ON	SCOPE:MESSAGE:S TATE ON done.		10-Apr-01 11:30:23
SCOPE:MESSAGE:BOX 85,0,600,45	SCOPE:MESSAGE:B OX 85,0,600,45 done.		10-Apr-01 11:30:23
SCOPE:Select:REF1 OFF	SCOPE:SELECT:RE F1 OFF done.		10-Apr-01 11:30:23
SCOPE:Select:REF2 OFF	SCOPE:SELECT:RE F2 OFF done.		10-Apr-01 11:30:23
SCOPE:Select:REF3 OFF	SCOPE:SELECT:RE F3 OFF done.		10-Apr-01 11:30:23
SCOPE:Select:REF4 OFF	SCOPE:SELECT:RE F4 OFF done.		10-Apr-01 11:30:23
SCOPE:Select:MATH OFF	SCOPE:SELECT:MA TH OFF done.		10-Apr-01 11:30:24
SCOPE:CH1:Coupling DC	SCOPE:CH1:COUPL ING DC done.		10-Apr-01 11:30:24
SCOPE:CH2:Coupling DC	SCOPE:CH2:COUPL ING DC done.		10-Apr-01 11:30:24
SCOPE:CH3:Coupling DC	SCOPE:CH3:COUPL ING DC done.		10-Apr-01 11:30:24
SCOPE:CH4:Coupling DC	SCOPE:CH4:COUPL ING DC done.		10-Apr-01 11:30:24
SCOPE:CH1:Bandwidth Full	SCOPE:CH1:BAND WIDTH Full done.		10-Apr-01 11:30:24
SCOPE:CH2:Bandwidth Full	SCOPE:CH2:BAND WIDTH Full done.		10-Apr-01 11:30:24
SCOPE:CH3:Bandwidth Full	SCOPE:CH3:BAND WIDTH Full done.		10-Apr-01 11:30:24

SCOPE:CH4:Bandwidth Full	SCOPE:CH4:BANDWIDTH Full done.		10-Apr-01 11:30:24
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH3 OFF done.		10-Apr-01 11:30:24
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH4 OFF done.		10-Apr-01 11:30:24
SCOPE:Select:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		10-Apr-01 11:30:24
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		10-Apr-01 11:30:25
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN:SCALE 400E-6 done.		10-Apr-01 11:30:25
SCOPE:HOR:DELAY:STATE OFF	SCOPE:HOR:DELAY:STATE OFF done.		10-Apr-01 11:30:25
SCOPE:HOR:TRIG:POS 1.50E0	SCOPE:HOR:TRIG:POS 1.50E0 done.		10-Apr-01 11:30:25
SCOPE:TRIG:A:MODE NORMAL	SCOPE:TRIG:A:MODE NORMAL done.		10-Apr-01 11:30:25
SCOPE:TRIG:A:EDGE:SLOPE FALL	SCOPE:TRIG:A:EDGE:SLOPE FALL done.		10-Apr-01 11:30:25
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		10-Apr-01 11:30:25
SCOPE:TRIG:A:EDGE:COUP DC	SCOPE:TRIG:A:EDGE:COUP DC done.		10-Apr-01 11:30:25
SCOPE:TRIG:A:LEVEL 0.5E-1	SCOPE:TRIG:A:LEVEL 0.5E-1 done.		10-Apr-01 11:30:25
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOLD:TIM 2.0E-2 done.		10-Apr-01 11:30:25
SCOPE:ACQ:STOPAFTER SEQ	SCOPE:ACQ:STOPAFTER SEQ done.		10-Apr-01 11:30:25

7 INITIAL POWER ON CONDITIONS - LOW VOLTAGE START TEST

Low voltage limit set on power supplies earlier.

STEP 5	Mixed		
QA ON	done		10-Apr-01 11:32:13
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		10-Apr-01 11:32:13
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		10-Apr-01 11:32:13
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 11:32:13
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.18V		10-Apr-01 11:32:13
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.73V, Channel B = -14.73V		10-Apr-01 11:32:13
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		10-Apr-01 11:32:13
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.34V		10-Apr-01 11:32:13
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		10-Apr-01 11:32:13
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		10-Apr-01 11:32:13
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 11:32:13
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.23V, Channel B = 14.24V		10-Apr-01 11:32:13

PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.1V, Channel B = -15.1V		10-Apr-01 11:32:13
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 11:32:13
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.08V, Channel B = 5.07V		10-Apr-01 11:32:13
PORTA: QA (PR) ON	IFC Echo = F00A		10-Apr-01 11:32:14
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		10-Apr-01 11:32:14
PORTA: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		10-Apr-01 11:32:14
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		10-Apr-01 11:32:14
PORTA: PSSV09;+5Volt DC-DC Converter SYS A	IFC Echo = 0008, Telemetry Channel A =5.35V, Channel B = 5.37V		10-Apr-01 11:32:14
PORTA: PSSV01;28Volt DC-DC Converter SYS A	IFC Echo = 000B, Telemetry Channel A =30.02V, Channel B = 30.02V		10-Apr-01 11:32:14
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		10-Apr-01 11:32:14
PORTA: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		10-Apr-01 11:32:14
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		10-Apr-01 11:32:14
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.36V, Channel B = 5.36V		10-Apr-01 11:32:14
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =30.0V, Channel B = 30.0V		10-Apr-01 11:32:14
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		10-Apr-01 11:32:14
PORTA: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		10-Apr-01 11:32:14
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500B		10-Apr-01 11:32:14

PORTA: PSSV11;+15Volt DC-DC Converter SYS A	IFC Echo = 0009, Telemetry Channel A =15.24V, Channel B = 15.24V		10-Apr-01 11:32:14
PORTA: PSSV13;-15Volt DC-DC Converter SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.35V		10-Apr-01 11:32:14
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		10-Apr-01 11:32:14
PORTA: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		10-Apr-01 11:32:14
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A013		10-Apr-01 11:32:14
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.25V		10-Apr-01 11:32:15
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		10-Apr-01 11:32:15
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		10-Apr-01 11:32:15

7.1 Set PCU start mode conditions.
This table issues commands as defined by PSM-01 and PSM-02 macros in C&TH Table 2.9.4.4-1.

This table is PSM-02 macro.

STEP 6	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		10-Apr-01 11:33:11
PORTA: SPU_+5B OFF	IFC Echo = C018		10-Apr-01 11:33:11
PORTA: SPU_+/-15A OFF	IFC Echo = E019		10-Apr-01 11:33:11
PORTA: SPU_+5A OFF	IFC Echo = E018		10-Apr-01 11:33:11
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		10-Apr-01 11:33:11
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		10-Apr-01 11:33:11
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		10-Apr-01 11:33:11
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		10-Apr-01 11:33:11
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		10-Apr-01 11:33:11
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		10-Apr-01 11:33:11
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		10-Apr-01 11:33:11
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		10-Apr-01 11:33:11
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		10-Apr-01 11:33:11
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		10-Apr-01 11:33:11
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		10-Apr-01 11:33:11
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		10-Apr-01 11:33:11
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		10-Apr-01 11:33:11
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		10-Apr-01 11:33:11
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		10-Apr-01 11:33:11
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		10-Apr-01 11:33:12
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		10-Apr-01 11:33:12
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		10-Apr-01 11:33:12
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		10-Apr-01 11:33:12
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		10-Apr-01 11:33:12
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		10-Apr-01 11:33:12
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		10-Apr-01 11:33:12
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		10-Apr-01 11:33:12
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		10-Apr-01 11:33:12
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		10-Apr-01 11:33:12
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		10-Apr-01 11:33:12
PORTA: NA (PR) OFF	IFC Echo = E01C		10-Apr-01 11:33:12
PORTA: NA (RR) OFF	IFC Echo = C01C		10-Apr-01 11:33:12
PORTA: NB (PR) OFF	IFC Echo = E01D		10-Apr-01 11:33:12
PORTA: NB (RR) OFF	IFC Echo = C01D		10-Apr-01 11:33:12

This table is PSM-01 Macro.

STEP 7	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		10-Apr-01 11:33:22
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		10-Apr-01 11:33:22
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		10-Apr-01 11:33:22
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		10-Apr-01 11:33:22
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		10-Apr-01 11:33:22
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		10-Apr-01 11:33:22

7.2 Telemetry verification after PSM-01 and PSM-02 macros.

STEP 8	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 11:33:50
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.23V, Channel B = 14.22V		10-Apr-01 11:33:50
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.2V, Channel B = -15.21V		10-Apr-01 11:33:50
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 11:33:50
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.08V, Channel B = 5.08V		10-Apr-01 11:33:50
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =19.3C, Channel B = 19.3C		10-Apr-01 11:33:50
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =20.8C, Channel B = 21.1C		10-Apr-01 11:33:50
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		10-Apr-01 11:33:50
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		10-Apr-01 11:33:50
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		10-Apr-01 11:33:51
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		10-Apr-01 11:33:51
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		10-Apr-01 11:33:51
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:33:51
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		10-Apr-01 11:33:51

PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		10-Apr-01 11:33:51
QA: V=29v	QA: V=29v Done		10-Apr-01 11:33:51
QB: V=29v	QB: V=29v Done		10-Apr-01 11:33:51
NA: V=29v	NA: V=29v Done		10-Apr-01 11:33:51
NB: V=29v	NB: V=29v Done		10-Apr-01 11:33:51

8 VERIFICATION OF IPU DATA INTERFACE

Set up Oscilloscope for interface testing.

STEP 9	Mixed		
SCOPE: CH1:VOLT 5	SCOPE:CH1:VOLT 5 done.		10-Apr-01 11:34:59
SCOPE: CH2:VOLT 5	SCOPE:CH2:VOLT 5 done.		10-Apr-01 11:35:00
SCOPE: CH3:VOLT 5	SCOPE:CH3:VOLT 5 done.		10-Apr-01 11:35:00
SCOPE: CH4:VOLT 5	SCOPE:CH4:VOLT 5 done.		10-Apr-01 11:35:00
SCOPE:CH1:POS 2	SCOPE:CH1:POS 2 done.		10-Apr-01 11:35:00
SCOPE:CH2:POS 0	SCOPE:CH2:POS 0 done.		10-Apr-01 11:35:00
SCOPE:CH3:POS -2	SCOPE:CH3:POS -2 done.		10-Apr-01 11:35:00
SCOPE:CH4:POS -4	SCOPE:CH4:POS -4 done.		10-Apr-01 11:35:00
SCOPE:Select:CH1 ON	SCOPE:SELECT:CH 1 ON done.		10-Apr-01 11:35:00
SCOPE:Select:CH2 ON	SCOPE:SELECT:CH 2 ON done.		10-Apr-01 11:35:00
SCOPE:HOR:MAIN:SCALE 100E-6	SCOPE:HOR:MAIN: SCALE 100E-6 done.		10-Apr-01 11:35:00
SCOPE:HOR:TRIG:POS 5.0E0	SCOPE:HOR:TRIG:P OS 5.0E0 done.		10-Apr-01 11:35:00
SCOPE:TRIG:A:EDGE:SLOPE FALL	SCOPE:TRIG:A:ED GE:SLOPE FALL done.		10-Apr-01 11:35:00
SCOPE:TRIG:A:LEVEL 2.0E0	SCOPE:TRIG:A:LEV EL 2.0E0 done.		10-Apr-01 11:35:00
PORTA: NB (RR) ON	IFC Echo = D01D		10-Apr-01 11:35:00
Connect a breakout box in the cable to the GSE card in the PC	ok		10-Apr-01 11:35:01
Connect oscilloscope probes to the 4 Channels of the Oscilloscope.	ok		10-Apr-01 11:35:01

8.1 Verify Port A Clock Waveforms

STEP 10	Mixed		
Connect CH1 and CH2 scope probe ground leads to Pin 24 of the break out box.	ok		10-Apr-01 11:37:32
Connect the channel 1 probe to pin 6 of the break out box.	ok		10-Apr-01 11:37:32
Connect the channel 2 probe to pin 5 of the break out box.	ok		10-Apr-01 11:37:32
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:37:32
SCOPE:MESS:SHOW "Port A Clock Waveforms\nCH1 Clock+ CH2 Clock-"	SCOPE:MESS:SHOW "Port A Clock Waveforms\nCH1 Clock+ CH2 Clock-" done.		10-Apr-01 11:37:32
PORTA: NB (RR) ON	IFC Echo = D01D		10-Apr-01 11:37:32
Verify that Oscilloscope has captured waveform	not captured		10-Apr-01 11:37:32
SCOPE:HARDCOPY CLOCKA.BMP	CLOCKA.BMP written to Appendix.		10-Apr-01 11:37:32

8.2 Verify Port A Control Waveforms

STEP 11	Mixed		
Connect the channel 2 probe to pin 2 of the break out box.	ok		10-Apr-01 11:38:47
Connect the Channel 3 probe to pin 1 of the break out box.	ok		10-Apr-01 11:38:48
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:38:48
SCOPE:Select:CH3 ON	SCOPE:SELECT:CH3 ON done.		10-Apr-01 11:38:48
PORTA: NB (RR) ON	IFC Echo = D01D		10-Apr-01 11:38:48
SCOPE:MESS:SHOW "Port A Control Waveforms\nCH1 Clock+ CH2 Control+ CH3 Control-"	SCOPE:MESS:SHOW "Port A Control Waveforms\nCH1 Clock+ CH2 Control+ CH3 Control-" done.		10-Apr-01 11:38:48
SCOPE:HARDCOPY CONTROLA.BMP	CONTROLA.BMP written to Appendix.		10-Apr-01 11:38:48

8.3 Verify Port A Select Waveforms

STEP 12	Mixed		
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:42:41
Connect the channel 3 probe to pin 4 of the break out box.	ok		10-Apr-01 11:42:41
Connect the Channel 4 probe to pin 3 of the break out box.	ok		10-Apr-01 11:42:41
SCOPE:Select:CH4 ON	SCOPE:SELECT:CH 4 ON done.		10-Apr-01 11:42:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:42:42
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:42:42
SCOPE:MESS:SHOW "Port A Select Waveforms\nCH1 Clock+ CH2 Control+ CH3 Select+ CH4 Select-"	SCOPE:MESS:SHO W "Port A Select Waveforms\nCH1 Clock+ CH2 Control+ CH3 Select+ CH4 Select-" done.		10-Apr-01 11:42:42
SCOPE:HARDCOPY SELECTA.BMP	SELECTA.BMP written to Appendix.		10-Apr-01 11:42:42

8.4 Verify Port A Execute Waveforms

STEP 13	Mixed		
Connect the channel 3 probe to pin 8 of the break out box.	ok		10-Apr-01 11:44:49
Connect the Channel 4 probe to pin 7 of the break out box.	ok		10-Apr-01 11:44:49
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:44:49
SCOPE: MESS:SHOW 'Port A Execute Waveforms\nCH1 Clock+ CH2 Control+ CH3 Execute+ CH4 Execute-'	SCOPE:MESS:SHO W 'Port A Execute Waveforms\nCH1 Clock+ CH2 Control+ CH3 Execute+ CH4 Execute-' done.		10-Apr-01 11:44:50
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:44:50
SCOPE: HARDCOPY	EXECUTEA.BMP		10-Apr-01 11:44:50

EXECUTEA.BMP	written to Appendix.		
SCOPE:SAVE:WAVE CH3,REF1	SCOPE:SAVE:WAVE CH3,REF1 done.		10-Apr-01 11:44:50
SCOPE:REF1:VERT:POS -4	SCOPE:REF1:VERT:POS -4 done.		10-Apr-01 11:44:50

8.5 Verify Port A Data Waveforms

STEP 14	Mixed		
Connect the channel 3 probe to pin 10 of the break out box.	ok		10-Apr-01 11:46:09
Connect the Channel 4 probe to pin 9 of the break out box.	ok		10-Apr-01 11:46:09
SCOPE:HOR:MAIN:SCALE 200E-6	SCOPE:HOR:MAIN: SCALE 200E-6 done.		10-Apr-01 11:46:10
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:46:10
SCOPE:MESS:SHOW 'Port A Data Waveform\nCH1 Clock+ CH2 Control+ CH3 Data+ CH4 Data-'	SCOPE:MESS:SHOW 'Port A Data Waveform\nCH1 Clock+ CH2 Control+ CH3 Data+ CH4 Data-' done.		10-Apr-01 11:46:10
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:46:10
SCOPE: HARDCOPY DATAA.BMP	DATAA.BMP written to Appendix.		10-Apr-01 11:46:10

8.6 PORTA full waveforms - Control Write

STEP 15	Mixed		
Connect the channel 4 probe to pin 4 of the break out box.	ok		10-Apr-01 11:47:20
SCOPE:HOR:MAIN:SCALE 100E-6	SCOPE:HOR:MAIN: SCALE 100E-6 done.		10-Apr-01 11:47:21
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:47:21
SCOPE:MESS:SHOW 'Port A Control Write Waveform CH1 Clock+\nCH2 Control+ CH3 Data+ CH4 Select+ REF1 Execute+'	SCOPE:MESS:SHOW 'Port A Control Write Waveform CH1 Clock+\nCH2 Control+ CH3 Data+ CH4 Select+ REF1 Execute+' done.		10-Apr-01 11:47:21
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:47:21
SCOPE:CH1:POS 2.5	SCOPE:CH1:POS 2.5 done.		10-Apr-01 11:47:21
SCOPE:CH2:POS 1	SCOPE:CH2:POS 1 done.		10-Apr-01 11:47:21

SCOPE:CH3:POS –0.5	SCOPE:CH3:POS –0.5 done.		10-Apr-01 11:47:21
SCOPE:CH4:POS –2.5	SCOPE:CH4:POS –2.5 done.		10-Apr-01 11:47:21
SCOPE:SELECT:REF1 ON	SCOPE:SELECT:REF1 ON done.		10-Apr-01 11:47:21
SCOPE: HARDCOPY CTLWRA.BMP	CTLWRA.BMP written to Appendix.		10-Apr-01 11:47:21

8.7 PORTA full waveforms - Data Read.

STEP 16	Mixed		
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		10-Apr-01 11:48:42
SCOPE:Select:REF1 OFF	SCOPE:SELECT:RE F1 OFF done.		10-Apr-01 11:48:42
Connect the channel 2 probe to pin 8 of the break out box.	ok		10-Apr-01 11:48:42
SCOPE:A:EDGE:SOURCE CH2	SCOPE:A:EDGE:SO URCE CH2 done.		10-Apr-01 11:48:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:48:42
SCOPE:MESS:SHOW 'Port A Data Read Waveform CH1 Clock+\nCH3 Data+ CH4 Select+'	SCOPE:MESS:SHO W 'Port A Data Read Waveform CH1 Clock+\nCH3 Data+ CH4 Select+' done.		10-Apr-01 11:48:42
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:48:42
SCOPE: HARDCOPY DATARDA.BMP	DATARDA.BMP written to Appendix.		10-Apr-01 11:48:42
SCOPE:Select:REF2 OFF	SCOPE:SELECT:RE F2 OFF done.		10-Apr-01 11:48:42
SCOPE:Select:REF3 OFF	SCOPE:SELECT:RE F3 OFF done.		10-Apr-01 11:48:43
SCOPE:Select:REF4 OFF	SCOPE:SELECT:RE F4 OFF done.		10-Apr-01 11:48:43
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		10-Apr-01 11:48:43
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH 4 OFF done.		10-Apr-01 11:48:43

8.8 Verify Port B Clock Waveforms

STEP 17	Mixed		
Connect the channel 1 probe to pin 16 of the break out box.	ok		10-Apr-01 11:50:02
Connect the Channel 2 probe to pin 15 of the break out box.	ok		10-Apr-01 11:50:02
SCOPE:A:EDGE:SOURCE CH1	SCOPE:A:EDGE:SOURCE CH1 done.		10-Apr-01 11:50:02
PORTB: NB (RR) ON	IFC Echo = D01D		10-Apr-01 11:50:02
SCOPE:HOR:MAIN:SCALE 100E-6	SCOPE:HOR:MAIN:SCALE 100E-6 done.		10-Apr-01 11:50:02
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:50:02
SCOPE:MESS:SHOW 'Port B Clock Waveforms\nCH1 Clock+ CH2 Clock-'	SCOPE:MESS:SHOW 'Port B Clock Waveforms\nCH1 Clock+ CH2 Clock-' done.		10-Apr-01 11:50:02
PORTB: NB (RR) ON	IFC Echo = D01D		10-Apr-01 11:50:02
SCOPE: HARDCOPY CLOCKB.BMP	CLOCKB.BMP written to Appendix.		10-Apr-01 11:50:02

8.9 Verify Port B Control Waveforms

STEP 18	Mixed		
Connect the channel 2 probe to pin 12 of the break out box.	ok		10-Apr-01 11:51:13
Connect the Channel 3 probe to pin 11 of the break out box.	ok		10-Apr-01 11:51:13
SCOPE:Select:CH3 ON	SCOPE:SELECT:CH3 ON done.		10-Apr-01 11:51:13
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:51:13
SCOPE:MESS:SHOW 'Port B Control Waveforms\nCH1 Clock+ CH2 Control+ CH3 Control-'	SCOPE:MESS:SHOW 'Port B Control Waveforms\nCH1 Clock+ CH2 Control+ CH3 Control-' done.		10-Apr-01 11:51:13
PORTB: NB (RR) ON	IFC Echo = D01D		10-Apr-01 11:51:13
SCOPE: HARDCOPY CONTROLB.BMP	CONTROLB.BMP written to Appendix.		10-Apr-01 11:51:13

8.10 Verify Port B Select Waveforms

STEP 19	Mixed		
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:53:02
Connect the channel 3 probe to pin 14 of the break out box.	ok		10-Apr-01 11:53:02
Connect the Channel 4 probe to pin 13 of the break out box.	ok		10-Apr-01 11:53:02
SCOPE:Select:CH4 ON	SCOPE:SELECT:CH 4 ON done.		10-Apr-01 11:53:02
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:53:02
SCOPE:MESS:SHOW 'Port B Select Waveforms\nCH1 Clock+ CH2 Control+ CH3 Select+ CH4 Select-'	SCOPE:MESS:SHO W 'Port B Select Waveforms\nCH1 Clock+ CH2 Control+ CH3 Select+ CH4 Select-' done.		10-Apr-01 11:53:02
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:53:02
SCOPE: HARDCOPY SELECTB.BMP	SELECTB.BMP written to Appendix.		10-Apr-01 11:53:03

8.11 Verify Port B Execute Waveforms

STEP 20	Mixed		
Connect the channel 3 probe to pin 18 of the break out box.	ok		10-Apr-01 11:54:54
Connect the Channel 4 probe to pin 17 of the break out box.	ok		10-Apr-01 11:54:54
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:54:54
SCOPE:MESS:SHOW 'Port B Execute Waveforms\nCH1 Clock+ CH2 Control+ CH3 Execute+ CH4 Execute-'	SCOPE:MESS:SHO W 'Port B Execute Waveforms\nCH1 Clock+ CH2 Control+ CH3 Execute+ CH4 Execute-' done.		10-Apr-01 11:54:54
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:54:54
SCOPE: HARDCOPY	EXECUTEB.BMP		10-Apr-01 11:54:54

EXECUTEB.BMP	written to Appendix.		
SCOPE:SAVE:WAVE CH3,REF1	SCOPE:SAVE:WAVE CH3,REF1 done.		10-Apr-01 11:54:55

8.12 Verify Port B Data Waveforms

STEP 21	Mixed		
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:56:17
Connect the channel 3 probe to pin 37 of the break out box.	ok		10-Apr-01 11:56:17
Connect the Channel 4 probe to pin 19 of the break out box.	ok		10-Apr-01 11:56:17
SCOPE:HOR:MAIN:SCALE 200E-6	SCOPE:HOR:MAIN: SCALE 200E-6 done.		10-Apr-01 11:56:17
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:56:17
SCOPE:MESS:SHOW 'Port B Data Waveforms\nCH1 Clock+ CH2 Control+ CH3 Data+ CH4 Data-'	SCOPE:MESS:SHOW 'Port B Data Waveforms\nCH1 Clock+ CH2 Control+ CH3 Data+ CH4 Data-' done.		10-Apr-01 11:56:17
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:56:17
SCOPE: HARDCOPY DATAB.BMP	DATAB.BMP written to Appendix.		10-Apr-01 11:56:17

8.13 PORTB full waveforms - Control Write

STEP 22	Mixed		
Connect the channel 4 probe to pin 14 of the break out box.	ok		10-Apr-01 11:57:25
SCOPE:HOR:MAIN:SCALE 100E-6	SCOPE:HOR:MAIN: SCALE 100E-6 done.		10-Apr-01 11:57:25
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:57:25
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:57:25
SCOPE:CH1:POS 2.5	SCOPE:CH1:POS 2.5 done.		10-Apr-01 11:57:25
SCOPE:CH2:POS 1	SCOPE:CH2:POS 1 done.		10-Apr-01 11:57:25
SCOPE:CH3:POS –0.5	SCOPE:CH3:POS –0.5 done.		10-Apr-01 11:57:25
SCOPE:CH4:POS –2.5	SCOPE:CH4:POS –2.5 done.		10-Apr-01 11:57:25

SCOPE:SELECT:REF1 ON	SCOPE:SELECT:REF1 ON done.		10-Apr-01 11:57:25
SCOPE:MESS:SHOW 'Port B Control Write Waveform CH1 Clock+\nCH2 Control+ CH3 Data+ CH4 Select+ REF1 Execute+'	SCOPE:MESS:SHOW 'Port B Control Write Waveform CH1 Clock+\nCH2 Control+ CH3 Data+ CH4 Select+ REF1 Execute+' done.		10-Apr-01 11:57:25
SCOPE: HARDCOPY CTLWRB.BMP	CTLWRB.BMP written to Appendix.		10-Apr-01 11:57:26

8.14 PORTB full waveforms - Data Read.

STEP 23	Mixed		
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		10-Apr-01 11:58:33
SCOPE:Select:REF1 OFF	SCOPE:SELECT:RE F1 OFF done.		10-Apr-01 11:58:33
Connect the channel 2 probe to pin 18 of the break out box.	ok		10-Apr-01 11:58:33
SCOPE:A:EDGE:SOURCE CH2	SCOPE:A:EDGE:SO URCE CH2 done.		10-Apr-01 11:58:33
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 11:58:33
SCOPE:MESS:SHOW 'Port B Data Read Waveform CH1 Clock+\nCH3 Data+ CH4 Select+'	SCOPE:MESS:SHO W 'Port B Data Read Waveform CH1 Clock+\nCH3 Data+ CH4 Select+' done.		10-Apr-01 11:58:34
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 11:58:34
SCOPE: HARDCOPY DATARDB.BMP	DATARDB.BMP written to Appendix.		10-Apr-01 11:58:34
SCOPE:Select:REF2 OFF	SCOPE:SELECT:RE F2 OFF done.		10-Apr-01 11:58:34
SCOPE:Select:REF3 OFF	SCOPE:SELECT:RE F3 OFF done.		10-Apr-01 11:58:34
SCOPE:Select:REF4 OFF	SCOPE:SELECT:RE F4 OFF done.		10-Apr-01 11:58:34
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		10-Apr-01 11:58:34
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH 4 OFF done.		10-Apr-01 11:58:34

8.15 Analogue Telemetry - Channel A Positive and Negative transitions.
Test is done by selecting internal +15V supply, and then measuring the time taken to switch to the internal –15V supply.

STEP 24	Mixed		
Connect a second breakout box to the cable going to the ADC card in the emulator.	ok		10-Apr-01 12:01:28
On the second breakout box, connect the channel 1 probe to pin 20, with ground connection to pin 42, .	ok		10-Apr-01 12:01:28
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.23V, Channel B = -15.23V		10-Apr-01 12:01:28
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		10-Apr-01 12:01:28
SCOPE: CH1:VOLT 2	SCOPE:CH1:VOLT 2 done.		10-Apr-01 12:01:29
SCOPE:CH2:POS 2	SCOPE:CH2:POS 2 done.		10-Apr-01 12:01:29
SCOPE:CH1:POS –1	SCOPE:CH1:POS –1 done.		10-Apr-01 12:01:29
SCOPE:Select:CH1 ON	SCOPE:SELECT:CH1 ON done.		10-Apr-01 12:01:29
SCOPE:Select:CH2 ON	SCOPE:SELECT:CH2 ON done.		10-Apr-01 12:01:29
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 12:01:29
SCOPE:MESS:SHOW 'Channel A Analogue Telemetry Waveform +ve transition\n CH2 Execute+ CH1 Analogue A'	SCOPE:MESS:SHOW 'Channel A Analogue Telemetry Waveform +ve transition\n CH2 Execute+ CH1 Analogue A' done.		10-Apr-01 12:01:29
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.23V, Channel B = 14.22V		10-Apr-01 12:01:29
SCOPE:HARDCOPY ANALOGAP.BMP	ANALOGAP.BMP written to Appendix.		10-Apr-01 12:01:29
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 12:01:29

SCOPE:MESS:SHOW 'Channel A Analogue Telemetry Waveform -ve transition\nCH2 Execute+ CH3 Analogue A'	SCOPE:MESS:SHOW 'Channel A Analogue Telemetry Waveform -ve transition\nCH2 Execute+ CH3 Analogue A' done.		10-Apr-01 12:01:29
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.23V, Channel B = -15.23V		10-Apr-01 12:01:29
SCOPE: HARDCOPY ANALOGAN.BMP	ANALOGAN.BMP written to Appendix.		10-Apr-01 12:01:29

8.16 Analogue telemetry - Channel B Positive and Negative transitions.

STEP 25	Mixed		
Connect the channel 1 scope probe to pin 8, with scope ground connection to pin 42, on the second breakout box.	ok		10-Apr-01 12:03:17
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 12:03:17
SCOPE:MESS:SHOW 'Channel B Analogue Telemetry Waveform +ve transition\nCH2 EXECUTE+ CH1 Analogue B'	SCOPE:MESS:SHOW 'Channel B Analogue Telemetry Waveform +ve transition\nCH2 EXECUTE+ CH1 Analogue B' done.		10-Apr-01 12:03:17
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.23V, Channel B = 14.24V		10-Apr-01 12:03:17
SCOPE: HARDCOPY ANALOGBP.BMP	ANALOGBP.BMP written to Appendix.		10-Apr-01 12:03:17
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 12:03:17
SCOPE:MESS:SHOW 'Channel B Analogue Telemetry Waveform -ve transition\nCH2 EXECUTE+ CH1 Analogue B'	SCOPE:MESS:SHOW 'Channel B Analogue Telemetry Waveform -ve transition\nCH2 EXECUTE+ CH1 Analogue B' done.		10-Apr-01 12:03:17
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.23V, Channel B = -15.23V		10-Apr-01 12:03:17
SCOPE: HARDCOPY ANALOGBN.BMP	ANALOGBN.BMP written to Appendix.		10-Apr-01 12:03:17
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		10-Apr-01 12:03:17

9 POWER ON PCU USING QA AND NA, ACTIVATE PRIME RELAY SETS

STEP 26	Mixed		
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		10-Apr-01 13:36:00
QA: OFF	QA: OFF Done		10-Apr-01 13:36:00
Change IPU load box cable to Side A at load box.	ok		10-Apr-01 13:36:00
Connect current probe to Oscilloscope CH1.	ok		10-Apr-01 13:36:00
Clip current probe to QA current probe measurement point.	ok		10-Apr-01 13:36:00
Set current probe power switch to 100mA/V.	ok		10-Apr-01 13:36:00
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		10-Apr-01 13:36:00
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:POS 20 done.		10-Apr-01 13:36:00
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		10-Apr-01 13:36:00
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		10-Apr-01 13:36:00
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		10-Apr-01 13:36:00
SCOPE:TRIG:A:LEVEL 7.5E-2	SCOPE:TRIG:A:LEVEL 7.5E-2 done.		10-Apr-01 13:36:00
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		10-Apr-01 13:36:01
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 13:36:01
SCOPE:MESS:SHOW 'QA Prime Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QA Prime Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		10-Apr-01 13:36:01
QA: ON	QA: ON Done		10-Apr-01 13:36:01
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		10-Apr-01 13:36:01
SCOPE: HARDCOPY INRUSHAP.BMP	INRUSHAP.BMP written to Appendix.		10-Apr-01 13:36:01
QA: IO?	Current 1.43A		10-Apr-01 13:36:01

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.38A, Channel B = 1.38A		10-Apr-01 13:36:01

9.1 Power On telemetry verification.

STEP 27	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 13:36:27
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.2V		10-Apr-01 13:36:27
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.77V, Channel B = -14.77V		10-Apr-01 13:36:27
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		10-Apr-01 13:36:27
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 13:36:27
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =19.9C, Channel B = 20.2C		10-Apr-01 13:36:28
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =19.6C, Channel B = 19.6C		10-Apr-01 13:36:28
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		10-Apr-01 13:36:28
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		10-Apr-01 13:36:28
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		10-Apr-01 13:36:28
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		10-Apr-01 13:36:28
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		10-Apr-01 13:36:28
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 13:36:28
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		10-Apr-01 13:36:28

PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		10-Apr-01 13:36:29

9.2 QC Power On with Primary Relay.
Carries out PSM-58 macro, and then relevant telemetry.

STEP 28	Mixed		
PORTA: QA (PR) ON	IFC Echo = F00A		10-Apr-01 13:39:50
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		10-Apr-01 13:39:50
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		10-Apr-01 13:39:50
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		10-Apr-01 13:39:50
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		10-Apr-01 13:39:50
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		10-Apr-01 13:39:50
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 13:39:50
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		10-Apr-01 13:39:50
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		10-Apr-01 13:39:50
QA: IO?	Current 1.54A		10-Apr-01 13:39:50
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.49A, Channel B = 1.49A		10-Apr-01 13:39:50
Connect current probe to Oscilloscope Ch2.	ok		10-Apr-01 13:39:50
Set current probe power switch to 100mA/V.	ok		10-Apr-01 13:39:50
Connect the differential probe to Oscilloscope Ch3.	ok		10-Apr-01 13:39:51
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		10-Apr-01 13:39:51
SCOPE: CH2:VOLT 0.2	SCOPE:CH2:VOLT 0.2 done.		10-Apr-01 13:39:51

9.3 Power on System Converters – prime set.

Power on Prime set of converters using PSM-13 and PSM-15. Outputs need to be selected using prime relay set. Telemetry checks done between and after macros.

STEP 29	Mixed		
NA: ON	NA: ON Done		10-Apr-01 13:41:31
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		10-Apr-01 13:41:31
SCOPE:TRIG:A:LEVEL +0.3V	SCOPE:TRIG:A:LEVEL +0.3V done.		10-Apr-01 13:41:31
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 13:41:31
SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		10-Apr-01 13:41:31
PORTA: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		10-Apr-01 13:41:31
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		10-Apr-01 13:41:31
SCOPE: HARDCOPY SYS1AQA.BMP	SYS1AQA.BMP written to Appendix.		10-Apr-01 13:41:31
PORTA: PSSV09;+5Volt DC-DC Converter SYS A	IFC Echo = 0008, Telemetry Channel A =5.36V, Channel B = 5.36V		10-Apr-01 13:41:31
PORTA: PSSV01;28Volt DC-DC Converter SYS A	IFC Echo = 000B, Telemetry Channel A =30.0V, Channel B = 30.0V		10-Apr-01 13:41:31
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.57A, Channel B = 1.57A		10-Apr-01 13:41:31
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		10-Apr-01 13:41:31
SCOPE:TRIG:A:LEVEL +0.4V	SCOPE:TRIG:A:LEVEL +0.4V done.		10-Apr-01 13:41:32
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 13:41:32

SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		10-Apr-01 13:41:32
PORTA: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		10-Apr-01 13:41:32
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 5009		10-Apr-01 13:41:32
SCOPE: HARDCOPY SYS2AQA.BMP	SYS2AQA.BMP written to Appendix.		10-Apr-01 13:41:32
PORTA: PSSV11;+15Volt DC-DC Converter SYS A	IFC Echo = 0009, Telemetry Channel A =15.24V, Channel B = 15.24V		10-Apr-01 13:41:32
PORTA: PSSV13;-15Volt DC-DC Converter SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.36V		10-Apr-01 13:41:32
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.64A, Channel B = 1.64A		10-Apr-01 13:41:32
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		10-Apr-01 13:41:34
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH2 ON done.		10-Apr-01 13:41:34

9.4 TEU A – Prime output relays – 28V.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through prime relays. This carries out PSM-18, PSM42, and PSM-45 macros with telemetry checks between macros.

STEP 30	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		10-Apr-01 13:46:08
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		10-Apr-01 13:46:08
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		10-Apr-01 13:46:08
Fit a breakout connector between the connector saver on J916 on the PCU, and the cable going to the Load Box	ok		10-Apr-01 13:46:09
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		10-Apr-01 13:46:09
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		10-Apr-01 13:46:09
PORTA: A_TEU_+28QC (PR) ON	IFC Echo = F014		10-Apr-01 13:46:09
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0006		10-Apr-01 13:46:09
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =2.29A, Channel B = 2.29A		10-Apr-01 13:46:09
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		10-Apr-01 13:46:09
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		10-Apr-01 13:46:09
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		10-Apr-01 13:46:09

9.5 TEU A – Prime output relays – 5V

STEP 31	Mixed		
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	done		10-Apr-01 13:48:53
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 13:48:53
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		10-Apr-01 13:48:53
SCOPE:TRIG:A:LEVEL 0.3	SCOPE:TRIG:A:LEVEL 0.3 done.		10-Apr-01 13:48:53
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 13:48:53
SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 0.2A/Div' done.		10-Apr-01 13:48:53
PORTA: A_TEU_+5 (PR) ON	IFC Echo = F00C		10-Apr-01 13:48:53
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500F		10-Apr-01 13:48:53
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		10-Apr-01 13:48:53
SCOPE:HARDCOPY TEUAC2.BMP	TEUAC2.BMP written to Appendix.		10-Apr-01 13:48:54
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.31V, Channel B = 5.31V		10-Apr-01 13:48:54
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =2.55A, Channel B = 2.55A		10-Apr-01 13:48:54
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		10-Apr-01 13:48:54
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		10-Apr-01 13:48:54
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		10-Apr-01 13:48:54
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		10-Apr-01 13:48:54
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 13:48:54
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 13:48:54

9.6 TEU A – Prime output relays – +/-15V

STEP 32	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		10-Apr-01 13:51:35
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		10-Apr-01 13:51:35
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 13:51:35
SCOPE:MESS:SHOW 'TEU A +15V Prime \nCurrent Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU A +15V Prime \nCurrent Waveform, 0.2A/Div' done.		10-Apr-01 13:51:35
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		10-Apr-01 13:51:35
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		10-Apr-01 13:51:35
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		10-Apr-01 13:51:35
Check that the Oscilloscope has triggered.	ok		10-Apr-01 13:51:35
SCOPE:HARDCOPY TEUAC3.BMP	TEUAC3.BMP written to Appendix.		10-Apr-01 13:51:36
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		10-Apr-01 13:51:36
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		10-Apr-01 13:51:36
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		10-Apr-01 13:51:36
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 13:51:36
SCOPE:TRIG:A:LEVEL 0.2	SCOPE:TRIG:A:LEVEL 0.2 done.		10-Apr-01 13:51:36
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 13:51:36
SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 2A/Div' done.		10-Apr-01 13:51:36
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		10-Apr-01 13:51:36
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		10-Apr-01 13:51:36
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		10-Apr-01 13:51:36

SCOPE:HARDCOPY TEUAC4.BMP	TEUAC4.BMP written to Appendix.		10-Apr-01 13:51:36
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.22V, Channel B = 15.22V		10-Apr-01 13:51:36
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.33V		10-Apr-01 13:51:37
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =2.95A, Channel B = 2.95A		10-Apr-01 13:51:37
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		10-Apr-01 13:51:37

9.7 TEU A Noise and voltage measurements – 28V and 5V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 33	Mixed		
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:EDGE:SOURCE CH3 done.		10-Apr-01 16:09:42
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		10-Apr-01 16:09:42
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH3 ON done.		10-Apr-01 16:09:42
Measure and record the voltage between Pin 3 (Ret) and Pin 2 (Power) at the breakout connector on J916. (Loaded)	28.50V		10-Apr-01 16:09:42
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J916. (Loaded)	28.50V		10-Apr-01 16:09:42
SCOPE:MESS:SHOW 'TEU A 28V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU A 28V Prime Noise Waveform' done.		10-Apr-01 16:09:42
Connect the Oscilloscope differential probe to pins 2 and 3 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 16:09:42
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		10-Apr-01 16:09:43
SCOPE:HARDCOPY TEUAN1.BMP	TEUAN1.BMP written to Appendix.		10-Apr-01 16:09:43
Measure and record the voltage between Pin 12 (Ret) and Pin 10 (Power) at the breakout connector on J916. (Loaded)	5.148		10-Apr-01 16:09:43
Measure and record the voltage between Pin 25 (Ret) and Pin 23 (Power) at the breakout connector on J916. (Loaded)	5.149V		10-Apr-01 16:09:43
SCOPE:MESS:SHOW 'TEU A 5V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU A 5V Prime Noise Waveform' done.		10-Apr-01 16:09:43
Connect the Oscilloscope differential probe to pins 12 and 10 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 16:09:43

SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		10-Apr-01 16:09:43
SCOPE:HARDCOPY TEUAN2.BMP	TEUAN2.BMP written to Appendix.		10-Apr-01 16:09:43
On Load Box select "I" position of TEU 28 V load switch.	ok		10-Apr-01 16:09:43
Measure and record the voltage between Pin 3 (Ret) and Pin 2 (Power) at the breakout connector on J916. (No Load)	28.66V		10-Apr-01 16:09:43
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J916. (No Load)	28.66V		10-Apr-01 16:09:43
On Load Box select "I" position of TEU 5V load switch.	ok		10-Apr-01 16:09:43
Measure and record the voltage between Pin 12 (Ret) and Pin 10 (Power) at the breakout connector on J916. (No Load)	5.356V		10-Apr-01 16:09:43
Measure and record the voltage between Pin 25 (Ret) and Pin 23 (Power) at the breakout connector on J916. (No Load)	5.356V		10-Apr-01 16:09:43
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		10-Apr-01 16:09:43
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		10-Apr-01 16:09:43
On Load Box select "V" position of TEU 28 V load switch.	ok		10-Apr-01 16:09:43
On Load Box select "V" position of TEU 5V load switch.	ok		10-Apr-01 16:09:43
PORTA: A_TEU_+28QC (PR) ON	IFC Echo = F014		10-Apr-01 16:09:43
PORTA: A_TEU_+5 (PR) ON	IFC Echo = F00C		10-Apr-01 16:09:43

9.8 TEU A Noise and voltage measurements – +/-15V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 34	Mixed		
Measure and record the voltage between Pin 12 (Ret) and Pin 6 (Power) at the breakout connector on J916. (Loaded)	15.21V		10-Apr-01 16:29:06
Measure and record the voltage between Pin 25 (Ret) and Pin 19 (Power) at the breakout connector on J916. (Loaded)	15.20V		10-Apr-01 16:29:06
Measure and record the voltage between Pin 12 (Ret) and Pin 7 (Power) at the breakout connector on J916. (Loaded)	-15.30V		10-Apr-01 16:29:06
Measure and record the voltage between Pin 25 (Ret) and Pin 20 (Power) at the breakout connector on J916. (Loaded)	-15.30V		10-Apr-01 16:29:06
SCOPE:MESS:SHOW 'TEU A +15V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU A +15V Prime Noise Waveform' done.		10-Apr-01 16:29:06
Connect the Oscilloscope differential probe to pins 12 and 7 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 16:29:06
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		10-Apr-01 16:29:07
SCOPE:HARDCOPY TEUAN3.BMP	TEUAN3.BMP written to Appendix.		10-Apr-01 16:29:07
SCOPE:MESS:SHOW 'TEU A -15V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU A -15V Prime Noise Waveform' done.		10-Apr-01 16:29:07
Connect the Oscilloscope differential probe to pins 12 and 6 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 16:29:07
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		10-Apr-01 16:29:07
SCOPE:HARDCOPY TEUAN4.BMP	TEUAN4.BMP written to Appendix.		10-Apr-01 16:29:07
On Load Box select "I" position of TEU +15V load switch.	ok		10-Apr-01 16:29:07

On Load Box select "I" position of TEU -15V load switch.	ok		10-Apr-01 16:29:07
Measure and record the voltage between Pin 12 (Ret) and Pin 6 (Power) at the breakout connector on J916. (No Load)	15.24V		10-Apr-01 16:29:07
Measure and record the voltage between Pin 25 (Ret) and Pin 19 (Power) at the breakout connector on J916. (No Load)	15.24V		10-Apr-01 16:29:07
Measure and record the voltage between Pin 12 (Ret) and Pin 7 (Power) at the breakout connector on J916. (No Load)	-15.34V		10-Apr-01 16:29:07
Measure and record the voltage between Pin 25 (Ret) and Pin 20 (Power) at the breakout connector on J916. (No Load)	-15.33V		10-Apr-01 16:29:07
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		10-Apr-01 16:29:07
On Load Box select "V" position of TEU +15V load switch.	ok		10-Apr-01 16:29:07
On Load Box select "V" position of TEU -15V load switch.	ok		10-Apr-01 16:29:07
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		10-Apr-01 16:29:07
Measure and record the voltage at the load box TEU 28 volt front panel jacks.	24.74V		10-Apr-01 16:29:07
Measure and record the current at the load box TEU 28 volt front panel jacks.	0.64A		10-Apr-01 16:29:07
Measure and record the voltage at the load box TEU +15 volt front panel jacks	15.05V		10-Apr-01 16:29:07
Measure and record the current at the load box TEU +15 volt front panel jacks	0.32A		10-Apr-01 16:29:07
Measure and record the voltage at the load box TEU -15 volt front panel jacks	-15.35V		10-Apr-01 16:29:08
Measure and record the current at the load box TEU -15 volt front panel jacks	0.27A		10-Apr-01 16:29:08
Measure and record the voltage at the load box TEU 5 volt front panel jacks.	4.86V		10-Apr-01 16:29:08
Measure and record the current at the load box TEU 5 volt front panel jacks.	1.05A		10-Apr-01 16:29:08

9.9 Turn on EEA – Prime relays 5V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply EEA through prime relays. This carries out PSM-54 macro, with telemetry checks between 5V and 15V operations

STEP 35	Mixed		
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		10-Apr-01 16:43:50
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		10-Apr-01 16:43:50
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		10-Apr-01 16:43:50
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		10-Apr-01 16:43:50
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		10-Apr-01 16:43:50
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		10-Apr-01 16:43:50
SCOPE:TRIG:A:LEVEL 0.015	SCOPE:TRIG:A:LEV EL 0.015 done.		10-Apr-01 16:43:50
Fit a breakout connector between the connector saver on J919 on the PCU, and the cable going to the Load Box	ok		10-Apr-01 16:43:51
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 16:43:51
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 16:43:51
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 16:43:51
SCOPE:MESS:SHOW 'EEA 5V Prime \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHO W 'EEA 5V Prime \nSoft Start Current Waveform, 0.2A/Div' done.		10-Apr-01 16:43:51
PORTA: EEA_+5 (PR) ON	IFC Echo = F008		10-Apr-01 16:43:51
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		10-Apr-01 16:43:51
SCOPE:HARDCOPY EEA5VPR.BMP	EEA5VPR.BMP written to Appendix.		10-Apr-01 16:43:51
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.05A, Channel B = 3.05A		10-Apr-01 16:43:51
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		10-Apr-01 16:43:51

Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 16:43:53
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 16:43:53

9.10 EEA – Prime relays +/-15V

STEP 36	Mixed		
SCOPE:TRIG:A:LEVEL 0.15	SCOPE:TRIG:A:LEVEL 0.15 done.		10-Apr-01 16:47:55
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 16:47:55
SCOPE:MESS:SHOW 'EEA +15V Prime Soft Start Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'EEA +15V Prime Soft Start Current Waveform, 2A/Div' done.		10-Apr-01 16:47:55
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		10-Apr-01 16:47:55
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		10-Apr-01 16:47:55
SCOPE:HARDCOPY EEA15PPV.BMP	EEA15PPV.BMP written to Appendix.		10-Apr-01 16:47:55
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		10-Apr-01 16:47:55
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		10-Apr-01 16:47:55
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 16:47:55
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 16:47:55
SCOPE:TRIG:A:LEVEL 0.2	SCOPE:TRIG:A:LEVEL 0.2 done.		10-Apr-01 16:47:55
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 16:47:55
SCOPE:MESS:SHOW 'EEA -15V Prime Soft Start Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'EEA -15V Prime Soft Start Current Waveform, 2A/Div' done.		10-Apr-01 16:47:55
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		10-Apr-01 16:47:55
SCOPE:HARDCOPY EEA15NPV.BMP	EEA15NPV.BMP written to Appendix.		10-Apr-01 16:47:55
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		10-Apr-01 16:47:55
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.13A, Channel B = 3.13A		10-Apr-01 16:47:55

PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.28V, Channel B = 5.28V		10-Apr-01 16:47:56
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.22V, Channel B = 15.21V		10-Apr-01 16:47:56
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.35V		10-Apr-01 16:47:56
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		10-Apr-01 16:47:56

9.11 EEA Noise and Voltage measurements – 5V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 37	Mixed		
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:EDGE:SOURCE CH3 done.		10-Apr-01 16:58:18
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		10-Apr-01 16:58:19
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH3 ON done.		10-Apr-01 16:58:19
Measure and record the voltage between Pin 7 (Ret) and Pin 1 (Power) at the breakout connector on J919. (Loaded)	5.22V		10-Apr-01 16:58:19
Measure and record the voltage between Pin 8 (Ret) and Pin 2 (Power) at the breakout connector on J919. (Loaded)	5.22V		10-Apr-01 16:58:19
SCOPE:MESS:SHOW 'EEA 5V Prime Noise Waveform'	SCOPE:MESS:SHOW 'EEA 5V Prime Noise Waveform' done.		10-Apr-01 16:58:19
Connect the Oscilloscope differential probe to pins 7 and 1 on J919. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 16:58:19
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		10-Apr-01 16:58:19
SCOPE:HARDCOPY EEAN1.BMP	EEAN1.BMP written to Appendix.		10-Apr-01 16:58:19
On Load Box select "I" position of EEA 5V load switch.	ok		10-Apr-01 16:58:19
Measure and record the voltage between Pin 7 (Ret) and Pin 1 (Power) at the breakout connector on J919. (No Load)	5.31V		10-Apr-01 16:58:19
Measure and record the voltage between Pin 8 (Ret) and Pin 2 (Power) at the breakout connector on J919. (No Load)	5.31V		10-Apr-01 16:58:19
Measure and record the voltage between Pin 9 (Ret) and Pin 3 (Power) at the breakout connector on J919. (Loaded)	15.23V		10-Apr-01 16:58:19
Measure and record the voltage between Pin 10 (Ret) and Pin 4 (Power) at the breakout connector on J919. (Loaded)	15.23V		10-Apr-01 16:58:19

Measure and record the voltage between Pin 7 (Ret) and Pin 13 (Power) at the breakout connector on J919. (Loaded)	-15.29V		10-Apr-01 16:58:19
Measure and record the voltage between Pin 9 (Ret) and Pin 14 (Power) at the breakout connector on J919. (Loaded)	-15.29V		10-Apr-01 16:58:19

9.12 EEA Noise and Voltage measurements – +/-15V.

STEP 38	Mixed		
SCOPE:MESS:SHOW 'EEA +15V Prime Noise Waveform'	SCOPE:MESS:SHOW 'EEA +15V Prime Noise Waveform' done.		10-Apr-01 17:09:22
Connect the Oscilloscope differential probe to pins 10 and 4 on J919. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 17:09:22
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		10-Apr-01 17:09:22
SCOPE:HARDCOPY EEAN2.BMP	EEAN2.BMP written to Appendix.		10-Apr-01 17:09:22
SCOPE:MESS:SHOW 'EEA –15V Prime Noise Waveform'	SCOPE:MESS:SHOW 'EEA –15V Prime Noise Waveform' done.		10-Apr-01 17:09:22
Connect the Oscilloscope differential probe to pins 7 and 13 on J919. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 17:09:22
SCOPE:HARDCOPY EEAN3.BMP	EEAN3.BMP written to Appendix.		10-Apr-01 17:09:22
On Load Box select "I" position of EEA +15V load switch.	ok		10-Apr-01 17:09:23
On Load Box select "I" position of EEA –15V load switch.	ok		10-Apr-01 17:09:23
Measure and record the voltage between Pin 9 (Ret) and Pin 3 (Power) at the breakout connector on J919. (No Load)	15.25V		10-Apr-01 17:09:23
Measure and record the voltage between Pin 10 (Ret) and Pin 4 (Power) at the breakout connector on J919. (No Load)	15.24V		10-Apr-01 17:09:23
Measure and record the voltage between Pin 7 (Ret) and Pin 13 (Power) at the breakout connector on J919. (No Load)	-15.30V		10-Apr-01 17:09:23
Measure and record the voltage between Pin 9 (Ret) and Pin 14 (Power) at the breakout connector on J919. (No Load)	-15.30V		10-Apr-01 17:09:23
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		10-Apr-01 17:09:23
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		10-Apr-01 17:09:23
On the load box select the "V" position of the EEA 5V load switch.	ok		10-Apr-01 17:09:23

On Load Box select "V" position of EEA +15V load switch.	ok		10-Apr-01 17:09:23
On Load Box select "V" position of EEA –15V load switch.	ok		10-Apr-01 17:09:23
PORTA: EEA_+5 (PR) ON	IFC Echo = F008		10-Apr-01 17:09:23
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		10-Apr-01 17:09:23
Measure and record the voltage at the load box EEA +15 volt front panel jacks	15.20V		10-Apr-01 17:09:23
Measure and record the current at the load box EEA +15 volt front panel jacks	67mA		10-Apr-01 17:09:23
Measure and record the voltage at the load box EEA –15 volt front panel jacks	-15.30V		10-Apr-01 17:09:23
Measure and record the current at the load box EEA –15 volt front panel jacks	49mA		10-Apr-01 17:09:23
Measure and record the voltage at the load box EEA 5 volt front panel jacks.	5.14V		10-Apr-01 17:09:23
Measure and record the current at the load box EEA 5 volt front panel jacks.	0.42A		10-Apr-01 17:09:23

9.13 IPU 28 Volt Regulated supply – Prime relay.
Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through prime relays. This carries out PSM-24 macro.

STEP 39	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		10-Apr-01 17:12:14
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		10-Apr-01 17:12:14
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		10-Apr-01 17:12:14
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		10-Apr-01 17:12:14
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		10-Apr-01 17:12:14
SCOPE: CH2:VOLT 0.1	SCOPE:CH2:VOLT 0.1 done.		10-Apr-01 17:12:14
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		10-Apr-01 17:12:14
SCOPE:TRIG:A:LEVEL 0.06	SCOPE:TRIG:A:LEV EL 0.06 done.		10-Apr-01 17:12:14
Fit a breakout connector between the connector saver on J913 on the PCU, and the cable going to the Load Box	ok		10-Apr-01 17:12:14
Fit a current monitor loop to the IPU 28V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 17:12:14
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 17:12:14
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 17:12:14
SCOPE:MESS:SHOW 'IPU A 28Vreg (Prime) \nStart Current Waveform, 1A/Div'	SCOPE:MESS:SHO W 'IPU A 28Vreg (Prime) \nStart Current Waveform, 1A/Div' done.		10-Apr-01 17:12:15
PORTA: A_IPU_+28REG (PR) ON	IFC Echo = F002		10-Apr-01 17:12:15
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 500F		10-Apr-01 17:12:15
SCOPE:HARDCOPY IPUA1.BMP	IPUA1.BMP written to Appendix.		10-Apr-01 17:12:15
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.91V		10-Apr-01 17:12:15

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.01A, Channel B = 5.02A		10-Apr-01 17:12:15
Set the switch on the 28Vreg monitor to "V" and remove the current loop.	ok		10-Apr-01 17:12:15

9.14 IPU 28 volt regulated supply Noise and Voltage measurements.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 40	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		10-Apr-01 17:25:09
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH 3 ON done.		10-Apr-01 17:25:09
Measure and record the voltage between Pin 20 (Ret) and Pin 7 (Power) at the breakout connector on J913. (Loaded)	29.87V		10-Apr-01 17:25:09
Measure and record the voltage between Pin 21 (Ret) and Pin 8 (Power) at the breakout connector on J913. (Loaded)	29.87V		10-Apr-01 17:25:09
SCOPE:MESS:SHOW 'IPU A 28Vreg Prime Noise Waveform'	SCOPE:MESS:SHO W 'IPU A 28Vreg Prime Noise Waveform' done.		10-Apr-01 17:25:09
Connect the Oscilloscope differential probe to pins 20 and 7 on J913. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 17:25:09
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		10-Apr-01 17:25:09
SCOPE:HARDCOPY IPUN1.BMP	IPUN1.BMP written to Appendix.		10-Apr-01 17:25:09
On Load Box select "I" position of IPU 28Vreg load switch.	ok		10-Apr-01 17:25:09
Measure and record the voltage between Pin 20 (Ret) and Pin 7 (Power) at the breakout connector on J913. (No Load)	30.10V		10-Apr-01 17:25:09
Measure and record the voltage between Pin 21 (Ret) and Pin 8 (Power) at the breakout connector on J913. (No Load)	30.10V		10-Apr-01 17:25:09
Measure and record the voltage between Pin 15 (Ret) and Pin 2 (Power) at the breakout connector on J913. (Loaded)	28.60V		10-Apr-01 17:25:09
Measure and record the voltage between Pin 16 (Ret) and Pin 3 (Power) at the breakout connector on J913. (Loaded)	28.57V		10-Apr-01 17:25:09
On Load Box select "I" position of IPU 28V load switch.	ok		10-Apr-01 17:25:09

Measure and record the voltage between Pin 15 (Ret) and Pin 2 (Power) at the breakout connector on J913. (No Load)	28.77V		10-Apr-01 17:25:09
Measure and record the voltage between Pin 16 (Ret) and Pin 3 (Power) at the breakout connector on J913. (No Load)	28.77V		10-Apr-01 17:25:09
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		10-Apr-01 17:25:09
On Load Box select "V" position of IPU 28V load switch.	ok		10-Apr-01 17:25:09
On Load Box select "V" position of IPU 28Vreg load switch.	ok		10-Apr-01 17:25:09
PORTA: A_IPU_+28REG (PR) ON	IFC Echo = F002		10-Apr-01 17:25:09
Measure and record the voltage at the load box IPU Reg 28 volt front panel jacks.	29.47V		10-Apr-01 17:25:09
Measure and record the current at the load box IPU Reg 28 volt front panel jacks.	1.51A		10-Apr-01 17:25:09
Measure and record the voltage at the load box IPU Unreg 28 volt front panel jacks.	23.99V		10-Apr-01 17:25:09
Measure and record the current at the load box IPU Unreg 28 volt front panel jacks.	1.25A		10-Apr-01 17:25:09

9.15 Power on SPU A Supplies from QA.
This carries out PSM-10 and PSM-38 macros.

STEP 41	Mixed		
Change SPU load box cable to Side A at load box.	ok		10-Apr-01 17:32:04
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		10-Apr-01 17:32:04
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		10-Apr-01 17:32:04
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		10-Apr-01 17:32:04
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		10-Apr-01 17:32:04
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		10-Apr-01 17:32:04
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		10-Apr-01 17:32:04
Fit a breakout connector between the connector saver on J915 on the PCU, and the cable going to the Load Box	ok		10-Apr-01 17:32:05
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 17:32:05
SCOPE:MESS:SHOW 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		10-Apr-01 17:32:05
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		10-Apr-01 17:32:05
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.11A, Channel B = 5.11A		10-Apr-01 17:32:05
SCOPE: HARDCOPY SPUAQA.BMP	SPUAQA.BMP written to Appendix.		10-Apr-01 17:32:05
PORTA:PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		10-Apr-01 17:32:05
PORTA: SPU_+5B OFF	IFC Echo = C018		10-Apr-01 17:32:05
PORTA: SPU_+/-15B OFF	IFC Echo = C019		10-Apr-01 17:32:05
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		10-Apr-01 17:32:05

SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		10-Apr-01 17:32:06
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		10-Apr-01 17:32:06
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		10-Apr-01 17:32:06
SCOPE:TRIG:A:LEVEL 0.03	SCOPE:TRIG:A:LEV EL 0.03 done.		10-Apr-01 17:32:06
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 17:32:06
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 17:32:06
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 17:32:06
SCOPE:MESS:SHOW 'SPU A +15V \nSoft Start Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU A +15V \nSoft Start Current Waveform, 2A/Div' done.		10-Apr-01 17:32:06

9.16 SPU A 5V and +/-15V Outputs.

STEP 42	Mixed		
PORTA:PSS_STATUS_00	IFC Echo = 4000, Telemetry 500F		10-Apr-01 17:37:14
PORTA:PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		10-Apr-01 17:37:14
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.11A, Channel B = 5.11A		10-Apr-01 17:37:14
SCOPE: HARDCOPY SPUAC15P.BMP	SPUAC15P.BMP written to Appendix.		10-Apr-01 17:37:14
SCOPE:TRIG:A:LEVEL 0.03	SCOPE:TRIG:A:LEVEL 0.03 done.		10-Apr-01 17:37:14
PORTA: SPU_+/-15A OFF	IFC Echo = E019		10-Apr-01 17:37:14
On Load Box select "V" position of SPU +15V load switch.	ok		10-Apr-01 17:37:14
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 17:37:14
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 17:37:14
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 17:37:15
SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 2A/Div' done.		10-Apr-01 17:37:15
PORTA: SPU_+/-15A ON	IFC Echo = F019		10-Apr-01 17:37:15
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C0F		10-Apr-01 17:37:15
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		10-Apr-01 17:37:15
SCOPE: HARDCOPY SPUAC15N.BMP	SPUAC15N.BMP written to Appendix.		10-Apr-01 17:37:15
On Load Box select "V" position of SPU -15V load switch.	ok		10-Apr-01 17:37:15
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 17:37:15
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 17:37:15
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 17:37:15

SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 2A/Div' done.		10-Apr-01 17:37:15
PORTA: SPU_+5A ON	IFC Echo = F018		10-Apr-01 17:37:15
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =6.43A, Channel B = 6.43A		10-Apr-01 17:37:15
SCOPE: HARDCOPY SPUAC5P.BMP	SPUAC5P.BMP written to Appendix.		10-Apr-01 17:37:15
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		10-Apr-01 17:37:15
PORTA PSS_STATUS_02	ok		10-Apr-01 17:37:15
PORTA:PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.56V, Channel B = 5.56V		10-Apr-01 17:37:16
PORTA:PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.19V, Channel B = 15.18V		10-Apr-01 17:37:16
PORTA:PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.27V, Channel B = -15.26V		10-Apr-01 17:37:16
On Load Box select "V" position of load switch and remove current loop.	ok		10-Apr-01 17:37:16

9.17 SPU A Noise and Voltage measurement +/-15V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 43	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		10-Apr-01 18:24:05
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH 3 ON done.		10-Apr-01 18:24:05
Measure and record the voltage between Pin 10 (Ret) and Pin 3 (Power) at the breakout connector on J915. (Loaded)	5.48V		10-Apr-01 18:24:05
Measure and record the voltage between Pin 5 (Ret) and Pin 12 (Power) at the breakout connector on J915. (Loaded)	15.04V		10-Apr-01 18:24:05
Measure and record the voltage between Pin 5 (Ret) and Pin 13 (Power) at the breakout connector on J915. (Loaded)	-15.18V		10-Apr-01 18:24:05
SCOPE:MESS:SHOW 'SPU A +5V Noise Waveform'	SCOPE:MESS:SHO W 'SPU A +5V Noise Waveform' done.		10-Apr-01 18:24:05
Connect the Oscilloscope differential probe to pins 10 and 3 on J915. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 18:24:05
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		10-Apr-01 18:24:05
SCOPE:HARDCOPY SPUN5A.BMP	SPUN5A.BMP written to Appendix.		10-Apr-01 18:24:06
SCOPE:MESS:SHOW 'SPU A +15V Noise Waveform'	SCOPE:MESS:SHO W 'SPU A +15V Noise Waveform' done.		10-Apr-01 18:24:06
Connect the Oscilloscope differential probe to pins 5 and 12 on J915. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 18:24:06
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		10-Apr-01 18:24:06
SCOPE:HARDCOPY SPUNP15A.BMP	SPUNP15A.BMP written to Appendix.		10-Apr-01 18:24:06
SCOPE:MESS:SHOW 'SPU A -15V Noise Waveform'	SCOPE:MESS:SHO W 'SPU A -15V Noise Waveform' done.		10-Apr-01 18:24:06

Connect the Oscilloscope differential probe to pins 5 and 13 on J915. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		10-Apr-01 18:24:06
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		10-Apr-01 18:24:06
SCOPE:HARDCOPY SPUNN15A.BMP	SPUNN15A.BMP written to Appendix.		10-Apr-01 18:24:06

9.18 SPU A Noise and Voltage measurements 5V.

STEP 44	Mixed		
On Load Box select "I" position of SPU 5V load switch.	ok		10-Apr-01 18:32:03
On Load Box select "I" position of SPU +15V load switch.	ok		10-Apr-01 18:32:03
On Load Box select "I" position of SPU –15V load switch.	ok		10-Apr-01 18:32:03
Measure and record the voltage between Pin 10 (Ret) and Pin 3 (Power) at the breakout connector on J915. (No Load)	5.60V		10-Apr-01 18:32:03
Measure and record the voltage between Pin 5 (Ret) and Pin 12 (Power) at the breakout connector on J915. (No Load)	15.28V		10-Apr-01 18:32:03
Measure and record the voltage between Pin 5 (Ret) and Pin 13 (Power) at the breakout connector on J915. (No Load)	-15.24V		10-Apr-01 18:32:03
PORTA: SPU_+5A OFF	IFC Echo = E018		10-Apr-01 18:32:03
PORTA: SPU_+/-15A OFF	IFC Echo = E019		10-Apr-01 18:32:03
On Load Box select "V" position of SPU 5V load switch.	ok		10-Apr-01 18:32:03
On Load Box select "V" position of SPU +15V load switch.	ok		10-Apr-01 18:32:03
On Load Box select "V" position of SPU –15V load switch.	ok		10-Apr-01 18:32:03
PORTA: SPU_+5A ON	IFC Echo = F018		10-Apr-01 18:32:03
PORTA: SPU_+/-15A ON	IFC Echo = F019		10-Apr-01 18:32:03
Measure and record the voltage at the load box SPU +15 volt front panel jacks	not measured		10-Apr-01 18:32:03
Measure and record the current at the load box SPU +15 volt front panel jacks	1.21A		10-Apr-01 18:32:03
Measure and record the voltage at the load box SPU -15 volt front panel jacks	not measured		10-Apr-01 18:32:03
Measure and record the current at the load box SPU -15 volt front panel jacks	0.52A		10-Apr-01 18:32:03
Measure and record the voltage at the load box SPU 5 volt front panel jacks.	not measured		10-Apr-01 18:32:03
Measure and record the current at the load box SPU 5 volt front panel jacks.	0.67A		10-Apr-01 18:32:03

9.19 GEU Supplies – Prime relays.

Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power GEU from prime side. This carries out PSM-33 and PSM-30 macros.

STEP 45	Mixed		
Fit a breakout connector between the connector saver on J918 on the PCU, and the cable going to the Load Box	ok		10-Apr-01 18:38:01
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		10-Apr-01 18:38:01
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		10-Apr-01 18:38:01
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		10-Apr-01 18:38:01
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		10-Apr-01 18:38:01
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		10-Apr-01 18:38:01
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		10-Apr-01 18:38:01
SCOPE:TRIG:A:LEVEL 0.04	SCOPE:TRIG:A:LEV EL 0.04 done.		10-Apr-01 18:38:01
Fit a current monitor loop to the GEU 5V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 18:38:01
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 18:38:01
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 18:38:01
SCOPE:MESS:SHOW 'GEU Prime 5V \nPower On Current Waveform, 0.5A/Div'	SCOPE:MESS:SHO W 'GEU Prime 5V \nPower On Current Waveform, 0.5A/Div' done.		10-Apr-01 18:38:02
PORTA: GEU_+5 (PR) ON	IFC Echo = F004		10-Apr-01 18:38:02
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 500F		10-Apr-01 18:38:02
SCOPE: HARDCOPY GEUP5V.BMP	GEUP5V.BMP written to Appendix.		10-Apr-01 18:38:02
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =6.61A, Channel B = 6.61A		10-Apr-01 18:38:02
On Load Box select "V" position of GEU 5V load switch.	ok		10-Apr-01 18:38:02

Fit a current monitor loop to the GEU +15V monitor on the Load Box and set the switch to "I".	ok		10-Apr-01 18:38:02
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 18:38:02
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 18:38:02
SCOPE:MESS:SHOW 'GEU Prime +15V \nPower On Current Waveform, 0.5A/Div'	SCOPE:MESS:SHOW 'GEU Prime +15V \nPower On Current Waveform, 0.5A/Div' done.		10-Apr-01 18:38:02
PORTA: GEU_+/-15 (PR) ON	IFC Echo = F005		10-Apr-01 18:38:02
PORTA:PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		10-Apr-01 18:38:02
SCOPE: HARDCOPY GEUPP15V.BMP	GEUPP15V.BMP written to Appendix.		10-Apr-01 18:38:02
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		10-Apr-01 18:38:02
On Load Box select "V" position of +15V load switch and remove link.	ok		10-Apr-01 18:38:02
Fit a current monitor loop to the GEU -15V monitor on the Load Box and set the switch to "I".	okok		10-Apr-01 18:38:02
Fit the 2nd current probe to the current monitor loop.	ok		10-Apr-01 18:38:02
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 18:38:02
SCOPE:MESS:SHOW 'GEU Prime -15V \nPower On Current Waveform, 0.5A/Div'	SCOPE:MESS:SHOW 'GEU Prime -15V \nPower On Current Waveform, 0.5A/Div' done.		10-Apr-01 18:38:03
PORTA: GEU_+/-15 (PR) ON	IFC Echo = F005		10-Apr-01 18:38:03
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		10-Apr-01 18:38:03
SCOPE: HARDCOPY GEUPN15V.BMP	GEUPN15V.BMP written to Appendix.		10-Apr-01 18:38:03
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =7.28A, Channel B = 7.28A		10-Apr-01 18:38:03
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.25V, Channel B = 5.25V		10-Apr-01 18:38:03

PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		10-Apr-01 18:38:03
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		10-Apr-01 18:38:03
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		10-Apr-01 18:38:03
PORTA: GEU_+28QC (PR) ON	IFC Echo = F016		10-Apr-01 18:38:03
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		10-Apr-01 18:38:04
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =8.11A, Channel B = 8.11A		10-Apr-01 18:38:04

9.20 GEU Noise and Voltage measurements.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 46	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		10-Apr-01 18:45:28
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH 3 ON done.		10-Apr-01 18:45:29
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:ED GE:SOURCE CH3 done.		10-Apr-01 18:45:29
Measure and record the voltage between Pin 11 (Ret) and Pin 24 (Power) at the breakout connector on J918. (Loaded)	27.52V		10-Apr-01 18:45:29
Measure and record the voltage between Pin 12 (Ret) and Pin 25 (Power) at the breakout connector on J918. (Loaded)	27.52V		10-Apr-01 18:45:29
On Load Box select "I" position of GEU 28V load switch.	ok		10-Apr-01 18:45:29
Measure and record the voltage between Pin 11 (Ret) and Pin 24 (Power) at the breakout connector on J918. (No Load)	27.73V		10-Apr-01 18:45:29
Measure and record the voltage between Pin 12 (Ret) and Pin 25 (Power) at the breakout connector on J918. (No Load)	27.73V		10-Apr-01 18:45:29
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		10-Apr-01 18:45:29
On Load Box select "V" position of GEU 28V load switch.	ok		10-Apr-01 18:45:29
PORTA: GEU_+28QC (PR) ON	IFC Echo = F016		10-Apr-01 18:45:29
Measure and record the voltage between Pin 8 (Ret) and Pin 7 (Power) at the breakout connector on J918. (Loaded)	5.19V		10-Apr-01 18:45:29
Measure and record the voltage between Pin 20 (Ret) and Pin 19 (Power) at the breakout connector on J918. (Loaded)	5.19V		10-Apr-01 18:45:29
On Load Box select "I" position of GEU +5V load switch.	ok		10-Apr-01 18:45:29
Measure and record the voltage between Pin 8 (Ret) and Pin 7 (Power) at the breakout connector on J918. (No Load)	5.33V (TEU 5V off)		10-Apr-01 18:45:29
Measure and record the voltage between Pin 20 (Ret) and Pin 19 (Power) at the breakout connector on J918. (No Load)	5.33V (TEU 5V load off)		10-Apr-01 18:45:29

9.21 GEU Noise and Voltage measurements.

STEP 47	Mixed		
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		10-Apr-01 18:52:12
On Load Box select "V" position of GEU +5V load switch.	ok		10-Apr-01 18:52:12
PORTA: GEU_+5 (PR) ON	IFC Echo = F004		10-Apr-01 18:52:12
Measure and record the voltage between Pin 4 (Ret) and Pin 3 (Power) at the breakout connector on J918. (Loaded)	15.19V		10-Apr-01 18:52:12
Measure and record the voltage between Pin 16 (Ret) and Pin 2 (Power) at the breakout connector on J918. (Loaded)	15.19V		10-Apr-01 18:52:12
On Load Box select "I" position of GEU +15V load switch.	ok		10-Apr-01 18:52:12
Measure and record the voltage between Pin 4 (Ret) and Pin 3 (Power) at the breakout connector on J918. (No Load)	15.26V		10-Apr-01 18:52:12
Measure and record the voltage between Pin 16 (Ret) and Pin 2 (Power) at the breakout connector on J918. (No Load)	15.26V		10-Apr-01 18:52:12
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J918. (Loaded)	-15.23V		10-Apr-01 18:52:12
Measure and record the voltage between Pin 4 (Ret) and Pin 14 (Power) at the breakout connector on J918. (Loaded)	-15.23V		10-Apr-01 18:52:12
On Load Box select "I" position of GEU -15V load switch.	ok		10-Apr-01 18:52:12
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J918. (No Load)	-15.30V		10-Apr-01 18:52:12
Measure and record the voltage between Pin 4 (Ret) and Pin 14 (Power) at the breakout connector on J918. (No Load)	-15.30V		10-Apr-01 18:52:12
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		10-Apr-01 18:52:12
On Load Box select "V" position of GEU +15V load switch.	ok		10-Apr-01 18:52:12
On Load Box select "V" position of GEU -15V load switch.	ok		10-Apr-01 18:52:12
PORTA: GEU_+/-15 (PR) ON	IFC Echo = F005		10-Apr-01 18:52:12
Measure and record the voltage at the load box GEU 28 volt front panel jacks.	not measured		10-Apr-01 18:52:12
Measure and record the current at the load box GEU 28 volt front panel jacks.	0.80A		10-Apr-01 18:52:13

Measure and record the voltage at the load box GEU +15 volt front panel jacks	not measured		10-Apr-01 18:52:13
Measure and record the current at the load box GEU +15 volt front panel jacks	0.56A		10-Apr-01 18:52:13
Measure and record the voltage at the load box GEU –15 volt front panel jacks	not measured		10-Apr-01 18:52:13
Measure and record the current at the load box GEU –15 volt front panel jacks	0.50A		10-Apr-01 18:52:13
Measure and record the voltage at the load box GEU 5 volt front panel jacks.	not measured		10-Apr-01 18:52:13
Measure and record the current at the load box GEU 5 volt front panel jacks.	0.75A		10-Apr-01 18:52:13

9.22 Noisy Bus – NA – prime relay.
Turn on the Noisy Bus Output from the NA supply through the Prime Relay. This uses PSM-04 macro. Loaded and No Load voltages at PCU recorded.

STEP 48	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		10-Apr-01 18:55:03
PORTA: NB (RR) OFF	IFC Echo = C01D		10-Apr-01 18:55:03
PORTA: NA (RR) OFF	IFC Echo = C01C		10-Apr-01 18:55:03
PORTA: NA (PR) ON	IFC Echo = F01C		10-Apr-01 18:55:03
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		10-Apr-01 18:55:03
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (Loaded)	26.83V		10-Apr-01 18:55:03
Measure and record the current at the load box CCU 28 volt front panel jacks.	5.34A		10-Apr-01 18:55:03
On Load Box select "I" position of CCU 28V load switch.	ok		10-Apr-01 18:55:03
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (No Load)	29.01V		10-Apr-01 18:55:03
On Load Box select "V" position of CCU 28V load switch.	ok		10-Apr-01 18:55:03

9.23 Do complete telemetry check of PCU.
Now all outputs are on, do Digital Telemetry first.

STEP 49	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		10-Apr-01 18:55:17
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		10-Apr-01 18:55:17
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		10-Apr-01 18:55:17
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		10-Apr-01 18:55:17
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		10-Apr-01 18:55:17
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		10-Apr-01 18:55:17

PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		10-Apr-01 18:55:17
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		10-Apr-01 18:55:17

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 50	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		10-Apr-01 18:55:46
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 18:55:46
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.18V		10-Apr-01 18:55:46
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.84V, Channel B = -14.83V		10-Apr-01 18:55:46
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		10-Apr-01 18:55:46
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 18:55:47
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.86A, Channel B = 7.85A		10-Apr-01 18:55:47
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.03A		10-Apr-01 18:55:47
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		10-Apr-01 18:55:47
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		10-Apr-01 18:55:47

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		10-Apr-01 18:55:47
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.91V		10-Apr-01 18:55:47
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		10-Apr-01 18:55:47
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		10-Apr-01 18:55:47
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		10-Apr-01 18:55:47
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.14V		10-Apr-01 18:55:47

Analogue Telemetry block 2.

STEP 51	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.55V, Channel B = 5.55V		10-Apr-01 18:56:13
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		10-Apr-01 18:56:13
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.27V, Channel B = -15.27V		10-Apr-01 18:56:13
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.03V, Channel B = -0.03V		10-Apr-01 18:56:13
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		10-Apr-01 18:56:13
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.09V		10-Apr-01 18:56:13
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =29.3C, Channel B = 29.3C		10-Apr-01 18:56:13
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:56:13
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =34.3C, Channel B = 34.3C		10-Apr-01 18:56:13
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:56:13

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =26.9C, Channel B = 26.9C		10-Apr-01 18:56:13
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =26.7C, Channel B = 26.9C		10-Apr-01 18:56:14
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =26.7C, Channel B = 26.4C		10-Apr-01 18:56:14
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =25.8C, Channel B = 25.8C		10-Apr-01 18:56:14

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V-regulator temperature.

STEP 52	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =31.3C, Channel B = 31.3C		10-Apr-01 18:56:41
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =33.1C, Channel B = 33.1C		10-Apr-01 18:56:41
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =31.3C, Channel B = 31.3C		10-Apr-01 18:56:41
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =35.4C, Channel B = 35.4C		10-Apr-01 18:56:42
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =29.9C, Channel B = 29.9C		10-Apr-01 18:56:42
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =28.7C, Channel B = 28.7C		10-Apr-01 18:56:42
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =30.8C, Channel B = 31.1C		10-Apr-01 18:56:42
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =29.0C, Channel B = 29.0C		10-Apr-01 18:56:42
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =29.9C, Channel B = 29.9C		10-Apr-01 18:56:42
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:56:42

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =30.2C, Channel B = 30.2C		10-Apr-01 18:56:42
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =37.5C, Channel B = 37.5C		10-Apr-01 18:56:43
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =26.7C, Channel B = 26.7C		10-Apr-01 18:56:43
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =24.3C, Channel B = 24.3C		10-Apr-01 18:56:43
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =25.8C, Channel B = 25.8C		10-Apr-01 18:56:43

9.24 Do High Voltage Input Limit Test

Adjust the QA and NA supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 53	Mixed		
QA: V=32.0V	QA: V=32.0V Done		10-Apr-01 18:56:58
NA: V=32.0V	NA: V=32.0V Done		10-Apr-01 18:56:58
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		10-Apr-01 18:56:58
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		10-Apr-01 18:56:58
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		10-Apr-01 18:56:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		10-Apr-01 18:56:58
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		10-Apr-01 18:56:58
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		10-Apr-01 18:56:58
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		10-Apr-01 18:56:58
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		10-Apr-01 18:56:58

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 54	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 18:57:26
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.18V		10-Apr-01 18:57:26
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.71V, Channel B = -14.7V		10-Apr-01 18:57:26
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		10-Apr-01 18:57:26
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 18:57:26
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.69A, Channel B = 7.69A		10-Apr-01 18:57:26
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		10-Apr-01 18:57:26
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		10-Apr-01 18:57:26
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		10-Apr-01 18:57:26
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		10-Apr-01 18:57:26

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.91V		10-Apr-01 18:57:26
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		10-Apr-01 18:57:26
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.06V		10-Apr-01 18:57:26
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		10-Apr-01 18:57:26
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.14V		10-Apr-01 18:57:27

Analogue Telemetry block 2.

STEP 55	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.55V, Channel B = 5.55V		10-Apr-01 18:57:52
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		10-Apr-01 18:57:52
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.27V, Channel B = -15.27V		10-Apr-01 18:57:52
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.03V		10-Apr-01 18:57:52
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.1V		10-Apr-01 18:57:52
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.09V		10-Apr-01 18:57:52
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =29.3C, Channel B = 29.6C		10-Apr-01 18:57:53
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =31.6C, Channel B = 31.9C		10-Apr-01 18:57:53
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =34.6C, Channel B = 34.3C		10-Apr-01 18:57:53
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:57:53
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =26.9C, Channel B = 26.9C		10-Apr-01 18:57:53

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =26.7C, Channel B = 26.9C		10-Apr-01 18:57:53
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =26.4C, Channel B = 26.4C		10-Apr-01 18:57:53
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =25.8C, Channel B = 25.8C		10-Apr-01 18:57:53

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V-regulator temperature.

STEP 56	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =31.3C, Channel B = 31.3C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =33.1C, Channel B = 33.1C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =35.7C, Channel B = 35.7C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =29.9C, Channel B = 29.9C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =28.7C, Channel B = 28.7C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =31.1C, Channel B = 31.1C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =29.0C, Channel B = 29.3C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:58:19
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =30.2C, Channel B = 29.9C		10-Apr-01 18:58:19

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =38.1C, Channel B = 37.8C		10-Apr-01 18:58:20
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =26.4C, Channel B = 26.4C		10-Apr-01 18:58:20
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =24.3C, Channel B = 24.3C		10-Apr-01 18:58:20
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =25.8C, Channel B = 26.1C		10-Apr-01 18:58:20

9.25 Do Low Operating Voltage Limit Test.
Adjust the QA and NA supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 57	Mixed		
QA: V=26.0V	QA: V=26.0V Done		10-Apr-01 18:58:35
NA: V=26.0V	NA: V=26.0V Done		10-Apr-01 18:58:35
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		10-Apr-01 18:58:35
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		10-Apr-01 18:58:35
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		10-Apr-01 18:58:36
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		10-Apr-01 18:58:36
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		10-Apr-01 18:58:36
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		10-Apr-01 18:58:36
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		10-Apr-01 18:58:36
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		10-Apr-01 18:58:36

Analogue telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 58	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 18:59:03
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.18V		10-Apr-01 18:59:04
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.82V, Channel B = -14.8V		10-Apr-01 18:59:04
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		10-Apr-01 18:59:04
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 18:59:04
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.15A, Channel B = 8.15A		10-Apr-01 18:59:04
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		10-Apr-01 18:59:04
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.3V		10-Apr-01 18:59:04
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		10-Apr-01 18:59:04
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		10-Apr-01 18:59:04

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.93V		10-Apr-01 18:59:04
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		10-Apr-01 18:59:04
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		10-Apr-01 18:59:04
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		10-Apr-01 18:59:04
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.14V		10-Apr-01 18:59:04

Analogue Telemetry block 2.

STEP 59	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.55V, Channel B = 5.55V		10-Apr-01 18:59:30
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.16V, Channel B = 15.18V		10-Apr-01 18:59:30
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.27V, Channel B = -15.27V		10-Apr-01 18:59:30
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.03V		10-Apr-01 18:59:30
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		10-Apr-01 18:59:31
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		10-Apr-01 18:59:31
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =29.3C, Channel B = 29.3C		10-Apr-01 18:59:31
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:59:31
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =34.3C, Channel B = 34.3C		10-Apr-01 18:59:31
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =31.3C, Channel B = 31.6C		10-Apr-01 18:59:31
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =26.7C, Channel B = 26.9C		10-Apr-01 18:59:31

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =26.9C, Channel B = 26.9C		10-Apr-01 18:59:31
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =26.4C, Channel B = 26.4C		10-Apr-01 18:59:31
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =25.5C, Channel B = 25.8C		10-Apr-01 18:59:31

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V-regulator temperature.

STEP 60	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =31.3C, Channel B = 31.3C		10-Apr-01 18:59:57
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =33.1C, Channel B = 33.1C		10-Apr-01 18:59:57
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =31.6C, Channel B = 31.6C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =35.7C, Channel B = 35.4C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =29.9C, Channel B = 29.9C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =28.7C, Channel B = 28.7C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =31.1C, Channel B = 31.1C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =29.3C, Channel B = 29.3C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =31.9C, Channel B = 31.9C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =30.5C, Channel B = 30.5C		10-Apr-01 18:59:58

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =37.5C, Channel B = 37.5C		10-Apr-01 18:59:58
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =26.7C, Channel B = 26.4C		10-Apr-01 18:59:59
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =24.3C, Channel B = 24.3C		10-Apr-01 18:59:59
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =25.8C, Channel B = 25.8C		10-Apr-01 18:59:59

9.26 Turn off all relays.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.
This table is PSM-02 macro.

STEP 61	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		10-Apr-01 19:00:58
PORTB: SPU_+5B OFF	IFC Echo = C018		10-Apr-01 19:00:58
PORTB: SPU_+/-15A OFF	IFC Echo = E019		10-Apr-01 19:00:58
PORTB: SPU_+5A OFF	IFC Echo = E018		10-Apr-01 19:00:58
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		10-Apr-01 19:00:58
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		10-Apr-01 19:00:58
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		10-Apr-01 19:00:58
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		10-Apr-01 19:00:58
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		10-Apr-01 19:00:59
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		10-Apr-01 19:00:59
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		10-Apr-01 19:00:59
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		10-Apr-01 19:00:59
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		10-Apr-01 19:00:59
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		10-Apr-01 19:00:59
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		10-Apr-01 19:00:59
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		10-Apr-01 19:00:59
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		10-Apr-01 19:00:59
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		10-Apr-01 19:00:59
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		10-Apr-01 19:00:59
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		10-Apr-01 19:00:59
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		10-Apr-01 19:00:59
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		10-Apr-01 19:00:59
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		10-Apr-01 19:00:59
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		10-Apr-01 19:00:59
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		10-Apr-01 19:00:59
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		10-Apr-01 19:00:59
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		10-Apr-01 19:00:59
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		10-Apr-01 19:00:59
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		10-Apr-01 19:00:59
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		10-Apr-01 19:00:59
PORTB: NA (PR) OFF	IFC Echo = E01C		10-Apr-01 19:00:59
PORTB: NA (RR) OFF	IFC Echo = C01C		10-Apr-01 19:00:59
PORTB: NB (PR) OFF	IFC Echo = E01D		10-Apr-01 19:00:59
PORTB: NB (RR) OFF	IFC Echo = C01D		10-Apr-01 19:00:59

This table is PSM-01 Macro.

STEP 62	Mixed		
PORTB: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		10-Apr-01 19:01:10
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		10-Apr-01 19:01:10
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		10-Apr-01 19:01:10
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		10-Apr-01 19:01:10
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		10-Apr-01 19:01:10
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		10-Apr-01 19:01:10

9.27 Test Quiet Bus Low Voltage detect signal
Very the operation of the +28QC_PWR Low Volts signal. Bit 15 of PSS_STATUS_06 should go high when the voltage drops below 20 volts.

STEP 63	Mixed		
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		10-Apr-01 19:01:17
NA: OFF	NA: OFF Done		10-Apr-01 19:01:17
QA: V=19.8V	QA: V=19.8V Done		10-Apr-01 19:01:17
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 8000		10-Apr-01 19:01:17
QA: V=29V	QA: V=29V Done		10-Apr-01 19:01:18
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		10-Apr-01 19:01:18

9.28 Status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QA.

STEP 64	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 19:01:52
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.2V, Channel B = 14.2V		10-Apr-01 19:01:52
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.9V, Channel B = -14.9V		10-Apr-01 19:01:52
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		10-Apr-01 19:01:52
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 19:01:52
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =29.0C, Channel B = 29.0C		10-Apr-01 19:01:52
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =26.7C, Channel B = 26.9C		10-Apr-01 19:01:52
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		10-Apr-01 19:01:52
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		10-Apr-01 19:01:52
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		10-Apr-01 19:01:52
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		10-Apr-01 19:01:52
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		10-Apr-01 19:01:52
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 19:01:52

PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		10-Apr-01 19:01:53
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		10-Apr-01 19:01:53
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		10-Apr-01 19:01:53
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		10-Apr-01 19:01:53
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		10-Apr-01 19:01:54
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		10-Apr-01 19:01:54
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		10-Apr-01 19:01:54
QA: OFF	QA: OFF Done		10-Apr-01 19:01:54

10 POWER ON PCU USING QA AND NA, REDUNDANT RELAY SETS.
Enters with redundant internal supply already selected at end of previous table.

STEP 65	Mixed		
QA:V=29.0v	QA:V=29.0v Done		10-Apr-01 19:02:39
QB:V=29.0v	QB:V=29.0v Done		10-Apr-01 19:02:39
NA:V=29.0v	NA:V=29.0v Done		10-Apr-01 19:02:39
NB:V=29.0v	NB:V=29.0v Done		10-Apr-01 19:02:39
SCOPE:Select:CH1 ON	SCOPE:SELECT:CH 1 ON done.		10-Apr-01 19:02:39
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		10-Apr-01 19:02:39
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		10-Apr-01 19:02:39
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH 4 OFF done.		10-Apr-01 19:02:39
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		10-Apr-01 19:02:39
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		10-Apr-01 19:02:40
SCOPE:TRIG:A:EDGE:SLOPE RISE	SCOPE:TRIG:A:ED GE:SLOPE RISE done.		10-Apr-01 19:02:40
SCOPE:TRIG:A:LEVEL 7.5E-2	SCOPE:TRIG:A:LEV EL 7.5E-2 done.		10-Apr-01 19:02:40
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:P OS 20 done.		10-Apr-01 19:02:40
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOL D:TIM 2.0E-2 done.		10-Apr-01 19:02:40
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		10-Apr-01 19:02:40
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		10-Apr-01 19:02:40
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 19:02:40
SCOPE:MESS:SHOW 'QA/Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHO W 'QA/Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		10-Apr-01 19:02:40
QA: ON	QA: ON Done		10-Apr-01 19:02:40
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		10-Apr-01 19:02:41

SCOPE: HARDCOPY INRUSHAR.BMP	INRUSHAR.BMP written to Appendix.		10-Apr-01 19:02:41
QA: IO?	Current 1.42A		10-Apr-01 19:02:41
PORTA:QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.37A, Channel B = 1.37A		10-Apr-01 19:02:41

10.1 Power On telemetry verification.

STEP 66	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		10-Apr-01 19:03:09
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.25V, Channel B = 14.25V		10-Apr-01 19:03:09
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.09V, Channel B = -15.1V		10-Apr-01 19:03:09
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		10-Apr-01 19:03:09
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		10-Apr-01 19:03:09
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =28.1C, Channel B = 28.1C		10-Apr-01 19:03:09
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =27.8C, Channel B = 27.8C		10-Apr-01 19:03:10
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		10-Apr-01 19:03:10
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		10-Apr-01 19:03:10
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		10-Apr-01 19:03:10
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		10-Apr-01 19:03:10
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		10-Apr-01 19:03:10
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 19:03:10
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		10-Apr-01 19:03:11

PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		10-Apr-01 19:03:11

10.2 QC Power On, with Redundant Relay.
Carries out PSM-59 macro, and then relevant telemetry.

STEP 67	Mixed		
PORTA: QA (RR) ON	IFC Echo = D00A		10-Apr-01 19:03:27
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		10-Apr-01 19:03:27
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		10-Apr-01 19:03:28
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		10-Apr-01 19:03:28
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		10-Apr-01 19:03:28
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		10-Apr-01 19:03:28
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		10-Apr-01 19:03:29
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		10-Apr-01 19:03:29
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		10-Apr-01 19:03:29

10.3 Power on System Converters, - Redundant set.
Power on using PSM-14 and PSM-16. Outputs need to be selected using redundant relay set. Telemetry checks done between and after macros.

STEP 68	Mixed		
NA: ON	NA: ON Done		10-Apr-01 19:04:56
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		10-Apr-01 19:04:56
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		10-Apr-01 19:04:56
SCOPE:TRIG:A:LEVEL +0.2V	SCOPE:TRIG:A:LEVEL +0.2V done.		10-Apr-01 19:04:56
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 19:04:56
SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		10-Apr-01 19:04:56
PORTA: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		10-Apr-01 19:04:56
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		10-Apr-01 19:04:56
SCOPE: HARDCOPY SYS1BQA.BMP	SYS1BQA.BMP written to Appendix.		10-Apr-01 19:04:56
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.36V		10-Apr-01 19:04:56
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.98V, Channel B = 29.98V		10-Apr-01 19:04:57
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.57A, Channel B = 1.57A		10-Apr-01 19:04:57
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		10-Apr-01 19:04:57
SCOPE:TRIG:A:LEVEL +0.3V	SCOPE:TRIG:A:LEVEL +0.3V done.		10-Apr-01 19:04:57
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		10-Apr-01 19:04:57

SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		10-Apr-01 19:04:57
PORTA: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		10-Apr-01 19:04:57
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A012		10-Apr-01 19:04:57
SCOPE: HARDCOPY SYS2BQA.BMP	SYS2BQA.BMP written to Appendix.		10-Apr-01 19:04:57
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.63A, Channel B = 1.64A		10-Apr-01 19:04:57
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.28V, Channel B = 15.25V		10-Apr-01 19:04:57
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.37V, Channel B = -15.36V		10-Apr-01 19:04:58
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		10-Apr-01 19:04:58
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH2 ON done.		10-Apr-01 19:04:58

10.4 TEU A – Redundant Output relays – 28V.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through redundant relays. This carries out PSM-19, PSM43, and PSM-46 macros with telemetry checks between macros.

STEP 69	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		10-Apr-01 19:05:15
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		10-Apr-01 19:05:15
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		10-Apr-01 19:05:15
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		10-Apr-01 19:05:16
SCOPE:TRIG:A:LEVEL 0.2	SCOPE:TRIG:A:LEVEL 0.2 done.		10-Apr-01 19:05:16
PORTA: A_TEU_+28QC (RR) ON	IFC Echo = D014		10-Apr-01 19:05:16
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0005		10-Apr-01 19:05:16
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.28A, Channel B = 2.28A		10-Apr-01 19:05:16
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		10-Apr-01 19:05:16
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		10-Apr-01 19:05:16
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		10-Apr-01 19:05:16

10.5 TEU A – Redundant output relays – 5V

STEP 70	Mixed		
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 09:47:44
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 09:47:44
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 09:47:44
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 09:47:44
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 09:47:44
SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 09:47:44
PORTA: A_TEU_+5 (RR) ON	IFC Echo = D00C		11-Apr-01 09:47:44
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A017		11-Apr-01 09:47:44
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		11-Apr-01 09:47:44
SCOPE:HARDCOPY TEUAC6.BMP	TEUAC6.BMP written to Appendix.		11-Apr-01 09:47:44
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.02V		11-Apr-01 09:47:45
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.54A, Channel B = 2.54A		11-Apr-01 09:47:45
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		11-Apr-01 09:47:45
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		11-Apr-01 09:47:45
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		11-Apr-01 09:47:45
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		11-Apr-01 09:47:45
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 09:47:45
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 09:47:45

10.6 TEU A – Redundant output relays – +/-15V

STEP 71	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 09:54:34
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 09:54:34
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 09:54:34
SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 09:54:34
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		11-Apr-01 09:54:34
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		11-Apr-01 09:54:34
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		11-Apr-01 09:54:34
SCOPE:HARDCOPY TEUAC7.BMP	TEUAC7.BMP written to Appendix.		11-Apr-01 09:54:34
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		11-Apr-01 09:54:34
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		11-Apr-01 09:54:34
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		11-Apr-01 09:54:34
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 09:54:34
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 09:54:34
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 09:54:34
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 09:54:34
SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 09:54:34
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		11-Apr-01 09:54:35
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		11-Apr-01 09:54:35

PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		11-Apr-01 09:54:35
SCOPE:HARDCOPY TEUAC8.BMP	TEUAC8.BMP written to Appendix.		11-Apr-01 09:54:35
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.94A, Channel B = 2.94A		11-Apr-01 09:54:35
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.23V		11-Apr-01 09:54:35
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		11-Apr-01 09:54:35
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =2.95A, Channel B = 2.94A		11-Apr-01 09:54:35
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		11-Apr-01 09:54:35

10.7 TEU Noise and voltage measurements – 28V and 5V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 72	Mixed		
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:EDGE:SOURCE CH3 done.		11-Apr-01 10:08:57
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		11-Apr-01 10:08:57
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH3 ON done.		11-Apr-01 10:08:57
Measure and record the voltage between Pin 3 (Ret) and Pin 2 (Power) at the breakout connector on J916. (Loaded)	28.50V		11-Apr-01 10:08:57
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J916. (Loaded)	28.51V		11-Apr-01 10:08:57
SCOPE:MESS:SHOW 'TEU A 28V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'TEU A 28V Redundant Noise Waveform' done.		11-Apr-01 10:08:57
Connect the Oscilloscope differential probe to pins 2 and 3 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:08:57
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 10:08:57
SCOPE:HARDCOPY TEUAN5.BMP	TEUAN5.BMP written to Appendix.		11-Apr-01 10:08:57
On Load Box select "I" position of TEU 28 V load switch.	ok		11-Apr-01 10:08:57
Measure and record the voltage between Pin 3 (Ret) and Pin 2 (Power) at the breakout connector on J916. (No Load)	28.66V		11-Apr-01 10:08:57
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J916. (No Load)	28.66V		11-Apr-01 10:08:57
Measure and record the voltage between Pin 12 (Ret) and Pin 10 (Power) at the breakout connector on J916. (Loaded)	5.15V		11-Apr-01 10:08:57
Measure and record the voltage between Pin 25 (Ret) and Pin 23 (Power) at the breakout connector on J916. (Loaded)	5.15V		11-Apr-01 10:08:57

SCOPE:MESS:SHOW 'TEU A 5V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'TEU A 5V Redundant Noise Waveform' done.		11-Apr-01 10:08:57
Connect the Oscilloscope differential probe to pins 12 and 10 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:08:57
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 10:08:58
SCOPE:HARDCOPY TEUAN6.BMP	TEUAN6.BMP written to Appendix.		11-Apr-01 10:08:58
On Load Box select "I" position of TEU 5V load switch.	ok		11-Apr-01 10:08:58
Measure and record the voltage between Pin 12 (Ret) and Pin 10 (Power) at the breakout connector on J916. (No Load)	5.36V		11-Apr-01 10:08:58
Measure and record the voltage between Pin 25 (Ret) and Pin 23 (Power) at the breakout connector on J916. (No Load)	5.36V		11-Apr-01 10:08:58
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		11-Apr-01 10:08:58
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		11-Apr-01 10:08:58
On Load Box select "V" position of TEU 28 V load switch.	ok		11-Apr-01 10:08:58
On Load Box select "V" position of TEU 5V load switch.	ok		11-Apr-01 10:08:58
PORTA: A_TEU_+5 (RR) ON	IFC Echo = D00C		11-Apr-01 10:08:58
PORTA: A_TEU_+28QC (RR) ON	IFC Echo = D014		11-Apr-01 10:08:58

10.8 TEU Noise and voltage measurements – +/-15V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 73	Mixed		
Measure and record the voltage between Pin 12 (Ret) and Pin 6 (Power) at the breakout connector on J916. (Loaded)	15.22V		11-Apr-01 10:20:36
Measure and record the voltage between Pin 25 (Ret) and Pin 19 (Power) at the breakout connector on J916. (Loaded)	15.22V		11-Apr-01 10:20:36
Measure and record the voltage between Pin 12 (Ret) and Pin 7 (Power) at the breakout connector on J916. (Loaded)	-15.30V		11-Apr-01 10:20:36
Measure and record the voltage between Pin 25 (Ret) and Pin 20 (Power) at the breakout connector on J916. (Loaded)	-15.30V		11-Apr-01 10:20:36
SCOPE:MESS:SHOW 'TEU A +15V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'TEU A +15V Redundant Noise Waveform' done.		11-Apr-01 10:20:37
Connect the Oscilloscope differential probe to pins 12 and 7 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:20:37
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 10:20:37
SCOPE:HARDCOPY TEUAN7.BMP	TEUAN7.BMP written to Appendix.		11-Apr-01 10:20:37
SCOPE:MESS:SHOW 'TEU A -15V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'TEU A -15V Redundant Noise Waveform' done.		11-Apr-01 10:20:37
Connect the Oscilloscope differential probe to pins 12 and 6 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:20:37
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 10:20:37
SCOPE:HARDCOPY TEUAN8.BMP	TEUAN8.BMP written to Appendix.		11-Apr-01 10:20:37
On Load Box select "I" position of TEU +15V load switch.	ok		11-Apr-01 10:20:37
On Load Box select "I" position of TEU -15V load switch.	ok		11-Apr-01 10:20:37

Measure and record the voltage between Pin 12 (Ret) and Pin 6 (Power) at the breakout connector on J916. (No Load)	15.25V		11-Apr-01 10:20:37
Measure and record the voltage between Pin 25 (Ret) and Pin 19 (Power) at the breakout connector on J916. (No Load)	15.25V		11-Apr-01 10:20:37
Measure and record the voltage between Pin 12 (Ret) and Pin 7 (Power) at the breakout connector on J916. (No Load)	-15.34V		11-Apr-01 10:20:37
Measure and record the voltage between Pin 25 (Ret) and Pin 20 (Power) at the breakout connector on J916. (No Load)	-15.34V		11-Apr-01 10:20:37
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		11-Apr-01 10:20:37
On Load Box select "V" position of TEU +15V load switch.	ok		11-Apr-01 10:20:37
On Load Box select "V" position of TEU -15V load switch.	ok		11-Apr-01 10:20:37
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		11-Apr-01 10:20:37
Measure and record the voltage at the load box TEU 28 volt front panel jacks.	not measured		11-Apr-01 10:20:37
Measure and record the current at the load box TEU 28 volt front panel jacks.	0.64A		11-Apr-01 10:20:37
Measure and record the voltage at the load box TEU +15 volt front panel jacks	not measured		11-Apr-01 10:20:38
Measure and record the current at the load box TEU +15 volt front panel jacks	0.32A		11-Apr-01 10:20:38
Measure and record the voltage at the load box TEU –15 volt front panel jacks	not measured		11-Apr-01 10:20:38
Measure and record the current at the load box TEU –15 volt front panel jacks	0.27A		11-Apr-01 10:20:38
Measure and record the voltage at the load box TEU 5 volt front panel jacks.	not measured		11-Apr-01 10:20:38
Measure and record the current at the load box TEU 5 volt front panel jacks.	1.04A		11-Apr-01 10:20:38

10.9 EEA – Redundant Relays 5V.
Turns on supplies in order specified in C&TH Vol1 part 2 section 5.5.1 to supply EEA through redundant relays.

STEP 74	Mixed		
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		11-Apr-01 10:23:08
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		11-Apr-01 10:23:08
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		11-Apr-01 10:23:08
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		11-Apr-01 10:23:08
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 10:23:08
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		11-Apr-01 10:23:08
SCOPE:TRIG:A:LEVEL 0.015	SCOPE:TRIG:A:LEV EL 0.015 done.		11-Apr-01 10:23:09
Fit a breakout connector between the connector saver on J919 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 10:23:09
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 10:23:09
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 10:23:09
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 10:23:09
SCOPE:MESS:SHOW 'EEA 5V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHO W 'EEA 5V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 10:23:09
PORTA: EEA_+5 (RR) ON	IFC Echo = D008		11-Apr-01 10:23:09
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		11-Apr-01 10:23:09
SCOPE:HARDCOPY EEA5VR.BMP	EEA5VR.BMP written to Appendix.		11-Apr-01 10:23:09
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.04A, Channel B = 3.04A		11-Apr-01 10:23:09
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		11-Apr-01 10:23:09

Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 10:23:09
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 10:23:09

10.10 EEA – Redundant relays +/-15V

STEP 75	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 10:25:50
SCOPE:TRIG:A:LEVEL 0.15	SCOPE:TRIG:A:LEVEL 0.15 done.		11-Apr-01 10:25:50
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 10:25:50
SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 10:25:50
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		11-Apr-01 10:25:50
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 10:25:50
SCOPE:HARDCOPY EEA15PRV.BMP	EEA15PRV.BMP written to Appendix.		11-Apr-01 10:25:50
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		11-Apr-01 10:25:50
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		11-Apr-01 10:25:50
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 10:25:51
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 10:25:51
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 10:25:51
SCOPE:TRIG:A:LEVEL 0.15	SCOPE:TRIG:A:LEVEL 0.15 done.		11-Apr-01 10:25:51
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 10:25:51
SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 10:25:51
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		11-Apr-01 10:25:51
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 10:25:51
SCOPE:HARDCOPY EEA15NRV.BMP	EEA15NRV.BMP written to Appendix.		11-Apr-01 10:25:51

PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.12A, Channel B = 3.12A		11-Apr-01 10:25:51
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.28V, Channel B = 5.28V		11-Apr-01 10:25:52
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.23V		11-Apr-01 10:25:52
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		11-Apr-01 10:25:52
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		11-Apr-01 10:25:52

10.11 EEA Noise and Voltage measurements.

Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 76	Mixed		
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:EDGE:SOURCE CH3 done.		11-Apr-01 10:34:40
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		11-Apr-01 10:34:40
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH3 ON done.		11-Apr-01 10:34:40
Measure and record the voltage between Pin 7 (Ret) and Pin 1 (Power) at the breakout connector on J919. (Loaded)	5.20V		11-Apr-01 10:34:40
Measure and record the voltage between Pin 8 (Ret) and Pin 2 (Power) at the breakout connector on J919. (Loaded)	5.20V		11-Apr-01 10:34:40
SCOPE:MESS:SHOW 'EEA 5V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'EEA 5V Redundant Noise Waveform' done.		11-Apr-01 10:34:40
Connect the Oscilloscope differential probe to pins 7 and 1 on J919. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:34:40
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 10:34:41
SCOPE:HARDCOPY EEAN4.BMP	EEAN4.BMP written to Appendix.		11-Apr-01 10:34:41
On Load Box select "I" position of EEA 5V load switch.	ok		11-Apr-01 10:34:41
Measure and record the voltage between Pin 7 (Ret) and Pin 1 (Power) at the breakout connector on J919. (No Load)	5.31V		11-Apr-01 10:34:41
Measure and record the voltage between Pin 8 (Ret) and Pin 2 (Power) at the breakout connector on J919. (No Load)	5.31V		11-Apr-01 10:34:41
Measure and record the voltage between Pin 9 (Ret) and Pin 3 (Power) at the breakout connector on J919. (Loaded)	15.24V		11-Apr-01 10:34:41
Measure and record the voltage between Pin 10 (Ret) and Pin 4 (Power) at the breakout connector on J919. (Loaded)	15.24V		11-Apr-01 10:34:41

Measure and record the voltage between Pin 7 (Ret) and Pin 13 (Power) at the breakout connector on J919. (Loaded)	-15.29V		11-Apr-01 10:34:41
Measure and record the voltage between Pin 9 (Ret) and Pin 14 (Power) at the breakout connector on J919. (Loaded)	-15.29V		11-Apr-01 10:34:41
SCOPE:MESS:SHOW 'EEA +15V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'EEA +15V Redundant Noise Waveform' done.		11-Apr-01 10:34:41
Connect the Oscilloscope differential probe to pins 10 and 4 on J919. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:34:41

10.12 EEA Noise and Voltage measurements.

STEP 77	Mixed		
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 10:41:36
SCOPE:HARDCOPY EEAN5.BMP	EEAN5.BMP written to Appendix.		11-Apr-01 10:41:36
SCOPE:MESS:SHOW 'EEA -15V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'EEA -15V Redundant Noise Waveform' done.		11-Apr-01 10:41:36
Connect the Oscilloscope differential probe to pins 7 and 13 on J919. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:41:36
SCOPE:HARDCOPY EEAN6.BMP	EEAN6.BMP written to Appendix.		11-Apr-01 10:41:36
On Load Box select "I" position of EEA +15V load switch.	ok		11-Apr-01 10:41:36
On Load Box select "I" position of EEA -15V load switch.	ok		11-Apr-01 10:41:36
Measure and record the voltage between Pin 9 (Ret) and Pin 3 (Power) at the breakout connector on J919. (No Load)	15.26V		11-Apr-01 10:41:36
Measure and record the voltage between Pin 10 (Ret) and Pin 4 (Power) at the breakout connector on J919. (No Load)	15.26V		11-Apr-01 10:41:36
Measure and record the voltage between Pin 7 (Ret) and Pin 13 (Power) at the breakout connector on J919. (No Load)	-15.30V		11-Apr-01 10:41:36
Measure and record the voltage between Pin 9 (Ret) and Pin 14 (Power) at the breakout connector on J919. (No Load)	-15.30V		11-Apr-01 10:41:36
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		11-Apr-01 10:41:36
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		11-Apr-01 10:41:36
On the load box select the "V" position of the EEA 5V load switch.	ok		11-Apr-01 10:41:36
On Load Box select "V" position of EEA +15V load switch.	ok		11-Apr-01 10:41:36
On Load Box select "V" position of EEA -15V load switch.	ok		11-Apr-01 10:41:36
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		11-Apr-01 10:41:36
PORTA: EEA_+5 (RR) ON	IFC Echo = D008		11-Apr-01 10:41:36
Measure and record the voltage at the load box EEA +15 volt front panel jacks	not measured		11-Apr-01 10:41:37

Measure and record the current at the load box EEA +15 volt front panel jacks	66mA		11-Apr-01 10:41:37
Measure and record the voltage at the load box EEA –15 volt front panel jacks	not measured		11-Apr-01 10:41:37
Measure and record the current at the load box EEA –15 volt front panel jacks	49mA		11-Apr-01 10:41:37
Measure and record the voltage at the load box EEA 5 volt front panel jacks.	not measured		11-Apr-01 10:41:37
Measure and record the current at the load box EEA 5 volt front panel jacks.	420mA		11-Apr-01 10:41:37

10.13 IPU 28 Volt Regulated supply – Redundant relay.

Turns on supply in order specified in C&TH Vol1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through redundant relays. This carries out PSM-25 macro.

STEP 78	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		11-Apr-01 10:43:18
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		11-Apr-01 10:43:18
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		11-Apr-01 10:43:18
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH3 OFF done.		11-Apr-01 10:43:18
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH2 ON done.		11-Apr-01 10:43:18
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		11-Apr-01 10:43:18
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		11-Apr-01 10:43:18
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		11-Apr-01 10:43:18
Fit a breakout connector between the connector saver on J913 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 10:43:18
Fit a current monitor loop to the IPU 28V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 10:43:18
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 10:43:18
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 10:43:18
SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) Start Current Waveform, 0.5A/Div'	SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) Start Current Waveform, 0.5A/Div' done.		11-Apr-01 10:43:19
PORTA: A_IPU_+28REG (RR) ON	IFC Echo = D002		11-Apr-01 10:43:19
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		11-Apr-01 10:43:19
SCOPE:HARDCOPY IPUA2.BMP	IPUA2.BMP written to Appendix.		11-Apr-01 10:43:19
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =0.29V, Channel B = 29.81V		11-Apr-01 10:43:19

PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.19A, Channel B = 4.99A		11-Apr-01 10:43:19
Set the switch on the 28Vreg monitor to "V" and remove the current loop.	ok		11-Apr-01 10:43:19

10.14 IPU 28 volt regulated supply Noise and Voltage measurements.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 79	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		11-Apr-01 10:50:37
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH3 ON done.		11-Apr-01 10:50:37
Measure and record the voltage between Pin 20 (Ret) and Pin 7 (Power) at the breakout connector on J913. (Loaded)	29.79V		11-Apr-01 10:50:37
Measure and record the voltage between Pin 21 (Ret) and Pin 8 (Power) at the breakout connector on J913. (Loaded)	29.79V		11-Apr-01 10:50:37
SCOPE:MESS:SHOW 'IPU 28VReg Redundant Noise Waveform'	SCOPE:MESS:SHOW 'IPU 28VReg Redundant Noise Waveform' done.		11-Apr-01 10:50:37
Connect the Oscilloscope differential probe to pins 20 and 7 on J913. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 10:50:37
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 10:50:37
SCOPE:HARDCOPY IPUN2.BMP	IPUN2.BMP written to Appendix.		11-Apr-01 10:50:38
On Load Box select "I" position of IPU 28VReg load switch.	ok		11-Apr-01 10:50:38
Measure and record the voltage between Pin 15 (Ret) and Pin 2 (Power) at the breakout connector on J913. (Loaded)	28.59V		11-Apr-01 10:50:38
Measure and record the voltage between Pin 16 (Ret) and Pin 3 (Power) at the breakout connector on J913. (Loaded)	28.57V		11-Apr-01 10:50:38
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		11-Apr-01 10:50:38
On Load Box select "V" position of IPU 28VReg load switch.	ok		11-Apr-01 10:50:38
PORTA: A_IPU_+28REG (RR) ON	IFC Echo = D002		11-Apr-01 10:50:38
Measure and record the voltage at the load box IPU Reg 28 volt front panel jacks.	not measured		11-Apr-01 10:50:38

Measure and record the current at the load box IPU Reg 28 volt front panel jacks.	1.51A		11-Apr-01 10:50:38
Measure and record the voltage at the load box IPU Unreg 28 volt front panel jacks.	not measured		11-Apr-01 10:50:38
Measure and record the current at the load box IPU Unreg 28 volt front panel jacks.	1.25A		11-Apr-01 10:50:38

10.15 Power on SPU B Supplies

Turn on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side B using PSM-12 and PSM-40 macros.

STEP 80	Mixed		
Change SPU load box cable to Side B at load box.	ok		11-Apr-01 11:22:20
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		11-Apr-01 11:22:20
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		11-Apr-01 11:22:20
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		11-Apr-01 11:22:20
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 11:22:20
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		11-Apr-01 11:22:20
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		11-Apr-01 11:22:20
Fit a breakout connector between the connector saver on J915 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 11:22:20
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 11:22:20
SCOPE:MESS:SHOW 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		11-Apr-01 11:22:21
PORTA: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		11-Apr-01 11:22:21
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry A012		11-Apr-01 11:22:21
SCOPE: HARDCOPY SPUAQA.BMP	SPUAQA.BMP written to Appendix.		11-Apr-01 11:22:21
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.21A, Channel B = 5.09A		11-Apr-01 11:22:21
PORTA: SPU_+5A OFF	IFC Echo = E018		11-Apr-01 11:22:21
PORTA: SPU_+/-15A OFF	IFC Echo = E019		11-Apr-01 11:22:21
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		11-Apr-01 11:22:21

SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		11-Apr-01 11:22:21
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		11-Apr-01 11:22:21
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		11-Apr-01 11:22:21
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEV EL 0.05 done.		11-Apr-01 11:22:22
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 11:22:22
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 11:22:22
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 11:22:22
SCOPE:MESS:SHOW 'SPU Converter B +15V \nSoft Start Current Waveform, 0.5A/Div'	SCOPE:MESS:SHO W 'SPU Converter B +15V \nSoft Start Current Waveform, 0.5A/Div' done.		11-Apr-01 11:22:22

10.16 SPU B Supplies 5V and +/-V Outputs.

STEP 81	Mixed		
PORTA: SPU_+/-15B ON	IFC Echo = D019		11-Apr-01 11:27:20
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		11-Apr-01 11:27:20
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		11-Apr-01 11:27:20
SCOPE: HARDCOPY SPUBC15P.BMP	SPUBC15P.BMP written to Appendix.		11-Apr-01 11:27:20
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		11-Apr-01 11:27:20
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		11-Apr-01 11:27:20
PORTA: SPU_+/-15A OFF	IFC Echo = E019		11-Apr-01 11:27:20
On Load Box select "V" position of SPU +15V load switch and remove loop.	IFC Echo = C019		11-Apr-01 11:27:20
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 11:27:20
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 11:27:20
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 11:27:20
SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 0.5A/Div'	SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 0.5A/Div' done.		11-Apr-01 11:27:20
PORTA: SPU_+/-15B ON	IFC Echo = D019		11-Apr-01 11:27:20
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		11-Apr-01 11:27:20
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		11-Apr-01 11:27:21
SCOPE: HARDCOPY SPUBC15N.BMP	SPUBC15N.BMP written to Appendix.		11-Apr-01 11:27:21
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.12A, Channel B = 6.21A		11-Apr-01 11:27:21
On Load Box select "V" position of SPU -15V load switch.	ok		11-Apr-01 11:27:21
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 11:27:21

Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 11:27:21
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 11:27:21
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 11:27:21
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 11:27:21
SCOPE:MESS:SHOW 'SPU Converter B 5V Soft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'SPU Converter B 5V Soft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 11:27:21
PORTA: SPU_+5B ON	IFC Echo = D018		11-Apr-01 11:27:21
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.09A, Channel B = 6.4A		11-Apr-01 11:27:22
SCOPE: HARDCOPY SPUBC5P.BMP	SPUBC5P.BMP written to Appendix.		11-Apr-01 11:27:22
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		11-Apr-01 11:27:22
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE12		11-Apr-01 11:27:22
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =0.01V, Channel B = 5.5V		11-Apr-01 11:27:22
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.3V, Channel B = 15.15V		11-Apr-01 11:27:22
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-2.7V, Channel B = -15.28V		11-Apr-01 11:27:22
On Load Box select "V" position of SPU -15V load switch and remove loop.	ok		11-Apr-01 11:27:22

10.17 SPU B Noise and Voltage measurement.

Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.

Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 82	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		11-Apr-01 11:48:08
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH 3 ON done.		11-Apr-01 11:48:08
Measure and record the voltage between Pin 9 (Ret) and Pin 1 (Power) at the breakout connector on J915. (Loaded)	5.44V		11-Apr-01 11:48:08
Measure and record the voltage between Pin 15 (Ret) and Pin 7 (Power) at the breakout connector on J915. (Loaded)	15.05V		11-Apr-01 11:48:08
Measure and record the voltage between Pin 15 (Ret) and Pin 8 (Power) at the breakout connector on J915. (Loaded)	-15.20V		11-Apr-01 11:48:08
SCOPE:MESS:SHOW 'SPU B +5V Noise Waveform'	SCOPE:MESS:SHO W 'SPU B +5V Noise Waveform' done.		11-Apr-01 11:48:08
Connect the Oscilloscope differential probe to pins 10 and 3 on J915. Trigger the oscilloscope to obtain a stored trace of the waveform.	Pin 9 to Pin 1		11-Apr-01 11:48:09
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		11-Apr-01 11:48:09
SCOPE:HARDCOPY SPUN5B.BMP	SPUN5B.BMP written to Appendix.		11-Apr-01 11:48:09
SCOPE:MESS:SHOW 'SPU B +15V Noise Waveform'	SCOPE:MESS:SHO W 'SPU B +15V Noise Waveform' done.		11-Apr-01 11:48:09
Connect the Oscilloscope differential probe to pins 5 and 12 on J915. Trigger the oscilloscope to obtain a stored trace of the waveform.	Pin 15 to Pin 7		11-Apr-01 11:48:09
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		11-Apr-01 11:48:09
SCOPE:HARDCOPY SPUNP15B.BMP	SPUNP15B.BMP written to Appendix.		11-Apr-01 11:48:09
SCOPE:MESS:SHOW 'SPU B -15V Noise Waveform'	SCOPE:MESS:SHO W 'SPU B -15V Noise Waveform' done.		11-Apr-01 11:48:09

Connect the Oscilloscope differential probe to pins 5 and 13 on J915. Trigger the oscilloscope to obtain a stored trace of the waveform.	Pin 15 to Pin 8		11-Apr-01 11:48:09
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 11:48:09
SCOPE:HARDCOPY SPUNN15B.BMP	SPUNN15B.BMP written to Appendix.		11-Apr-01 11:48:09
On Load Box select "I" position of SPU 5V load switch.	ok		11-Apr-01 11:48:09
On Load Box select "I" position of SPU +15V load switch.	ok		11-Apr-01 11:48:09
On Load Box select "I" position of SPU -15V load switch.	ok		11-Apr-01 11:48:09
Measure and record the voltage between Pin 10 (Ret) and Pin 3 (Power) at the breakout connector on J915. (No Load)	Pin 9 to Pin 1 5.56V		11-Apr-01 11:48:09
Measure and record the voltage between Pin 5 (Ret) and Pin 12 (Power) at the breakout connector on J915. (No Load)	Pin 15 to Pin 7 15.29V		11-Apr-01 11:48:09
Measure and record the voltage between Pin 5 (Ret) and Pin 13 (Power) at the breakout connector on J915. (No Load)	Pin 15 to Pin 8 -15.28V		11-Apr-01 11:48:09
PORTA: SPU_+/-15B OFF	IFC Echo = C019		11-Apr-01 11:48:09
PORTA: SPU_+5B OFF	IFC Echo = C018		11-Apr-01 11:48:10
On Load Box select "V" position of SPU 5V load switch.	ok		11-Apr-01 11:48:10
On Load Box select "V" position of SPU +15V load switch.	ok		11-Apr-01 11:48:10
On Load Box select "V" position of SPU -15V load switch.	ok		11-Apr-01 11:48:10
PORTA: SPU_+/-15B ON	IFC Echo = D019		11-Apr-01 11:48:10
PORTA: SPU_+5B ON	IFC Echo = D018		11-Apr-01 11:48:10
Measure and record the voltage at the load box SPU +15 volt front panel jacks	not measured		11-Apr-01 11:48:10
Measure and record the current at the load box SPU +15 volt front panel jacks	1.21A		11-Apr-01 11:48:10
Measure and record the voltage at the load box SPU –15 volt front panel jacks	not measured		11-Apr-01 11:48:10
Measure and record the current at the load box SPU –15 volt front panel jacks	0.52A		11-Apr-01 11:48:10
Measure and record the voltage at the load box SPU 5 volt front panel jacks.	not measured		11-Apr-01 11:48:10
Measure and record the current at the load box SPU 5 volt front panel jacks.	0.67A		11-Apr-01 11:48:10

10.18 GEU Supplies – Redundant relays.

Turns on GEU supplies in order specified in C&TH Vol1 Part 2 section 5.5.5 to power GEU from prime side. This carries out PSM-36 and PSM-31 macros.

STEP 83	Mixed		
Fit a breakout connector between the connector saver on J918 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 11:52:21
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		11-Apr-01 11:52:21
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		11-Apr-01 11:52:21
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		11-Apr-01 11:52:21
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		11-Apr-01 11:52:21
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		11-Apr-01 11:52:21
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		11-Apr-01 11:52:21
SCOPE:TRIG:A:LEVEL 0.025	SCOPE:TRIG:A:LEVEL 0.025 done.		11-Apr-01 11:52:21
Fit a current monitor loop to the GEU 5V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 11:52:21
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 11:52:21
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 11:52:21
SCOPE:MESS:SHOW 'GEU Redundant 5V \nPower On Current Waveform, 0.5A/Div'	SCOPE:MESS:SHOW 'GEU Redundant 5V \nPower On Current Waveform, 0.5A/Div' done.		11-Apr-01 11:52:21
PORTA: GEU_+5 (RR) ON	IFC Echo = D004		11-Apr-01 11:52:22
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE17		11-Apr-01 11:52:22
SCOPE: HARDCOPY GEUR5V.BMP	GEUR5V.BMP written to Appendix.		11-Apr-01 11:52:22
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.6A, Channel B = 6.6A		11-Apr-01 11:52:22
On Load Box select "V" position of GEU 5V load switch and remove loop.	ok		11-Apr-01 11:52:22

Fit a current monitor loop to the GEU +15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 11:52:22
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 11:52:22
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		11-Apr-01 11:52:22
SCOPE:TRIG:A:LEVEL 0.025	SCOPE:TRIG:A:LEVEL 0.025 done.		11-Apr-01 11:52:22
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 11:52:22
SCOPE:MESS:SHOW 'GEU Redundant +15V \nPower On Current Waveform, 0.5A/Div'	SCOPE:MESS:SHOW 'GEU Redundant +15V \nPower On Current Waveform, 0.5A/Div' done.		11-Apr-01 11:52:22
PORTA: GEU_+/-15 (RR) ON	IFC Echo = D005		11-Apr-01 11:52:22
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 11:52:22
SCOPE: HARDCOPY GEURP15V.BMP	GEURP15V.BMP written to Appendix.		11-Apr-01 11:52:22
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		11-Apr-01 11:52:22
On Load Box select "V" position of SPU +15V load switch.	ok		11-Apr-01 11:52:22
Fit a current monitor loop to the GEU -15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 11:52:22
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 11:52:22
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		11-Apr-01 11:52:23
SCOPE:TRIG:A:LEVEL 0.025	SCOPE:TRIG:A:LEVEL 0.025 done.		11-Apr-01 11:52:23
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 11:52:23
SCOPE:MESS:SHOW 'GEU Redundant +15V \nPower On Current Waveform, 0.5A/Div'	SCOPE:MESS:SHOW 'GEU Redundant +15V \nPower On Current Waveform, 0.5A/Div' done.		11-Apr-01 11:52:23
PORTA: GEU_+/-15 (RR) ON	IFC Echo = D005		11-Apr-01 11:52:23
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 11:52:23
SCOPE: HARDCOPY GEURN15V.BMP	GEURN15V.BMP written to Appendix.		11-Apr-01 11:52:23

PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.28A, Channel B = 7.28A		11-Apr-01 11:52:23
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.24V, Channel B = 5.24V		11-Apr-01 11:52:23
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.2V		11-Apr-01 11:52:23
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.33V, Channel B = -15.32V		11-Apr-01 11:52:23
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		11-Apr-01 11:52:23
PORTA: GEU_+28QC (RR) ON	IFC Echo = D016		11-Apr-01 11:52:24
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		11-Apr-01 11:52:24
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.1A, Channel B = 8.1A		11-Apr-01 11:52:24

10.19 GEU Noise and Voltage measurements.

Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 84	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		11-Apr-01 11:57:30
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH 3 ON done.		11-Apr-01 11:57:30
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:ED GE:SOURCE CH3 done.		11-Apr-01 11:57:30
Measure and record the voltage between Pin 11 (Ret) and Pin 24 (Power) at the breakout connector on J918. (Loaded)	27.52V		11-Apr-01 11:57:30
Measure and record the voltage between Pin 12 (Ret) and Pin 25 (Power) at the breakout connector on J918. (Loaded)	27.52V		11-Apr-01 11:57:30
On Load Box select "I" position of GEU 28V load switch.	ok		11-Apr-01 11:57:30
Measure and record the voltage between Pin 11 (Ret) and Pin 24 (Power) at the breakout connector on J918. (No Load)	27.73V		11-Apr-01 11:57:30
Measure and record the voltage between Pin 12 (Ret) and Pin 25 (Power) at the breakout connector on J918. (No Load)	27.73V		11-Apr-01 11:57:30
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		11-Apr-01 11:57:30
On Load Box select "V" position of GEU 28V load switch.	ok		11-Apr-01 11:57:30
PORTA: GEU_+28QC (RR) ON	IFC Echo = D016		11-Apr-01 11:57:30
Measure and record the voltage between Pin 8 (Ret) and Pin 7 (Power) at the breakout connector on J918. (Loaded)	5.19V		11-Apr-01 11:57:30
Measure and record the voltage between Pin 20 (Ret) and Pin 19 (Power) at the breakout connector on J918. (Loaded)	5.19V		11-Apr-01 11:57:30
On Load Box select "I" position of GEU +5V load switch.	ok		11-Apr-01 11:57:30
Measure and record the voltage between Pin 8 (Ret) and Pin 7 (Power) at the breakout connector on J918. (No Load)	5.28V		11-Apr-01 11:57:30
Measure and record the voltage between Pin 20 (Ret) and Pin 19 (Power) at the breakout connector on J918. (No Load)	5.28V		11-Apr-01 11:57:30

PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		11-Apr-01 11:57:30
On Load Box select "V" position of GEU +5V load switch.	ok		11-Apr-01 11:57:31
PORTA: GEU_+5 (RR) ON	IFC Echo = D004		11-Apr-01 11:57:31

10.20 GEU Noise and Voltage measurements.

STEP 85	Mixed		
Measure and record the voltage between Pin 4 (Ret) and Pin 3 (Power) at the breakout connector on J918. (Loaded)	15.20V		11-Apr-01 12:02:33
Measure and record the voltage between Pin 16 (Ret) and Pin 2 (Power) at the breakout connector on J918. (Loaded)	15.20V		11-Apr-01 12:02:33
On Load Box select "I" position of GEU +15V load switch.	ok		11-Apr-01 12:02:33
Measure and record the voltage between Pin 4 (Ret) and Pin 3 (Power) at the breakout connector on J918. (No Load)	15.27V		11-Apr-01 12:02:33
Measure and record the voltage between Pin 16 (Ret) and Pin 2 (Power) at the breakout connector on J918. (No Load)	15.27V		11-Apr-01 12:02:33
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J918. (Loaded)	-15.23V		11-Apr-01 12:02:33
Measure and record the voltage between Pin 4 (Ret) and Pin 14 (Power) at the breakout connector on J918. (Loaded)	-15.23V		11-Apr-01 12:02:33
On Load Box select "I" position of GEU -15V load switch.	ok		11-Apr-01 12:02:33
Measure and record the voltage between Pin 16 (Ret) and Pin 15 (Power) at the breakout connector on J918. (No Load)	-15.30V		11-Apr-01 12:02:33
Measure and record the voltage between Pin 4 (Ret) and Pin 14 (Power) at the breakout connector on J918. (No Load)	-15.30V		11-Apr-01 12:02:33
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		11-Apr-01 12:02:33
On Load Box select "V" position of GEU +15V load switch.	ok		11-Apr-01 12:02:33
On Load Box select "V" position of GEU -15V load switch.	ok		11-Apr-01 12:02:33
PORTA: GEU_+/-15 (RR) ON	IFC Echo = D005		11-Apr-01 12:02:33
Measure and record the voltage at the load box GEU 28 volt front panel jacks.	not measured		11-Apr-01 12:02:33
Measure and record the current at the load box GEU 28 volt front panel jacks.	0.79A		11-Apr-01 12:02:33
Measure and record the voltage at the load box GEU +15 volt front panel jacks	not measured		11-Apr-01 12:02:33
Measure and record the current at the load box GEU +15 volt front panel jacks	0.56A		11-Apr-01 12:02:34

Measure and record the voltage at the load box GEU –15 volt front panel jacks	not measured		11-Apr-01 12:02:34
Measure and record the current at the load box GEU –15 volt front panel jacks	0.50A		11-Apr-01 12:02:34
Measure and record the voltage at the load box GEU 5 volt front panel jacks.	not measured		11-Apr-01 12:02:34
Measure and record the current at the load box GEU 5 volt front panel jacks.	0.74A		11-Apr-01 12:02:34

10.21 Noisy Bus – NA - Redundant relay

Turn on the Noisy Bus Output from the NA supply through the Prime Relay. This uses PSM-05 macro. Loaded and No Load voltages at PCU recorded.

STEP 86	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		11-Apr-01 12:04:13
PORTA: NB (RR) OFF	IFC Echo = C01D		11-Apr-01 12:04:13
PORTA: NA (PR) OFF	IFC Echo = E01C		11-Apr-01 12:04:13
PORTA: NA (RR) ON	IFC Echo = D01C		11-Apr-01 12:04:13
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:04:13
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (Loaded)	26.86V		11-Apr-01 12:04:13
Measure and record the current at the load box CCU 28 volt front panel jacks.	5.35A		11-Apr-01 12:04:13
On Load Box select "I" position of CCU 28V load switch.	ok		11-Apr-01 12:04:13
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (No Load)	29.01V		11-Apr-01 12:04:13
On Load Box select "V" position of CCU 28V load switch.	ok		11-Apr-01 12:04:13

10.22 Do complete telemetry check of PCU.

Now all outputs are on, do Digital Telemetry first.

STEP 87	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		11-Apr-01 12:04:27
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		11-Apr-01 12:04:27
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 12:04:27
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:04:27
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		11-Apr-01 12:04:27
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 12:04:27
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		11-Apr-01 12:04:27

PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		11-Apr-01 12:04:27

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 88	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		11-Apr-01 12:04:56
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 12:04:56
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.22V, Channel B = 14.23V		11-Apr-01 12:04:56
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.16V, Channel B = -15.16V		11-Apr-01 12:04:56
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 12:04:56
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 12:04:56
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.1A, Channel B = 8.1A		11-Apr-01 12:04:56
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 12:04:56
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 12:04:56
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 12:04:56

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 12:04:57
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:04:57
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.24V, Channel B = 5.24V		11-Apr-01 12:04:57
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.2V		11-Apr-01 12:04:57
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.33V, Channel B = -15.33V		11-Apr-01 12:04:57
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.87V, Channel B = 29.87V		11-Apr-01 12:04:57

Analogue Telemetry block 2.

STEP 89	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 12:05:22
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:05:22
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:05:22
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.51V, Channel B = 5.51V		11-Apr-01 12:05:22
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		11-Apr-01 12:05:22
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.3V		11-Apr-01 12:05:22
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =26.1C, Channel B = 25.8C		11-Apr-01 12:05:22
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =26.9C, Channel B = 26.9C		11-Apr-01 12:05:22
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =27.2C, Channel B = 27.2C		11-Apr-01 12:05:22
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =24.9C, Channel B = 24.9C		11-Apr-01 12:05:22
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =28.1C, Channel B = 28.1C		11-Apr-01 12:05:23

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =29.6C, Channel B = 29.6C		11-Apr-01 12:05:23
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =31.9C, Channel B = 32.2C		11-Apr-01 12:05:23
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =29.6C, Channel B = 29.6C		11-Apr-01 12:05:23

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 90	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =28.1C, Channel B = 28.1C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =29.3C, Channel B = 29.3C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =28.4C, Channel B = 28.4C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =28.7C, Channel B = 28.7C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =31.9C, Channel B = 32.2C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =30.5C, Channel B = 30.5C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =32.5C, Channel B = 32.2C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =34.0C, Channel B = 34.0C		11-Apr-01 12:05:50
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =29.3C, Channel B = 29.6C		11-Apr-01 12:05:50
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =31.3C, Channel B = 31.3C		11-Apr-01 12:05:50

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =29.9C, Channel B = 29.9C		11-Apr-01 12:05:51
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 12:05:51
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =34.6C, Channel B = 34.9C		11-Apr-01 12:05:51
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =23.7C, Channel B = 24.0C		11-Apr-01 12:05:51
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =25.8C, Channel B = 25.8C		11-Apr-01 12:05:51

10.23 Do High Voltage Input Limit Test

Adjust the QA and NA supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 91	Mixed		
QA: V=32.0V	QA: V=32.0V Done		11-Apr-01 12:06:06
NA: V=32.0V	NA: V=32.0V Done		11-Apr-01 12:06:06
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		11-Apr-01 12:06:06
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		11-Apr-01 12:06:06
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 12:06:06
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:06:06
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		11-Apr-01 12:06:06
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 12:06:06
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		11-Apr-01 12:06:06
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		11-Apr-01 12:06:06

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 92	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 12:06:33
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.23V, Channel B = 14.22V		11-Apr-01 12:06:33
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.06V, Channel B = -15.06V		11-Apr-01 12:06:33
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 12:06:33
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 12:06:33
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.91A, Channel B = 7.91A		11-Apr-01 12:06:33
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 12:06:33
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 12:06:33
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 12:06:33
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 12:06:33

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.12V, Channel B = -0.1V		11-Apr-01 12:06:33
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.24V, Channel B = 5.24V		11-Apr-01 12:06:34
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.21V, Channel B = 15.2V		11-Apr-01 12:06:34
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.33V, Channel B = -15.33V		11-Apr-01 12:06:34
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.87V, Channel B = 29.87V		11-Apr-01 12:06:34

Analogue Telemetry block 2.

STEP 93	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 12:06:59
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:06:59
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:06:59
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.51V, Channel B = 5.51V		11-Apr-01 12:06:59
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		11-Apr-01 12:06:59
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.3V, Channel B = -15.29V		11-Apr-01 12:06:59
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 12:06:59
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =26.9C, Channel B = 26.9C		11-Apr-01 12:06:59
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =27.2C, Channel B = 27.2C		11-Apr-01 12:06:59
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =24.6C, Channel B = 24.9C		11-Apr-01 12:06:59

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =28.4C, Channel B = 28.7C		11-Apr-01 12:06:59
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =29.9C, Channel B = 29.9C		11-Apr-01 12:06:59
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =32.2C, Channel B = 32.2C		11-Apr-01 12:06:59
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =29.9C, Channel B = 29.9C		11-Apr-01 12:06:59

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 94	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =28.1C, Channel B = 28.1C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =29.3C, Channel B = 29.3C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =28.4C, Channel B = 28.4C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =28.7C, Channel B = 28.7C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =32.2C, Channel B = 32.2C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =30.5C, Channel B = 30.5C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =32.5C, Channel B = 32.5C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =34.3C, Channel B = 34.3C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =31.1C, Channel B = 31.1C		11-Apr-01 12:07:25
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =29.9C, Channel B = 29.6C		11-Apr-01 12:07:25

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 12:07:26
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =35.2C, Channel B = 35.2C		11-Apr-01 12:07:26
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =24.0C, Channel B = 24.0C		11-Apr-01 12:07:26
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =25.8C, Channel B = 25.8C		11-Apr-01 12:07:27

10.24 Do Low Operating Voltage Limit Test.

Adjust the QA and NA supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 95	Mixed		
QA: V=26.0V	QA: V=26.0V Done		11-Apr-01 12:07:41
NA: V=26.0V	NA: V=26.0V Done		11-Apr-01 12:07:41
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:41
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:41
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:41
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:41
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:41
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:41
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:42
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		11-Apr-01 12:07:42

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 96	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 12:08:08
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.23V, Channel B = 14.23V		11-Apr-01 12:08:08
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.12V, Channel B = -15.12V		11-Apr-01 12:08:08
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 12:08:08
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 12:08:08
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.43A, Channel B = 8.44A		11-Apr-01 12:08:08
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 12:08:09
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 12:08:09
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 12:08:09
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 12:08:09

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:08:09
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.24V, Channel B = 5.24V		11-Apr-01 12:08:09
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.2V		11-Apr-01 12:08:09
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.33V, Channel B = -15.33V		11-Apr-01 12:08:09
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.87V, Channel B = 29.87V		11-Apr-01 12:08:09

Analogue Telemetry block 2.

STEP 97	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 12:08:34
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:08:34
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 12:08:34
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.5V, Channel B = 5.51V		11-Apr-01 12:08:34
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		11-Apr-01 12:08:34
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		11-Apr-01 12:08:34
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 12:08:34
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =26.9C, Channel B = 26.9C		11-Apr-01 12:08:34
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =27.2C, Channel B = 27.5C		11-Apr-01 12:08:35
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 12:08:35
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =28.1C, Channel B = 28.4C		11-Apr-01 12:08:35

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =29.6C, Channel B = 29.6C		11-Apr-01 12:08:35
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =32.2C, Channel B = 32.2C		11-Apr-01 12:08:35
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =29.9C, Channel B = 29.9C		11-Apr-01 12:08:35

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 98	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =28.4C, Channel B = 28.1C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =29.6C, Channel B = 29.6C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =28.4C, Channel B = 28.7C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =29.0C, Channel B = 28.7C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =32.2C, Channel B = 32.2C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =30.5C, Channel B = 30.5C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =32.5C, Channel B = 32.5C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =34.3C, Channel B = 34.3C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =31.6C, Channel B = 31.6C		11-Apr-01 12:09:00
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =30.2C, Channel B = 30.2C		11-Apr-01 12:09:01

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 12:09:01
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =35.2C, Channel B = 35.2C		11-Apr-01 12:09:02
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =24.0C, Channel B = 24.0C		11-Apr-01 12:09:02
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =25.8C, Channel B = 26.1C		11-Apr-01 12:09:02

10.25 Turn off all relays.

Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.

This table is PSM-02 macro.

STEP 99	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		11-Apr-01 12:09:59
PORTB: SPU_+5B OFF	IFC Echo = C018		11-Apr-01 12:09:59
PORTB: SPU_+/-15A OFF	IFC Echo = E019		11-Apr-01 12:09:59
PORTB: SPU_+5A OFF	IFC Echo = E018		11-Apr-01 12:09:59
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		11-Apr-01 12:09:59
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		11-Apr-01 12:09:59
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		11-Apr-01 12:09:59
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		11-Apr-01 12:09:59
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		11-Apr-01 12:09:59
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		11-Apr-01 12:09:59
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		11-Apr-01 12:09:59
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		11-Apr-01 12:09:59
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		11-Apr-01 12:09:59
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		11-Apr-01 12:09:59
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		11-Apr-01 12:09:59
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		11-Apr-01 12:09:59
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		11-Apr-01 12:09:59
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		11-Apr-01 12:09:59
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		11-Apr-01 12:09:59
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		11-Apr-01 12:09:59
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		11-Apr-01 12:09:59
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		11-Apr-01 12:09:59
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		11-Apr-01 12:09:59
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		11-Apr-01 12:09:59
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		11-Apr-01 12:09:59
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		11-Apr-01 12:09:59
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		11-Apr-01 12:10:00
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		11-Apr-01 12:10:00
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		11-Apr-01 12:10:00
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		11-Apr-01 12:10:00
PORTB: NA (PR) OFF	IFC Echo = E01C		11-Apr-01 12:10:00
PORTB: NA (RR) OFF	IFC Echo = C01C		11-Apr-01 12:10:00
PORTB: NB (PR) OFF	IFC Echo = E01D		11-Apr-01 12:10:00
PORTB: NB (RR) OFF	IFC Echo = C01D		11-Apr-01 12:10:00

This table is PSM-01 Macro.

STEP 100	Mixed		
PORTB: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		11-Apr-01 12:10:10
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		11-Apr-01 12:10:10
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		11-Apr-01 12:10:10
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		11-Apr-01 12:10:10
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		11-Apr-01 12:10:10
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		11-Apr-01 12:10:10

10.26 Status check and turn off QC bus relay.

STEP 101	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 12:10:37
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.24V, Channel B = 14.24V		11-Apr-01 12:10:37
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.23V, Channel B = -15.23V		11-Apr-01 12:10:37
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 12:10:37
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 12:10:38
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 12:10:38
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =28.1C, Channel B = 28.1C		11-Apr-01 12:10:38
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		11-Apr-01 12:10:38
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		11-Apr-01 12:10:38
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		11-Apr-01 12:10:38
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		11-Apr-01 12:10:38
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		11-Apr-01 12:10:38
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		11-Apr-01 12:10:38
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		11-Apr-01 12:10:39

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		11-Apr-01 12:10:39
NA: OFF	NA: OFF Done		11-Apr-01 12:10:39
QA: OFF	QA: OFF Done		11-Apr-01 12:10:39

11 POWER ON PCU USING QB AND NB, SYS1 PRIMARY AND SYS2 REDUNDANT

Enters with Primary Internal Supply connected to QB from previous test block.

STEP 102	Mixed		
Move scope CH1 current probe to QB Supply lead	ok		11-Apr-01 13:43:16
Change IPU load box cable to Side B at load box.	ok		11-Apr-01 13:43:16
QA: V=29.0v	QA: V=29.0v Done		11-Apr-01 13:43:16
QB: V=29.0v	QB: V=29.0v Done		11-Apr-01 13:43:16
NA: V=29.0v	NA: V=29.0v Done		11-Apr-01 13:43:17
NB: V=29.0v	NB: V=29.0v Done		11-Apr-01 13:43:17
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		11-Apr-01 13:43:17
SCOPE:HOR:TRIG:POS 2	SCOPE:HOR:TRIG:POS 2 done.		11-Apr-01 13:43:17
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		11-Apr-01 13:43:17
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		11-Apr-01 13:43:17
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		11-Apr-01 13:43:17
SCOPE:TRIG:A:LEVEL 7.5E-2	SCOPE:TRIG:A:LEVEL 7.5E-2 done.		11-Apr-01 13:43:17
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		11-Apr-01 13:43:18
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 13:43:18
SCOPE:MESS:SHOW 'QB Prime Converter Power On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Prime Converter Power On Inrush Current Waveform, 500mA/Div' done.		11-Apr-01 13:43:18
QB: ON	QB: ON Done		11-Apr-01 13:43:18
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		11-Apr-01 13:43:18
SCOPE: HARDCOPY INRUSHBP.BMP	INRUSHBP.BMP written to Appendix.		11-Apr-01 13:43:18
QB: IO?	Current 1.43A		11-Apr-01 13:43:18
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.37A, Channel B = 1.37A		11-Apr-01 13:43:18

11.1 Power On telemetry verification.

STEP 103	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 13:43:44
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.18V		11-Apr-01 13:43:44
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.76V, Channel B = -14.76V		11-Apr-01 13:43:44
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 13:43:44
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 13:43:44
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =19.6C, Channel B = 19.6C		11-Apr-01 13:43:45
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =19.0C, Channel B = 19.3C		11-Apr-01 13:43:45
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		11-Apr-01 13:43:45
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		11-Apr-01 13:43:45
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		11-Apr-01 13:43:45
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		11-Apr-01 13:43:45
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		11-Apr-01 13:43:45
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		11-Apr-01 13:43:46
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		11-Apr-01 13:43:46

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		11-Apr-01 13:43:47

11.2 QC Power On with QB Primary relay.
Carries out PSM-60 macro, and then relevant telemetry.

STEP 104	Mixed		
PORTB: QB (PR) ON	IFC Echo = F00B		11-Apr-01 13:44:05
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		11-Apr-01 13:44:06
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		11-Apr-01 13:44:06
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		11-Apr-01 13:44:06
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		11-Apr-01 13:44:06
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		11-Apr-01 13:44:06
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		11-Apr-01 13:44:06
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		11-Apr-01 13:44:06
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		11-Apr-01 13:44:06
QB: IO?	Current 1.55A		11-Apr-01 13:44:07
PORTB: QB Primary Current	IFC Echo = 0007, Telemetry Channel A =1.49A, Channel B = 1.49A		11-Apr-01 13:44:07
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 13:44:07
SCOPE: CH2:VOLT 0.2	SCOPE:CH2:VOLT 0.2 done.		11-Apr-01 13:44:08

11.3 System Converters, Prime SYS1 and Redundant SYS2.
Power on SYS1A and SYS2B converters using PSM-13 and PSM-16. Outputs need to be selected using prime relay set for 5V and 28V, and redundant relay set for +/-15V. Telemetry checks done between and after macros.

STEP 105	Mixed		
NB: ON	NB: ON Done		11-Apr-01 13:45:33
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		11-Apr-01 13:45:33
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 13:45:33
SCOPE:TRIG:A:LEVEL +0.25V	SCOPE:TRIG:A:LEVEL +0.25V done.		11-Apr-01 13:45:33
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 13:45:33
SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		11-Apr-01 13:45:33
PORTB: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		11-Apr-01 13:45:33
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		11-Apr-01 13:45:33
SCOPE: HARDCOPY SYS1AQB.BMP	SYS1AQB.BMP written to Appendix.		11-Apr-01 13:45:33
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.58A, Channel B = 1.58A		11-Apr-01 13:45:33
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.36V, Channel B = 5.37V		11-Apr-01 13:45:34
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =30.0V, Channel B = 30.0V		11-Apr-01 13:45:34
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		11-Apr-01 13:45:34
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 13:45:34
SCOPE:TRIG:A:LEVEL +0.3V	SCOPE:TRIG:A:LEVEL +0.3V done.		11-Apr-01 13:45:34

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 13:45:34
SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		11-Apr-01 13:45:34
PORTB: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		11-Apr-01 13:45:34
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		11-Apr-01 13:45:34
SCOPE: HARDCOPY SYS2BQB.BMP	SYS2BQB.BMP written to Appendix.		11-Apr-01 13:45:34
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.64A, Channel B = 1.65A		11-Apr-01 13:45:34
PORTB: PSSV12;+15Volt DC-DC Converter SYS B	IFC Echo = 000D, Telemetry Channel A =15.21V, Channel B = 15.25V		11-Apr-01 13:45:34
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		11-Apr-01 13:45:35
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		11-Apr-01 13:45:35
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		11-Apr-01 13:45:36

11.4 TEU B – Prime relays – 28V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-21, PSM48, and PSM-52 macros with telemetry checks between macros.

STEP 106	Mixed		
Change TEU load box cable to Side B at load box.	ok		11-Apr-01 13:47:05
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		11-Apr-01 13:47:05
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		11-Apr-01 13:47:05
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		11-Apr-01 13:47:05
Fit a breakout connector between the connector saver on J916 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 13:47:06
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		11-Apr-01 13:47:06
PORTB: B_TEU_+28QC (PR) ON	IFC Echo = F015		11-Apr-01 13:47:06
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0030		11-Apr-01 13:47:06
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.29A, Channel B = 2.29A		11-Apr-01 13:47:06
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		11-Apr-01 13:47:06
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		11-Apr-01 13:47:06
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		11-Apr-01 13:47:06

11.5 TEU B – Prime output relays – 5V

STEP 107	Mixed		
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 13:49:53
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 13:49:53
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 13:49:53
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 13:49:54
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 13:49:54
SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 13:49:54
PORTB: B_TEU_+5 (PR) ON	IFC Echo = F010		11-Apr-01 13:49:54
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		11-Apr-01 13:49:54
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0017		11-Apr-01 13:49:54
SCOPE:HARDCOPY TEUBC2.BMP	TEUBC2.BMP written to Appendix.		11-Apr-01 13:49:54
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.54A, Channel B = 2.54A		11-Apr-01 13:49:54
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.31V, Channel B = 5.31V		11-Apr-01 13:49:54
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		11-Apr-01 13:49:54
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		11-Apr-01 13:49:54
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		11-Apr-01 13:49:54
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		11-Apr-01 13:49:54
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 13:49:54
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 13:49:55

11.6 TEU B – Redundant relays – +/-15V

STEP 108	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 13:52:04
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 13:52:04
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 13:52:04
SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 13:52:04
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		11-Apr-01 13:52:04
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		11-Apr-01 13:52:04
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 13:52:04
SCOPE:HARDCOPY TEUBC3.BMP	TEUBC3.BMP written to Appendix.		11-Apr-01 13:52:04
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		11-Apr-01 13:52:05
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		11-Apr-01 13:52:05
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		11-Apr-01 13:52:05
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 13:52:05
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 13:52:05
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 13:52:05
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 13:52:05
SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 13:52:05
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		11-Apr-01 13:52:05
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		11-Apr-01 13:52:05

PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 13:52:05
SCOPE:HARDCOPY TEUBC4.BMP	TEUBC4.BMP written to Appendix.		11-Apr-01 13:52:06
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.95A, Channel B = 2.95A		11-Apr-01 13:52:06
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.22V		11-Apr-01 13:52:06
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.33V, Channel B = -15.35V		11-Apr-01 13:52:06
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		11-Apr-01 13:52:06

11.7 TEU B Noise and voltage measurements – 28V and 5V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 109	Mixed		
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:EDGE:SOURCE CH3 done.		11-Apr-01 14:03:27
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		11-Apr-01 14:03:28
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH3 ON done.		11-Apr-01 14:03:28
Measure and record the voltage between Pin 3 (Ret) and Pin 4 (Power) at the breakout connector on J916. (Loaded)	28.51V		11-Apr-01 14:03:28
Measure and record the voltage between Pin 16 (Ret) and Pin 17 (Power) at the breakout connector on J916. (Loaded)	28.50V		11-Apr-01 14:03:28
SCOPE:MESS:SHOW 'TEU B 28V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU B 28V Prime Noise Waveform' done.		11-Apr-01 14:03:28
Connect the Oscilloscope differential probe to pins 3 and 4 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 14:03:28
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 14:03:28
SCOPE:HARDCOPY TEUBN1.BMP	TEUBN1.BMP written to Appendix.		11-Apr-01 14:03:28
Measure and record the voltage between Pin 12 (Ret) and Pin 11 (Power) at the breakout connector on J916. (Loaded)	5.16V		11-Apr-01 14:03:28
Measure and record the voltage between Pin 25 (Ret) and Pin 24 (Power) at the breakout connector on J916. (Loaded)	5.16V		11-Apr-01 14:03:28
SCOPE:MESS:SHOW 'TEU B 5V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU B 5V Prime Noise Waveform' done.		11-Apr-01 14:03:28
Connect the Oscilloscope differential probe to pins 12 and 11 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 14:03:28

SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 14:03:28
SCOPE:HARDCOPY TEUBN2.BMP	TEUBN2.BMP written to Appendix.		11-Apr-01 14:03:28
On Load Box select "I" position of TEU 28 V load switch.	ok		11-Apr-01 14:03:28
Measure and record the voltage between Pin 3 (Ret) and Pin 4 (Power) at the breakout connector on J916. (No Load)	28.66V		11-Apr-01 14:03:28
Measure and record the voltage between Pin 16 (Ret) and Pin 17 (Power) at the breakout connector on J916. (No Load)	28.66V		11-Apr-01 14:03:28
On Load Box select "I" position of TEU 5V load switch.	ok		11-Apr-01 14:03:28
Measure and record the voltage between Pin 12 (Ret) and Pin 11 (Power) at the breakout connector on J916. (No Load)	5.36V		11-Apr-01 14:03:28
Measure and record the voltage between Pin 25 (Ret) and Pin 24 (Power) at the breakout connector on J916. (No Load)	5.36V		11-Apr-01 14:03:28
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		11-Apr-01 14:03:29
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		11-Apr-01 14:03:29
On Load Box select "V" position of TEU 28 V load switch.	ok		11-Apr-01 14:03:29
On Load Box select "V" position of TEU 5V load switch.	ok		11-Apr-01 14:03:29
PORTB: B_TEU_+5 (PR) ON	IFC Echo = F010		11-Apr-01 14:03:29
PORTB: B_TEU_+28QC (PR) ON	IFC Echo = F015		11-Apr-01 14:03:29

11.8 TEU B Noise and voltage measurements – +/-15V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 110	Mixed		
Measure and record the voltage between Pin 12 (Ret) and Pin 8 (Power) at the breakout connector on J916. (Loaded)	15.22V		11-Apr-01 14:09:46
Measure and record the voltage between Pin 25 (Ret) and Pin 21 (Power) at the breakout connector on J916. (Loaded)	15.22V		11-Apr-01 14:09:46
Measure and record the voltage between Pin 12 (Ret) and Pin 9 (Power) at the breakout connector on J916. (Loaded)	-15.30V		11-Apr-01 14:09:46
Measure and record the voltage between Pin 25 (Ret) and Pin 22 (Power) at the breakout connector on J916. (Loaded)	15.30V		11-Apr-01 14:09:46
SCOPE:MESS:SHOW 'TEU B +15V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'TEU B +15V Redundant Noise Waveform' done.		11-Apr-01 14:09:46
Connect the Oscilloscope differential probe to pins 12 and 8 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 14:09:46
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 14:09:47
SCOPE:HARDCOPY TEUBN3.BMP	TEUBN3.BMP written to Appendix.		11-Apr-01 14:09:47
SCOPE:MESS:SHOW 'TEU B -15V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'TEU B -15V Redundant Noise Waveform' done.		11-Apr-01 14:09:47
Connect the Oscilloscope differential probe to pins 12 and 9 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 14:09:47
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 14:09:47
SCOPE:HARDCOPY TEUBN4.BMP	TEUBN4.BMP written to Appendix.		11-Apr-01 14:09:47
On Load Box select "I" position of TEU +15V load switch.	ok		11-Apr-01 14:09:47

On Load Box select "I" position of TEU -15V load switch.	ok		11-Apr-01 14:09:47

11.9 TEU B Noise and voltage measurements – +/-15V.

STEP 111	Mixed		
Measure and record the voltage between Pin 12 (Ret) and Pin 8 (Power) at the breakout connector on J916. (No Load)	15.25V		11-Apr-01 14:14:40
Measure and record the voltage between Pin 25 (Ret) and Pin 21 (Power) at the breakout connector on J916. (No Load)	15.25V		11-Apr-01 14:14:40
Measure and record the voltage between Pin 12 (Ret) and Pin 9 (Power) at the breakout connector on J916. (No Load)	-15.33V		11-Apr-01 14:14:40
Measure and record the voltage between Pin 25 (Ret) and Pin 22 (Power) at the breakout connector on J916. (No Load)	-15.33V		11-Apr-01 14:14:40
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		11-Apr-01 14:14:40
On Load Box select "V" position of TEU +15V load switch.	ok		11-Apr-01 14:14:40
On Load Box select "V" position of TEU -15V load switch.	ok		11-Apr-01 14:14:40
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		11-Apr-01 14:14:40
Measure and record the voltage at the load box TEU 28 volt front panel jacks.	not measured		11-Apr-01 14:14:40
Measure and record the current at the load box TEU 28 volt front panel jacks.	0.64A		11-Apr-01 14:14:40
Measure and record the voltage at the load box TEU +15 volt front panel jacks	not measured		11-Apr-01 14:14:40
Measure and record the current at the load box TEU +15 volt front panel jacks	0.32A		11-Apr-01 14:14:40
Measure and record the voltage at the load box TEU –15 volt front panel jacks	not measured		11-Apr-01 14:14:40
Measure and record the current at the load box TEU –15 volt front panel jacks	0.27A		11-Apr-01 14:14:40
Measure and record the voltage at the load box TEU 5 volt front panel jacks.	not measured		11-Apr-01 14:14:41
Measure and record the current at the load box TEU 5 volt front panel jacks.	1.05A		11-Apr-01 14:14:41

11.10 Power On EEA.

Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1.
Primary and Redundant measurements already made. No A or B selection.

STEP 112	Mixed		
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		11-Apr-01 14:14:59
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		11-Apr-01 14:14:59
PORTB: EEA_+5 (PR) ON	IFC Echo = F008		11-Apr-01 14:14:59
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		11-Apr-01 14:14:59
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.04A, Channel B = 3.05A		11-Apr-01 14:15:00
PORTB: EEA_+/-15 (RR) ON	IFC Echo = D009		11-Apr-01 14:15:00
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 14:15:00
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.13A, Channel B = 3.13A		11-Apr-01 14:15:00
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		11-Apr-01 14:15:00
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.23V		11-Apr-01 14:15:00
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.33V		11-Apr-01 14:15:00

11.11 IPU B Regulated 28 Volt Supply – Prime relay

Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B Regulated 28 volts through prime relays. This carries out PSM-27 macro.

STEP 113	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		11-Apr-01 14:16:48
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		11-Apr-01 14:16:48
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		11-Apr-01 14:16:48
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		11-Apr-01 14:16:48
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		11-Apr-01 14:16:48
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		11-Apr-01 14:16:48
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		11-Apr-01 14:16:48
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEV EL 0.05 done.		11-Apr-01 14:16:48
Fit a breakout connector between the connector saver on J913 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 14:16:48
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	okok		11-Apr-01 14:16:49
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 14:16:49
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:16:49
SCOPE:MESS:SHOW 'IPU B 28VReg (Prime) \nStart Current Waveform, 0.5A/Div'	SCOPE:MESS:SHO W 'IPU B 28VReg (Prime) \nStart Current Waveform, 0.5A/Div' done.		11-Apr-01 14:16:49
PORTB: B_IPU_+28REG (PR) ON	IFC Echo = F003		11-Apr-01 14:16:49
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5039		11-Apr-01 14:16:49
SCOPE:HARDCOPY IPUB1.BMP	IPUB1.BMP written to Appendix.		11-Apr-01 14:16:50
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		11-Apr-01 14:16:50

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.01A, Channel B = 5.01A		11-Apr-01 14:16:50
Set the switch on the 28Vreg monitor to "V" and remove the current loop.	ok		11-Apr-01 14:16:50

11.12 IPU B 28 volt regulated supply Noise and Voltage measurements.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 114	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		11-Apr-01 14:26:04
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH 3 ON done.		11-Apr-01 14:26:04
Measure and record the voltage between Pin 22 (Ret) and Pin 9 (Power) at the breakout connector on J913. (Loaded)	29.81V		11-Apr-01 14:26:04
Measure and record the voltage between Pin 23 (Ret) and Pin 10 (Power) at the breakout connector on J913. (Loaded)	29.81V		11-Apr-01 14:26:04
SCOPE:MESS:SHOW 'IPU B 28VReg Prime Noise Waveform'	SCOPE:MESS:SHO W 'IPU B 28VReg Prime Noise Waveform' done.		11-Apr-01 14:26:04
Connect the Oscilloscope differential probe to pins 20 and 7 on J913. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 14:26:04
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		11-Apr-01 14:26:04
SCOPE:HARDCOPY IPUN1.BMP	IPUN1.BMP written to Appendix.		11-Apr-01 14:26:04
On Load Box select "I" position of IPU 28VReg load switch.	ok		11-Apr-01 14:26:04
Measure and record the voltage between Pin 22 (Ret) and Pin 9 (Power) at the breakout connector on J913. (No Load)	30.10V		11-Apr-01 14:26:04
Measure and record the voltage between Pin 23 (Ret) and Pin 10 (Power) at the breakout connector on J913. (No Load)	30.10V		11-Apr-01 14:26:04
Measure and record the voltage between Pin 17 (Ret) and Pin 4 (Power) at the breakout connector on J913. (Loaded)	28.58V		11-Apr-01 14:26:04
Measure and record the voltage between Pin 18 (Ret) and Pin 5 (Power) at the breakout connector on J913. (Loaded)	28.59V		11-Apr-01 14:26:04
On Load Box select "I" position of IPU 28V load switch.	ok		11-Apr-01 14:26:04

Measure and record the voltage between Pin 17 (Ret) and Pin 4 (Power) at the breakout connector on J913. (Loaded)	28.76V		11-Apr-01 14:26:04
Measure and record the voltage between Pin 18 (Ret) and Pin 5 (Power) at the breakout connector on J913. (Loaded)	28.77V		11-Apr-01 14:26:04
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		11-Apr-01 14:26:04
On Load Box select "V" position of IPU 28V load switch.	ok		11-Apr-01 14:26:04
On Load Box select "V" position of IPU 28VReg load switch.	ok		11-Apr-01 14:26:04
PORTB: B_IPU_+28REG (PR) ON	IFC Echo = F003		11-Apr-01 14:26:04
Measure and record the voltage at the load box IPU Reg 28 volt front panel jacks.	not measured		11-Apr-01 14:26:04
Measure and record the current at the load box IPU Reg 28 volt front panel jacks.	1.51A		11-Apr-01 14:26:04
Measure and record the voltage at the load box IPU Unreg 28 volt front panel jacks.	not measured		11-Apr-01 14:26:04
Measure and record the current at the load box IPU Unreg 28 volt front panel jacks.	1.26A		11-Apr-01 14:26:04

11.13 Power on SPU A Supplies from QB.
Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-10 and PSM-38 macros.

STEP 115	Mixed		
Change SPU load box cable to Side A at load box.	ok		11-Apr-01 14:27:51
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		11-Apr-01 14:27:51
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		11-Apr-01 14:27:51
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		11-Apr-01 14:27:51
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 14:27:51
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		11-Apr-01 14:27:51
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		11-Apr-01 14:27:51
Fit a breakout connector between the connector saver on J915 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 14:27:51
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:27:51
SCOPE:MESS:SHOW 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		11-Apr-01 14:27:52
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		11-Apr-01 14:27:52
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		11-Apr-01 14:27:52
SCOPE: HARDCOPY SPUAQB.BMP	SPUAQB.BMP written to Appendix.		11-Apr-01 14:27:52
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.11A, Channel B = 5.1A		11-Apr-01 14:27:52
PORTB: SPU_+5B OFF	IFC Echo = C018		11-Apr-01 14:27:52
PORTB: SPU_+/-15B OFF	IFC Echo = C019		11-Apr-01 14:27:52
PORTB: SPU_+/-15A ON	IFC Echo = F019		11-Apr-01 14:27:52

PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C39		11-Apr-01 14:27:53
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		11-Apr-01 14:27:53
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.22A, Channel B = 6.23A		11-Apr-01 14:27:53
PORTB: SPU_+5A ON	IFC Echo = F018		11-Apr-01 14:27:53
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		11-Apr-01 14:27:53
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		11-Apr-01 14:27:53
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.41A, Channel B = 6.41A		11-Apr-01 14:27:53
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		11-Apr-01 14:27:53
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		11-Apr-01 14:27:54
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		11-Apr-01 14:27:54

11.14 GEU Supplies – Prime and Redundant relays.

Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5. GEU supplies already checked as no A/B supplies required. This carries out PSM-34 and PSM-30 macros.

STEP 116	Mixed		
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		11-Apr-01 14:28:19
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		11-Apr-01 14:28:19
PORTB: GEU_+5 (PR) ON	IFC Echo = F004		11-Apr-01 14:28:19
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		11-Apr-01 14:28:19
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.6A, Channel B = 6.6A		11-Apr-01 14:28:19
PORTB: GEU_+/-15 (PR) ON	IFC Echo = F005		11-Apr-01 14:28:19
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		11-Apr-01 14:28:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.6A, Channel B = 6.6A		11-Apr-01 14:28:20
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.25V, Channel B = 5.25V		11-Apr-01 14:28:20
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.23V		11-Apr-01 14:28:20
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		11-Apr-01 14:28:21
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		11-Apr-01 14:28:21
PORTB: GEU_+28QC (PR) ON	IFC Echo = F016		11-Apr-01 14:28:21
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		11-Apr-01 14:28:21
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.42A, Channel B = 7.42A		11-Apr-01 14:28:21

11.15 Turn on Noisy Bus – NB - Prime Relay.

Turn on the Noisy Bus Output from the NB supply through the Prime Relay. This uses PSM-07 macro. Loaded and No Load voltages at PCU recorded.

STEP 117	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		11-Apr-01 14:29:53
PORTB: NA (RR) OFF	IFC Echo = C01C		11-Apr-01 14:29:53
PORTB: NB (RR) OFF	IFC Echo = C01D		11-Apr-01 14:29:53
PORTB: NB (PR) ON	IFC Echo = F01D		11-Apr-01 14:29:53
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		11-Apr-01 14:29:53
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (Loaded)	27.06V		11-Apr-01 14:29:53
Measure and record the current at the load box CCU 28 volt front panel jacks.	5.40A		11-Apr-01 14:29:53
On Load Box select "I" position of CCU 28V load switch.	ok		11-Apr-01 14:29:53
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (No Load)	29.01V		11-Apr-01 14:29:53
On Load Box select "V" position of CCU 28V load switch.	ok		11-Apr-01 14:29:53

11.16 Do complete telemetry check of PCU.

STEP 118	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		11-Apr-01 14:30:06
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		11-Apr-01 14:30:06
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		11-Apr-01 14:30:06
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		11-Apr-01 14:30:06
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 14:30:07
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 14:30:07
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		11-Apr-01 14:30:07

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		11-Apr-01 14:30:07

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 119	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		11-Apr-01 14:30:35
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 14:30:35
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.17V		11-Apr-01 14:30:35
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.8V, Channel B = -14.8V		11-Apr-01 14:30:35
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 14:30:35
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 14:30:35
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 14:30:35
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.42A, Channel B = 7.42A		11-Apr-01 14:30:35
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.25V, Channel B = 5.25V		11-Apr-01 14:30:36
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.06V		11-Apr-01 14:30:36

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.06V, Channel B = -0.06V		11-Apr-01 14:30:36
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		11-Apr-01 14:30:36
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 14:30:36
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.23V		11-Apr-01 14:30:36
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.33V		11-Apr-01 14:30:36
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.1V		11-Apr-01 14:30:36

Analogue Telemetry block 2.

STEP 120	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.56V, Channel B = 5.56V		11-Apr-01 14:31:01
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.19V, Channel B = 15.18V		11-Apr-01 14:31:01
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.26V, Channel B = -15.27V		11-Apr-01 14:31:01
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.03V		11-Apr-01 14:31:01
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		11-Apr-01 14:31:01
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		11-Apr-01 14:31:01
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =24.0C, Channel B = 24.3C		11-Apr-01 14:31:02
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 14:31:02
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 14:31:02
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 14:31:02
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =22.8C, Channel B = 22.8C		11-Apr-01 14:31:02

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =22.8C, Channel B = 22.8C		11-Apr-01 14:31:02
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =23.1C, Channel B = 23.1C		11-Apr-01 14:31:02
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =22.3C, Channel B = 22.5C		11-Apr-01 14:31:02

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 121	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =27.8C, Channel B = 27.5C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =24.9C, Channel B = 24.9C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =24.0C, Channel B = 24.3C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =30.5C, Channel B = 30.5C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =23.7C, Channel B = 23.7C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =26.4C, Channel B = 26.4C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =23.7C, Channel B = 23.7C		11-Apr-01 14:31:29
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 14:31:29
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =27.2C, Channel B = 27.2C		11-Apr-01 14:31:30

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 14:31:30
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =21.7C, Channel B = 21.7C		11-Apr-01 14:31:31
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =22.8C, Channel B = 22.8C		11-Apr-01 14:31:31
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =31.9C, Channel B = 31.9C		11-Apr-01 14:31:31
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =23.4C, Channel B = 23.4C		11-Apr-01 14:31:31

11.17 Do High Voltage Input Limit Test

Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 122	Mixed		
QB: V=32.0V	QB: V=32.0V Done		11-Apr-01 14:31:45
NB: V=32.0V	NB: V=32.0V Done		11-Apr-01 14:31:45
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		11-Apr-01 14:31:45
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		11-Apr-01 14:31:46
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		11-Apr-01 14:31:46
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		11-Apr-01 14:31:46
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 14:31:46
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 14:31:46
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		11-Apr-01 14:31:46
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		11-Apr-01 14:31:46

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 123	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 14:32:12
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.17V, Channel B = 14.17V		11-Apr-01 14:32:13
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.69V, Channel B = -14.69V		11-Apr-01 14:32:13
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 14:32:13
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 14:32:13
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 14:32:13
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.3A, Channel B = 7.3A		11-Apr-01 14:32:13
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.25V, Channel B = 5.25V		11-Apr-01 14:32:13
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 14:32:13
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 14:32:13

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.85V, Channel B = 29.87V		11-Apr-01 14:32:13
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 14:32:13
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.22V, Channel B = 15.22V		11-Apr-01 14:32:13
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		11-Apr-01 14:32:13
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		11-Apr-01 14:32:13

Analogue Telemetry block 2.

STEP 124	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.56V, Channel B = 5.55V		11-Apr-01 14:32:38
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		11-Apr-01 14:32:38
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.27V, Channel B = -15.27V		11-Apr-01 14:32:38
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 14:32:38
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 14:32:38
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 14:32:38
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 14:32:38
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 14:32:39
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =28.1C, Channel B = 28.4C		11-Apr-01 14:32:39
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =25.8C, Channel B = 25.8C		11-Apr-01 14:32:39
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =22.8C, Channel B = 22.8C		11-Apr-01 14:32:39

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =22.8C, Channel B = 22.8C		11-Apr-01 14:32:39
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =22.8C, Channel B = 23.1C		11-Apr-01 14:32:39
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =22.5C, Channel B = 22.5C		11-Apr-01 14:32:39

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V-regulator temperature.

STEP 125	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =28.1C, Channel B = 28.1C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =24.9C, Channel B = 25.2C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =24.3C, Channel B = 24.3C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =30.8C, Channel B = 31.1C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =23.7C, Channel B = 23.7C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =26.7C, Channel B = 26.7C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =27.8C, Channel B = 27.8C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =23.7C, Channel B = 23.7C		11-Apr-01 14:33:04
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 14:33:05
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =26.4C, Channel B = 26.1C		11-Apr-01 14:33:05

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =21.7C, Channel B = 21.7C		11-Apr-01 14:33:05
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =23.1C, Channel B = 23.1C		11-Apr-01 14:33:06
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =32.2C, Channel B = 32.2C		11-Apr-01 14:33:06
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =23.7C, Channel B = 23.4C		11-Apr-01 14:33:07

11.18 Do Low Operating Voltage Limit Test.

Adjust the QB and NB supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 126	Mixed		
QB: V=26.0V	QB: V=26.0V Done		11-Apr-01 14:33:21
NB: V=26.0V	NB: V=26.0V Done		11-Apr-01 14:33:21
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		11-Apr-01 14:33:21
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		11-Apr-01 14:33:21
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		11-Apr-01 14:33:21
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		11-Apr-01 14:33:21
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 14:33:21
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 14:33:21
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		11-Apr-01 14:33:22
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		11-Apr-01 14:33:22

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 127	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 14:33:48
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.17V, Channel B = 14.17V		11-Apr-01 14:33:48
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.79V, Channel B = -14.79V		11-Apr-01 14:33:48
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 14:33:48
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 14:33:48
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 14:33:48
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.65A, Channel B = 7.65A		11-Apr-01 14:33:49
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.25V, Channel B = 5.25V		11-Apr-01 14:33:49
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 14:33:49
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.06V		11-Apr-01 14:33:49

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		11-Apr-01 14:33:49
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 14:33:49
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.22V, Channel B = 15.22V		11-Apr-01 14:33:49
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		11-Apr-01 14:33:49
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		11-Apr-01 14:33:49

Analogue Telemetry block 2.

STEP 128	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.56V, Channel B = 5.56V		11-Apr-01 14:34:14
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		11-Apr-01 14:34:14
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.27V, Channel B = -15.27V		11-Apr-01 14:34:14
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 14:34:14
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 14:34:14
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.09V		11-Apr-01 14:34:14
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 14:34:14
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =26.7C, Channel B = 26.4C		11-Apr-01 14:34:14
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =28.7C, Channel B = 28.7C		11-Apr-01 14:34:14
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 14:34:14
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =23.1C, Channel B = 23.1C		11-Apr-01 14:34:14

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =23.1C, Channel B = 23.4C		11-Apr-01 14:34:14
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =23.1C, Channel B = 23.4C		11-Apr-01 14:34:15
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =22.8C, Channel B = 22.8C		11-Apr-01 14:34:15

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V-regulator temperature.

STEP 129	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =28.1C, Channel B = 28.1C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =31.1C, Channel B = 31.1C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =24.0C, Channel B = 24.0C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =26.7C, Channel B = 26.7C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =27.8C, Channel B = 28.1C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =24.0C, Channel B = 24.0C		11-Apr-01 14:34:40
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =28.1C, Channel B = 28.1C		11-Apr-01 14:34:41
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =26.9C, Channel B = 26.9C		11-Apr-01 14:34:41

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =21.7C, Channel B = 21.7C		11-Apr-01 14:34:41
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =23.4C, Channel B = 23.4C		11-Apr-01 14:34:42
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =32.5C, Channel B = 32.2C		11-Apr-01 14:34:42
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =23.7C, Channel B = 24.0C		11-Apr-01 14:34:42

11.19 Turn of all relays.

Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTA to verify alternate channel communication.

This table is PSM-02 macro.

STEP 130	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		11-Apr-01 14:35:38
PORTA: SPU_+5B OFF	IFC Echo = C018		11-Apr-01 14:35:38
PORTA: SPU_+/-15A OFF	IFC Echo = E019		11-Apr-01 14:35:38
PORTA: SPU_+5A OFF	IFC Echo = E018		11-Apr-01 14:35:38
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		11-Apr-01 14:35:38
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		11-Apr-01 14:35:38
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		11-Apr-01 14:35:39
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		11-Apr-01 14:35:39
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		11-Apr-01 14:35:39
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		11-Apr-01 14:35:39
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		11-Apr-01 14:35:39
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		11-Apr-01 14:35:39
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		11-Apr-01 14:35:39
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		11-Apr-01 14:35:39
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		11-Apr-01 14:35:39
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		11-Apr-01 14:35:39
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		11-Apr-01 14:35:39
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		11-Apr-01 14:35:39
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		11-Apr-01 14:35:39
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		11-Apr-01 14:35:39
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		11-Apr-01 14:35:39
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		11-Apr-01 14:35:39
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		11-Apr-01 14:35:39
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		11-Apr-01 14:35:39
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		11-Apr-01 14:35:39
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		11-Apr-01 14:35:39
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		11-Apr-01 14:35:39
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		11-Apr-01 14:35:39
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		11-Apr-01 14:35:39
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		11-Apr-01 14:35:39
PORTA: NA (PR) OFF	IFC Echo = E01C		11-Apr-01 14:35:39
PORTA: NA (RR) OFF	IFC Echo = C01C		11-Apr-01 14:35:39
PORTA: NB (PR) OFF	IFC Echo = E01D		11-Apr-01 14:35:39
PORTA: NB (RR) OFF	IFC Echo = C01D		11-Apr-01 14:35:39

This is PSM-01.

STEP 131	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		11-Apr-01 14:35:50
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		11-Apr-01 14:35:50
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		11-Apr-01 14:35:50
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		11-Apr-01 14:35:50
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		11-Apr-01 14:35:50
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		11-Apr-01 14:35:50

11.20 Status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QB.

STEP 132	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 14:36:23
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.18V, Channel B = 14.18V		11-Apr-01 14:36:23
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.85V, Channel B = -14.85V		11-Apr-01 14:36:23
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 14:36:23
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 14:36:23
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 14:36:23
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =23.4C, Channel B = 23.4C		11-Apr-01 14:36:23
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		11-Apr-01 14:36:23
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		11-Apr-01 14:36:24
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		11-Apr-01 14:36:24
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		11-Apr-01 14:36:24
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		11-Apr-01 14:36:24
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		11-Apr-01 14:36:24

PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		11-Apr-01 14:36:24
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		11-Apr-01 14:36:24
NB:OFF	NB:OFF Done		11-Apr-01 14:36:24
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		11-Apr-01 14:36:24
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		11-Apr-01 14:36:24
DIR: (IPU B) HIR_PSS_DISCRETE(2)	(IPU B) HIR_PSS_DISCRETE(2) Enabled		11-Apr-01 14:36:25
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		11-Apr-01 14:36:25
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		11-Apr-01 14:36:25
QB:OFF	QB:OFF Done		11-Apr-01 14:36:25

12 POWER ON PCU USING QB AND NB, SYS1 REDUNDANT AND SYS2 PRIMARY.
Enters with Redundant Internal Supply connected to QB from previous test block.

STEP 133	Mixed		
QA: V=29.0v	QA: V=29.0v Done		11-Apr-01 14:37:06
QB: V=29.0v	QB: V=29.0v Done		11-Apr-01 14:37:06
NA: V=29.0v	NA: V=29.0v Done		11-Apr-01 14:37:06
NB: V=29.0v	NB: V=29.0v Done		11-Apr-01 14:37:06
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		11-Apr-01 14:37:06
SCOPE:HOR:TRIG:POS 2	SCOPE:HOR:TRIG:POS 2 done.		11-Apr-01 14:37:06
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		11-Apr-01 14:37:06
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		11-Apr-01 14:37:06
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		11-Apr-01 14:37:06
SCOPE:TRIG:A:LEVEL 7.5E-2	SCOPE:TRIG:A:LEVEL 7.5E-2 done.		11-Apr-01 14:37:06
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		11-Apr-01 14:37:06
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:37:07
SCOPE:MESS:SHOW 'QB Redundant Converter Power On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Redundant Converter Power On Inrush Current Waveform, 500mA/Div' done.		11-Apr-01 14:37:07
QB: ON	QB: ON Done		11-Apr-01 14:37:07
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		11-Apr-01 14:37:08
SCOPE: HARDCOPY INRUSHBR.BMP	INRUSHBR.BMP written to Appendix.		11-Apr-01 14:37:08
QB: IO?	Current 1.43A		11-Apr-01 14:37:08
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.38A, Channel B = 1.38A		11-Apr-01 14:37:08

12.1 Power On telemetry verification.

STEP 134	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 14:37:34
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.25V, Channel B = 14.24V		11-Apr-01 14:37:34
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.09V, Channel B = -15.09V		11-Apr-01 14:37:34
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 14:37:34
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 14:37:35
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =24.0C, Channel B = 24.0C		11-Apr-01 14:37:35
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 14:37:36
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		11-Apr-01 14:37:36
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		11-Apr-01 14:37:36
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		11-Apr-01 14:37:36
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		11-Apr-01 14:37:36
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		11-Apr-01 14:37:36
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		11-Apr-01 14:37:36
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		11-Apr-01 14:37:37

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		11-Apr-01 14:37:37

12.2 QC Power On with QB Redundant relay.
Carries out PSM-61 macro, and then relevant telemetry.

STEP 135	Mixed		
PORTB: QB (RR) ON	IFC Echo = D00B		11-Apr-01 14:37:56
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		11-Apr-01 14:37:57
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		11-Apr-01 14:37:57
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		11-Apr-01 14:37:57
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		11-Apr-01 14:37:57
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		11-Apr-01 14:37:57
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		11-Apr-01 14:37:57
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		11-Apr-01 14:37:57
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		11-Apr-01 14:37:57
QB: IO?	Current 1.55A		11-Apr-01 14:37:57
PORTB: QB Primary Current	IFC Echo = 0007, Telemetry Channel A =1.49A, Channel B = 1.49A		11-Apr-01 14:37:58
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 14:37:58
SCOPE: CH2:VOLT 0.2	SCOPE:CH2:VOLT 0.2 done.		11-Apr-01 14:37:59

12.3 Turn on System Converters - Redundant SYS1 and Prime SYS2.
Power on SYS1B and SYS2A converters using PSM-14 and PSM-15. Outputs need to be selected using redundant relay set for 5V and 28V, and prime relay set for +/-15V. Telemetry checks done between and after macros.

STEP 136	Mixed		
NB: ON	NB: ON Done		11-Apr-01 14:39:23
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		11-Apr-01 14:39:23
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 14:39:23
SCOPE:TRIG:A:LEVEL +0.25V	SCOPE:TRIG:A:LEVEL +0.25V done.		11-Apr-01 14:39:23
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:39:23
SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		11-Apr-01 14:39:23
PORTB: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		11-Apr-01 14:39:23
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		11-Apr-01 14:39:23
SCOPE: HARDCOPY SYS1BQB.BMP	SYS1BQB.BMP written to Appendix.		11-Apr-01 14:39:23
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.57A, Channel B = 1.57A		11-Apr-01 14:39:23
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.36V		11-Apr-01 14:39:23
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.98V, Channel B = 29.98V		11-Apr-01 14:39:24
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		11-Apr-01 14:39:24
SCOPE:TRIG:A:LEVEL +0.3V	SCOPE:TRIG:A:LEVEL +0.3V done.		11-Apr-01 14:39:24
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:39:24

SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		11-Apr-01 14:39:24
PORTB: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		11-Apr-01 14:39:24
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		11-Apr-01 14:39:25
SCOPE: HARDCOPY SYS2AQB.BMP	SYS2AQB.BMP written to Appendix.		11-Apr-01 14:39:25
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.64A, Channel B = 1.64A		11-Apr-01 14:39:25
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.24V, Channel B = 15.24V		11-Apr-01 14:39:25
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.36V, Channel B = -15.36V		11-Apr-01 14:39:25

12.4 TEU B – Redundant relays – 28V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-22, PSM49, and PSM-51 macros with telemetry checks between macros.

STEP 137	Mixed		
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		11-Apr-01 14:39:50
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		11-Apr-01 14:39:50
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		11-Apr-01 14:39:50
Fit a breakout connector between the connector saver on J916 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 14:39:50
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		11-Apr-01 14:39:50
SCOPE:TRIG:A:LEVEL 0.2	SCOPE:TRIG:A:LEVEL 0.2 done.		11-Apr-01 14:39:50
PORTB: B_TEU_+28QC (RR) ON	IFC Echo = D015		11-Apr-01 14:39:50
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0028		11-Apr-01 14:39:50
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.28A, Channel B = 2.28A		11-Apr-01 14:39:50
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		11-Apr-01 14:39:50
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		11-Apr-01 14:39:50
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		11-Apr-01 14:39:51

12.5 TEU B – Redundant relays – 5V

STEP 138	Mixed		
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 14:42:25
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 14:42:25
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 14:42:25
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 14:42:25
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:42:25
SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 14:42:26
PORTB: B_TEU_+5 (RR) ON	IFC Echo = D010		11-Apr-01 14:42:26
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		11-Apr-01 14:42:26
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 000F		11-Apr-01 14:42:27
SCOPE:HARDCOPY TEUBC6.BMP	TEUBC6.BMP written to Appendix.		11-Apr-01 14:42:27
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.54A, Channel B = 2.54A		11-Apr-01 14:42:27
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.3V, Channel B = 5.3V		11-Apr-01 14:42:27
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		11-Apr-01 14:42:27
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		11-Apr-01 14:42:27
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		11-Apr-01 14:42:27
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		11-Apr-01 14:42:27
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 14:42:27

Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 14:42:27

12.6 TEU B – Prime relays – +/-15V

STEP 139	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 14:44:48
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 14:44:48
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:44:48
SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 14:44:49
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		11-Apr-01 14:44:49
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		11-Apr-01 14:44:49
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 14:44:49
SCOPE:HARDCOPY TEUBC7.BMP	TEUBC7.BMP written to Appendix.		11-Apr-01 14:44:49
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		11-Apr-01 14:44:49
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		11-Apr-01 14:44:49
Fit a current monitor loop to the TEU –15V monitor on the Load Box and set the switch to "I"	ok		11-Apr-01 14:44:49
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 14:44:49
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 14:44:49
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		11-Apr-01 14:44:49
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 14:44:49
SCOPE:MESS:SHOW 'TEU B –15V Prime \nSoft Start Current Waveform, 0.2A/Div'	SCOPE:MESS:SHOW 'TEU B –15V Prime \nSoft Start Current Waveform, 0.2A/Div' done.		11-Apr-01 14:44:49
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		11-Apr-01 14:44:49
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		11-Apr-01 14:44:49
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 14:44:50

SCOPE:HARDCOPY TEUBC8.BMP	TEUBC8.BMP written to Appendix.		11-Apr-01 14:44:51
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.94A, Channel B = 2.94A		11-Apr-01 14:44:51
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.22V, Channel B = 15.22V		11-Apr-01 14:44:51
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.35V		11-Apr-01 14:44:51
Set the switch on the –15V monitor to "V" and remove the current loop.	ok		11-Apr-01 14:44:51

12.7 TEU B Noise and voltage measurements – 28V and 5V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 140	Mixed		
SCOPE:TRIG:A:EDGE:SOURCE CH3	SCOPE:TRIG:A:EDGE:SOURCE CH3 done.		11-Apr-01 14:57:57
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		11-Apr-01 14:57:57
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH3 ON done.		11-Apr-01 14:57:57
Measure and record the voltage between Pin 3 (Ret) and Pin 4 (Power) at the breakout connector on J916. (Loaded)	28.51V		11-Apr-01 14:57:57
Measure and record the voltage between Pin 16 (Ret) and Pin 17 (Power) at the breakout connector on J916. (Loaded)	28.51V		11-Apr-01 14:57:57
SCOPE:MESS:SHOW 'TEU B 28V Redundant Noise Waveform'	SCOPE:MESS:SHOW 'TEU B 28V Redundant Noise Waveform' done.		11-Apr-01 14:57:57
Connect the Oscilloscope differential probe to pins 3 and 4 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 14:57:57
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 14:57:58
SCOPE:HARDCOPY TEUBN5.BMP	TEUBN5.BMP written to Appendix.		11-Apr-01 14:57:58
Measure and record the voltage between Pin 12 (Ret) and Pin 11 (Power) at the breakout connector on J916. (Loaded)	5.15V		11-Apr-01 14:57:58
Measure and record the voltage between Pin 25 (Ret) and Pin 24 (Power) at the breakout connector on J916. (Loaded)	5.15V		11-Apr-01 14:57:58
SCOPE:MESS:SHOW 'TEU B 5V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU B 5V Prime Noise Waveform' done.		11-Apr-01 14:57:58

Connect the Oscilloscope differential probe to pins 12 and 11 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 14:57:58
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 14:57:58
SCOPE:HARDCOPY TEUBN2.BMP	TEUBN2.BMP written to Appendix.		11-Apr-01 14:57:58
On Load Box select "I" position of TEU 28 V load switch.	ok		11-Apr-01 14:57:58
Measure and record the voltage between Pin 3 (Ret) and Pin 4 (Power) at the breakout connector on J916. (No Load)	28.66V		11-Apr-01 14:57:58
Measure and record the voltage between Pin 16 (Ret) and Pin 17 (Power) at the breakout connector on J916. (No Load)	28.66V		11-Apr-01 14:57:58
On Load Box select "I" position of TEU 5V load switch.	ok		11-Apr-01 14:57:58
Measure and record the voltage between Pin 12 (Ret) and Pin 11 (Power) at the breakout connector on J916. (No Load)	5.36V		11-Apr-01 14:57:58
Measure and record the voltage between Pin 25 (Ret) and Pin 24 (Power) at the breakout connector on J916. (No Load)	5.36V		11-Apr-01 14:57:58
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		11-Apr-01 14:57:59
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		11-Apr-01 14:57:59
On Load Box select "V" position of TEU 28 V load switch.	ok		11-Apr-01 14:57:59
On Load Box select "V" position of TEU 5V load switch.	ok		11-Apr-01 14:57:59
PORTB: B_TEU_+5 (RR) ON	IFC Echo = D010		11-Apr-01 14:57:59
PORTB: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		11-Apr-01 14:57:59

12.8 TEU B Noise and voltage measurements – +/-15V.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 141	Mixed		
Measure and record the voltage between Pin 12 (Ret) and Pin 8 (Power) at the breakout connector on J916. (Loaded)	15.21V		11-Apr-01 15:09:23
Measure and record the voltage between Pin 25 (Ret) and Pin 21 (Power) at the breakout connector on J916. (Loaded)	15.21V		11-Apr-01 15:09:23
Measure and record the voltage between Pin 12 (Ret) and Pin 9 (Power) at the breakout connector on J916. (Loaded)	-15.3V		11-Apr-01 15:09:23
Measure and record the voltage between Pin 25 (Ret) and Pin 22 (Power) at the breakout connector on J916. (Loaded)	-15.3V		11-Apr-01 15:09:23
SCOPE:MESS:SHOW 'TEU B +15V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU B +15V Prime Noise Waveform' done.		11-Apr-01 15:09:23
Connect the Oscilloscope differential probe to pins 12 and 8 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 15:09:23
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 15:09:23
SCOPE:HARDCOPY TEUBN7.BMP	TEUBN7.BMP written to Appendix.		11-Apr-01 15:09:23
SCOPE:MESS:SHOW 'TEU B -15V Prime Noise Waveform'	SCOPE:MESS:SHOW 'TEU B -15V Prime Noise Waveform' done.		11-Apr-01 15:09:23
Connect the Oscilloscope differential probe to pins 12 and 9 on J916. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 15:09:23
SCOPE:CLEARMENU	SCOPE:CLEARMENU done.		11-Apr-01 15:09:23
SCOPE:HARDCOPY TEUBN8.BMP	TEUBN8.BMP written to Appendix.		11-Apr-01 15:09:23
On Load Box select "I" position of TEU +15V load switch.	ok		11-Apr-01 15:09:23

On Load Box select "I" position of TEU -15V load switch.	ok		11-Apr-01 15:09:23
Measure and record the voltage between Pin 12 (Ret) and Pin 8 (Power) at the breakout connector on J916. (No Load)	15.24V		11-Apr-01 15:09:23
Measure and record the voltage between Pin 25 (Ret) and Pin 21 (Power) at the breakout connector on J916. (No Load)	15.24V		11-Apr-01 15:09:23
Measure and record the voltage between Pin 12 (Ret) and Pin 9 (Power) at the breakout connector on J916. (No Load)	-15.33V		11-Apr-01 15:09:23
Measure and record the voltage between Pin 25 (Ret) and Pin 22 (Power) at the breakout connector on J916. (No Load)	-15.33V		11-Apr-01 15:09:23
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		11-Apr-01 15:09:23
On Load Box select "V" position of TEU +15V load switch.	ok		11-Apr-01 15:09:24
On Load Box select "V" position of TEU -15V load switch.	ok		11-Apr-01 15:09:24
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		11-Apr-01 15:09:24
Measure and record the voltage at the load box TEU 28 volt front panel jacks.	not measured		11-Apr-01 15:09:24
Measure and record the current at the load box TEU 28 volt front panel jacks.	0.64A		11-Apr-01 15:09:24
Measure and record the voltage at the load box TEU +15 volt front panel jacks	not measured		11-Apr-01 15:09:24
Measure and record the current at the load box TEU +15 volt front panel jacks	0.32A		11-Apr-01 15:09:24
Measure and record the voltage at the load box TEU –15 volt front panel jacks	not measured		11-Apr-01 15:09:24
Measure and record the current at the load box TEU –15 volt front panel jacks	0.27A		11-Apr-01 15:09:24
Measure and record the voltage at the load box TEU 5 volt front panel jacks.	not measured		11-Apr-01 15:09:24
Measure and record the current at the load box TEU 5 volt front panel jacks.	1.05A		11-Apr-01 15:09:24

12.9 Power on EEA.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1
Primary and Redundant measurements already made. No A or B selection.

STEP 142	Mixed		
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		11-Apr-01 15:09:43
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		11-Apr-01 15:09:43
PORTB: EEA_+5 (RR) ON	IFC Echo = D008		11-Apr-01 15:09:43
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		11-Apr-01 15:09:43
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.04A, Channel B = 3.04A		11-Apr-01 15:09:43
PORTB: EEA_+/-15 (PR) ON	IFC Echo = F009		11-Apr-01 15:09:43
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 15:09:43
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.12A, Channel B = 3.12A		11-Apr-01 15:09:44
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.28V, Channel B = 5.28V		11-Apr-01 15:09:44
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.21V, Channel B = 15.21V		11-Apr-01 15:09:44
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.33V		11-Apr-01 15:09:44

12.10 Turn on IPU regulated 28 Volt Supply.

Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B side regulated 28 Volts through redundant relays. This carries out PSM-28 macro.

STEP 143	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		11-Apr-01 15:11:51
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		11-Apr-01 15:11:51
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		11-Apr-01 15:11:51
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		11-Apr-01 15:11:52
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		11-Apr-01 15:11:52
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		11-Apr-01 15:11:52
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		11-Apr-01 15:11:52
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEV EL 0.02 done.		11-Apr-01 15:11:52
Fit a breakout connector between the connector saver on J913 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 15:11:52
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		11-Apr-01 15:11:52
Fit the 2nd current probe to the current monitor loop.	ok		11-Apr-01 15:11:52
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 15:11:53
SCOPE:MESS:SHOW 'IPU B 28VReg (Redundant) \nStart Current Waveform, 0.2A/Div'	SCOPE:MESS:SHO W 'IPU B 28VReg (Redundant) \nStart Current Waveform, 0.2A/Div' done.		11-Apr-01 15:11:53
PORTB: B_IPU_+28REG (RR) ON	IFC Echo = D003		11-Apr-01 15:11:53
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		11-Apr-01 15:11:53
SCOPE:HARDCOPY IPUB2.BMP	IPUB2.BMP written to Appendix.		11-Apr-01 15:11:53
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.89V, Channel B = 29.91V		11-Apr-01 15:11:53

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.01A, Channel B = 5.01A		11-Apr-01 15:11:53
Set the switch on the 28Vreg monitor to "V" and remove the current loop.	ok		11-Apr-01 15:11:54

12.11 IPU B 28 volt regulated supply Noise and Voltage measurements.
Loaded and No load DC voltages, and loaded noise voltages at PCU recorded.
Note that there is extra switching off and on of outputs as soft start circuits do not work if the relay is already on.

STEP 144	Mixed		
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		11-Apr-01 15:21:01
SCOPE:SELECT:CH3 ON	SCOPE:SELECT:CH 3 ON done.		11-Apr-01 15:21:01
Measure and record the voltage between Pin 22 (Ret) and Pin 9 (Power) at the breakout connector on J913. (Loaded)	29.86V		11-Apr-01 15:21:01
Measure and record the voltage between Pin 23 (Ret) and Pin 10 (Power) at the breakout connector on J913. (Loaded)	29.86V		11-Apr-01 15:21:01
Measure and record the voltage between Pin 17 (Ret) and Pin 4 (Power) at the breakout connector on J913. (Loaded)	28.37V		11-Apr-01 15:21:01
Measure and record the voltage between Pin 18 (Ret) and Pin 5 (Power) at the breakout connector on J913. (Loaded)	28.37V		11-Apr-01 15:21:01
SCOPE:MESS:SHOW 'IPU B 28VReg Redundant Noise Waveform'	SCOPE:MESS:SHO W 'IPU B 28VReg Redundant Noise Waveform' done.		11-Apr-01 15:21:01
Connect the Oscilloscope differential probe to pins 20 and 7 on J913. Trigger the oscilloscope to obtain a stored trace of the waveform.	ok		11-Apr-01 15:21:01
SCOPE:CLEARMENU	SCOPE:CLEARMEN U done.		11-Apr-01 15:21:01
SCOPE:HARDCOPY IPUN2.BMP	IPUN2.BMP written to Appendix.		11-Apr-01 15:21:01
On Load Box select "I" position of IPU 28VReg load switch.	ok		11-Apr-01 15:21:01
Measure and record the voltage between Pin 22 (Ret) and Pin 9 (Power) at the breakout connector on J913. (No Load)	30.07V		11-Apr-01 15:21:01
Measure and record the voltage between Pin 23 (Ret) and Pin 10 (Power) at the breakout connector on J913. (No Load)	30.07V		11-Apr-01 15:21:01
On Load Box select "I" position of IPU 28V load switch.	ok		11-Apr-01 15:21:02

Measure and record the voltage between Pin 17 (Ret) and Pin 4 (Power) at the breakout connector on J913. (Loaded)	28.76V		11-Apr-01 15:21:02
Measure and record the voltage between Pin 18 (Ret) and Pin 5 (Power) at the breakout connector on J913. (Loaded)	28.76V		11-Apr-01 15:21:02
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		11-Apr-01 15:21:02
On Load Box select "V" position of IPU 28V load switch.	ok		11-Apr-01 15:21:02
On Load Box select "V" position of IPU 28VReg load switch.	ok		11-Apr-01 15:21:02
PORTB: B_IPU_+28REG (RR) ON	IFC Echo = D003		11-Apr-01 15:21:02
Measure and record the voltage at the load box IPU Reg 28 volt front panel jacks.	not measured		11-Apr-01 15:21:02
Measure and record the current at the load box IPU Reg 28 volt front panel jacks.	1.51A		11-Apr-01 15:21:02
Measure and record the voltage at the load box IPU Unreg 28 volt front panel jacks.	not measured		11-Apr-01 15:21:02
Measure and record the current at the load box IPU Unreg 28 volt front panel jacks.	1.26A		11-Apr-01 15:21:02

12.12 Power on SPU B supplies from QB.

Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5. to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-12 and PSM-40 macros.

STEP 145	Mixed		
Change SPU load box cable to Side B at load box.	ok		11-Apr-01 15:23:00
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		11-Apr-01 15:23:00
SCOPE:SELECT:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		11-Apr-01 15:23:00
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		11-Apr-01 15:23:00
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		11-Apr-01 15:23:00
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		11-Apr-01 15:23:01
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		11-Apr-01 15:23:01
Fit a breakout connector between the connector saver on J915 on the PCU, and the cable going to the Load Box	ok		11-Apr-01 15:23:01
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		11-Apr-01 15:23:01
SCOPE:MESS:SHOW 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		11-Apr-01 15:23:01
PORTB: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		11-Apr-01 15:23:01
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.1A, Channel B = 5.1A		11-Apr-01 15:23:01
SCOPE: HARDCOPY SPUBQB.BMP	SPUBQB.BMP written to Appendix.		11-Apr-01 15:23:01
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry A00A		11-Apr-01 15:23:01
PORTB: SPU_+5A OFF	IFC Echo = E018		11-Apr-01 15:23:01
PORTB: SPU_+/-15A OFF	IFC Echo = E019		11-Apr-01 15:23:01
PORTB: SPU_+/-15B ON	IFC Echo = D019		11-Apr-01 15:23:01

PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		11-Apr-01 15:23:01
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC0A		11-Apr-01 15:23:01
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.23A, Channel B = 6.23A		11-Apr-01 15:23:02
PORTB: SPU_+5B ON	IFC Echo = D018		11-Apr-01 15:23:02
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		11-Apr-01 15:23:02
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0A		11-Apr-01 15:23:02
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.42A, Channel B = 6.42A		11-Apr-01 15:23:02
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.52V, Channel B = 5.52V		11-Apr-01 15:23:02
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.19V, Channel B = 15.17V		11-Apr-01 15:23:03
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.28V, Channel B = -15.29V		11-Apr-01 15:23:03

12.13 Turn on GEU supplies.

Turn on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5.
GEU supplies already checked as no A/B supplies required. This carries out PSM-35 and PSM-31 macros.

STEP 146	Mixed		
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		11-Apr-01 15:23:27
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		11-Apr-01 15:23:27
PORTB: GEU_+5 (RR) ON	IFC Echo = D004		11-Apr-01 15:23:27
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0F		11-Apr-01 15:23:27
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.61A, Channel B = 6.6A		11-Apr-01 15:23:27
PORTB: GEU_+/-15 (PR) ON	IFC Echo = F005		11-Apr-01 15:23:27
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.28A, Channel B = 7.28A		11-Apr-01 15:23:27
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 15:23:27
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.25V, Channel B = 5.25V		11-Apr-01 15:23:27
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		11-Apr-01 15:23:27
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.31V		11-Apr-01 15:23:28
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		11-Apr-01 15:23:28
PORTB: GEU_+28QC (RR) ON	IFC Echo = D016		11-Apr-01 15:23:28
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		11-Apr-01 15:23:29

12.14 Turn on Noisy Bus – NB - Redundant Relay.

STEP 147	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		11-Apr-01 15:24:56
PORTB: NA (RR) OFF	IFC Echo = C01C		11-Apr-01 15:24:56
PORTB: NB (PR) OFF	IFC Echo = E01D		11-Apr-01 15:24:56
PORTB: NB (RR) ON	IFC Echo = D01D		11-Apr-01 15:24:56
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		11-Apr-01 15:24:56
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (Loaded)	27.05V		11-Apr-01 15:24:56
Measure and record the current at the load box CCU 28 volt front panel jacks.	5.38A		11-Apr-01 15:24:56
On Load Box select "I" position of CCU 28V load switch.	ok		11-Apr-01 15:24:56
Measure and record the voltage at the load box CCU 28 volt front panel jacks. (No Load)	29.01V		11-Apr-01 15:24:56
On Load Box select "V" position of CCU 28V load switch.	ok		11-Apr-01 15:24:56

12.15 Do complete telemetry check of PCU.

STEP 148	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		11-Apr-01 15:25:10
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		11-Apr-01 15:25:10
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 15:25:10
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		11-Apr-01 15:25:10
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 15:25:10
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 15:25:10
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		11-Apr-01 15:25:10
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		11-Apr-01 15:25:10

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 149	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		11-Apr-01 15:25:39
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 15:25:39
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.22V, Channel B = 14.22V		11-Apr-01 15:25:39
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.15V, Channel B = -15.15V		11-Apr-01 15:25:39
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 15:25:39
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 15:25:39
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 15:25:39
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.1A, Channel B = 8.1A		11-Apr-01 15:25:39
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.02V		11-Apr-01 15:25:39
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		11-Apr-01 15:25:39

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.31V, Channel B = -15.32V		11-Apr-01 15:25:39
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.12V, Channel B = -0.12V		11-Apr-01 15:25:39
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.25V, Channel B = 5.24V		11-Apr-01 15:25:39
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.06V, Channel B = -0.06V		11-Apr-01 15:25:40
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.06V, Channel B = -0.06V		11-Apr-01 15:25:40
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.91V, Channel B = 29.91V		11-Apr-01 15:25:40

Analogue Telemetry block 2.

STEP 150	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		11-Apr-01 15:26:04
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.09V, Channel B = -0.09V		11-Apr-01 15:26:04
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.09V		11-Apr-01 15:26:05
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.52V, Channel B = 5.52V		11-Apr-01 15:26:05
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.19V, Channel B = 15.19V		11-Apr-01 15:26:05
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.28V, Channel B = -15.28V		11-Apr-01 15:26:05
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =23.1C, Channel B = 23.1C		11-Apr-01 15:26:05
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =23.7C, Channel B = 24.0C		11-Apr-01 15:26:05
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 15:26:05
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =22.0C, Channel B = 22.0C		11-Apr-01 15:26:05
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =25.8C, Channel B = 25.5C		11-Apr-01 15:26:05

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =26.1C, Channel B = 26.4C		11-Apr-01 15:26:05
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =28.7C, Channel B = 28.7C		11-Apr-01 15:26:05
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =26.7C, Channel B = 26.7C		11-Apr-01 15:26:05

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 151	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 15:26:32
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =29.0C, Channel B = 29.3C		11-Apr-01 15:26:32
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 15:26:32
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =26.4C, Channel B = 26.1C		11-Apr-01 15:26:32
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =29.3C, Channel B = 29.3C		11-Apr-01 15:26:32
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 15:26:33
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 15:26:33
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =30.5C, Channel B = 30.5C		11-Apr-01 15:26:33
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =26.1C, Channel B = 26.4C		11-Apr-01 15:26:33
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =28.7C, Channel B = 28.7C		11-Apr-01 15:26:33

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 15:26:34
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =22.5C, Channel B = 22.5C		11-Apr-01 15:26:34
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =24.3C, Channel B = 24.3C		11-Apr-01 15:26:35
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =24.6C, Channel B = 24.9C		11-Apr-01 15:26:35
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =31.3C, Channel B = 31.1C		11-Apr-01 15:26:35

12.16 Do High Voltage Input Limit Test

Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 152	Mixed		
QB:V=32.0V	QB:V=32.0V Done		11-Apr-01 15:26:49
NB:V=32.0V	NB:V=32.0V Done		11-Apr-01 15:26:49
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		11-Apr-01 15:26:49
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		11-Apr-01 15:26:49
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 15:26:49
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		11-Apr-01 15:26:50
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 15:26:50
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 15:26:50
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		11-Apr-01 15:26:50
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		11-Apr-01 15:26:50

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 153	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 15:27:16
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.22V, Channel B = 14.22V		11-Apr-01 15:27:16
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.06V, Channel B = -15.05V		11-Apr-01 15:27:16
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 15:27:16
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 15:27:16
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 15:27:17
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.9A, Channel B = 7.9A		11-Apr-01 15:27:17
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 15:27:17
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		11-Apr-01 15:27:17
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		11-Apr-01 15:27:17

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		11-Apr-01 15:27:17
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.24V, Channel B = 5.24V		11-Apr-01 15:27:17
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.06V		11-Apr-01 15:27:17
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 15:27:17
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.89V, Channel B = 29.89V		11-Apr-01 15:27:17

Analogue Telemetry block 2.

STEP 154	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 15:27:42
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 15:27:42
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		11-Apr-01 15:27:42
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.51V, Channel B = 5.51V		11-Apr-01 15:27:42
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		11-Apr-01 15:27:42
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		11-Apr-01 15:27:42
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =23.1C, Channel B = 23.4C		11-Apr-01 15:27:42
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =23.7C, Channel B = 24.0C		11-Apr-01 15:27:42
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =24.3C, Channel B = 24.3C		11-Apr-01 15:27:42
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =22.0C, Channel B = 22.0C		11-Apr-01 15:27:42
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =26.1C, Channel B = 26.1C		11-Apr-01 15:27:43

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =26.9C, Channel B = 26.9C		11-Apr-01 15:27:43
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =29.3C, Channel B = 29.3C		11-Apr-01 15:27:43
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =26.9C, Channel B = 27.2C		11-Apr-01 15:27:43

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V-regulator temperature.

STEP 155	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =29.3C, Channel B = 29.6C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =27.5C, Channel B = 27.8C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =26.4C, Channel B = 26.4C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =29.6C, Channel B = 29.6C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =25.2C, Channel B = 25.5C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =31.1C, Channel B = 31.1C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =29.0C, Channel B = 28.7C		11-Apr-01 15:28:08
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =27.8C, Channel B = 27.8C		11-Apr-01 15:28:09

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =22.5C, Channel B = 22.5C		11-Apr-01 15:28:09
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 15:28:10
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =25.2C, Channel B = 24.9C		11-Apr-01 15:28:10
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =31.6C, Channel B = 31.6C		11-Apr-01 15:28:11

12.17 Low Operating Voltage Limit Test.

Adjust the QA and NA supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 156	Mixed		
QB: V=26.0V	QB: V=26.0V Done		11-Apr-01 15:28:25
NB: V=26.0V	NB: V=26.0V Done		11-Apr-01 15:28:25
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		11-Apr-01 15:28:25
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		11-Apr-01 15:28:25
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		11-Apr-01 15:28:26
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		11-Apr-01 15:28:26
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		11-Apr-01 15:28:26
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		11-Apr-01 15:28:26
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		11-Apr-01 15:28:26
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		11-Apr-01 15:28:26

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 157	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		11-Apr-01 15:28:52
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.22V, Channel B = 14.22V		11-Apr-01 15:28:52
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.12V, Channel B = -15.12V		11-Apr-01 15:28:52
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		11-Apr-01 15:28:53
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		11-Apr-01 15:28:53
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.04A, Channel B = -0.04A		11-Apr-01 15:28:53
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.42A, Channel B = 8.42A		11-Apr-01 15:28:53
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		11-Apr-01 15:28:53
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		11-Apr-01 15:28:53
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		11-Apr-01 15:28:53

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		11-Apr-01 15:28:53
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.24V, Channel B = 5.24V		11-Apr-01 15:28:53
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		11-Apr-01 15:28:53
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.06V		11-Apr-01 15:28:53
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.89V, Channel B = 29.89V		11-Apr-01 15:28:53

Analogue Telemetry block 2.

STEP 158	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.03V		11-Apr-01 15:29:18
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.09V, Channel B = -0.09V		11-Apr-01 15:29:18
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.09V		11-Apr-01 15:29:18
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.51V, Channel B = 5.51V		11-Apr-01 15:29:18
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		11-Apr-01 15:29:18
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		11-Apr-01 15:29:18
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =23.7C, Channel B = 23.4C		11-Apr-01 15:29:18
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =24.0C, Channel B = 24.3C		11-Apr-01 15:29:18
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =24.6C, Channel B = 24.6C		11-Apr-01 15:29:19
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =22.0C, Channel B = 22.3C		11-Apr-01 15:29:19
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =26.1C, Channel B = 26.4C		11-Apr-01 15:29:19

PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =26.9C, Channel B = 27.2C		11-Apr-01 15:29:19
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =29.6C, Channel B = 29.9C		11-Apr-01 15:29:19
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =27.5C, Channel B = 27.5C		11-Apr-01 15:29:19

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V-regulator temperature.

STEP 159	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =25.5C, Channel B = 25.5C		11-Apr-01 15:29:44
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =29.6C, Channel B = 29.6C		11-Apr-01 15:29:44
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =27.8C, Channel B = 27.8C		11-Apr-01 15:29:44
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =26.4C, Channel B = 26.4C		11-Apr-01 15:29:44
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =29.6C, Channel B = 29.6C		11-Apr-01 15:29:44
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =25.8C, Channel B = 25.5C		11-Apr-01 15:29:44
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =27.8C, Channel B = 27.8C		11-Apr-01 15:29:44
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =31.1C, Channel B = 31.1C		11-Apr-01 15:29:45
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =29.9C, Channel B = 29.9C		11-Apr-01 15:29:45
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =28.4C, Channel B = 28.7C		11-Apr-01 15:29:45

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =22.5C, Channel B = 22.8C		11-Apr-01 15:29:46
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =24.6C, Channel B = 24.9C		11-Apr-01 15:29:46
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =25.2C, Channel B = 25.2C		11-Apr-01 15:29:46
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =31.9C, Channel B = 31.9C		11-Apr-01 15:29:47

13 END OF TEST.

This table issues commands as defined by PSM-01 and PSM-02 macros in C&TH Table 2.9.4.4-1. to power down the PCU. This leaves the PCU in a known state for the next power power on.

This table is PSM-02 macro.

STEP 160	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		11-Apr-01 15:30:43
PORTA: SPU_+5B OFF	IFC Echo = C018		11-Apr-01 15:30:43
PORTA: SPU_+/-15A OFF	IFC Echo = E019		11-Apr-01 15:30:43
PORTA: SPU_+5A OFF	IFC Echo = E018		11-Apr-01 15:30:43
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		11-Apr-01 15:30:43
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		11-Apr-01 15:30:43
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		11-Apr-01 15:30:43
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		11-Apr-01 15:30:44
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		11-Apr-01 15:30:44
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		11-Apr-01 15:30:44
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		11-Apr-01 15:30:44
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		11-Apr-01 15:30:44
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		11-Apr-01 15:30:44
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		11-Apr-01 15:30:44
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		11-Apr-01 15:30:44
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		11-Apr-01 15:30:44
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		11-Apr-01 15:30:44
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		11-Apr-01 15:30:44
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		11-Apr-01 15:30:44
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		11-Apr-01 15:30:44
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		11-Apr-01 15:30:44
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		11-Apr-01 15:30:44
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		11-Apr-01 15:30:44
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		11-Apr-01 15:30:44
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		11-Apr-01 15:30:44
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		11-Apr-01 15:30:44
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		11-Apr-01 15:30:44
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		11-Apr-01 15:30:44
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		11-Apr-01 15:30:44
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		11-Apr-01 15:30:44
PORTA: NA (PR) OFF	IFC Echo = E01C		11-Apr-01 15:30:44
PORTA: NA (RR) OFF	IFC Echo = C01C		11-Apr-01 15:30:44
PORTA: NB (PR) OFF	IFC Echo = E01D		11-Apr-01 15:30:44
PORTA: NB (RR) OFF	IFC Echo = C01D		11-Apr-01 15:30:44

This table is PSM-01 Macro. It has Noisy Bus Off macros added.

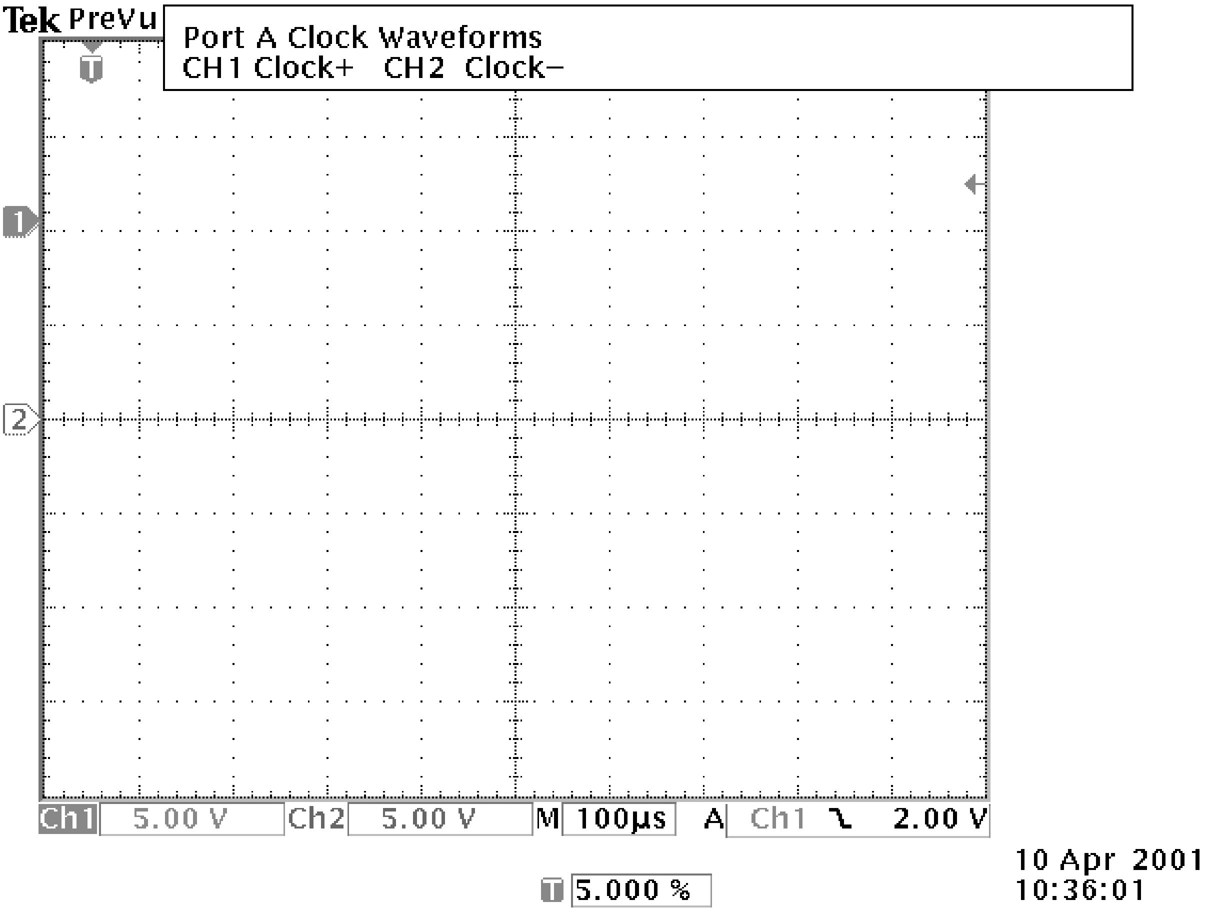
STEP 161	Mixed		
PORTA:SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		11-Apr-01 15:31:01
PORTA:SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		11-Apr-01 15:31:01
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		11-Apr-01 15:31:01
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		11-Apr-01 15:31:01
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		11-Apr-01 15:31:01
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		11-Apr-01 15:31:01
PORTB: NA (PR) OFF	IFC Echo = E01C		11-Apr-01 15:31:01
PORTB: NA (RR) OFF	IFC Echo = C01C		11-Apr-01 15:31:01
PORTB: NB (RR) OFF	IFC Echo = C01D		11-Apr-01 15:31:01
PORTB: NB (PR) OFF	IFC Echo = E01D		11-Apr-01 15:31:01

13.1 Test bench close down

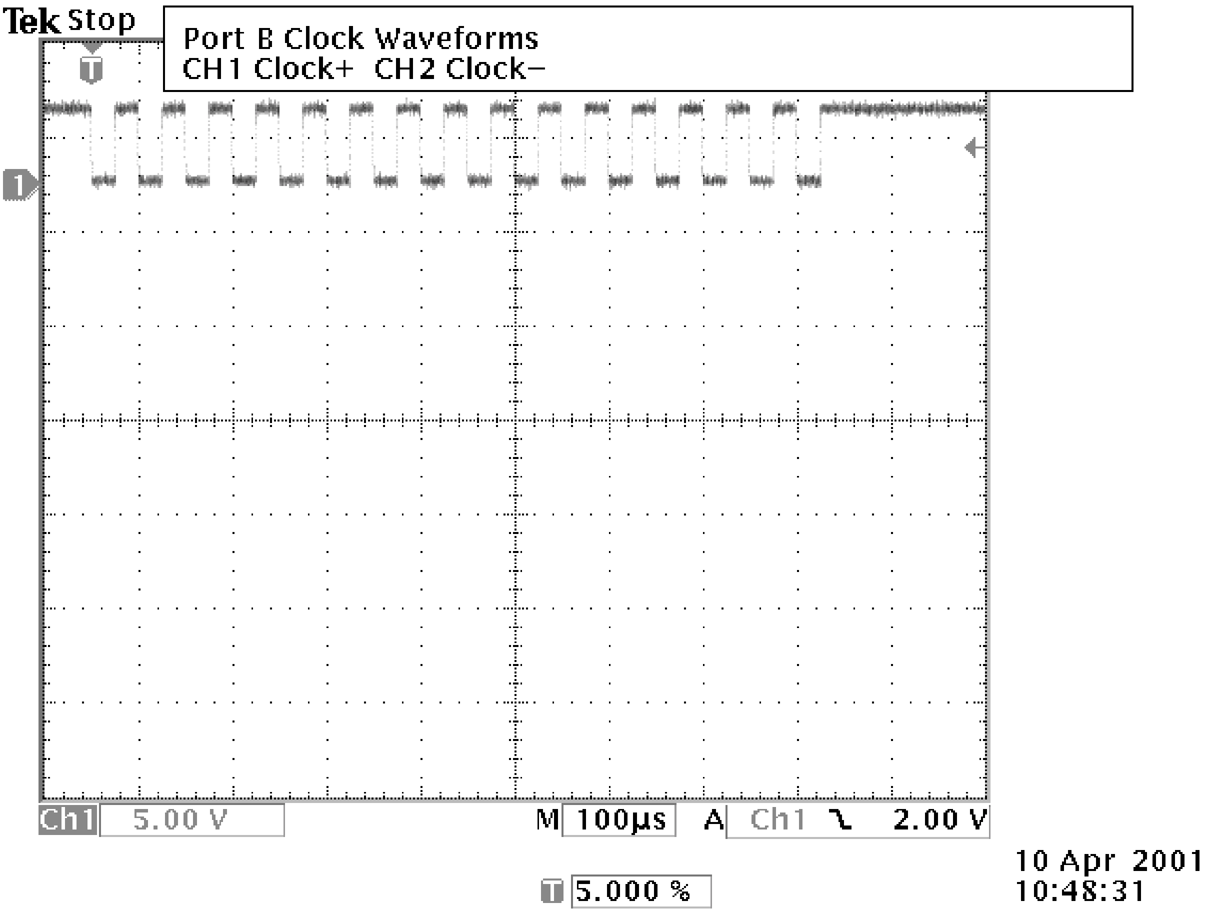
STEP 162	Mixed		
QA: OFF	QA: OFF Done		11-Apr-01 15:31:22
QB: OFF	QB: OFF Done		11-Apr-01 15:31:22
NA: OFF	NA: OFF Done		11-Apr-01 15:31:22
NB: OFF	NB: OFF Done		11-Apr-01 15:31:22
Turn off Current Probes	ok		11-Apr-01 15:31:22
Turn off Differential Probe	ok		11-Apr-01 15:31:22
Disconnect all leads and remove breakout connectors from Connector Savers.	ok		11-Apr-01 15:31:22
Pack the PCU to await next procedure	ok		11-Apr-01 15:31:22
Ensure all test certification is signed and annotated on diary cards.	ok		11-Apr-01 15:31:22
Ensure QA are notified of file name and test number for archiving.	ok		11-Apr-01 15:31:22

14 APPENDIX

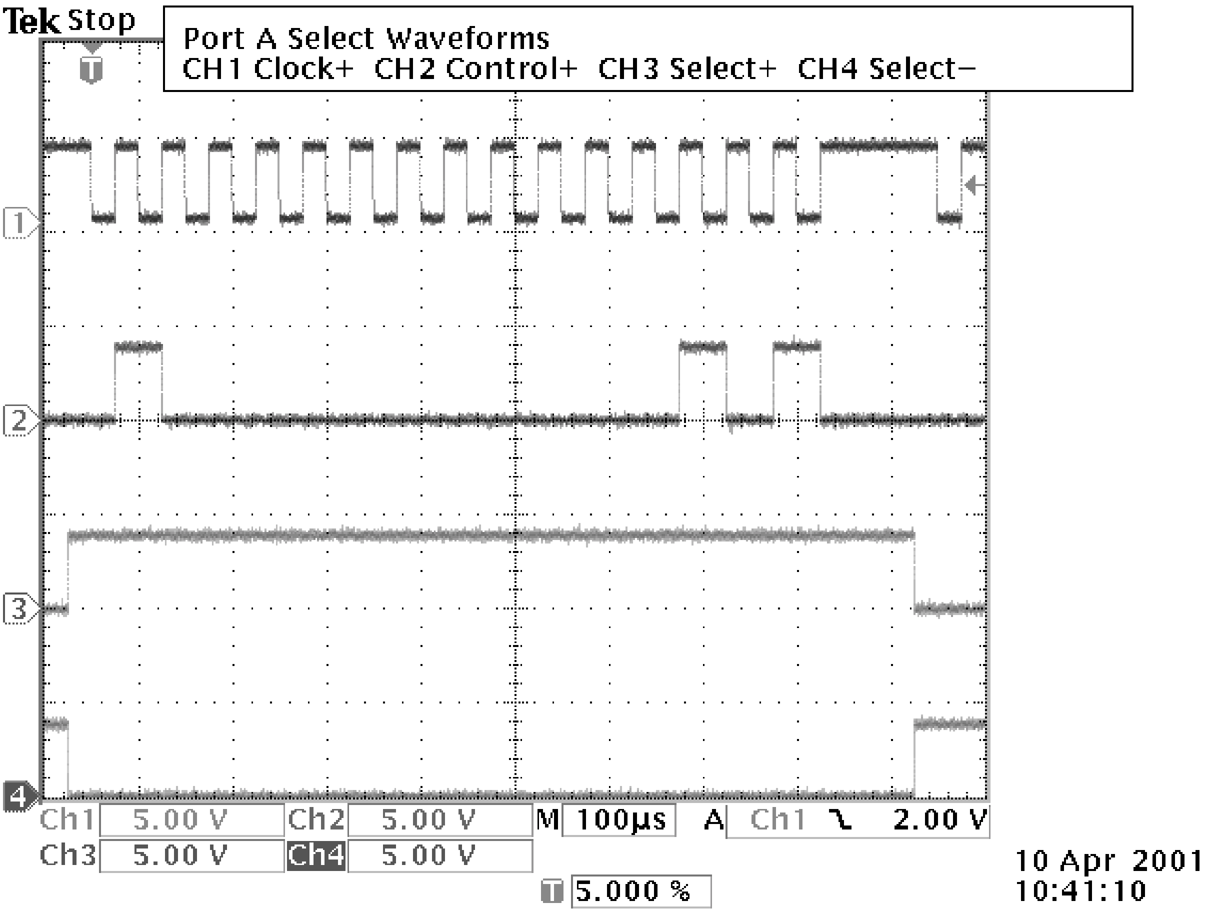
14.1 Waveform CLOCKA.BMP



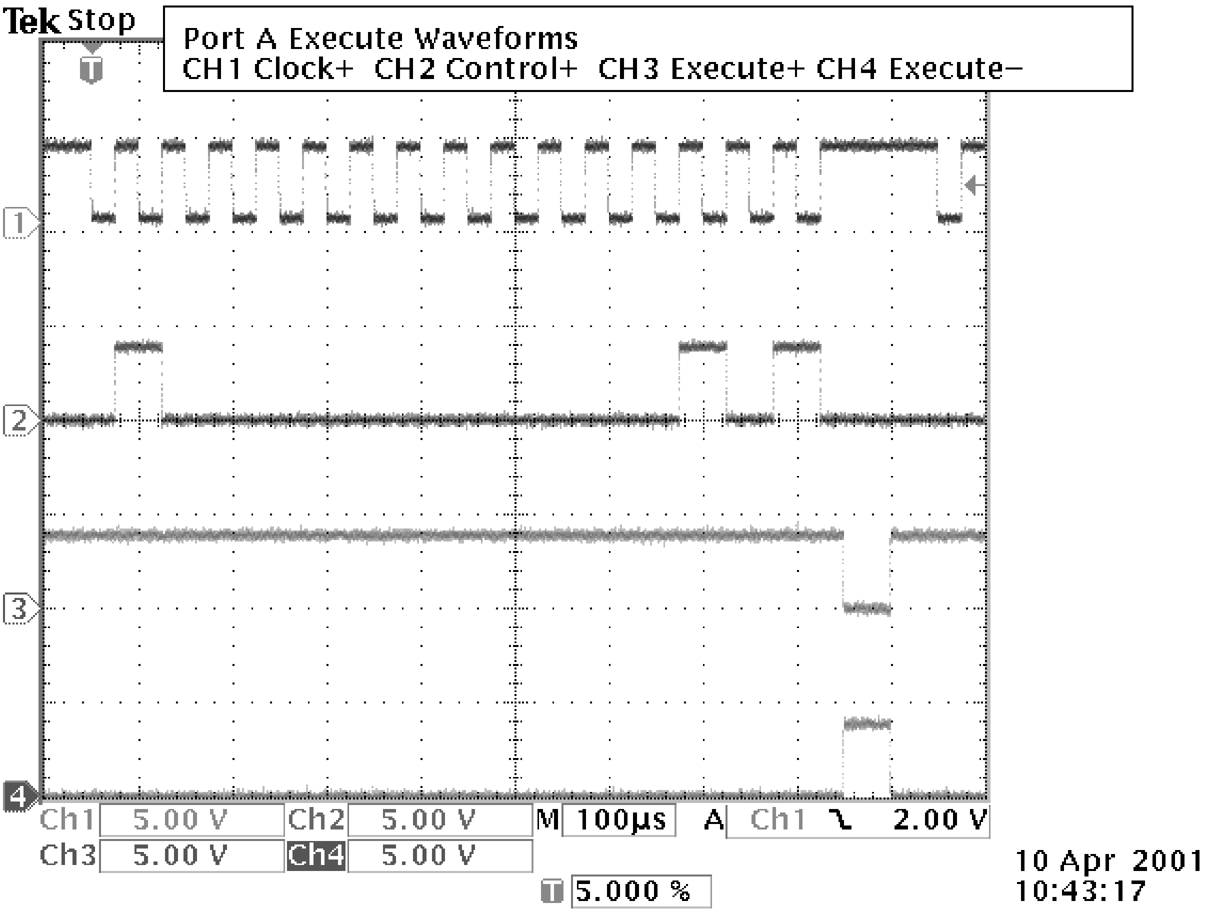
Waveform CONTROLA.BMP



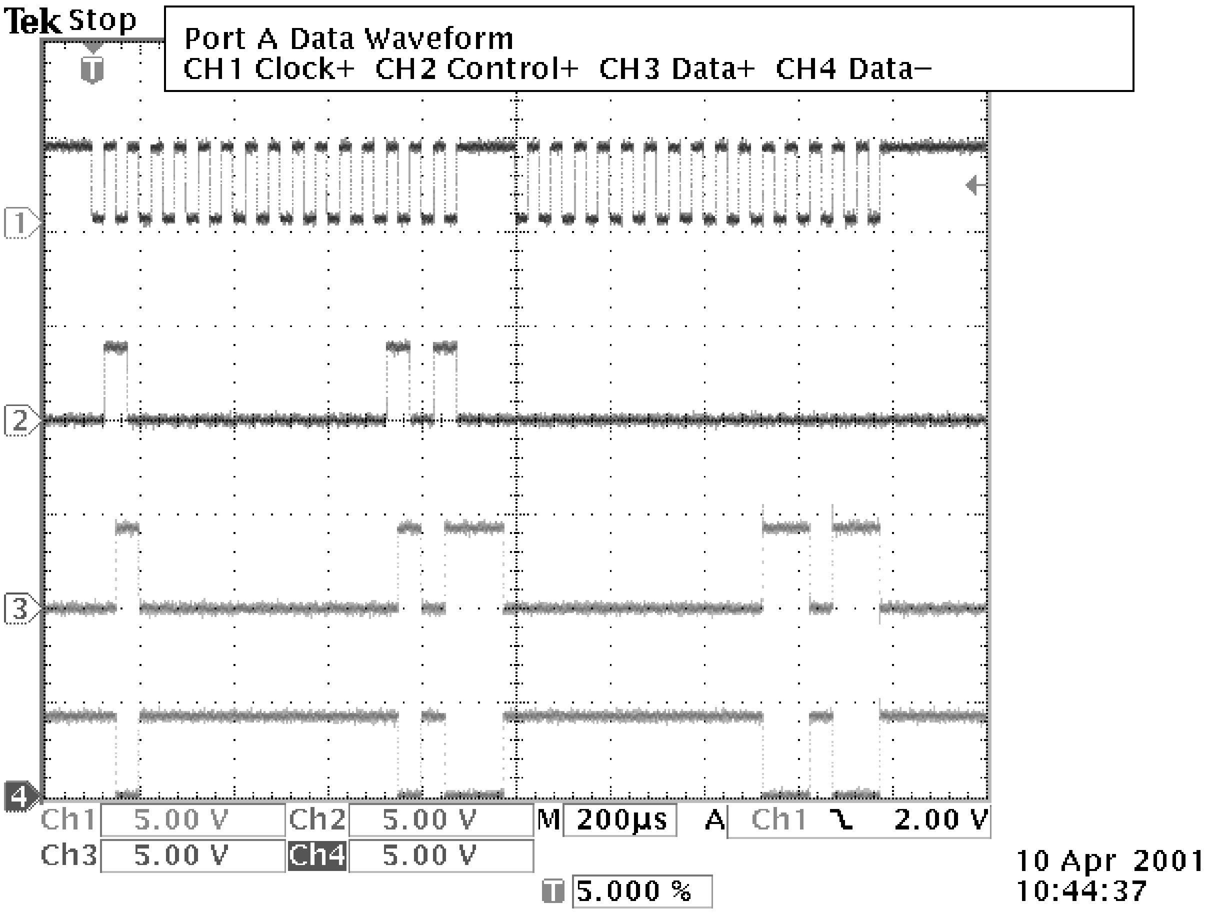
Waveform SELECTA.BMP



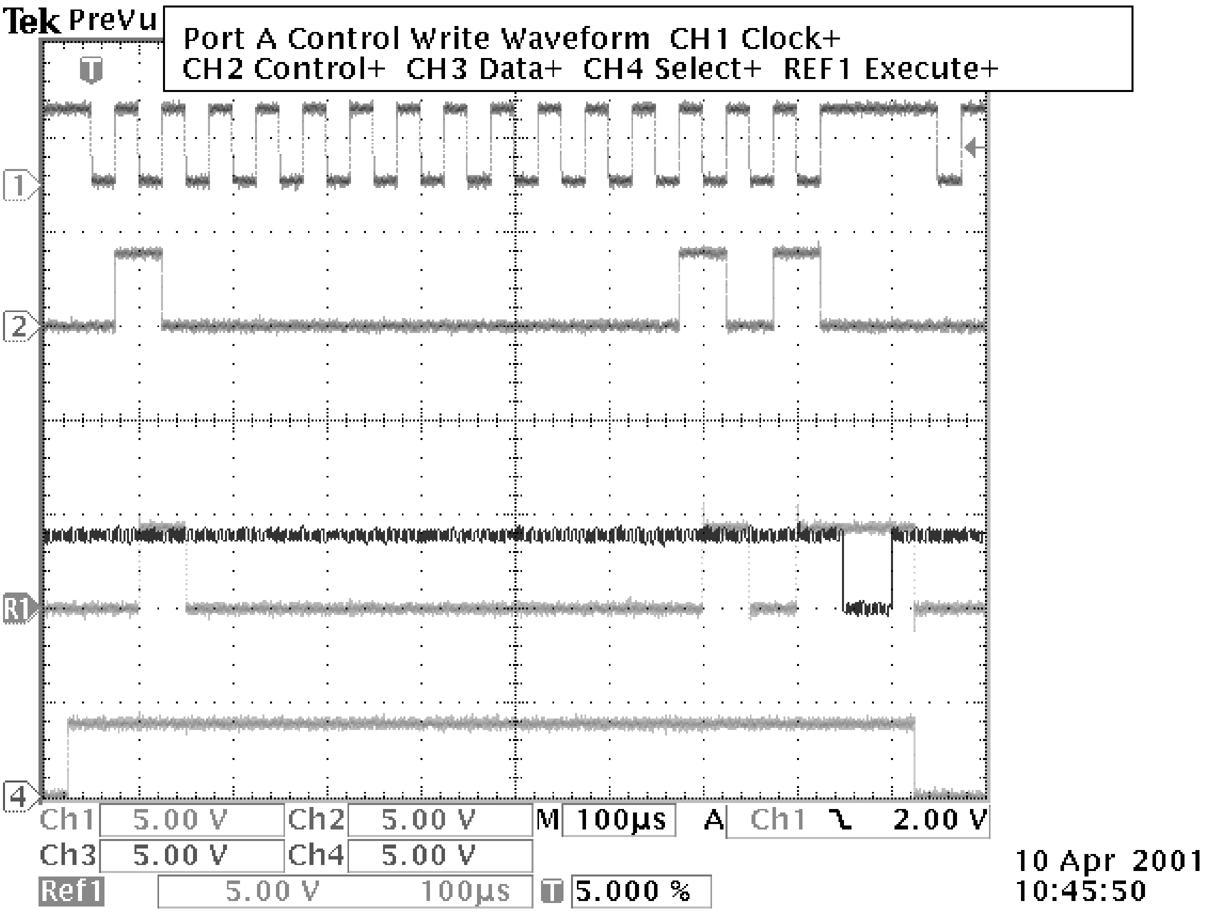
Waveform EXECUTEA.BMP



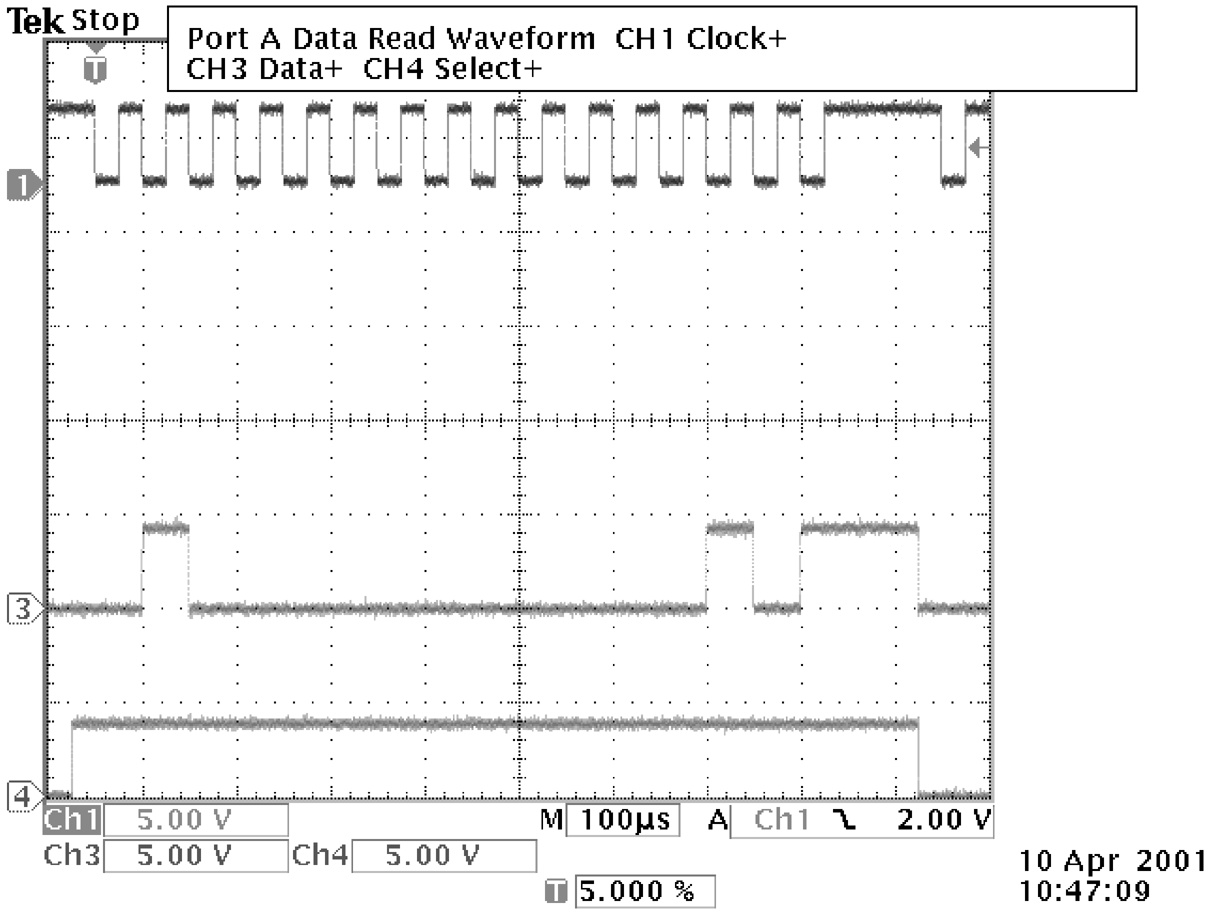
Waveform DATAA.BMP



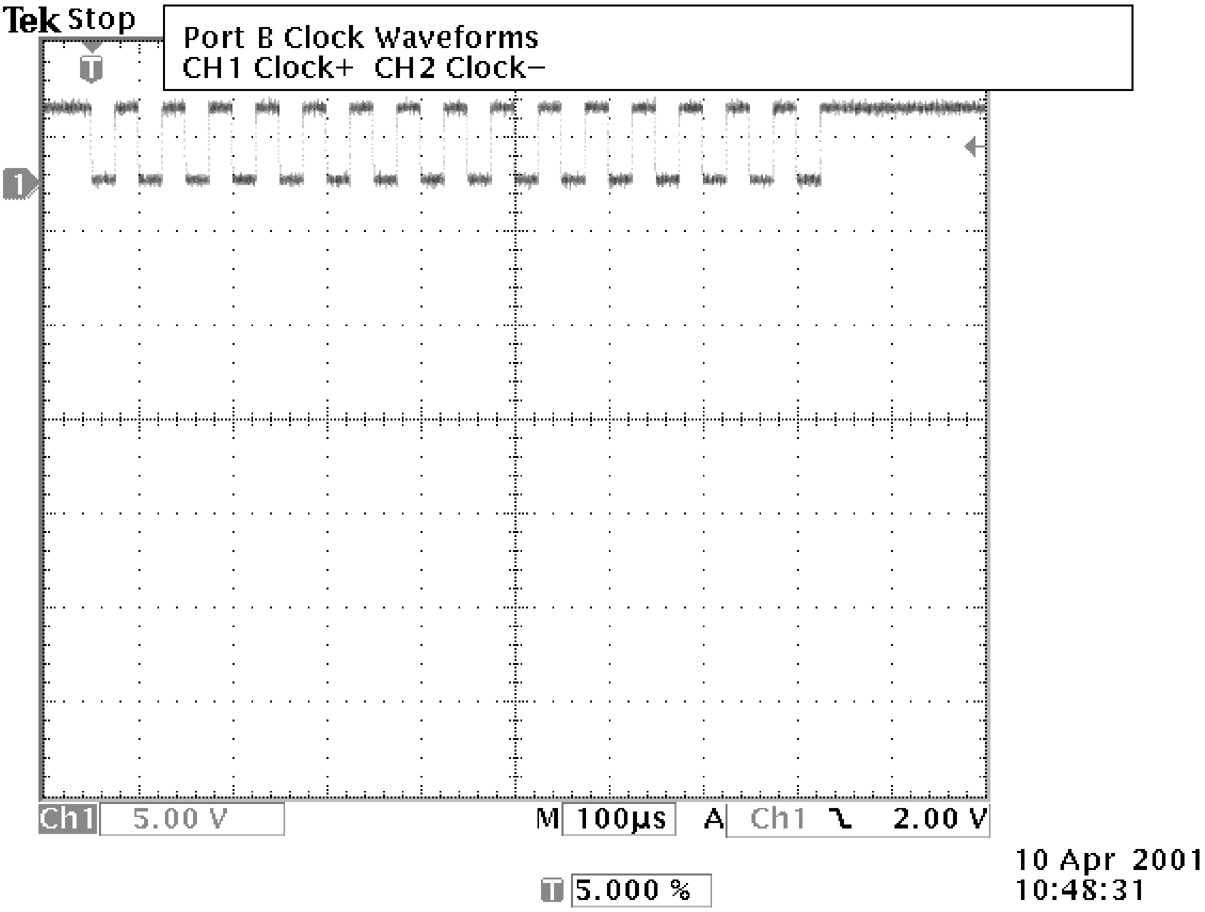
Waveform CTLWRA.BMP



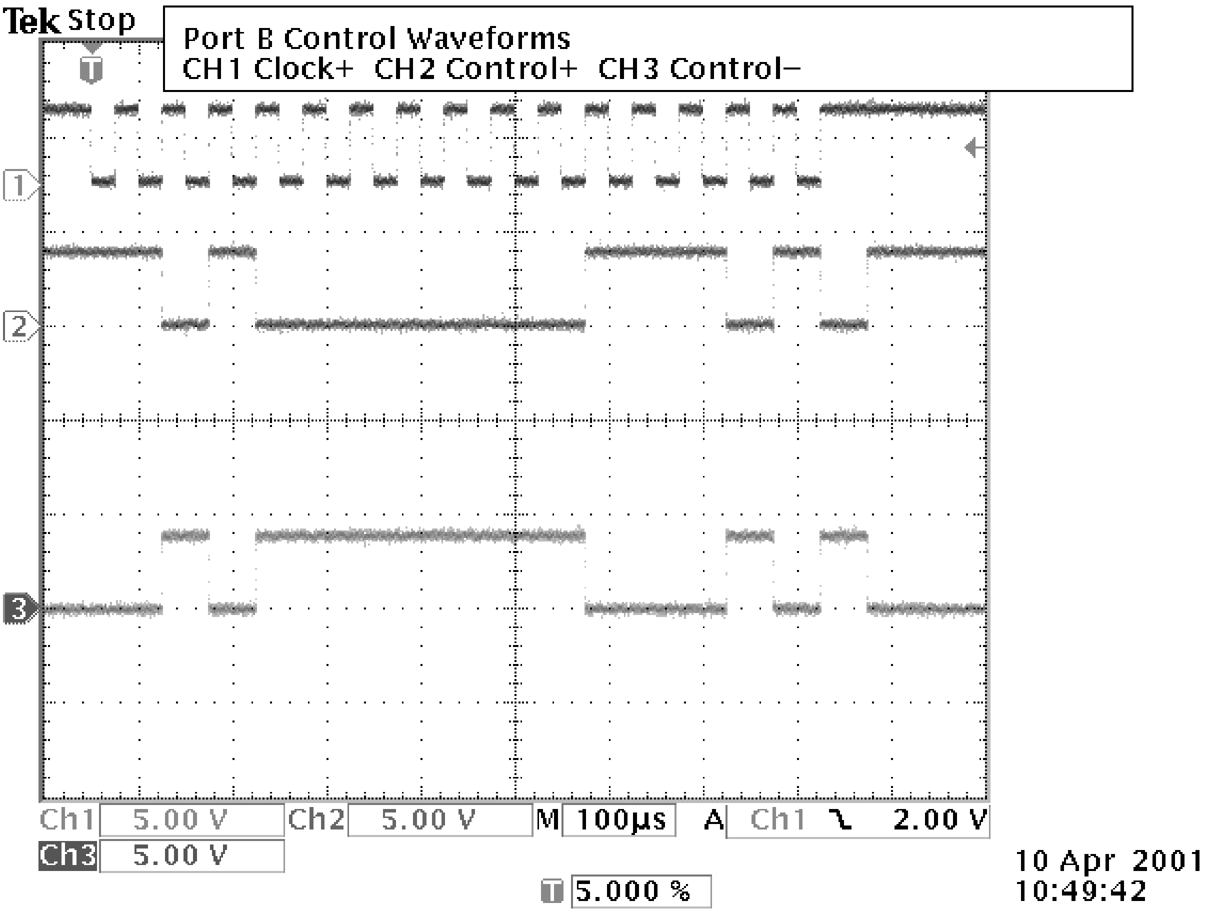
Waveform DATARDA.BMP



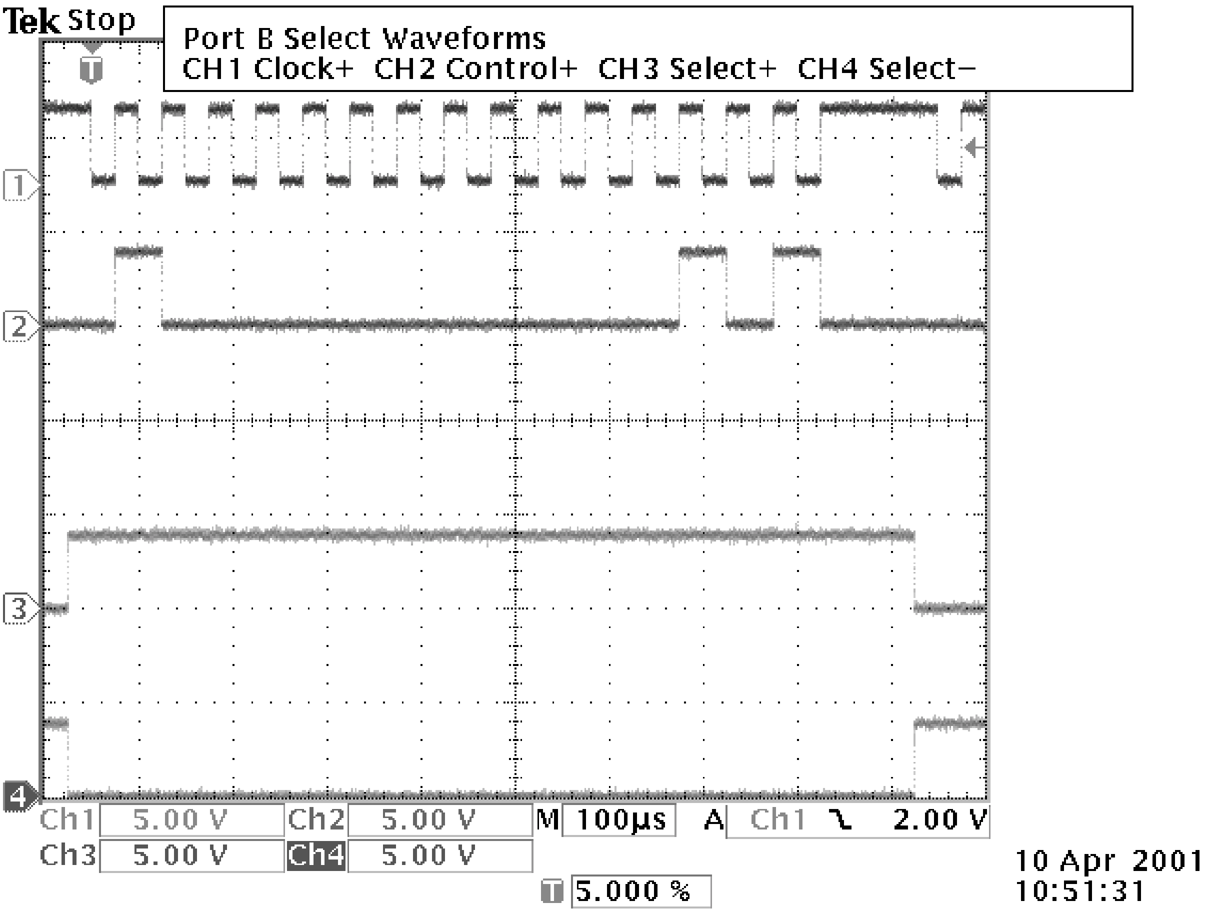
Waveform CLOCKB.BMP



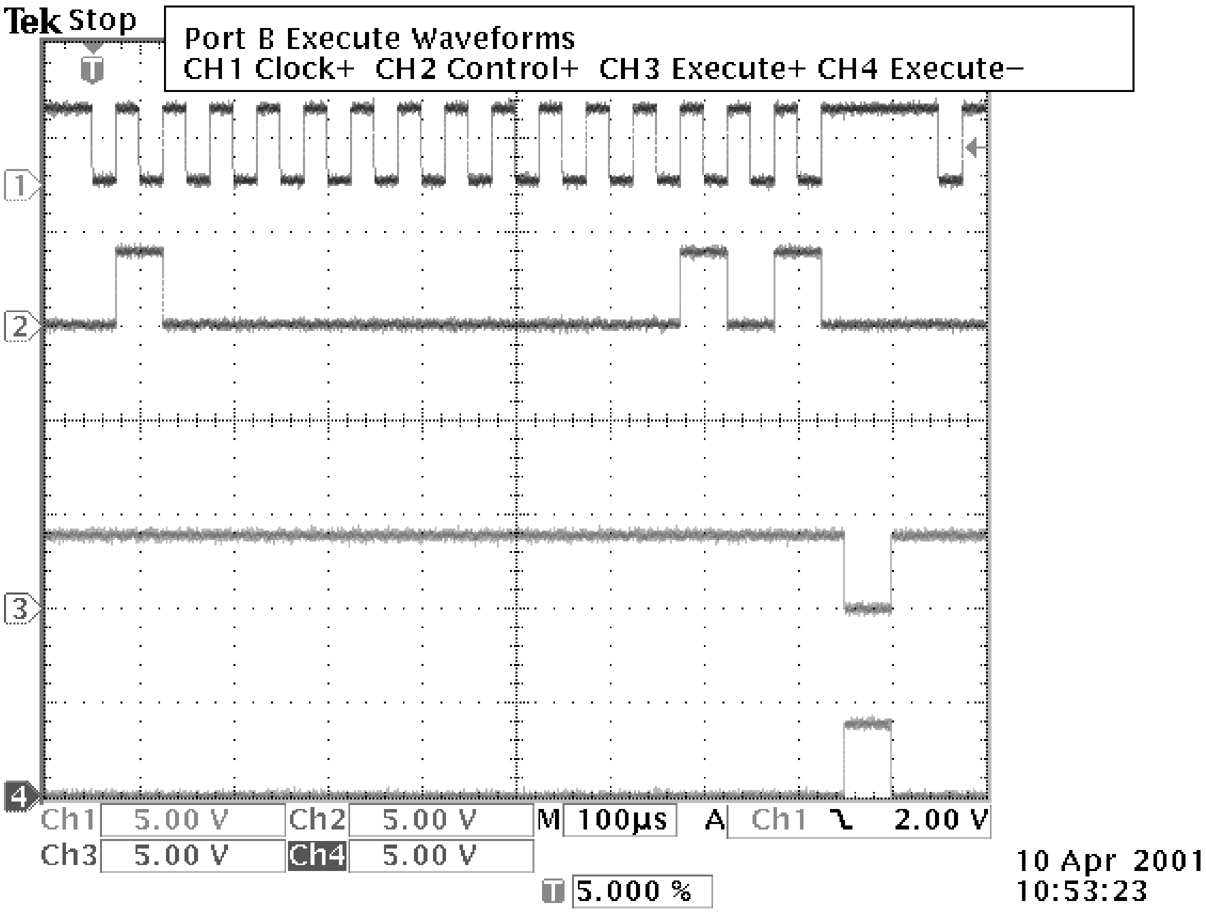
Waveform CONTROLB.BMP



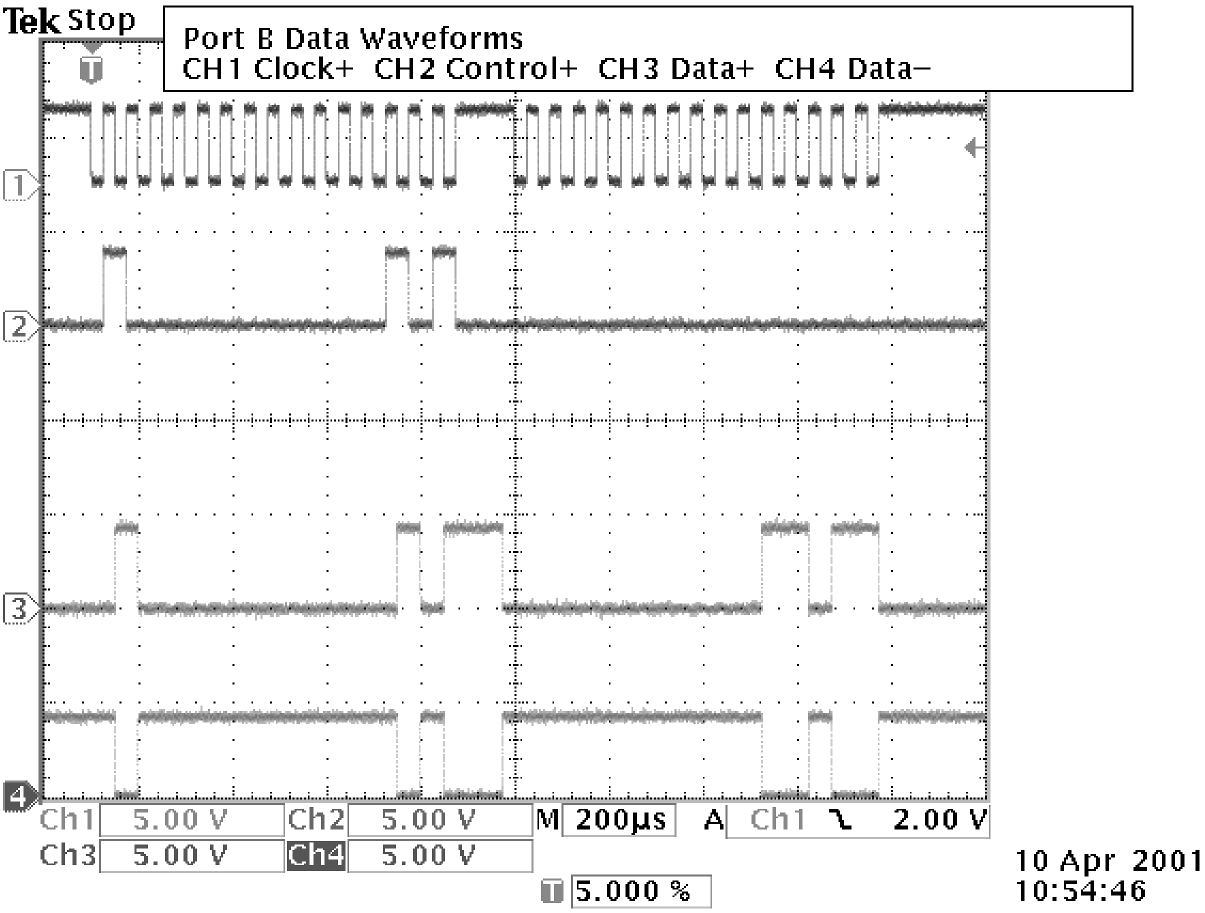
Waveform SELECTB.BMP



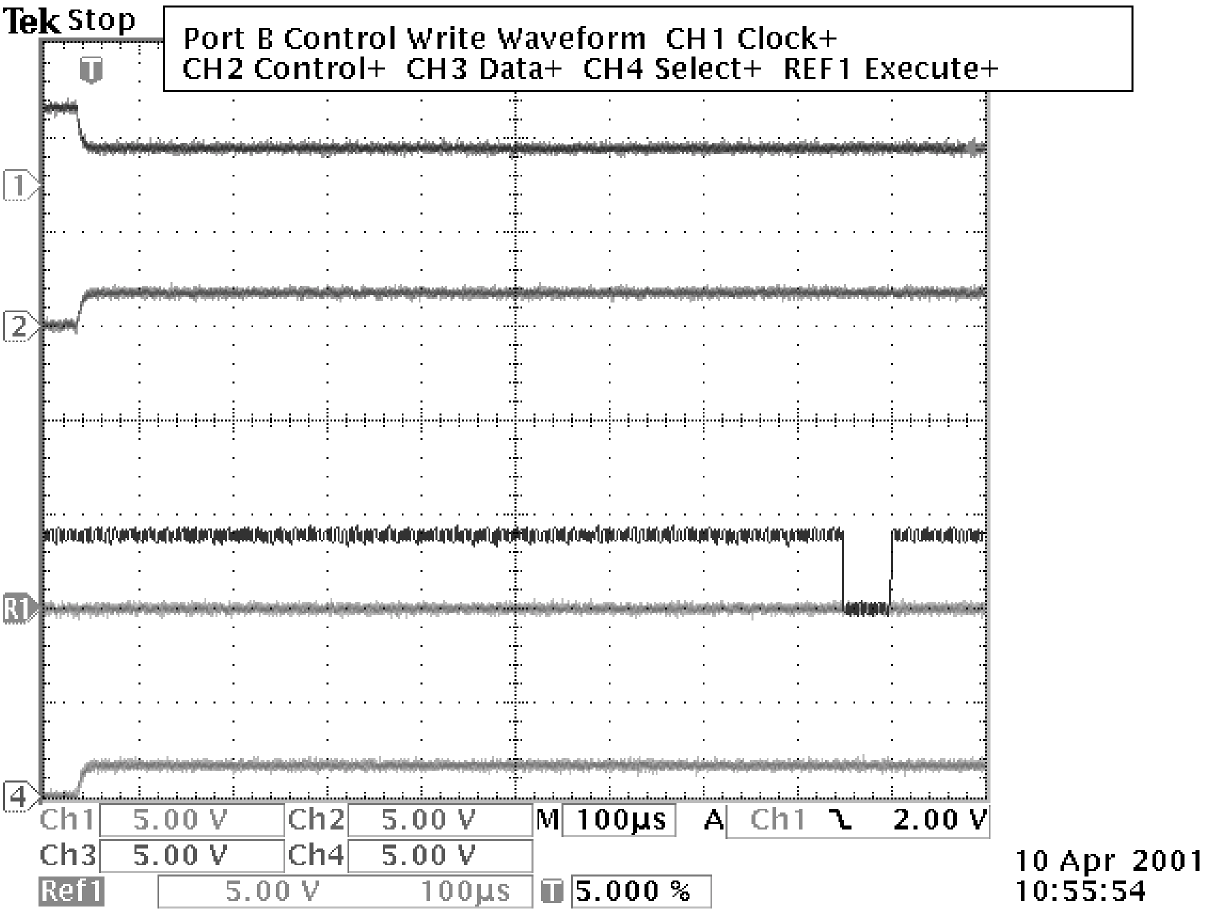
Waveform EXECUTEB.BMP



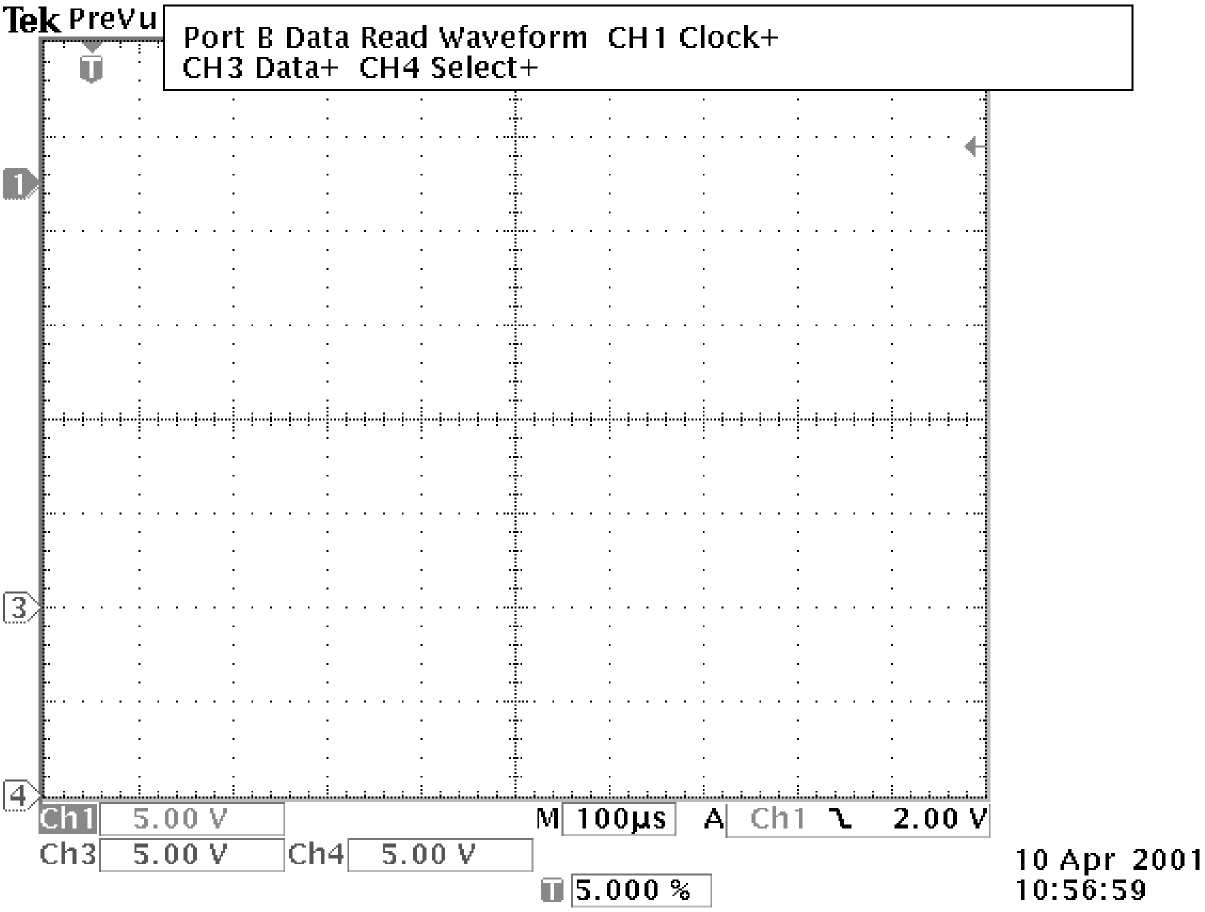
Waveform DATAB.BMP



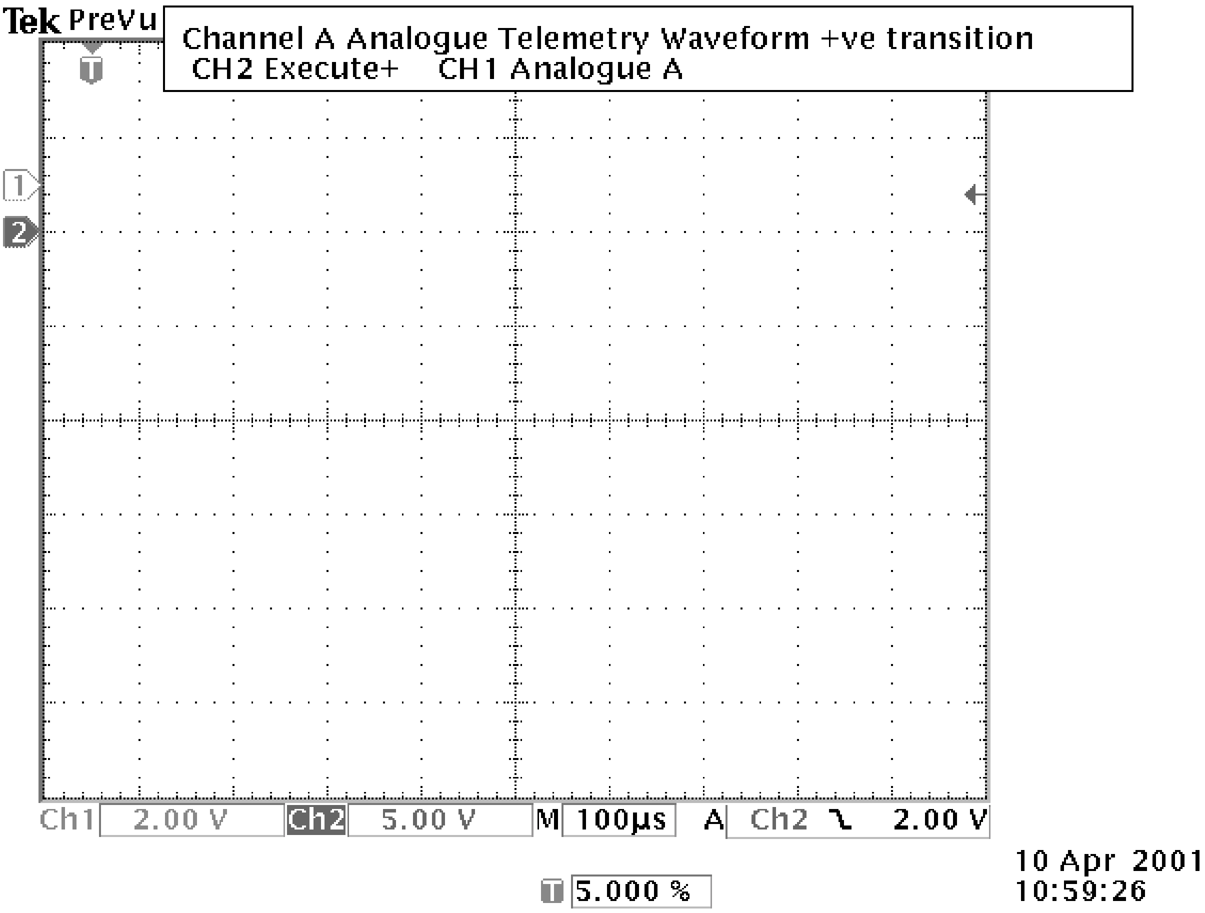
Waveform CTLWRB.BMP



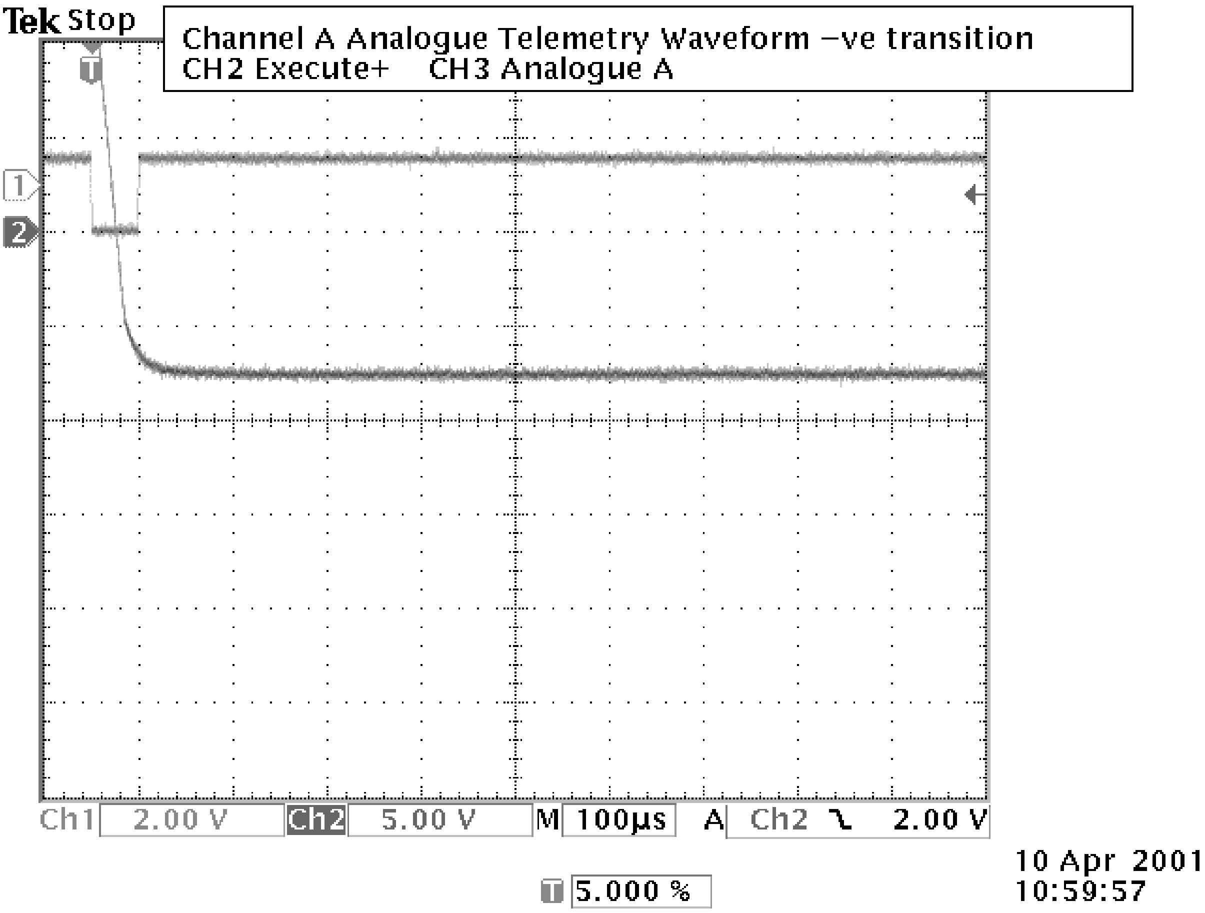
Waveform DATARDB.BMP



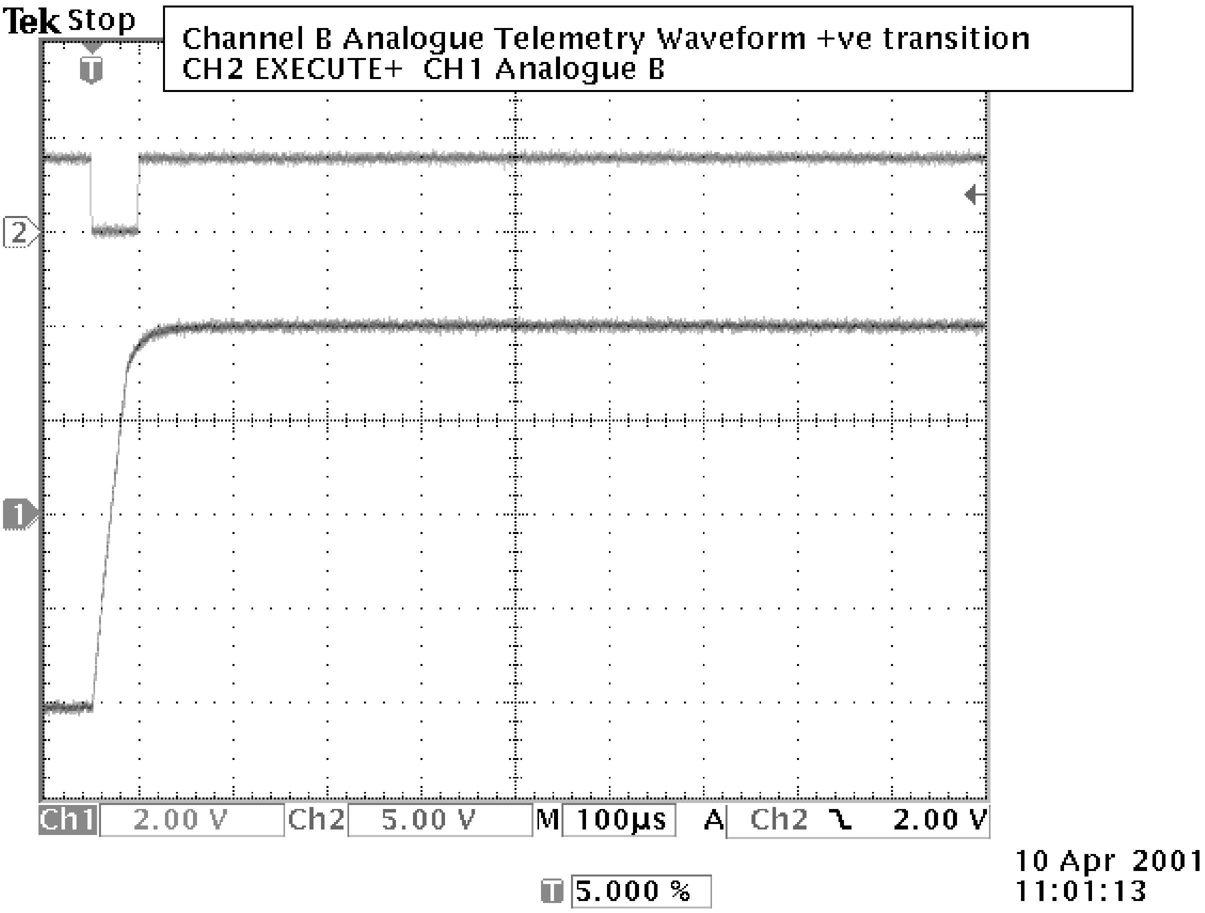
Waveform ANALOGAP.BMP



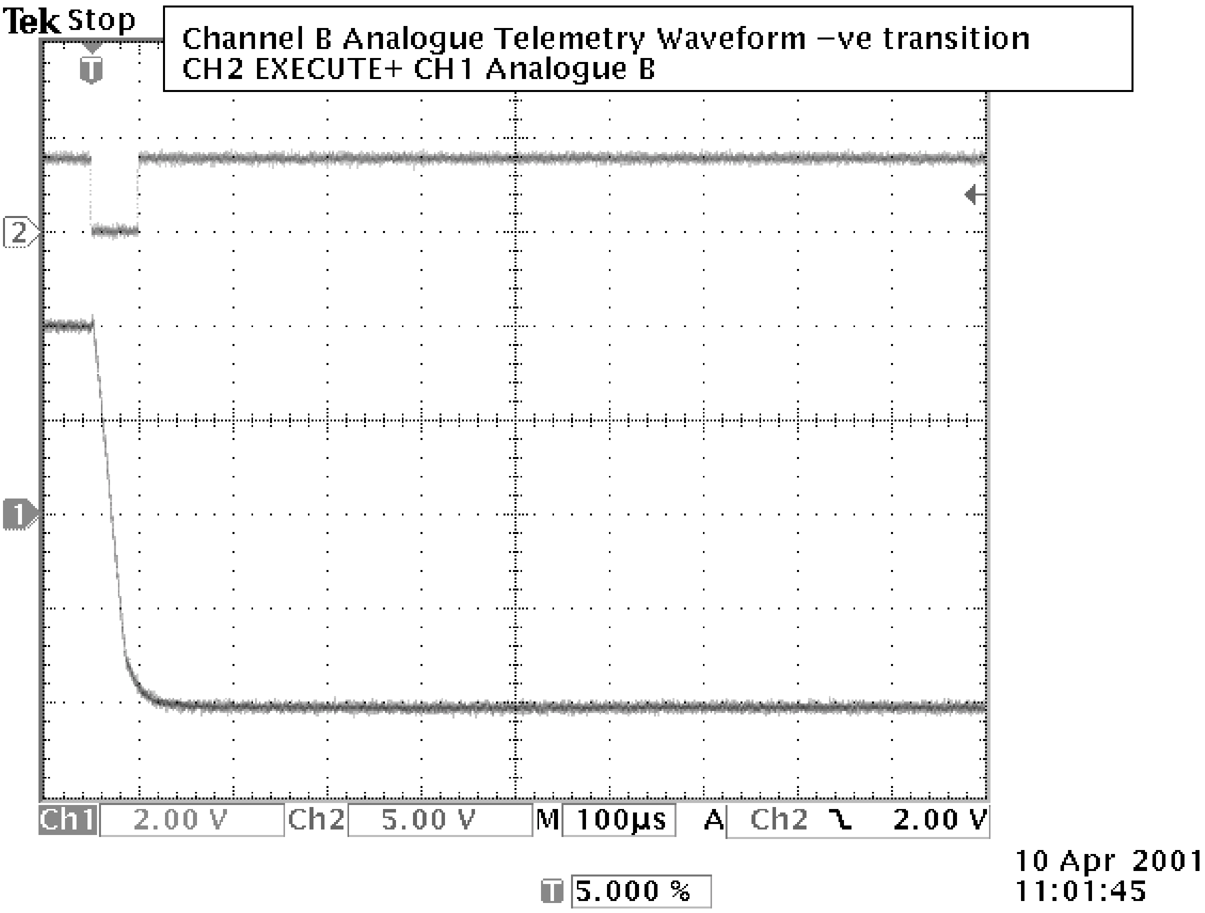
Waveform ANALOGAN.BMP



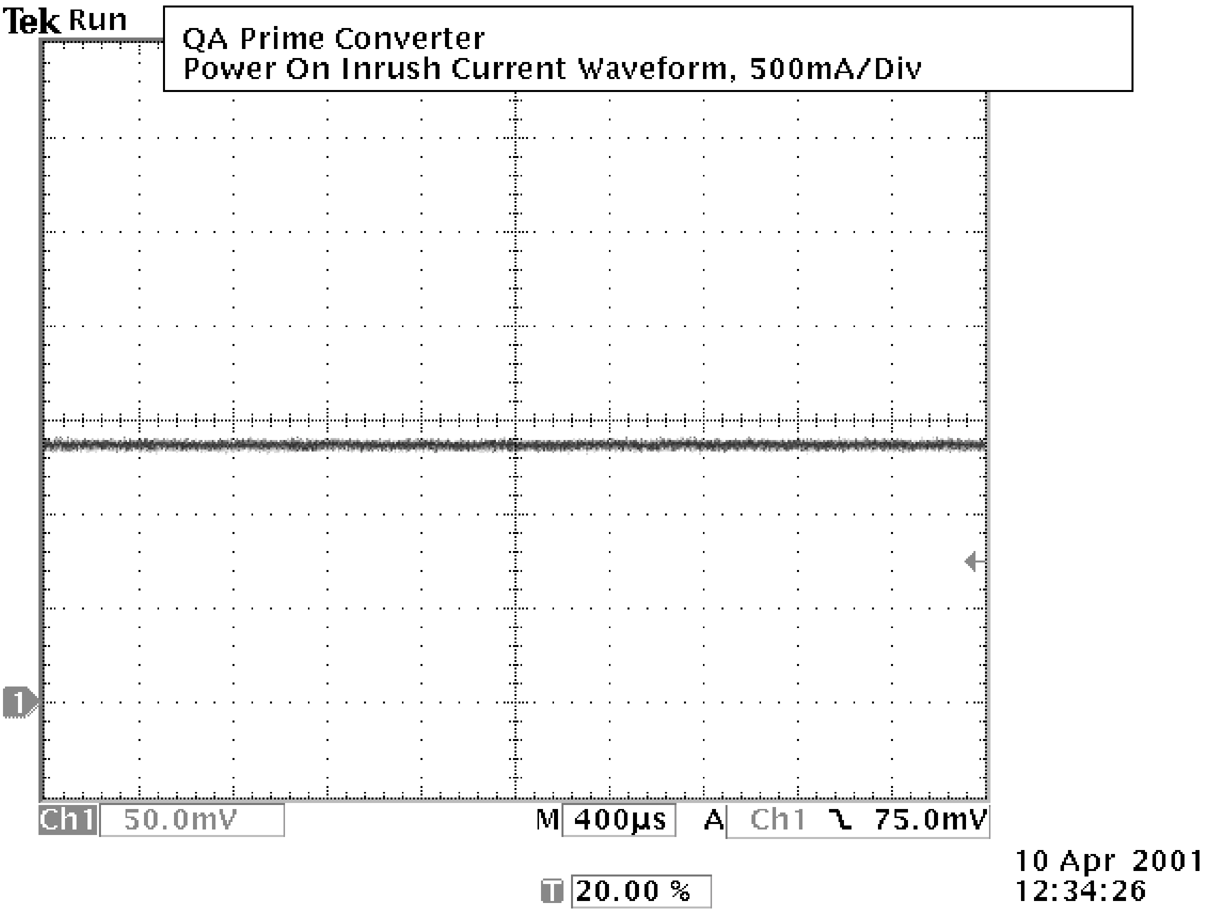
Waveform ANALOGBP.BMP



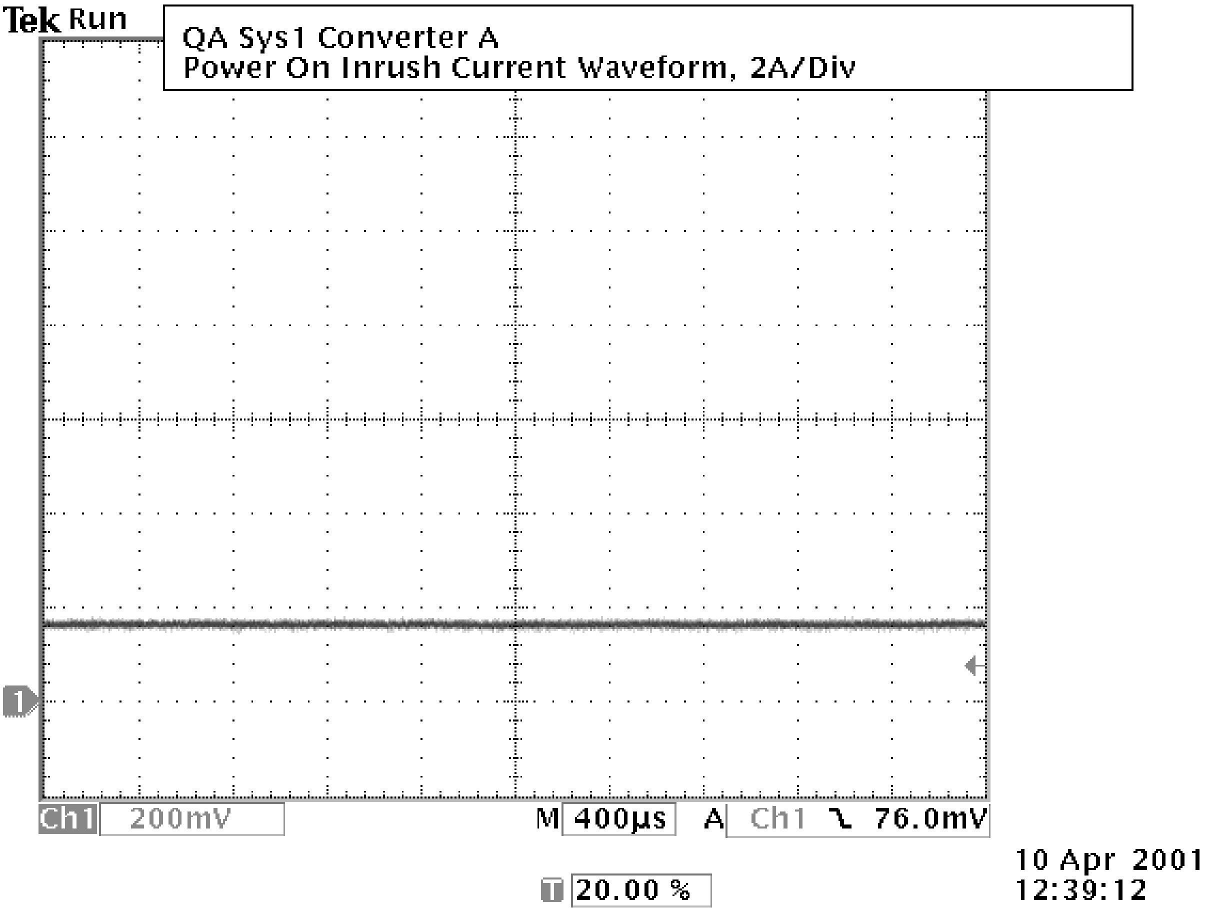
Waveform ANALOGBN.BMP



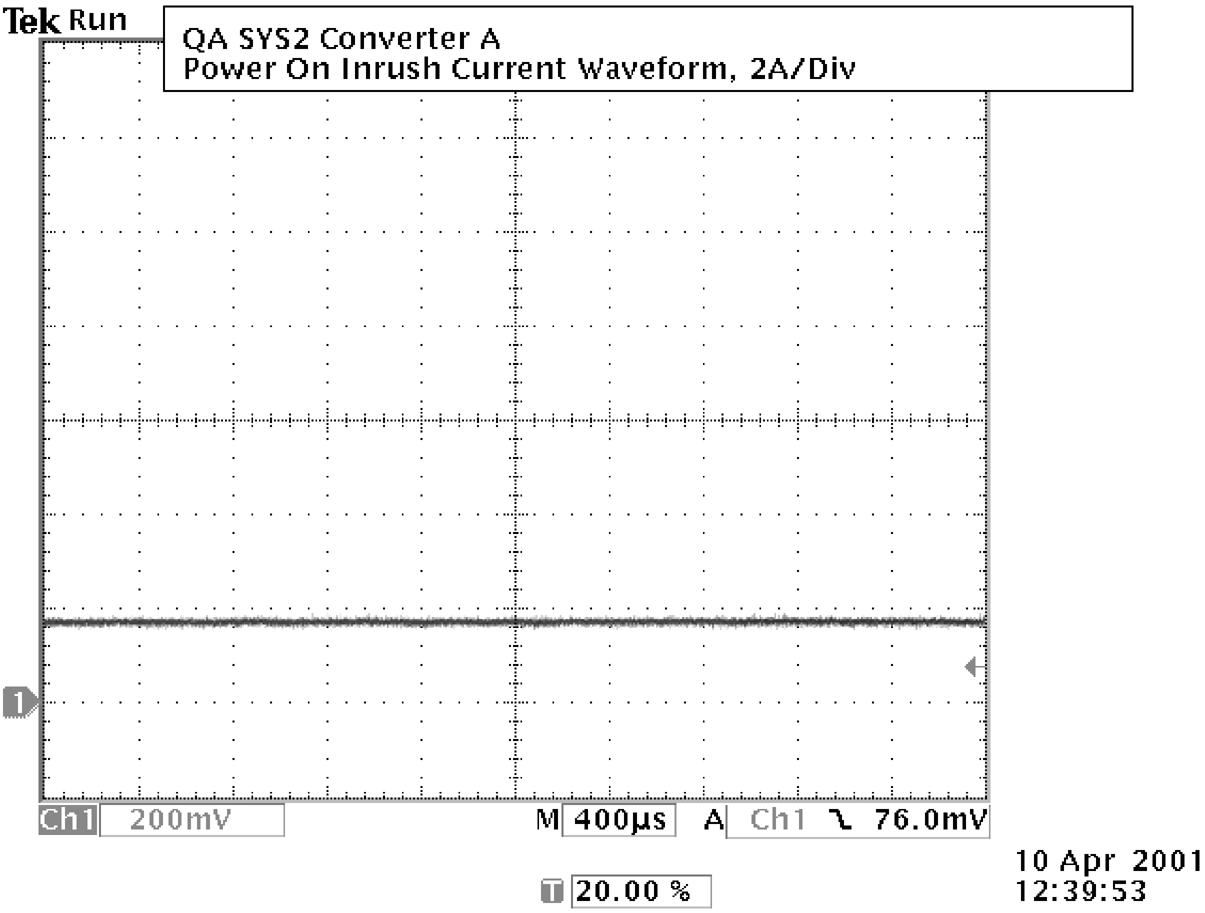
Waveform INRUSHAP.BMP



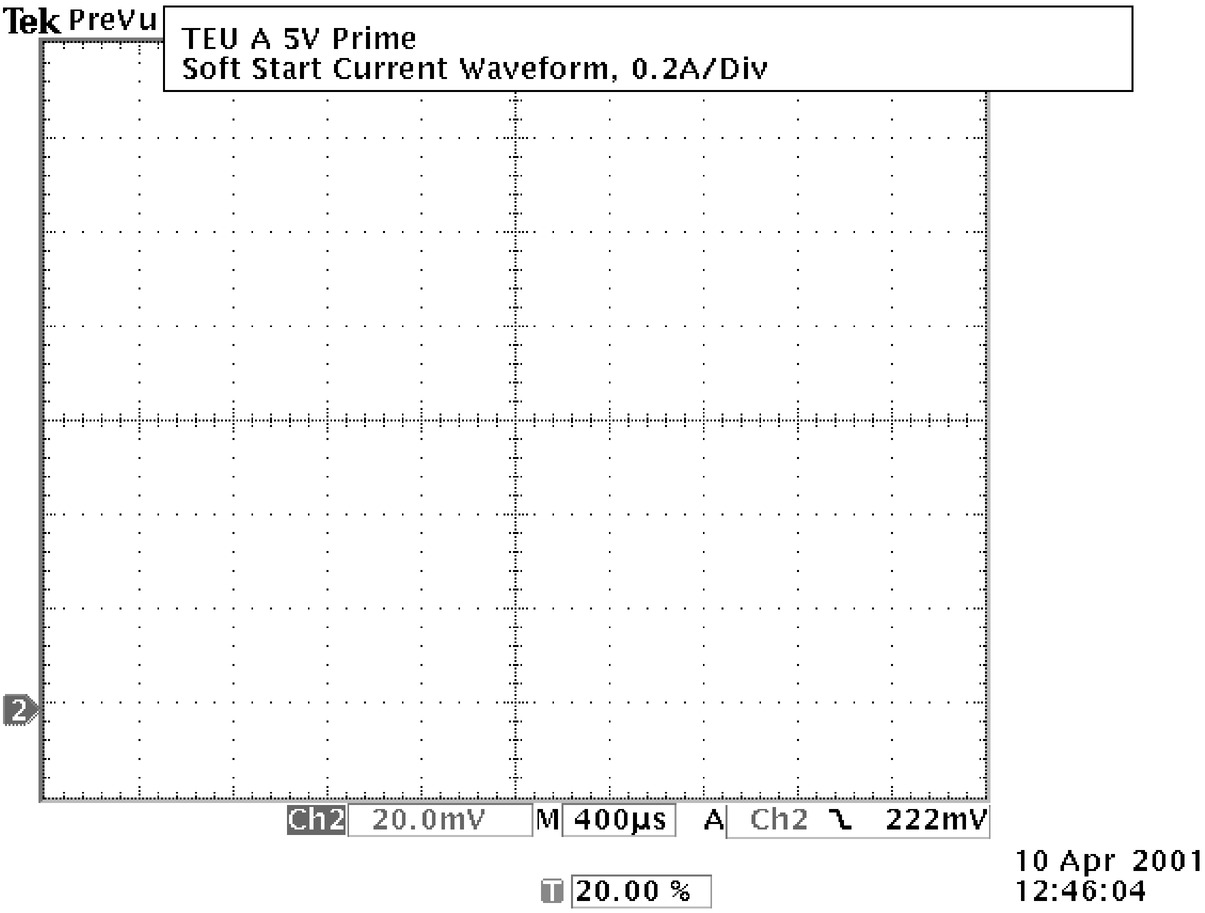
Waveform SYS1AQA.BMP



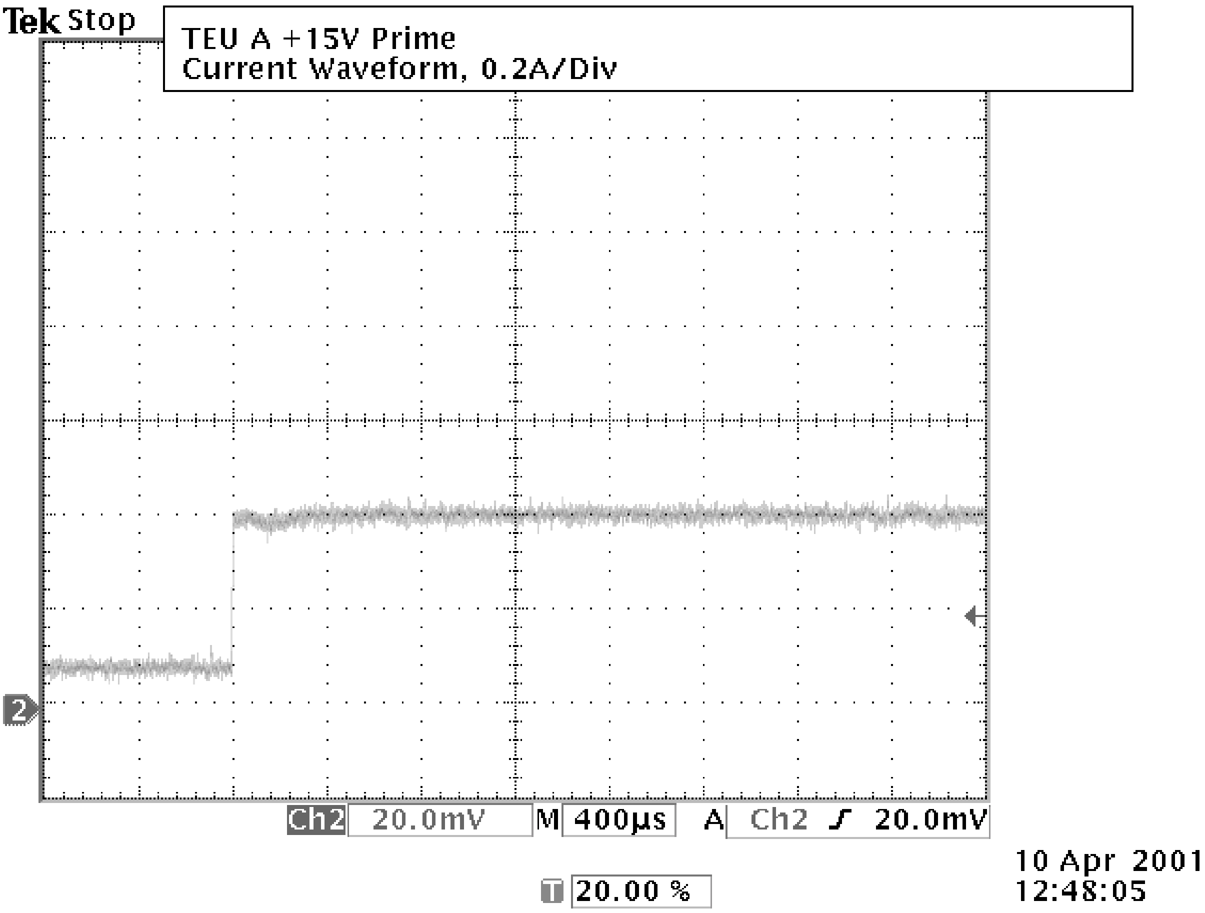
Waveform SYS2AQA.BMP



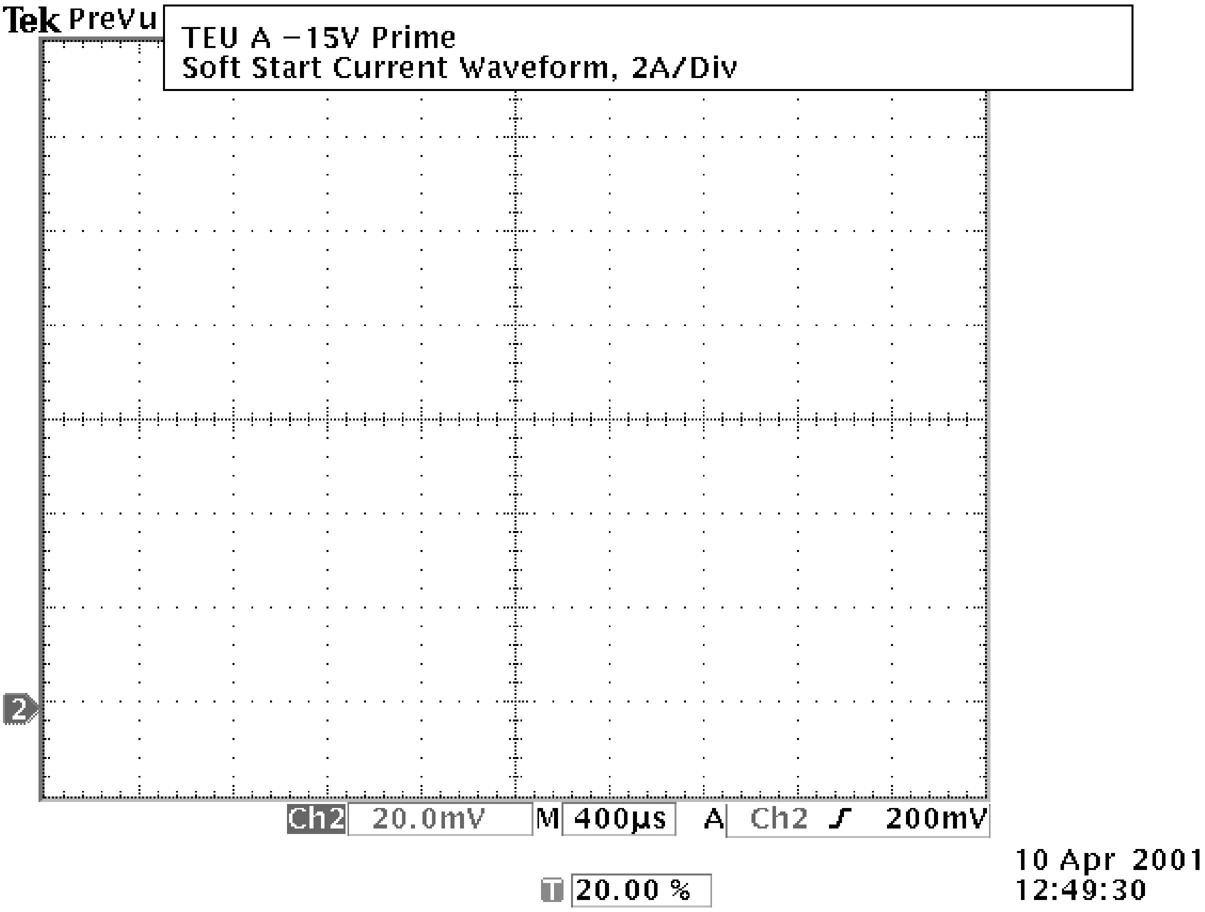
Waveform TEUAC2.BMP



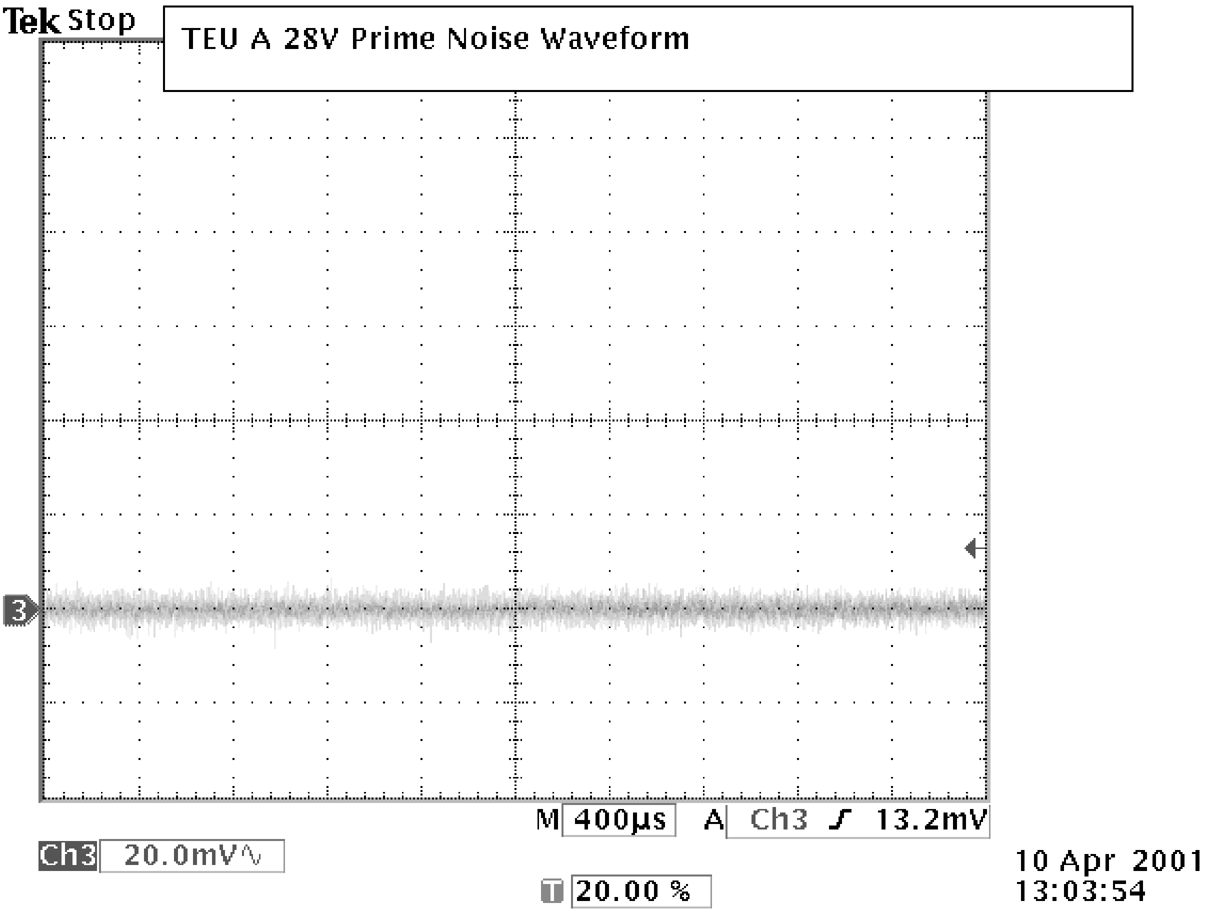
Waveform TEUAC3.BMP



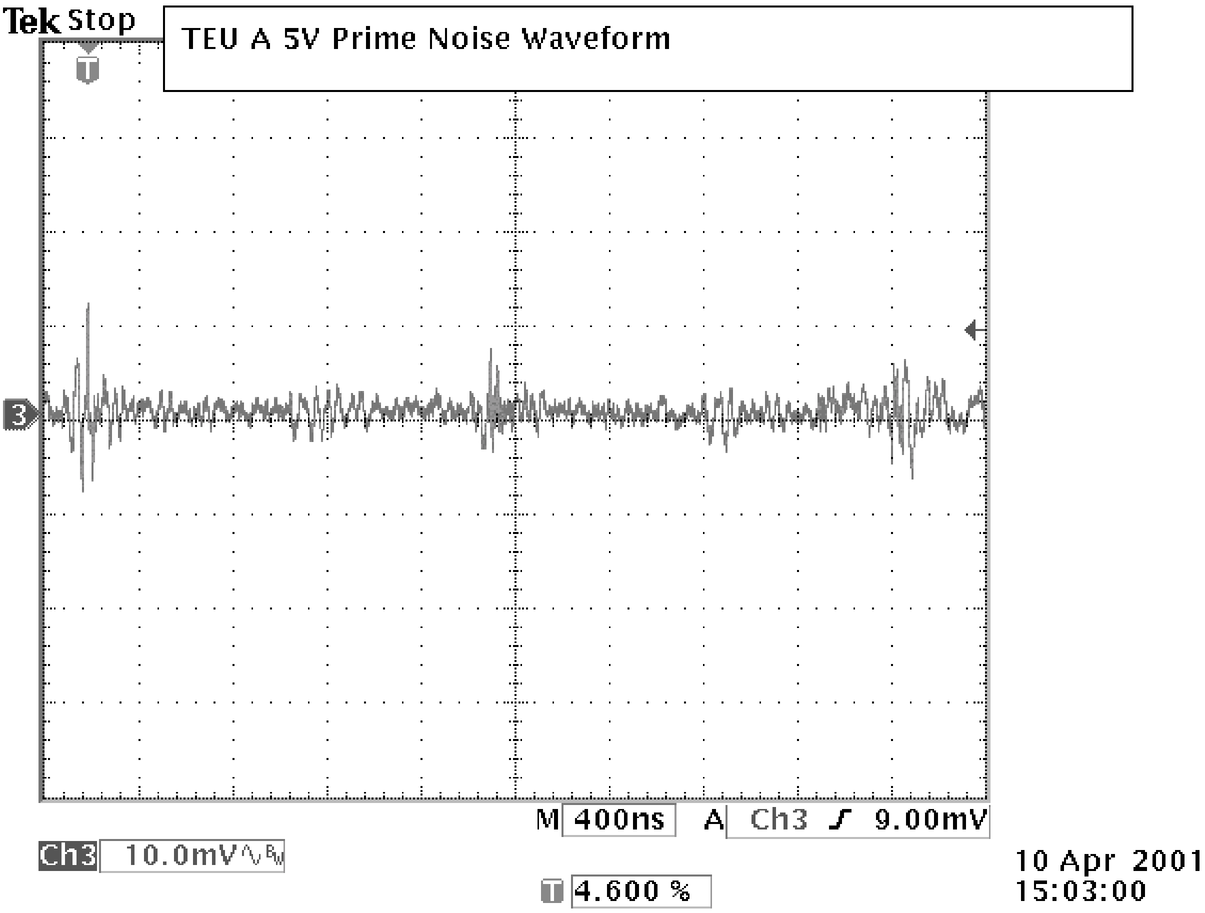
Waveform TEUAC4.BMP



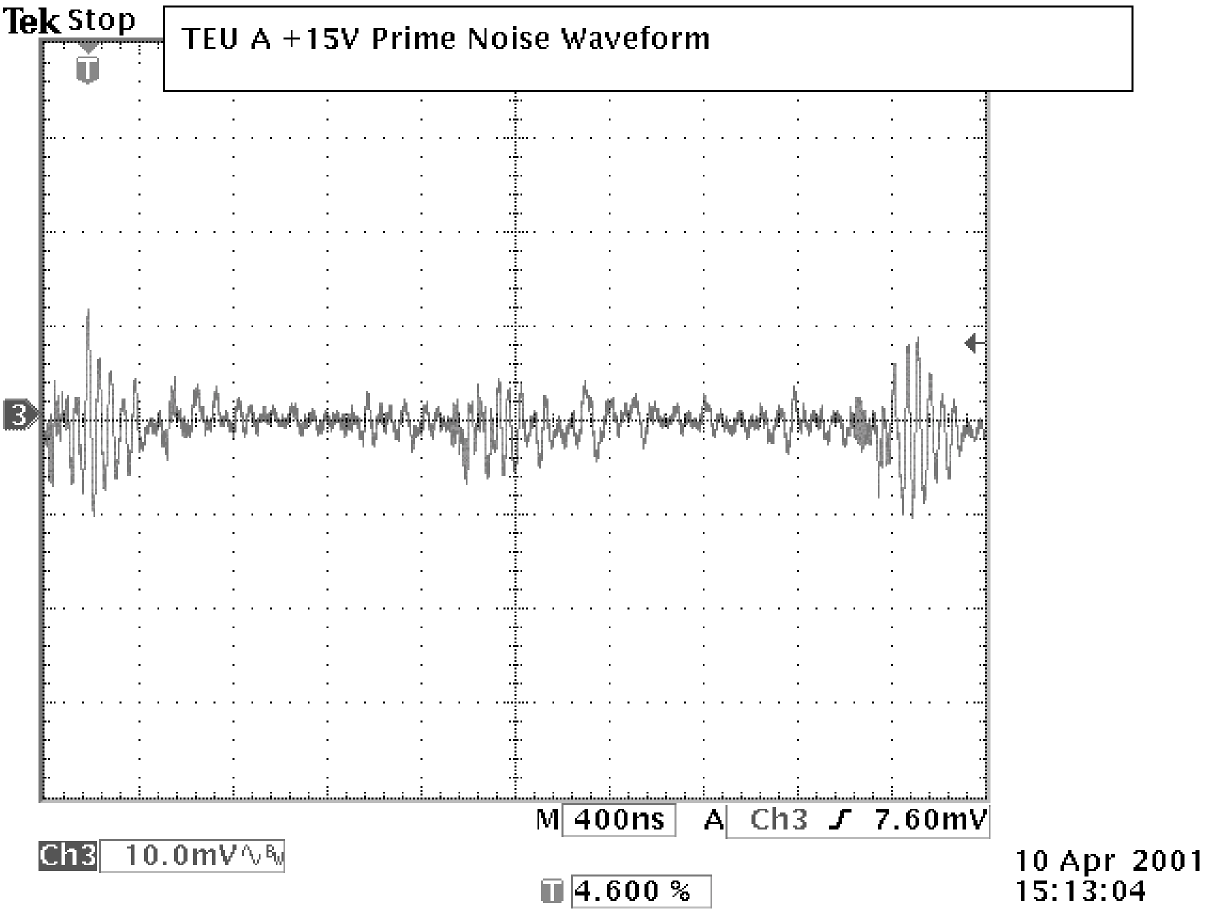
Waveform TEUAN1.BMP



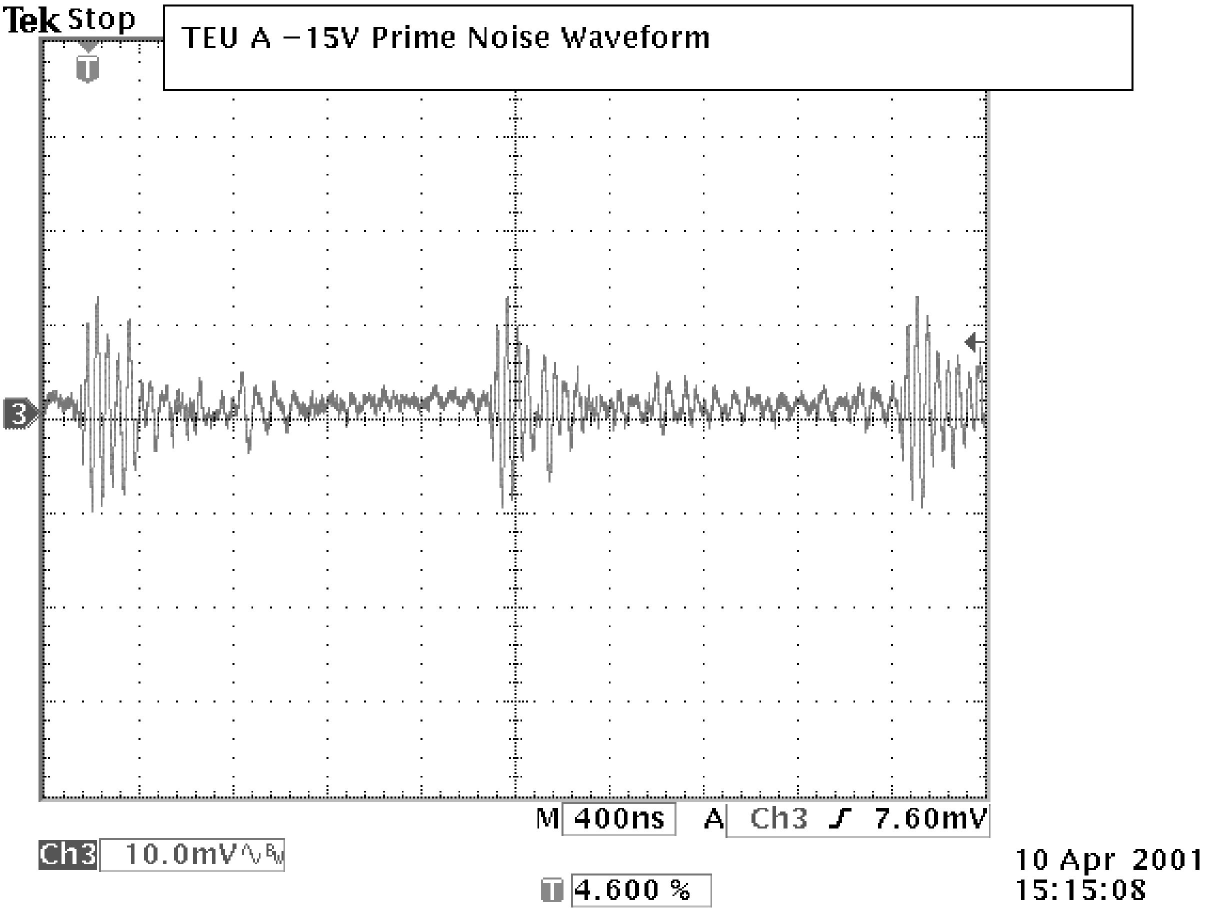
Waveform TEUAN2.BMP



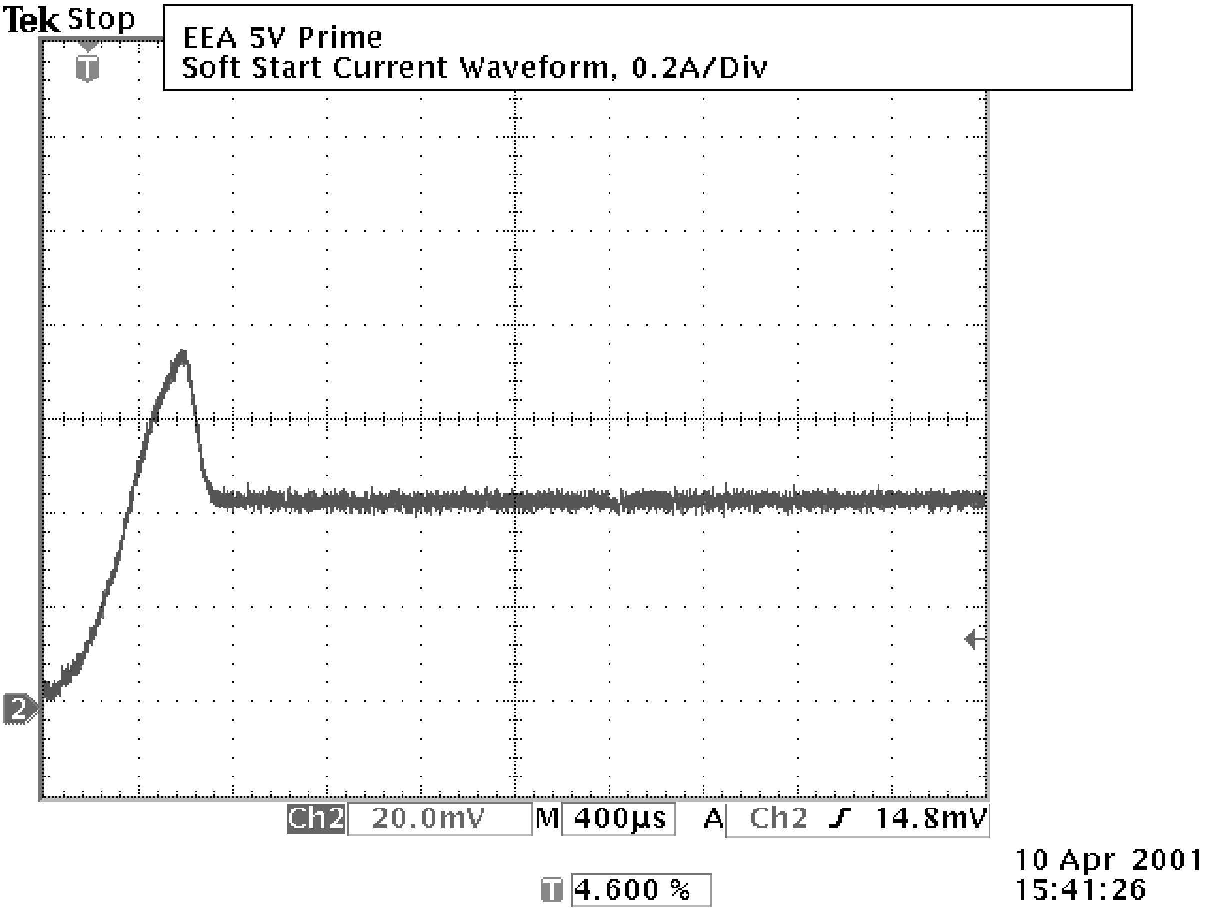
Waveform TEUAN3.BMP



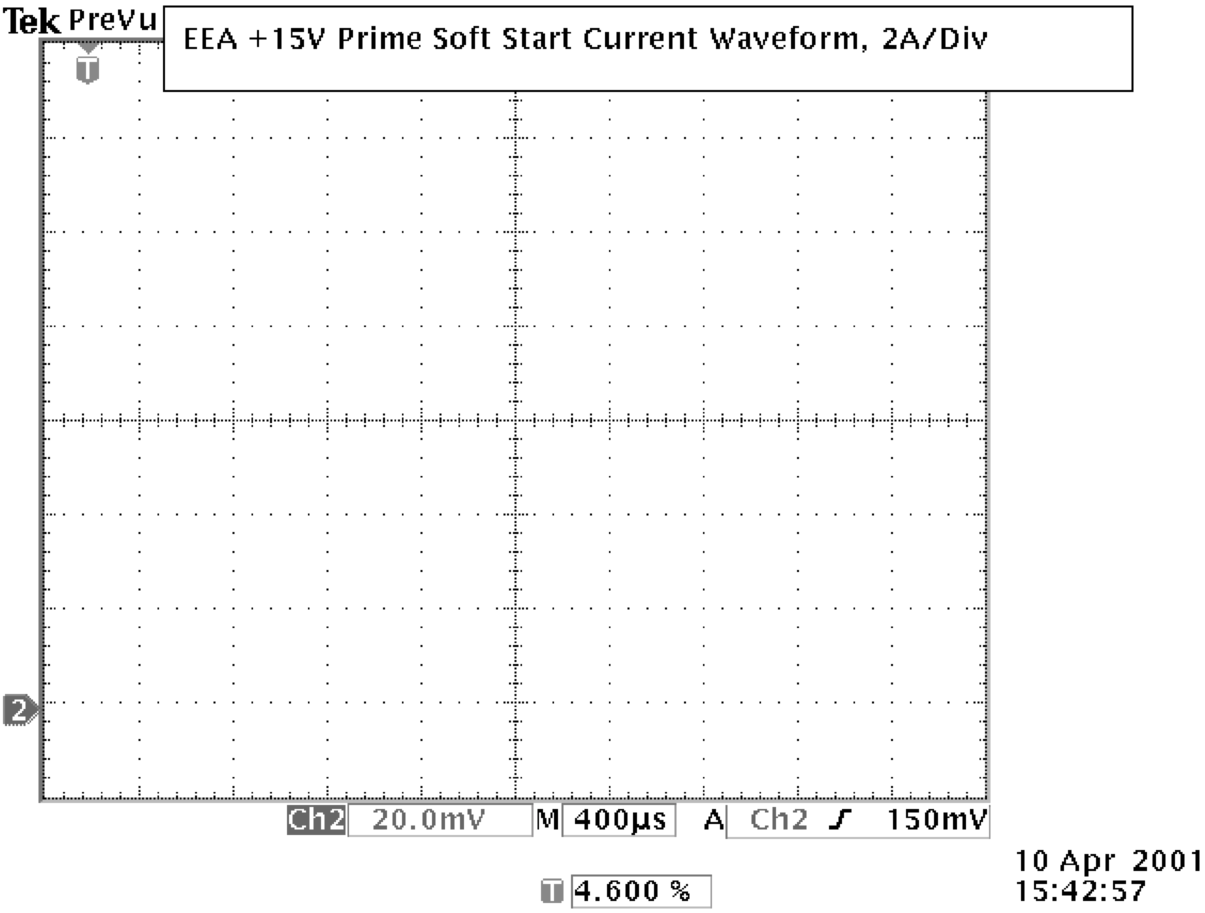
Waveform TEUAN4.BMP



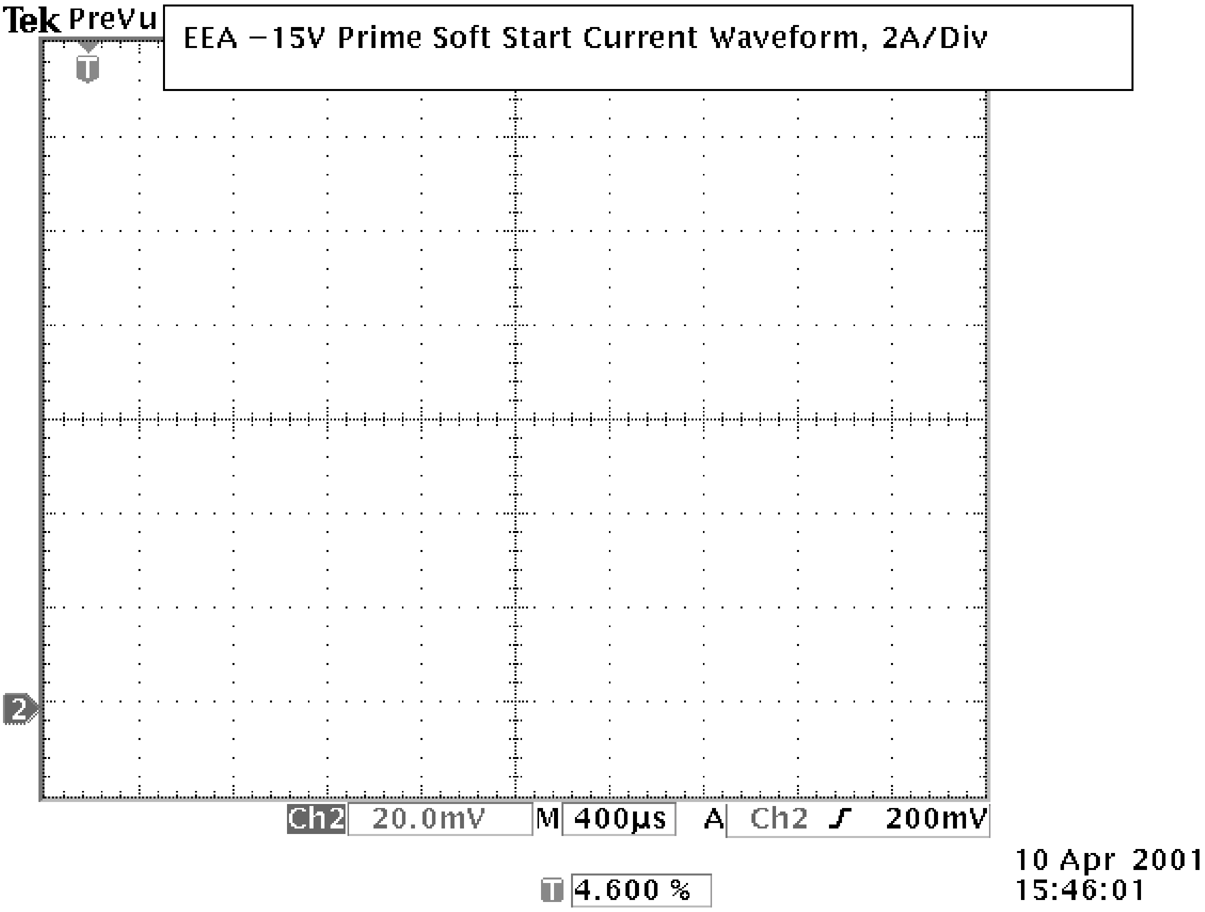
Waveform EEA5VPR.BMP



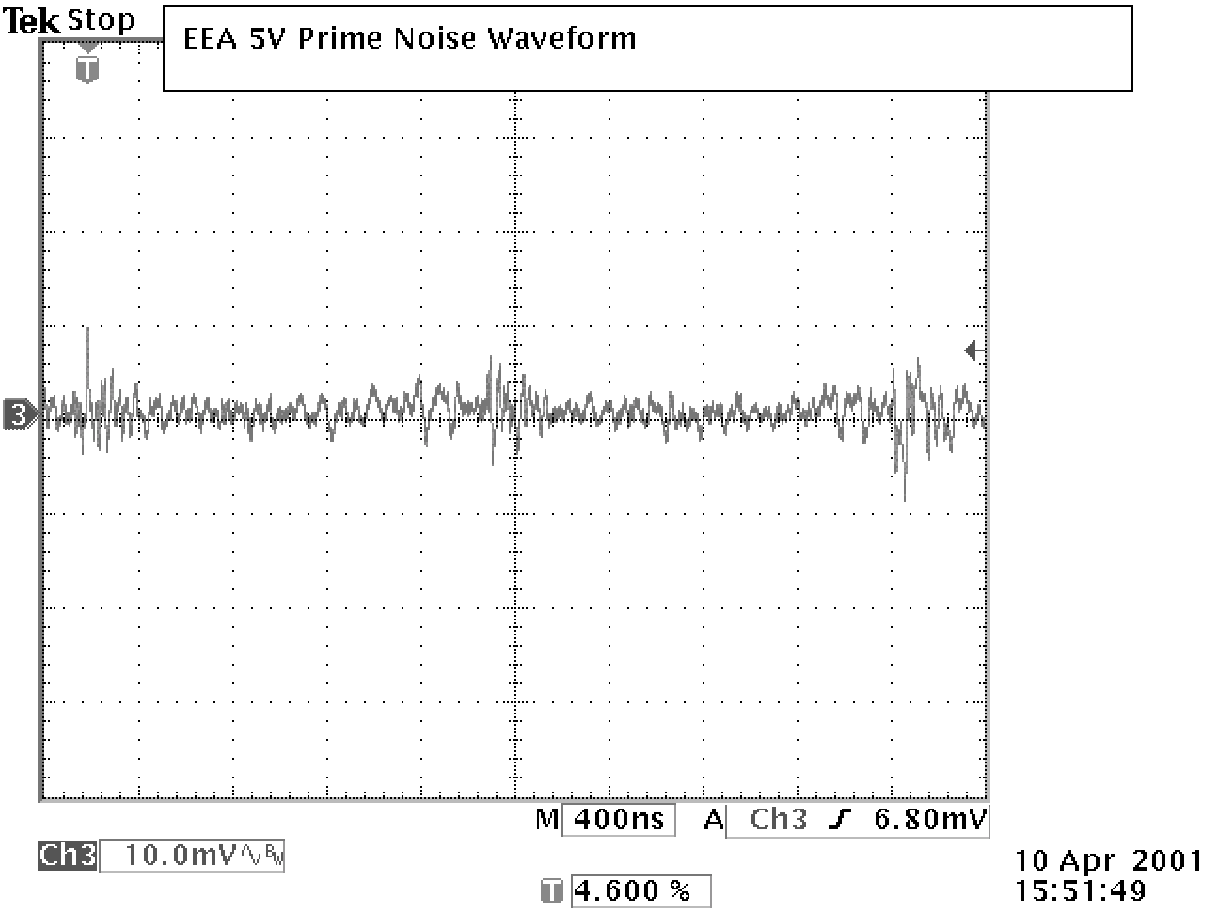
Waveform EEA15PPV.BMP



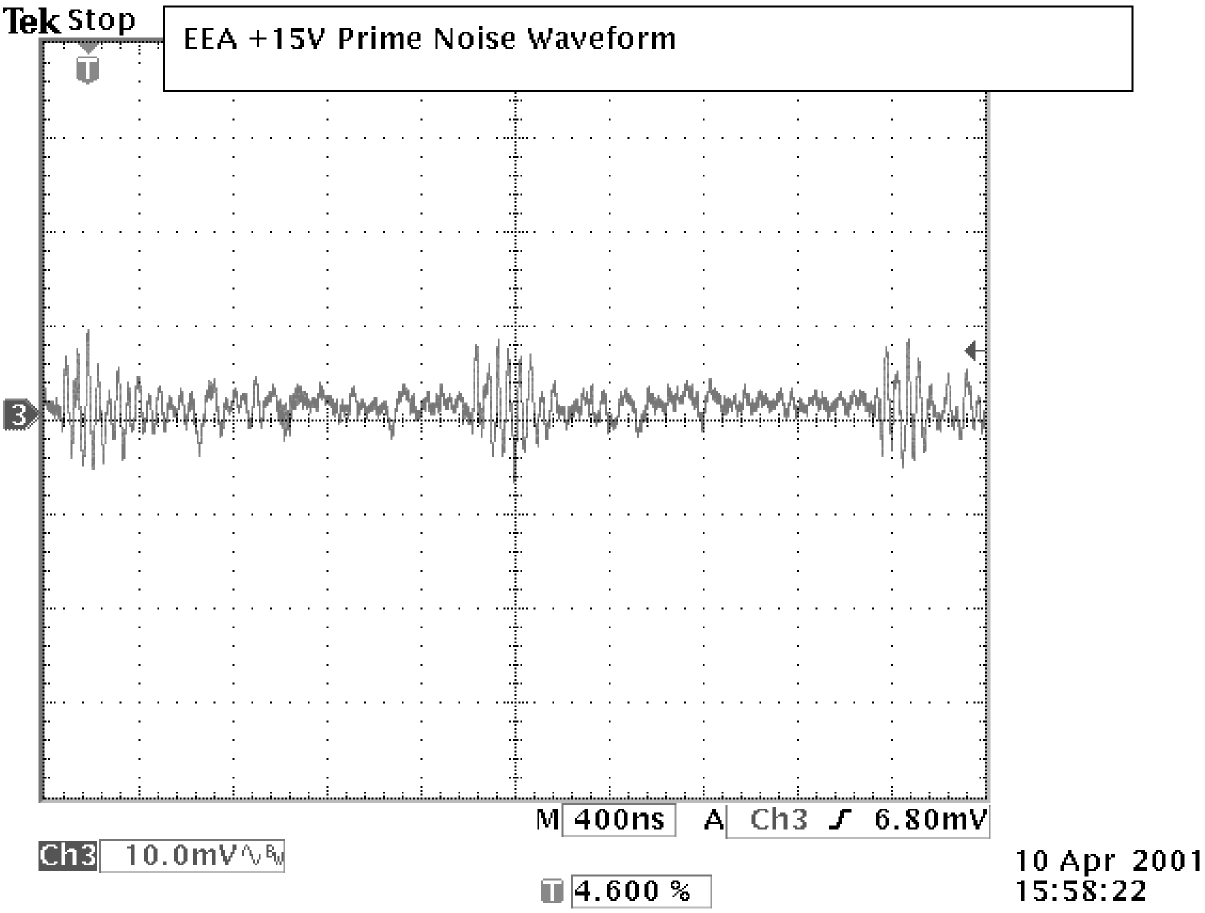
Waveform EEA15NPV.BMP



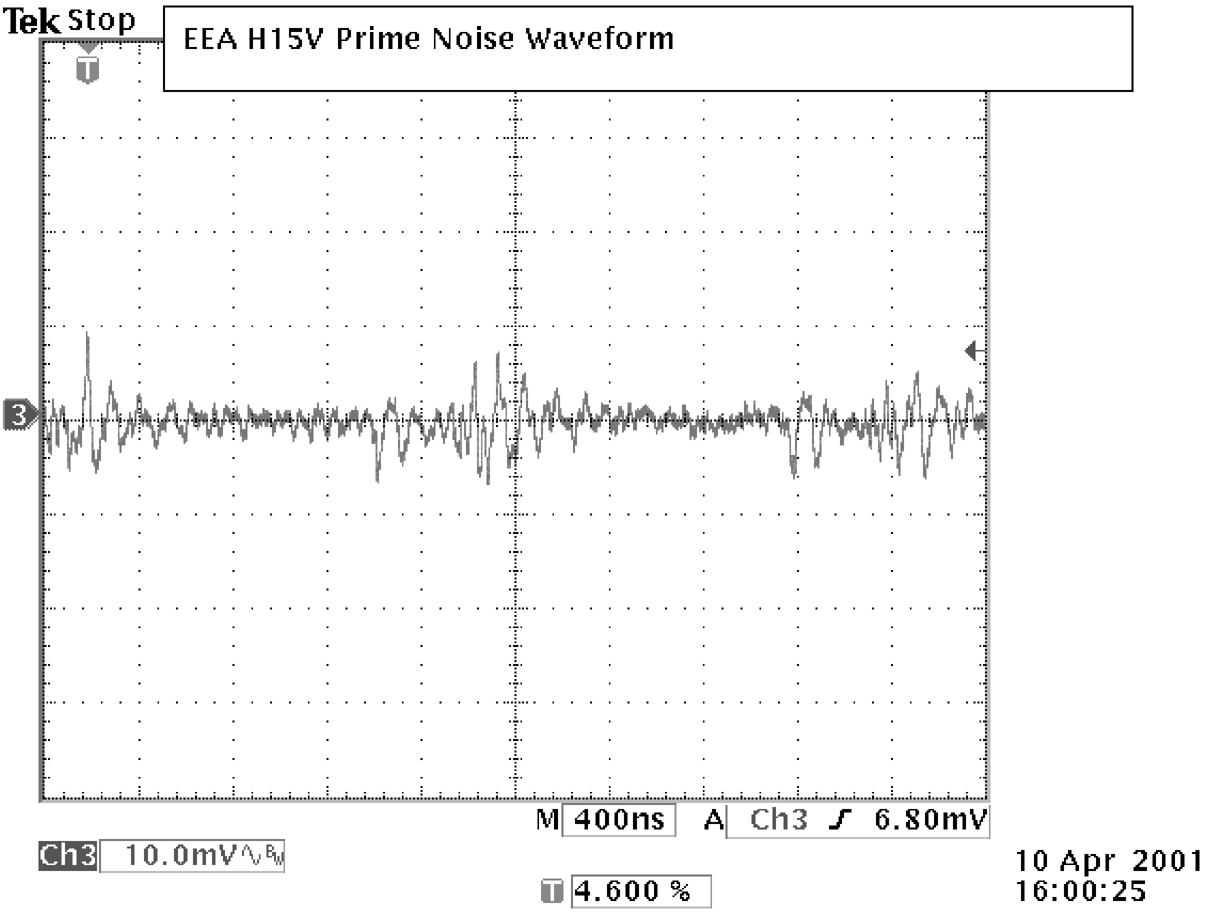
Waveform EEAN1.BMP



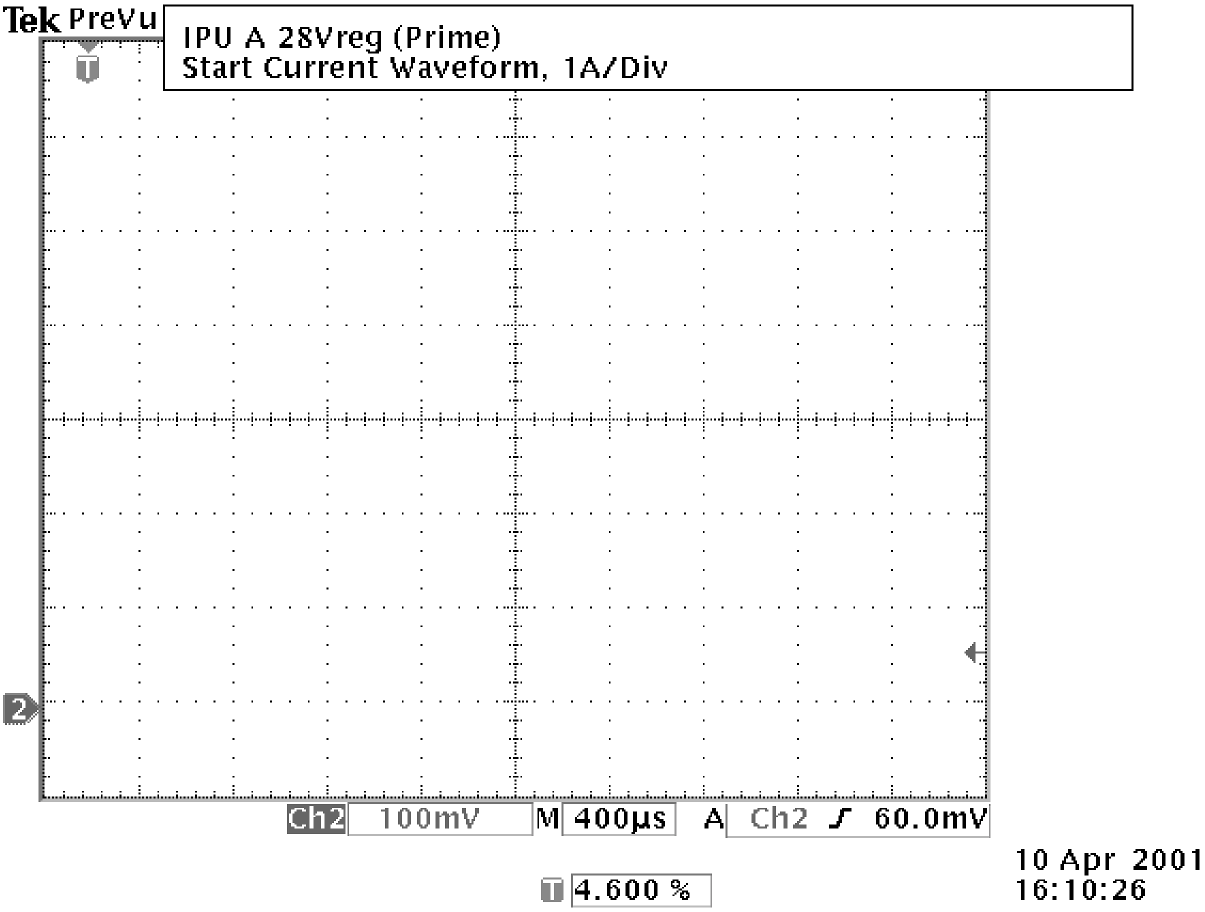
Waveform EEAN2.BMP



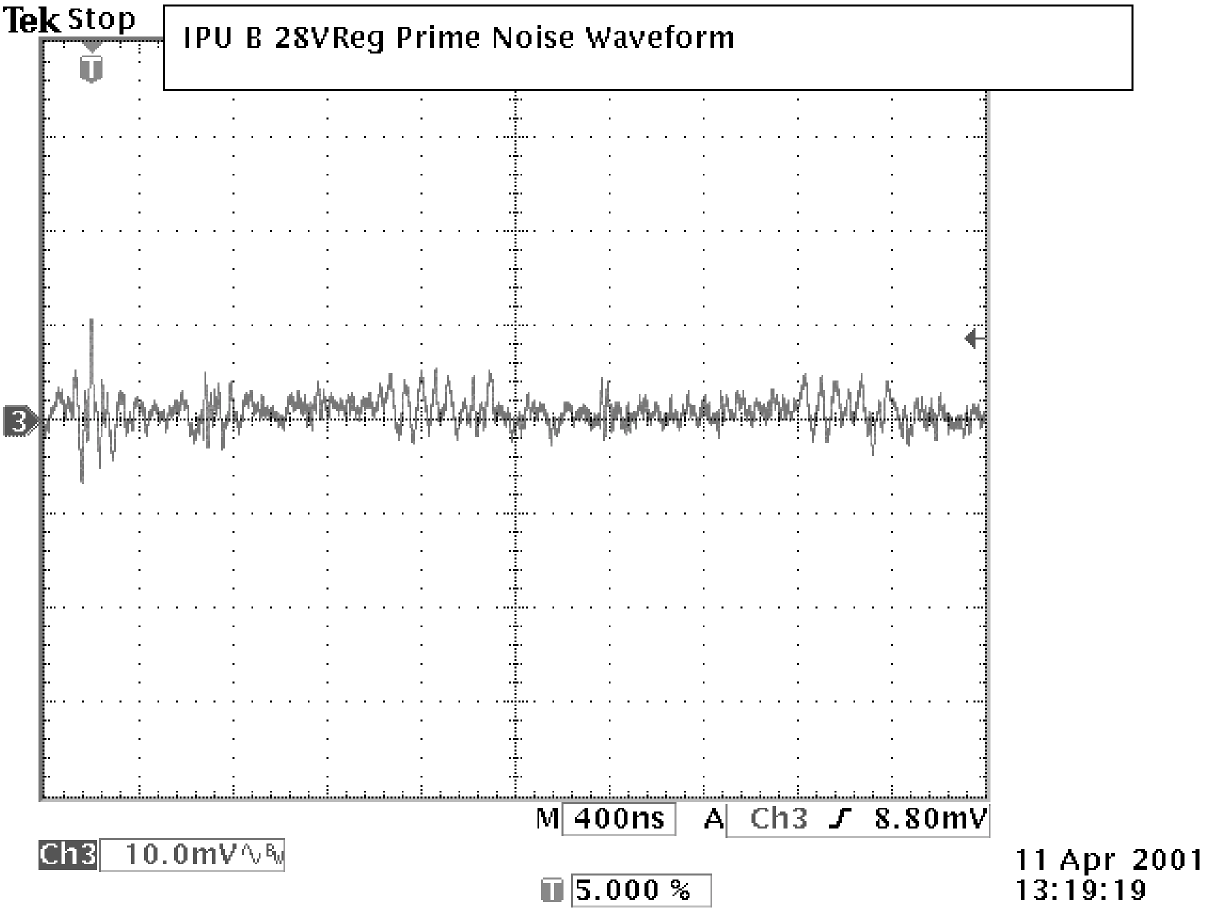
Waveform EEAN3.BMP



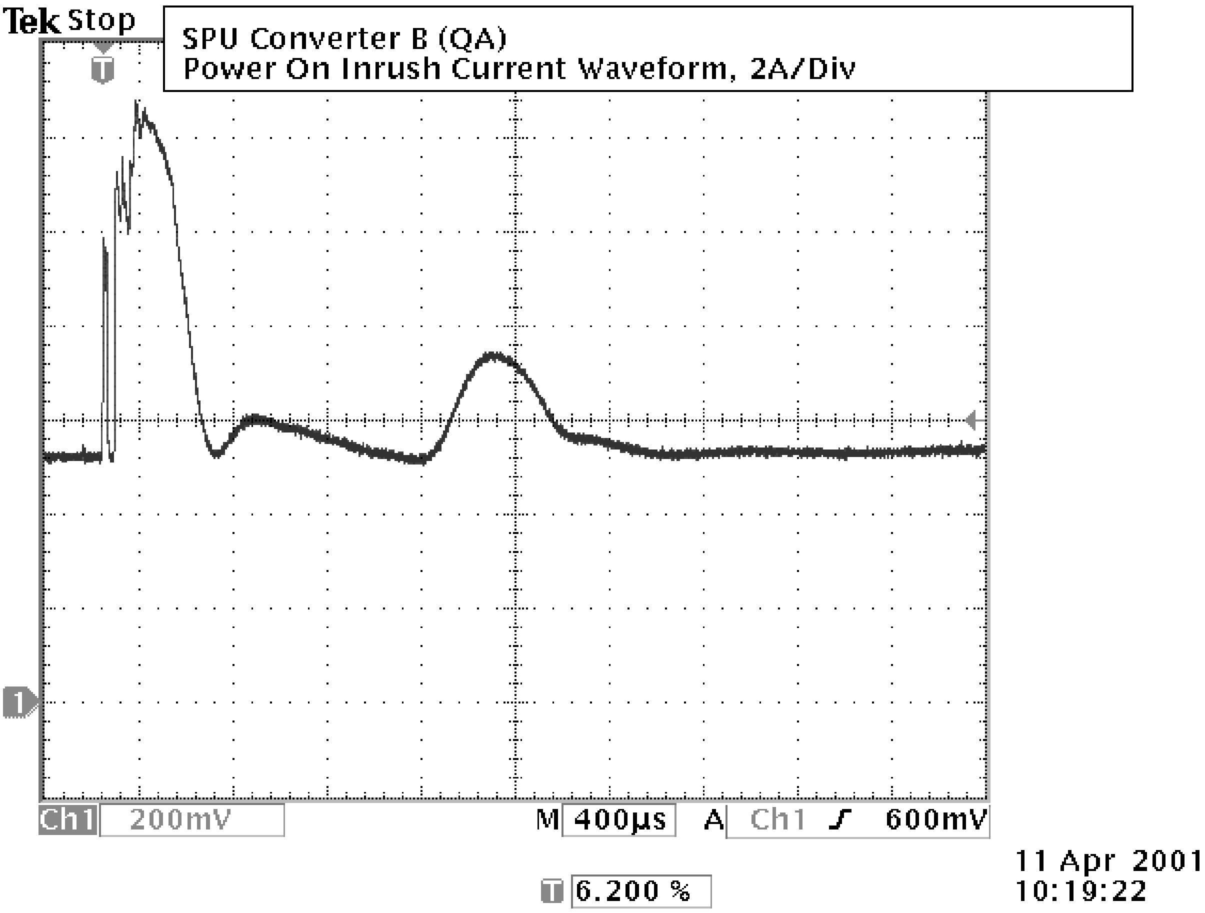
Waveform IPUA1.BMP



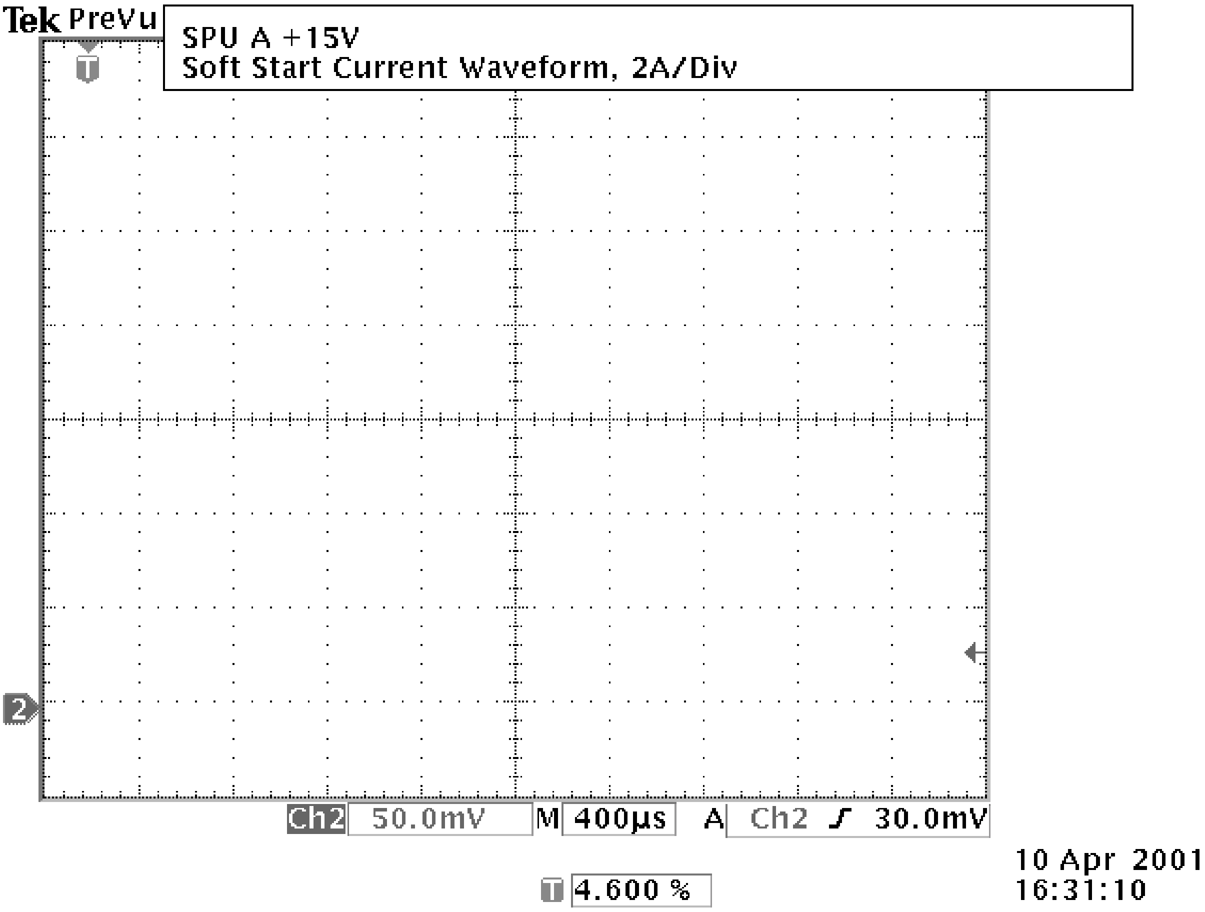
Waveform IPUN1.BMP



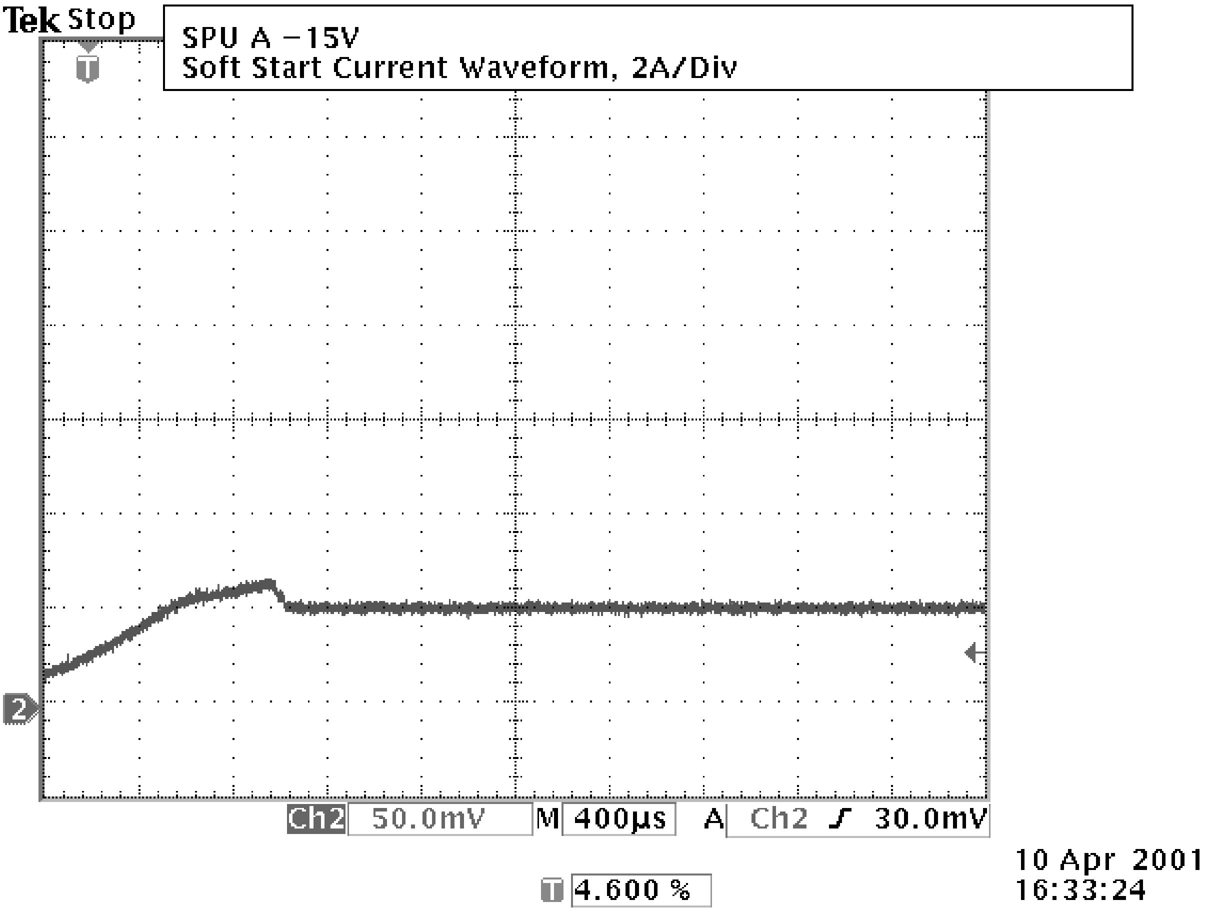
Waveform SPUAQA.BMP



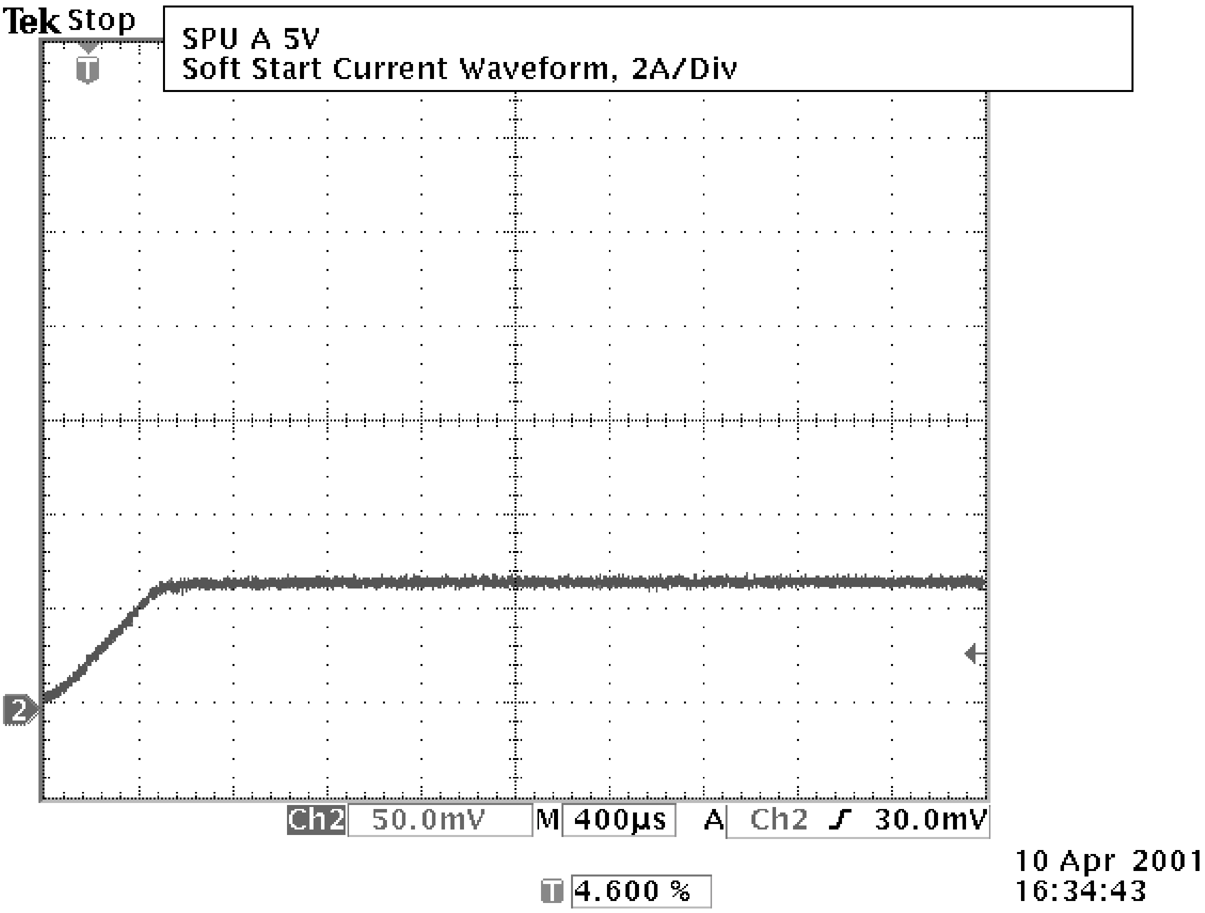
Waveform SPUAC15P.BMP



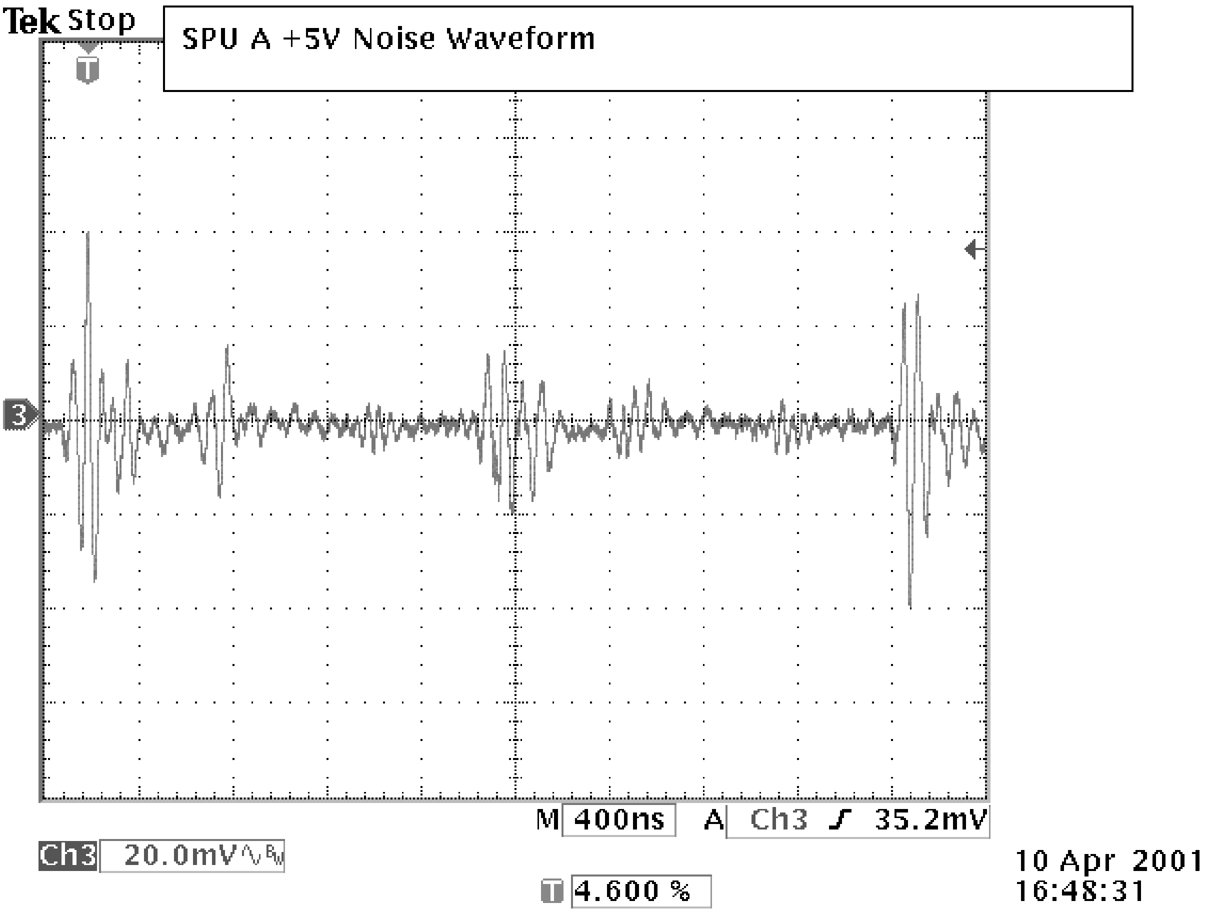
Waveform SPUAC15N.BMP



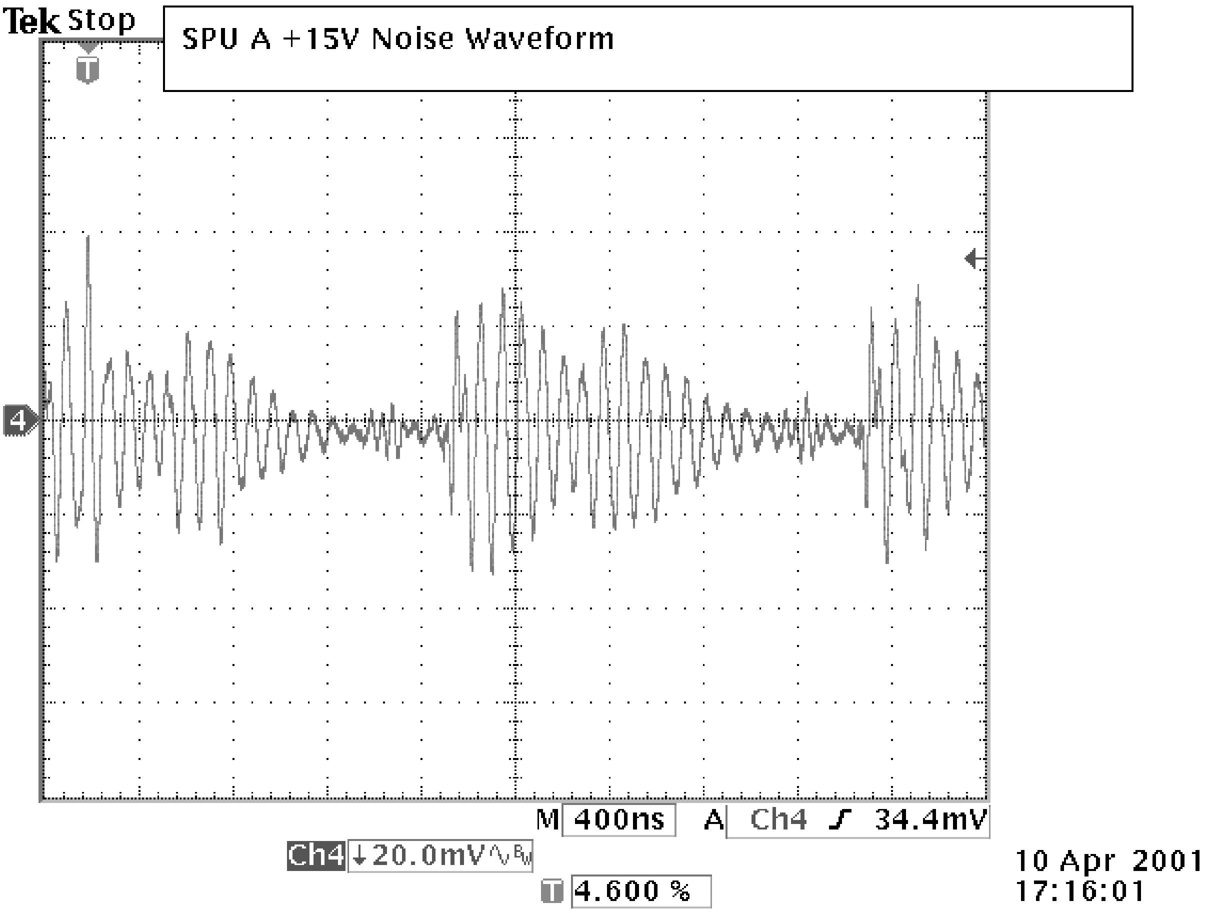
Waveform SPUAC5P.BMP



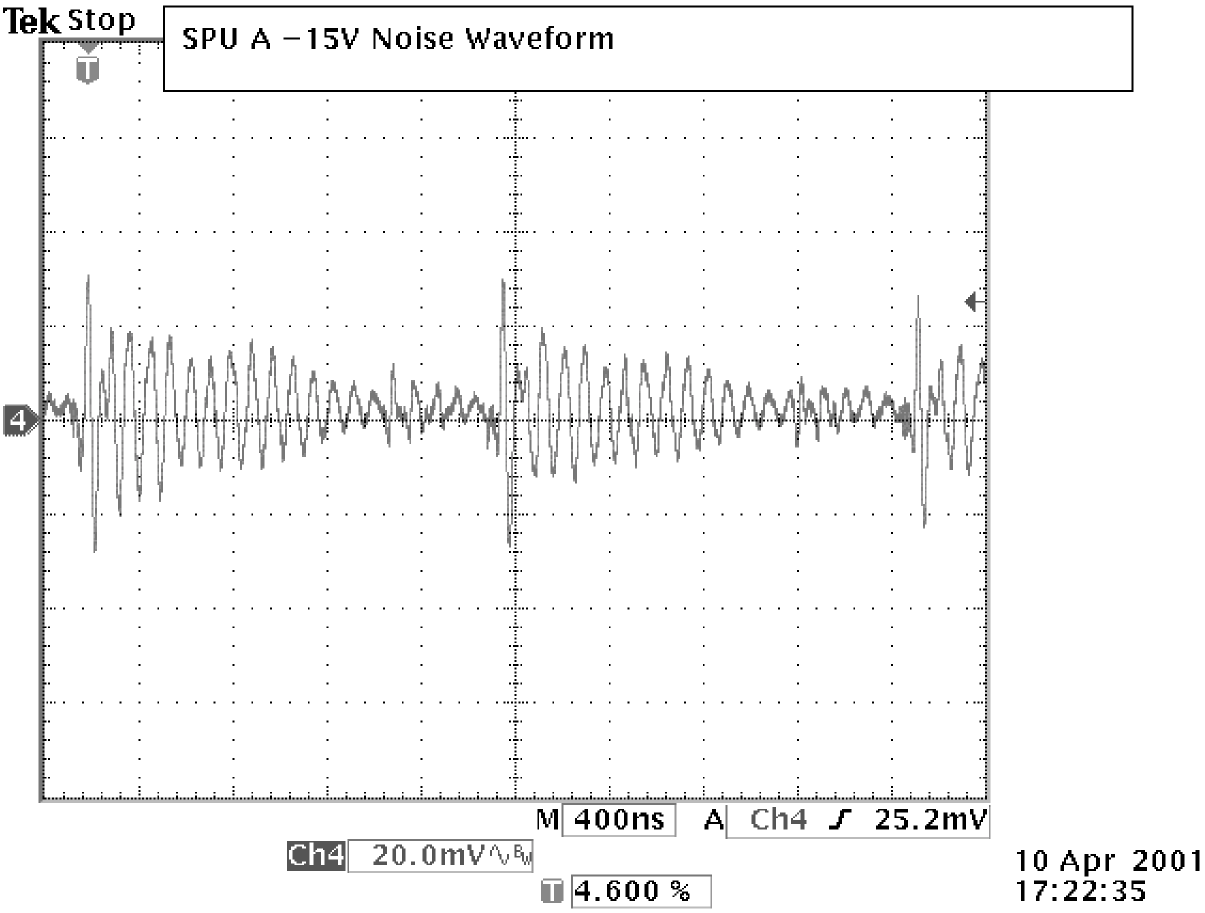
Waveform SPUN5A.BMP



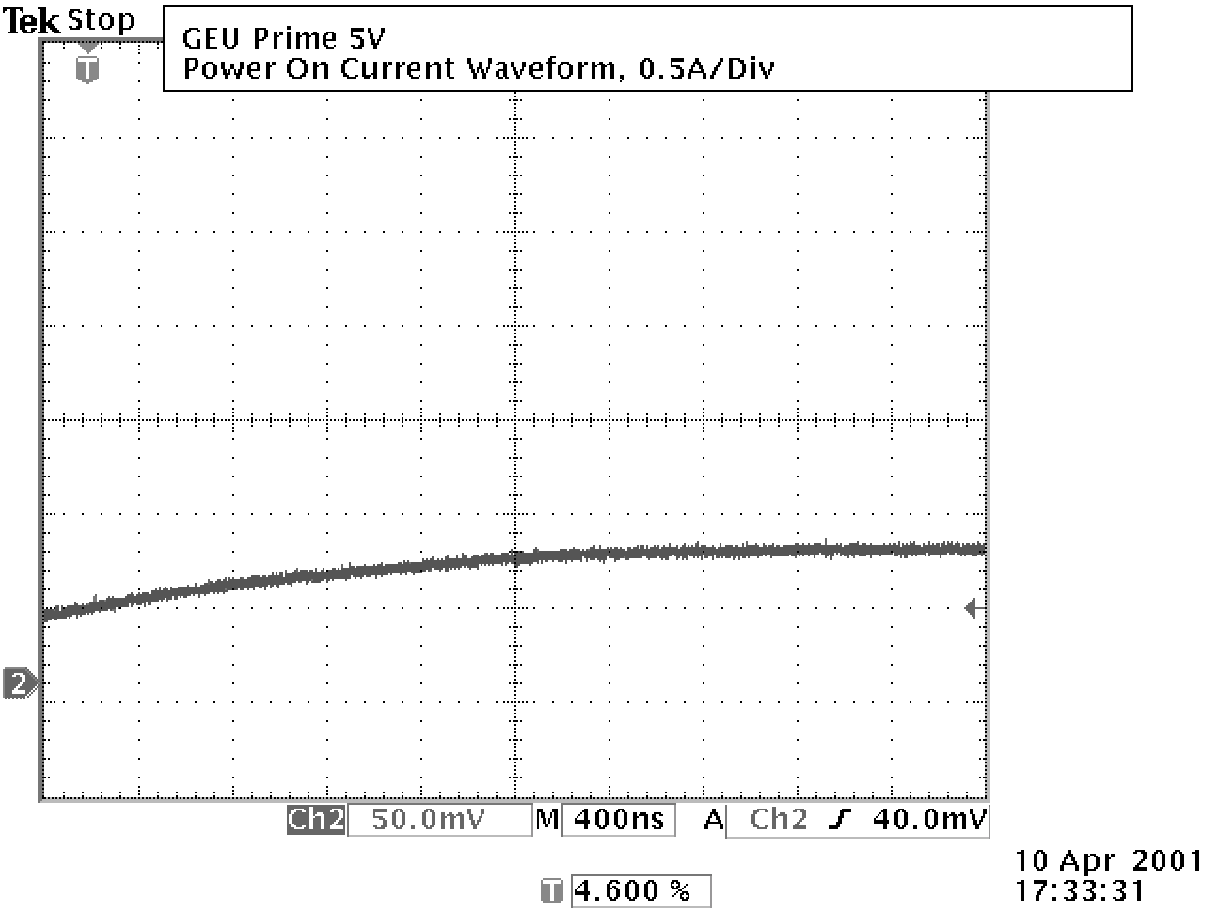
Waveform SPUNP15A.BMP



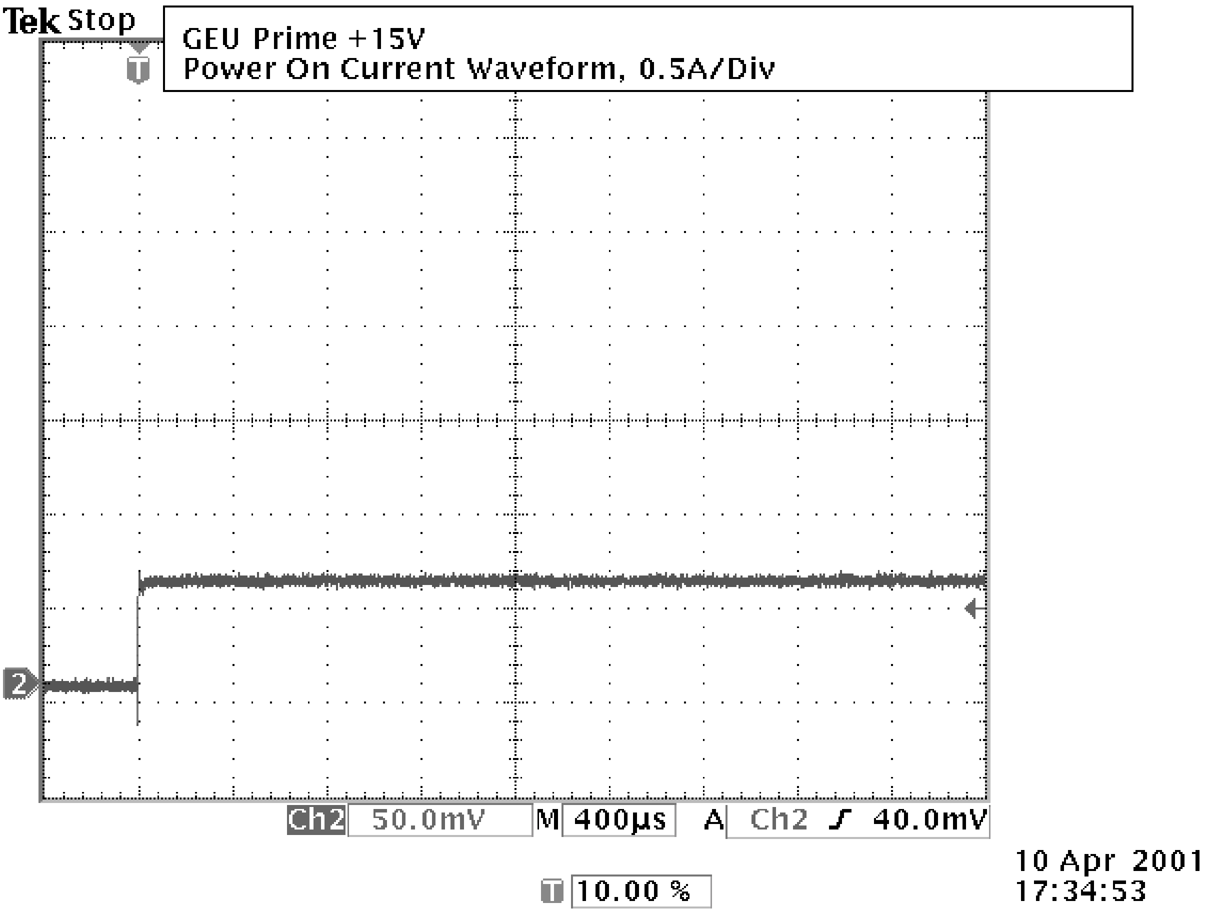
Waveform SPUNN15A.BMP



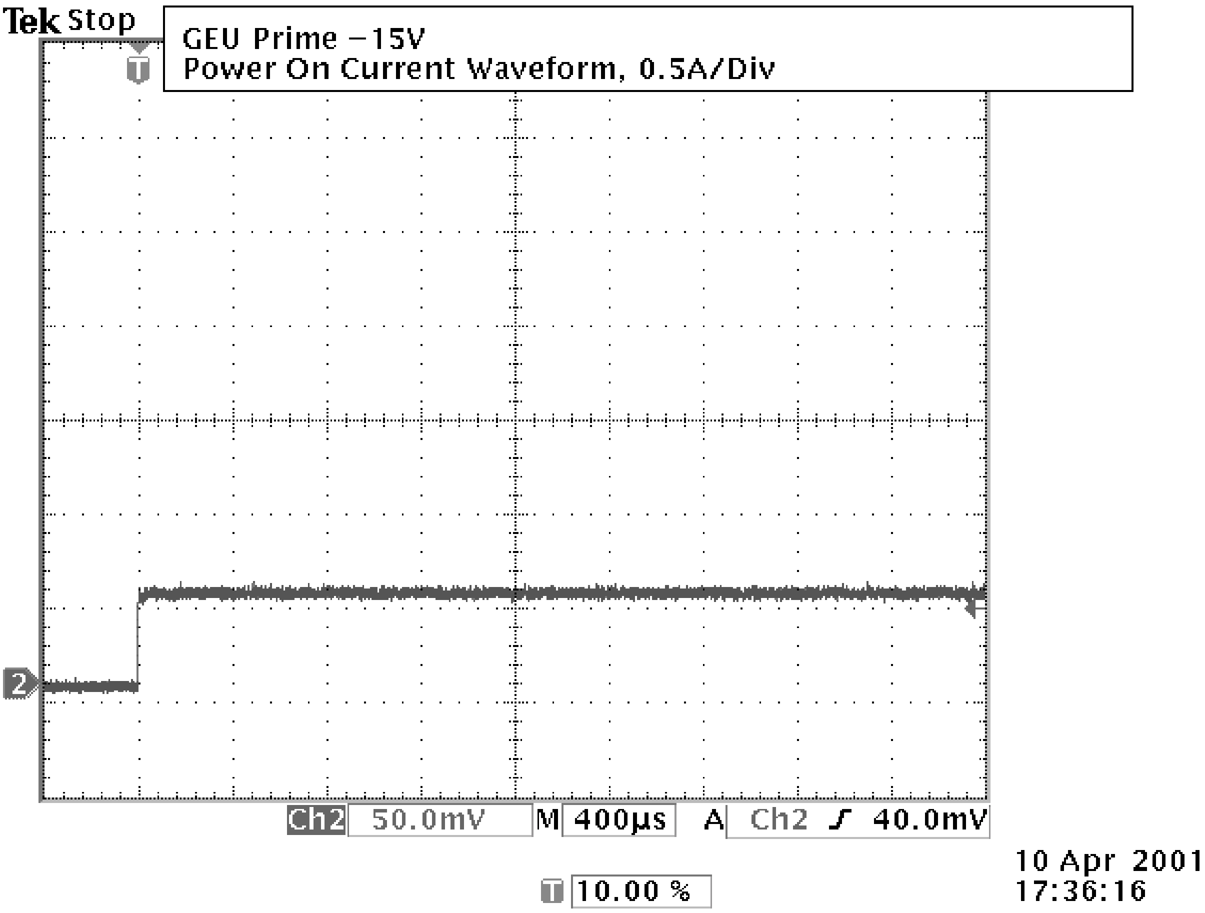
Waveform GEUP5V.BMP



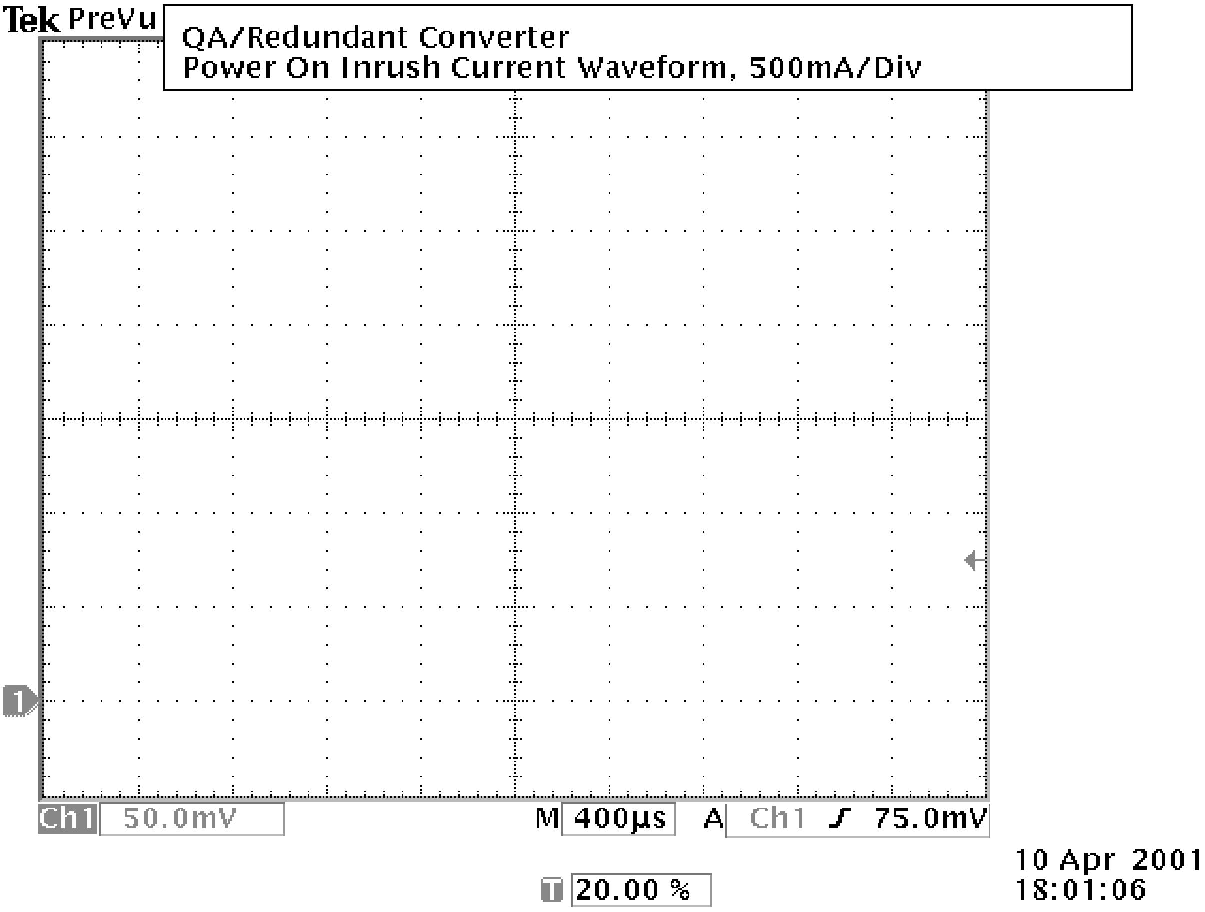
Waveform GEUPP15V.BMP



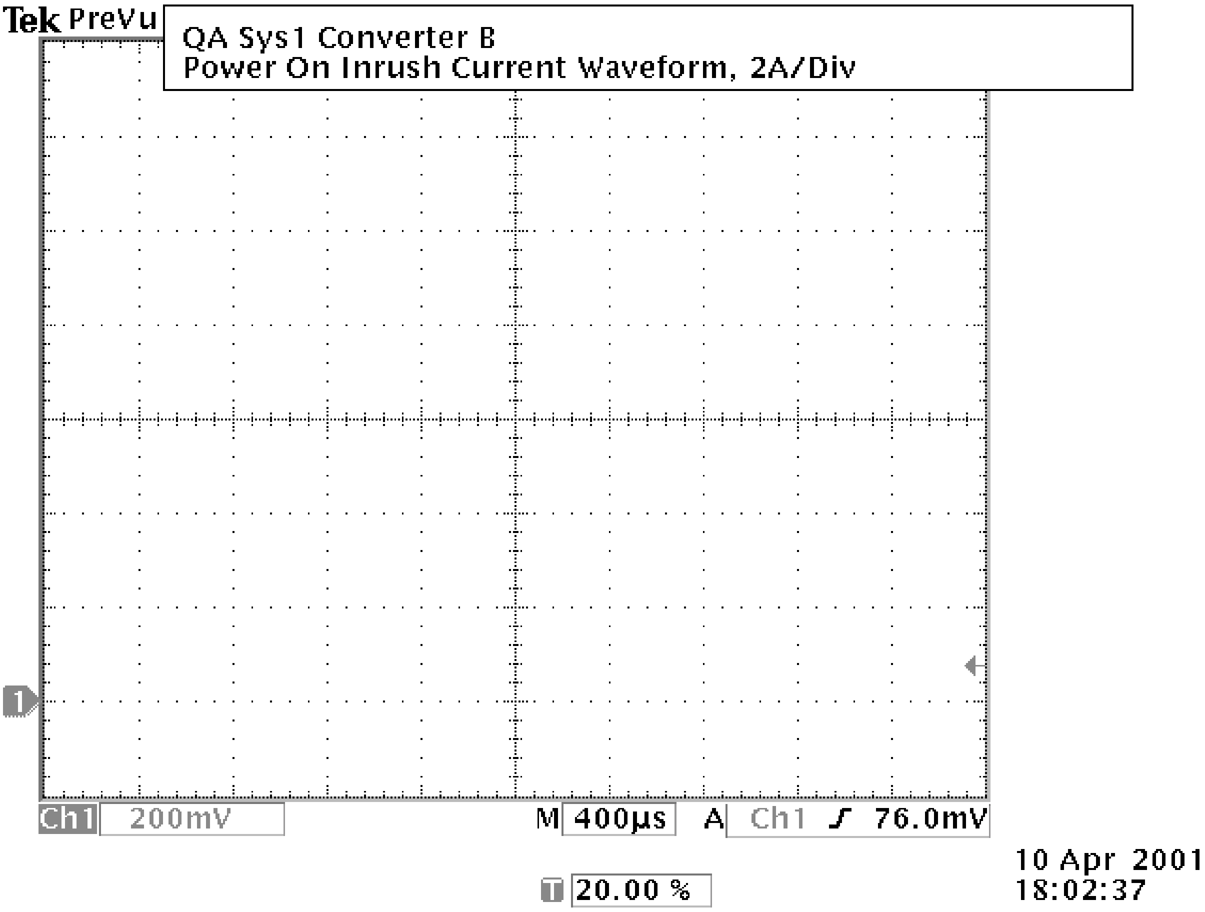
Waveform GEUPN15V.BMP



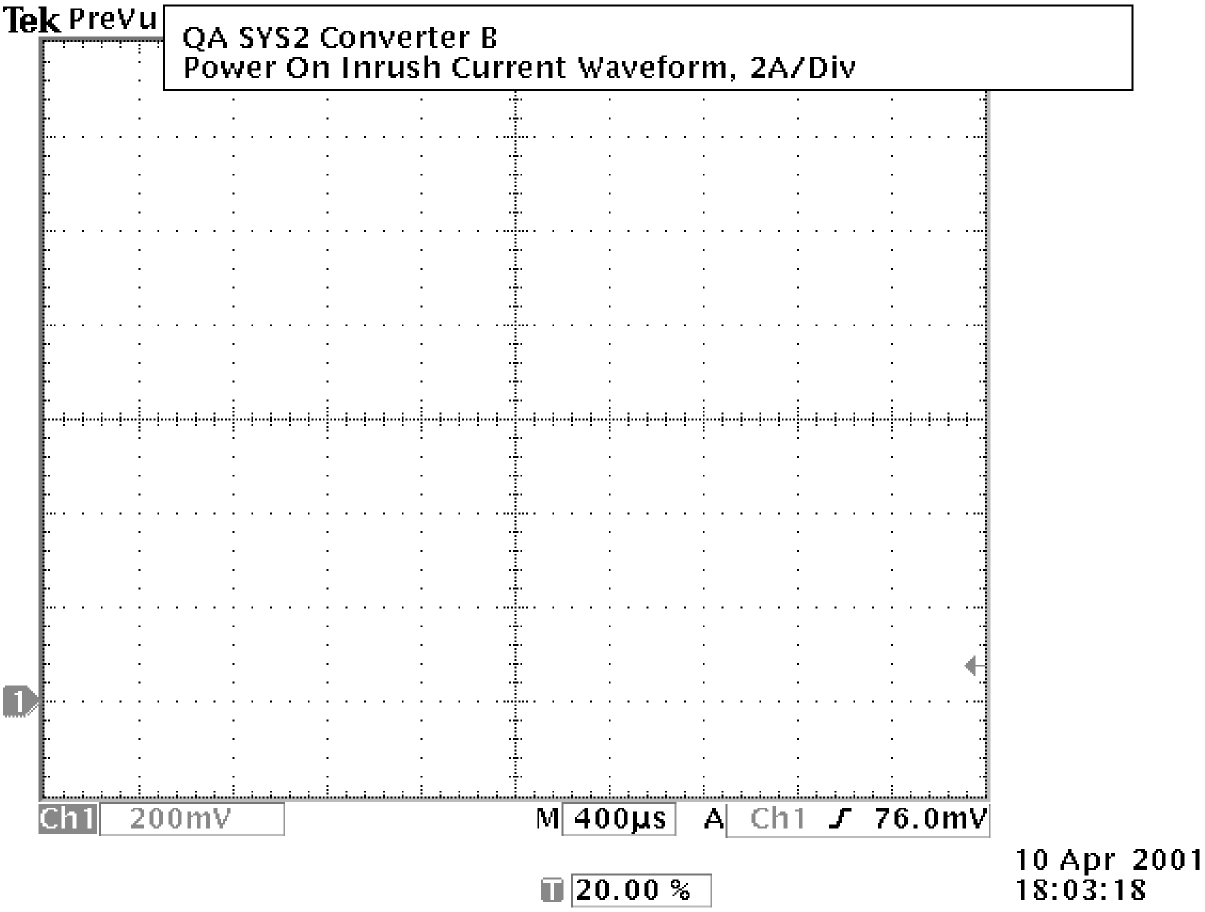
Waveform INRUSHAR.BMP



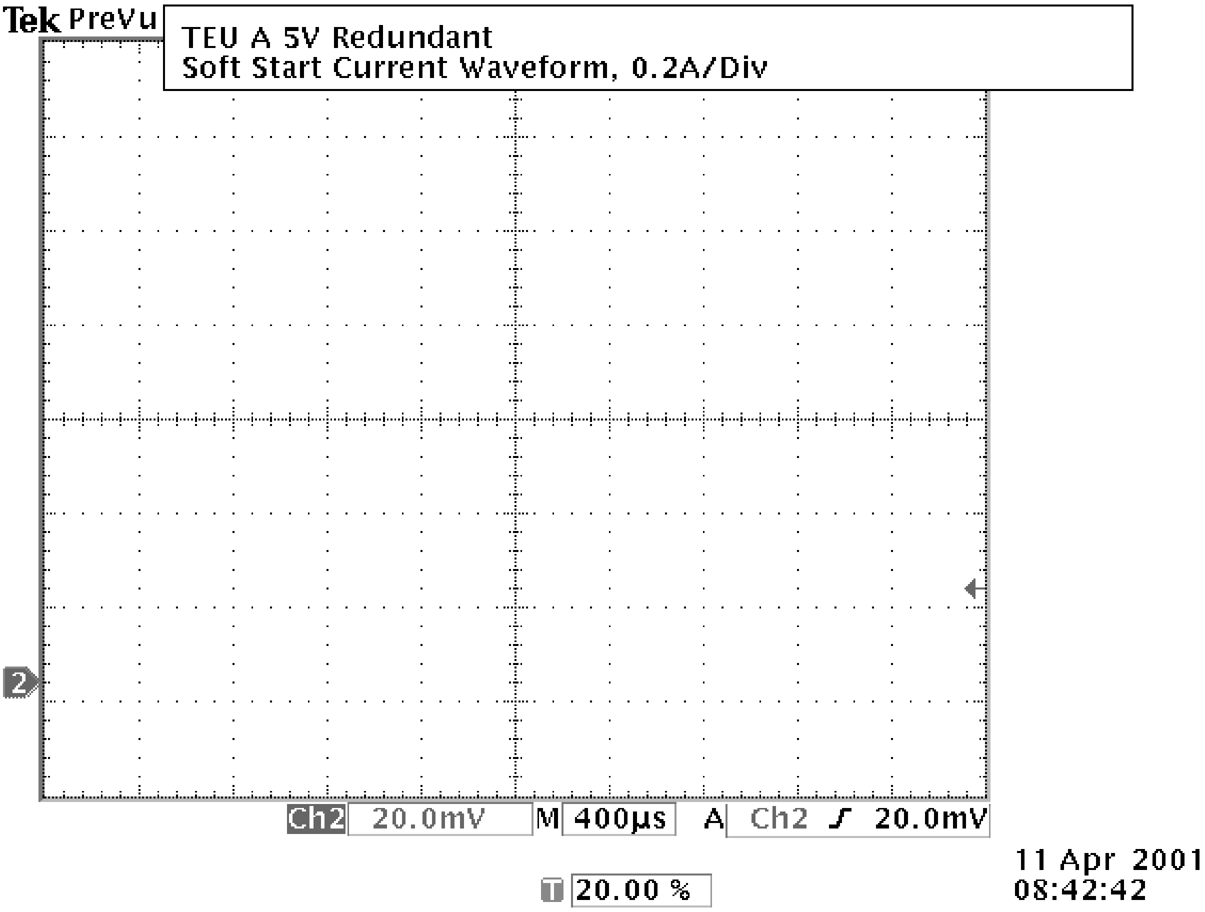
Waveform SYS1BQA.BMP



Waveform SYS2BQA.BMP



Waveform TEUAC6.BMP



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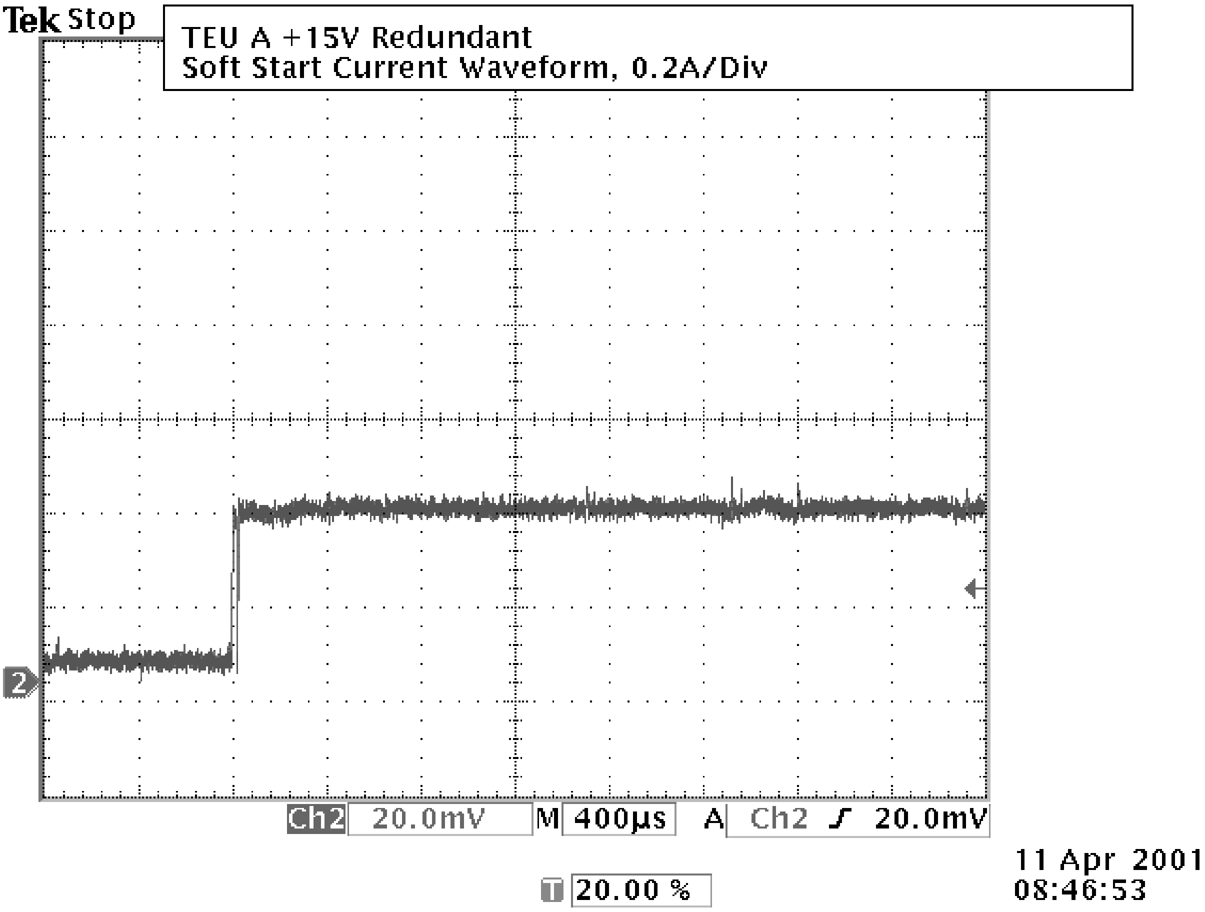

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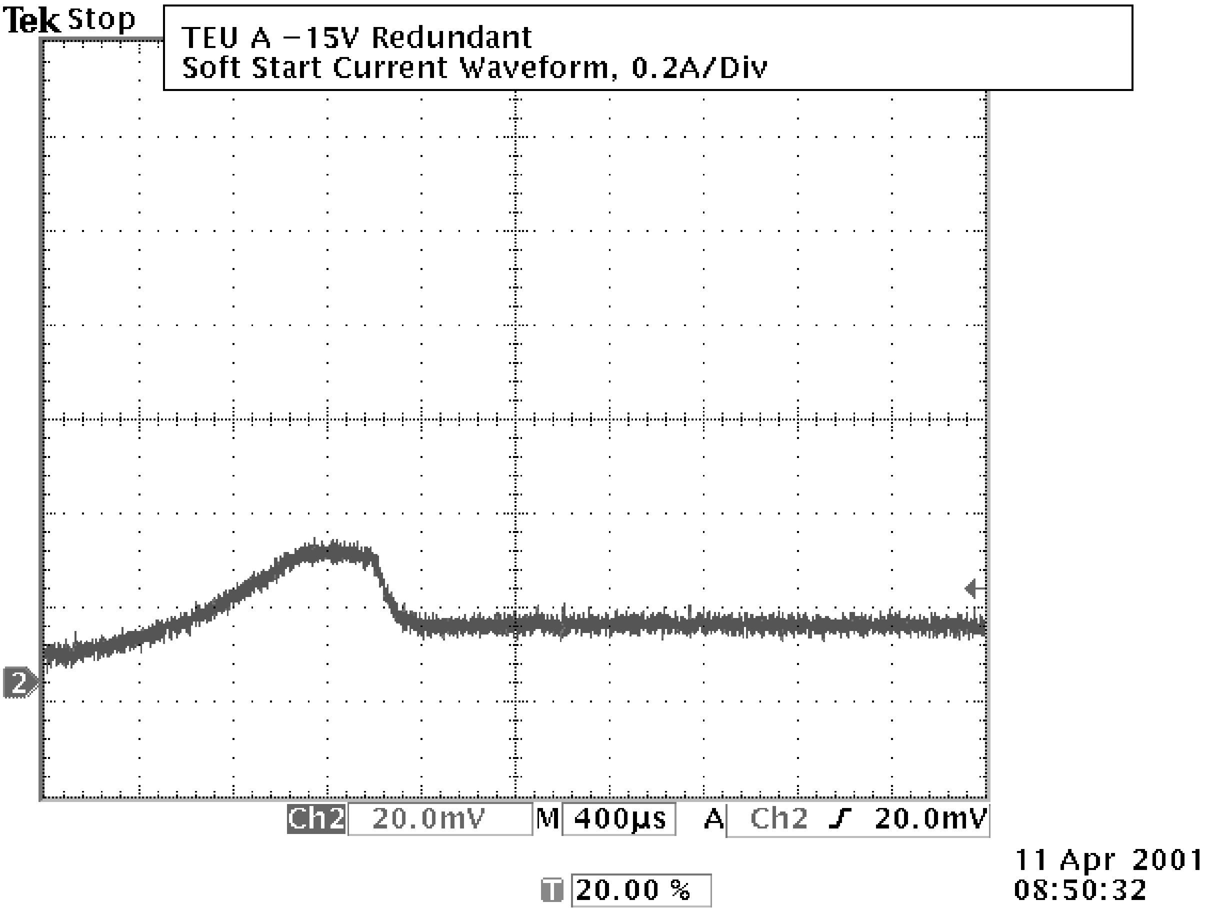

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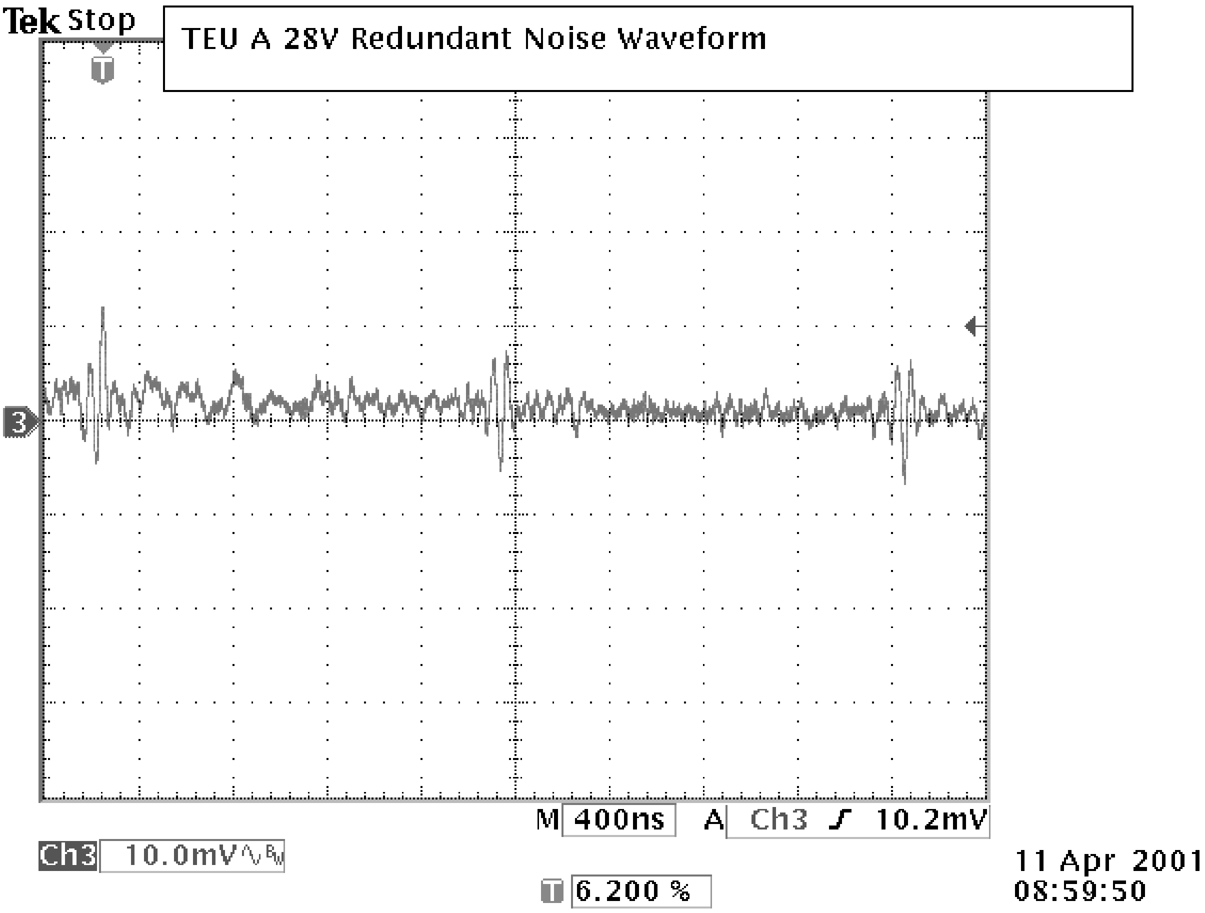

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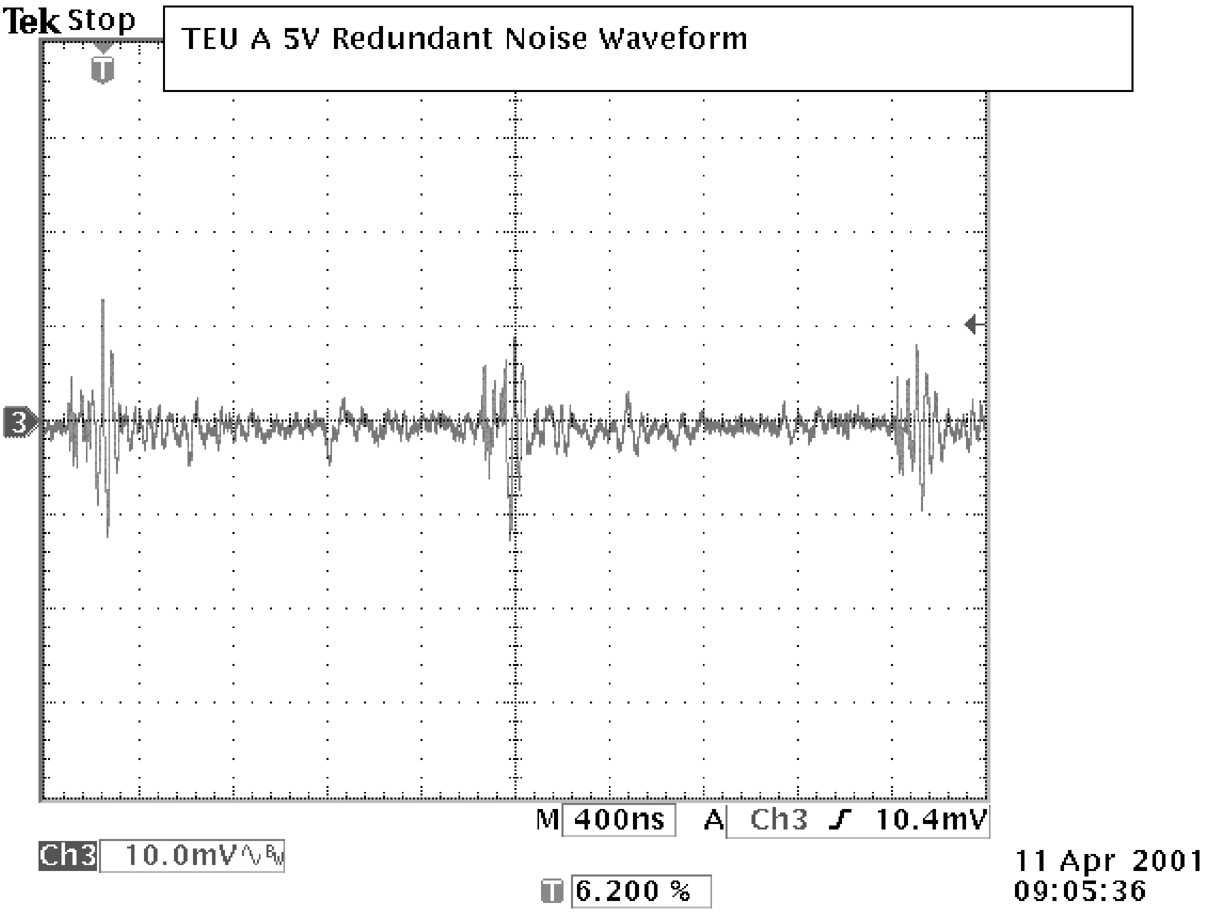

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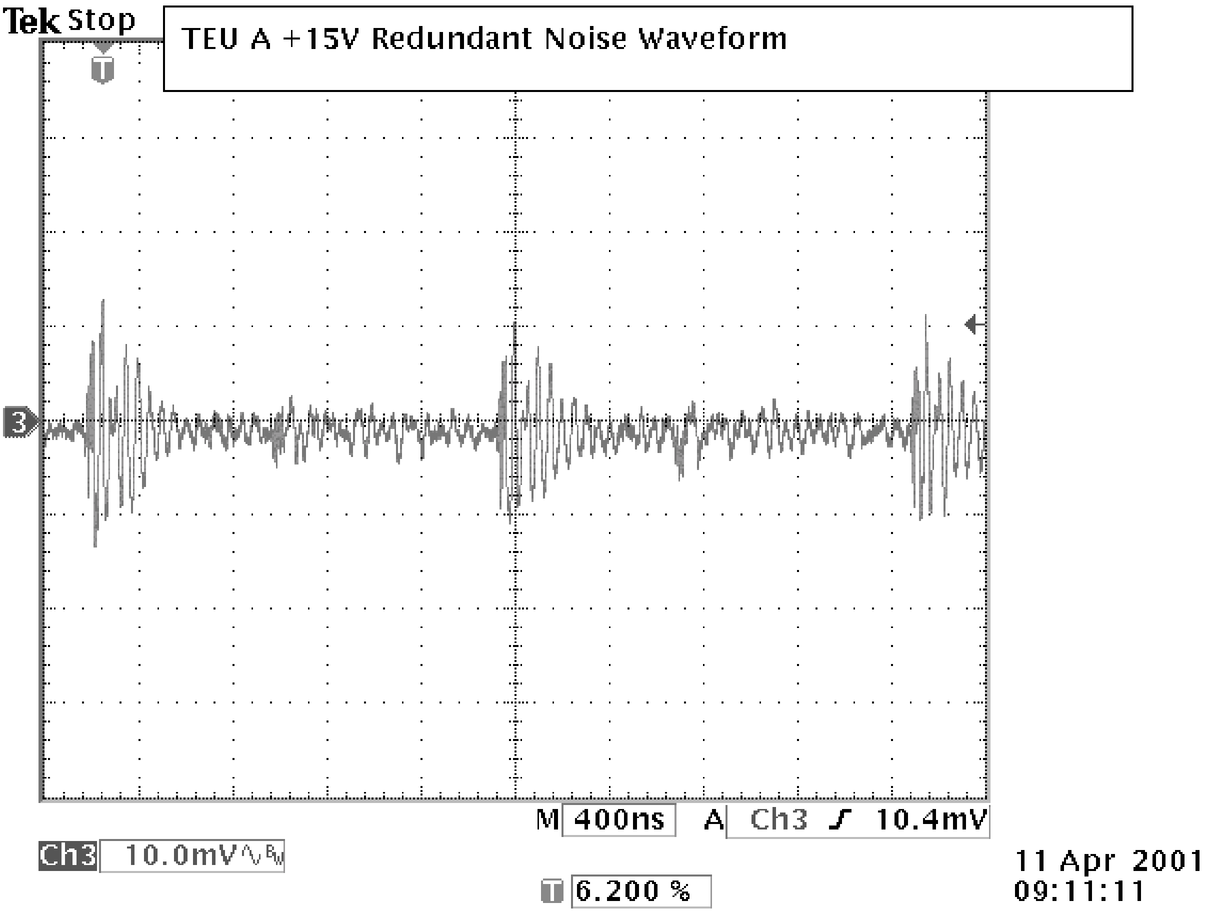

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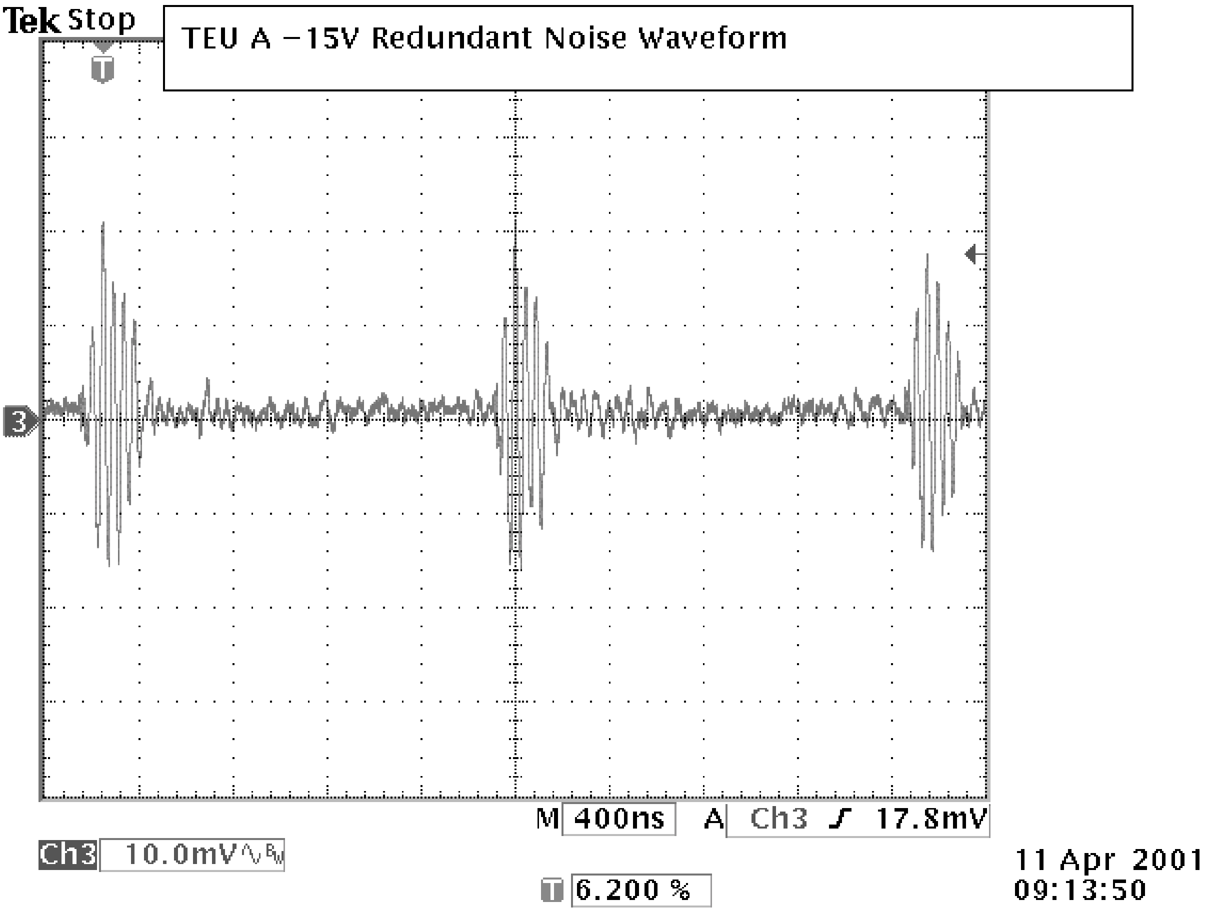

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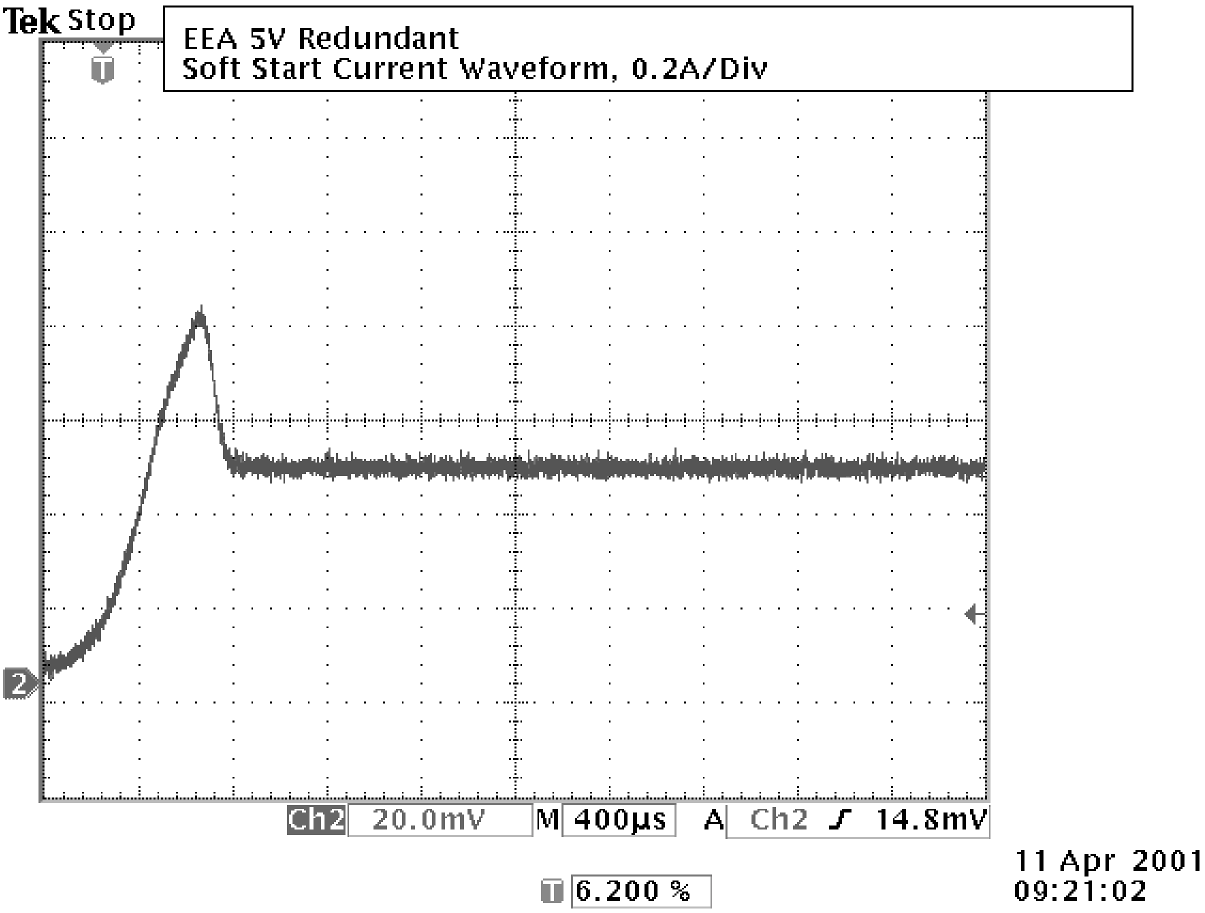

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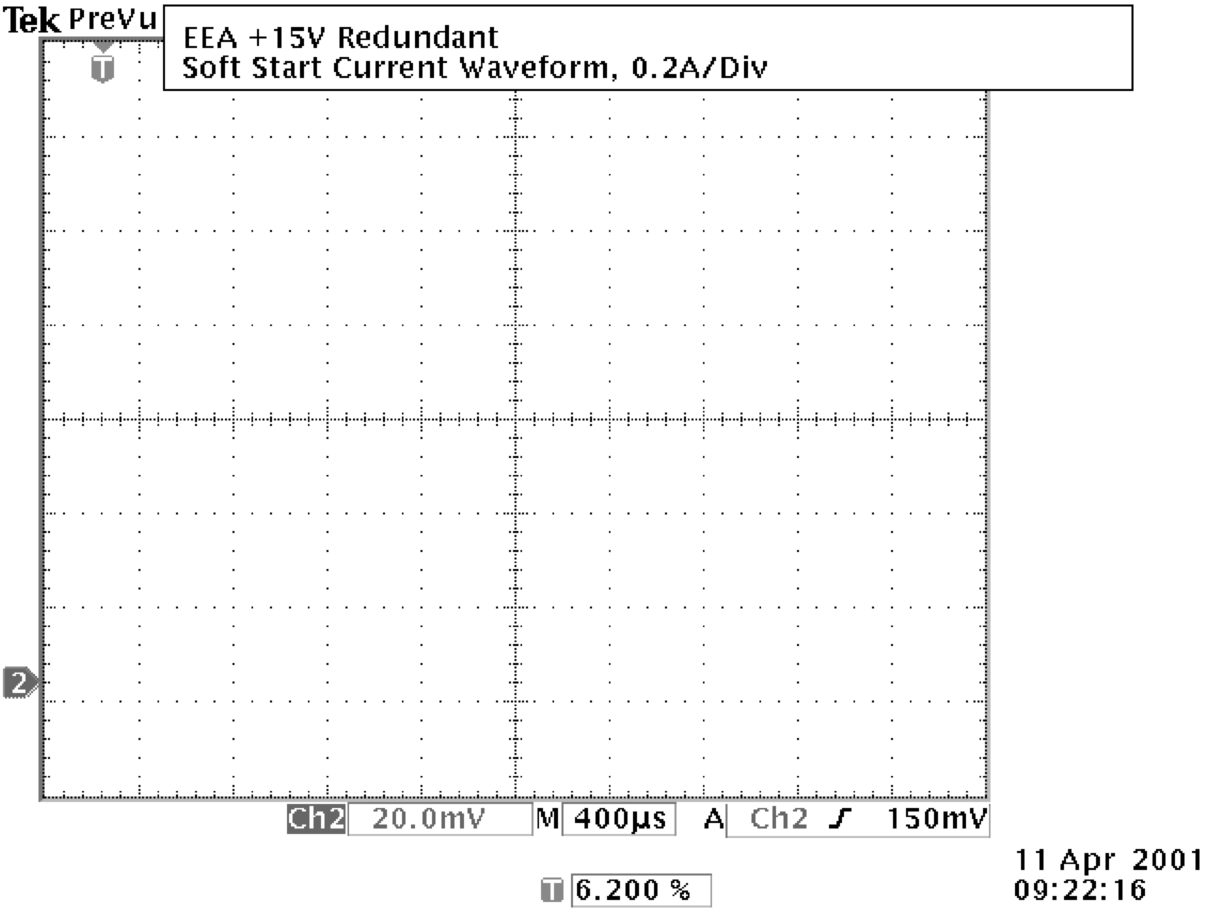

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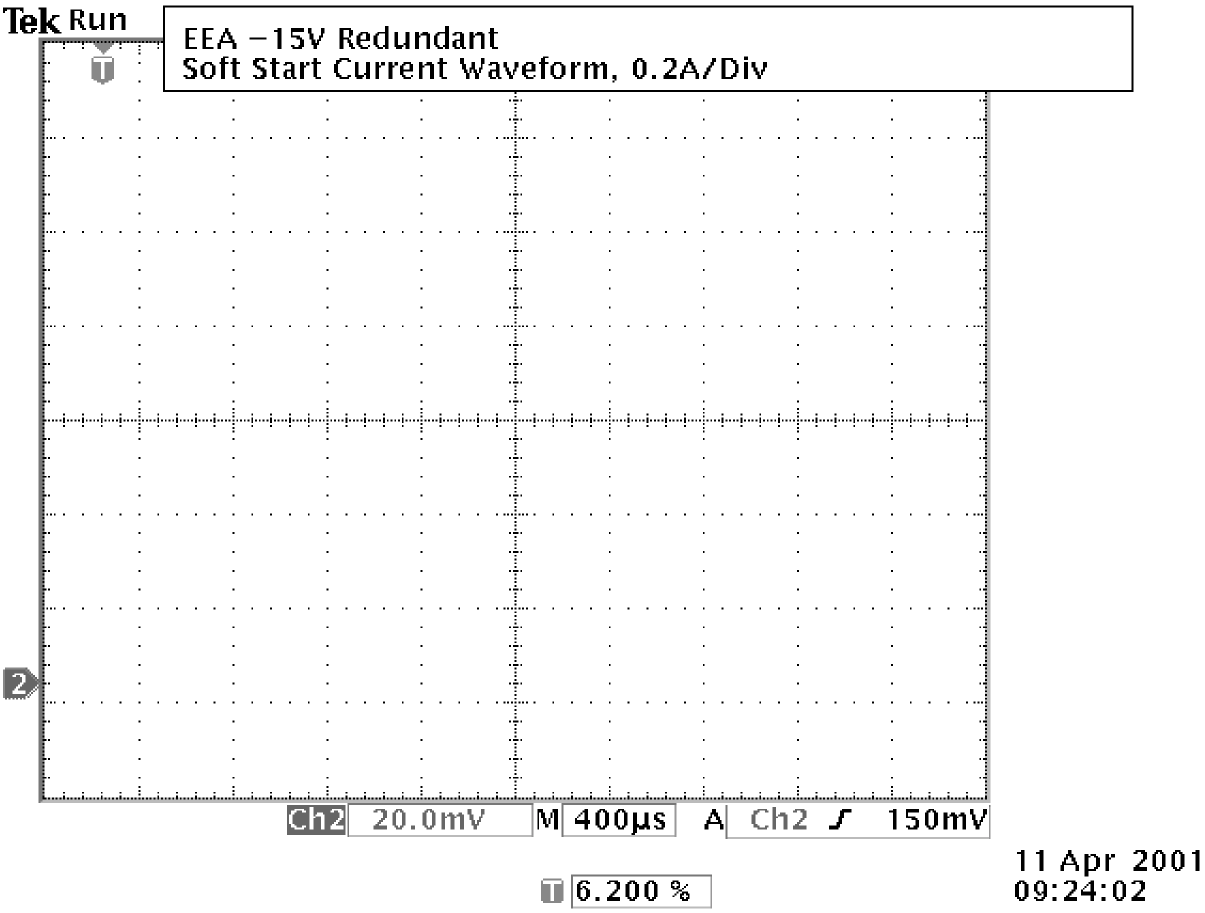

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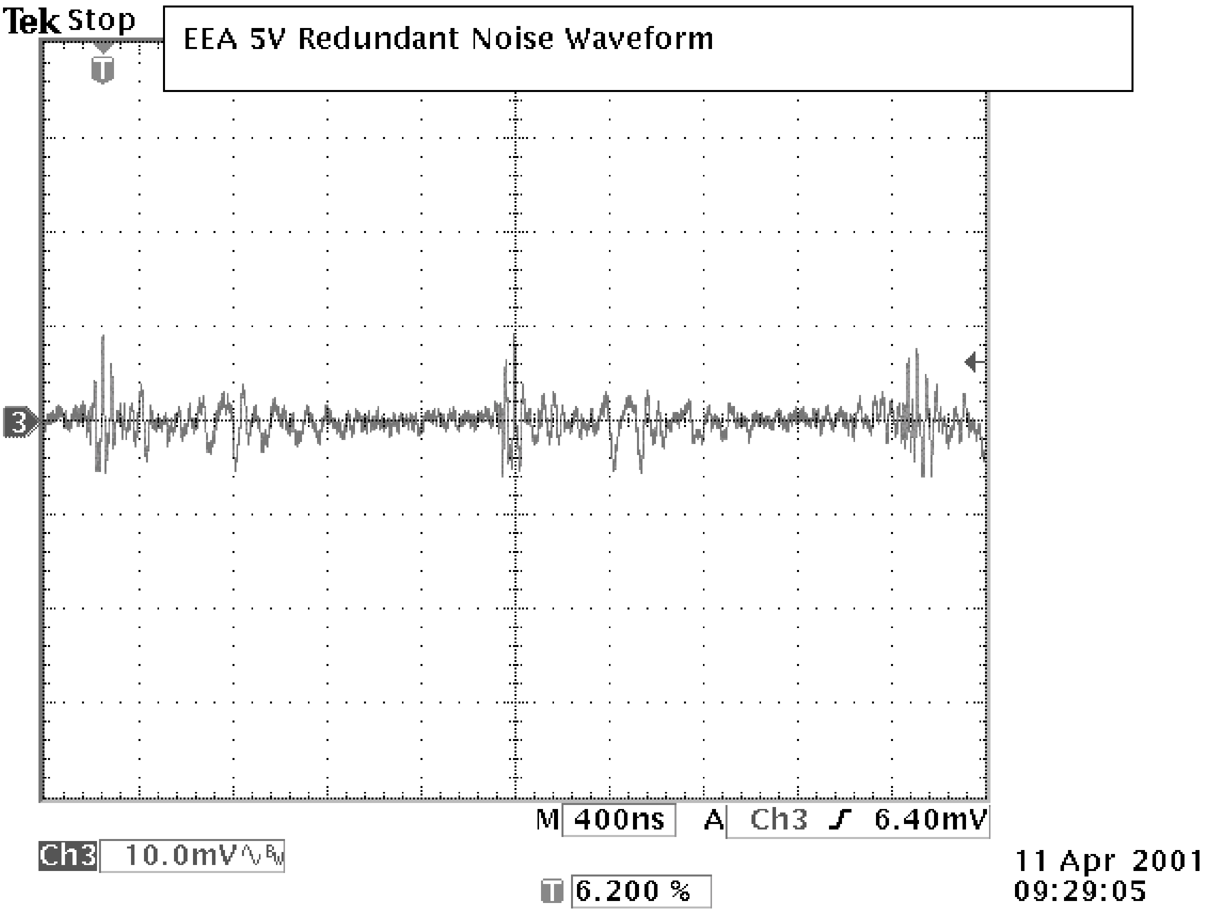

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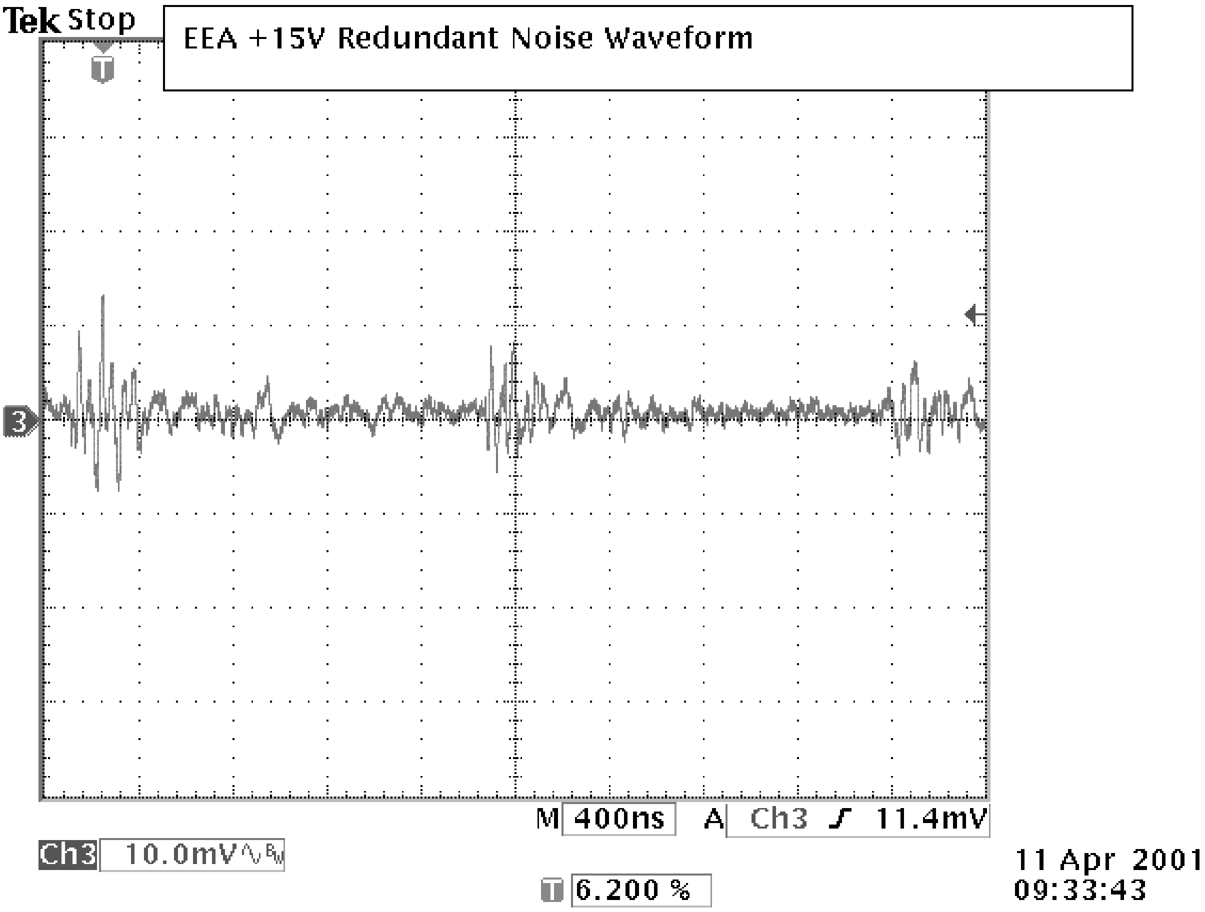

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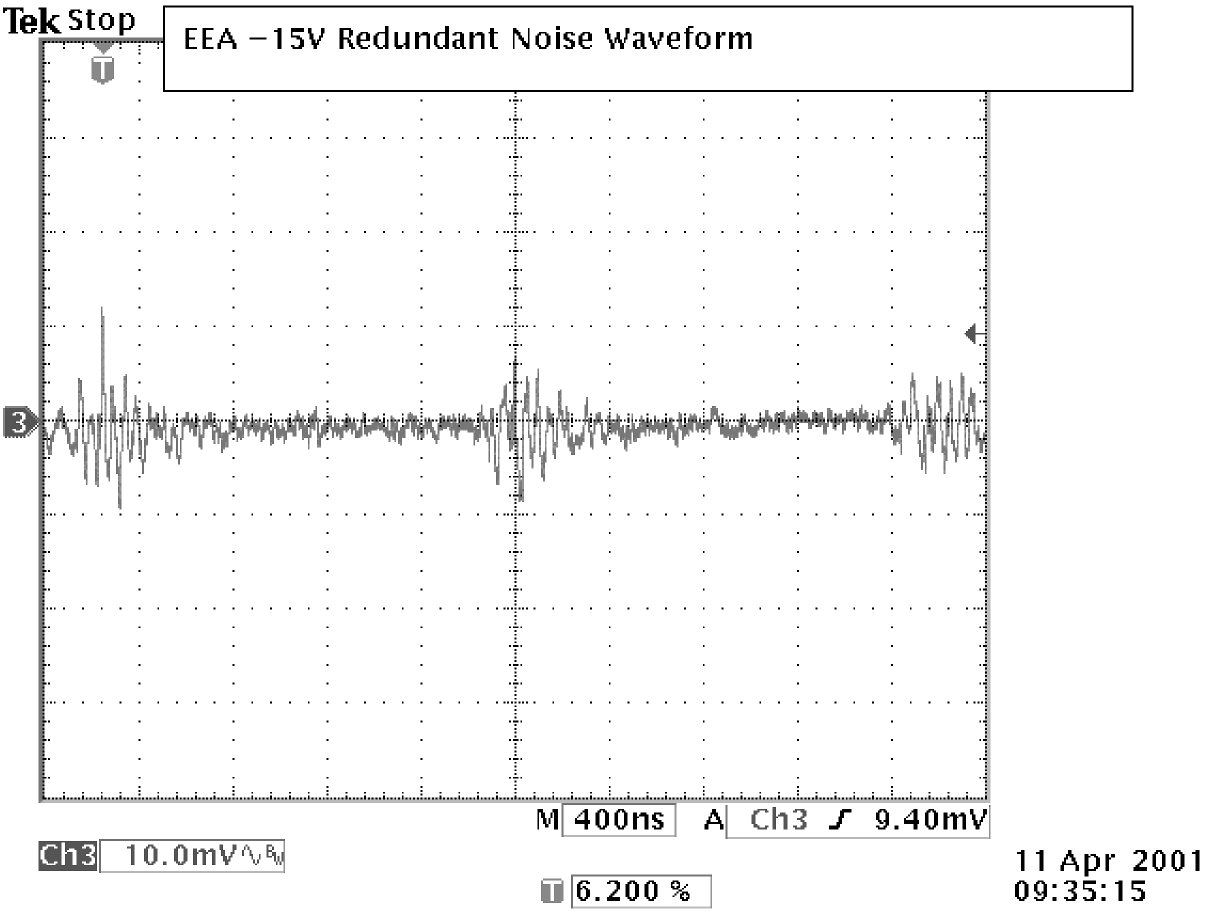

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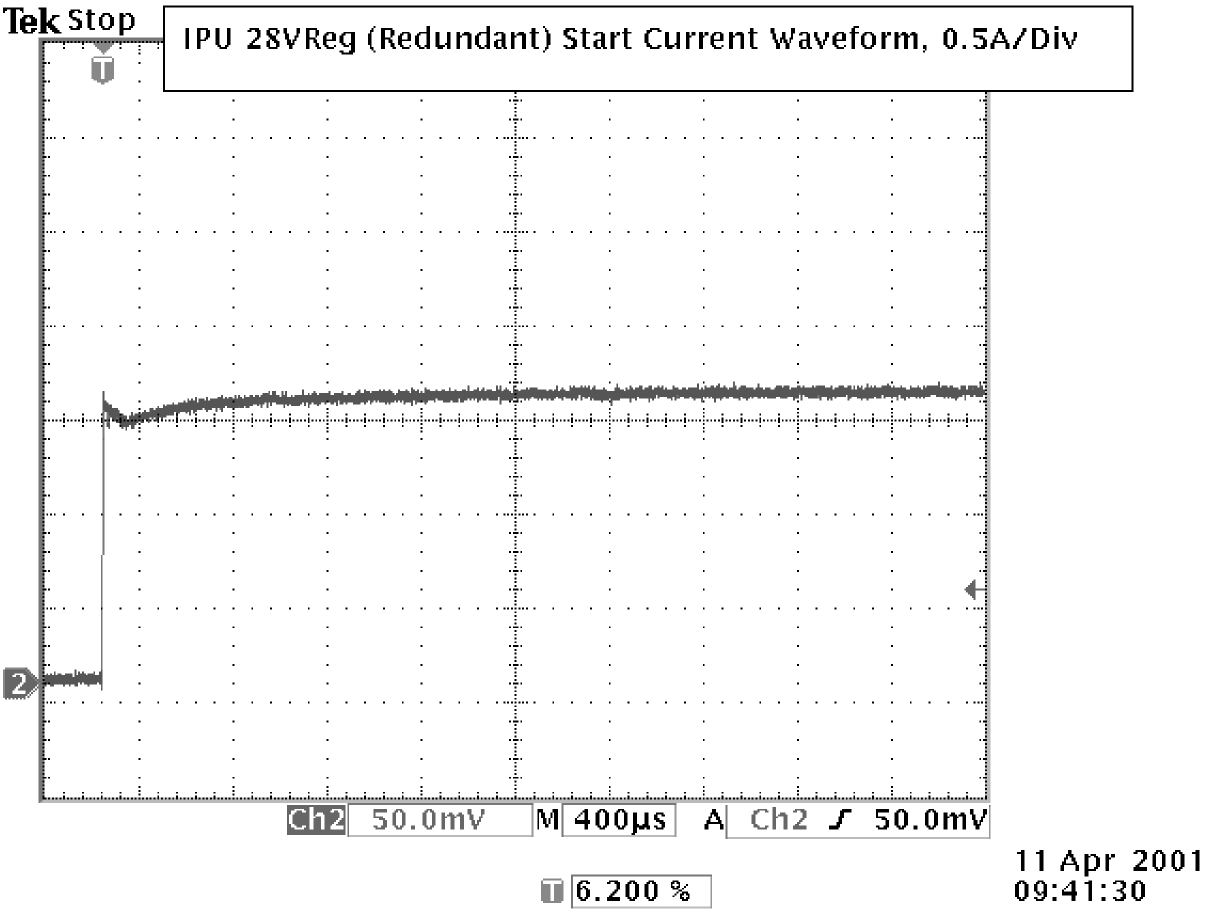

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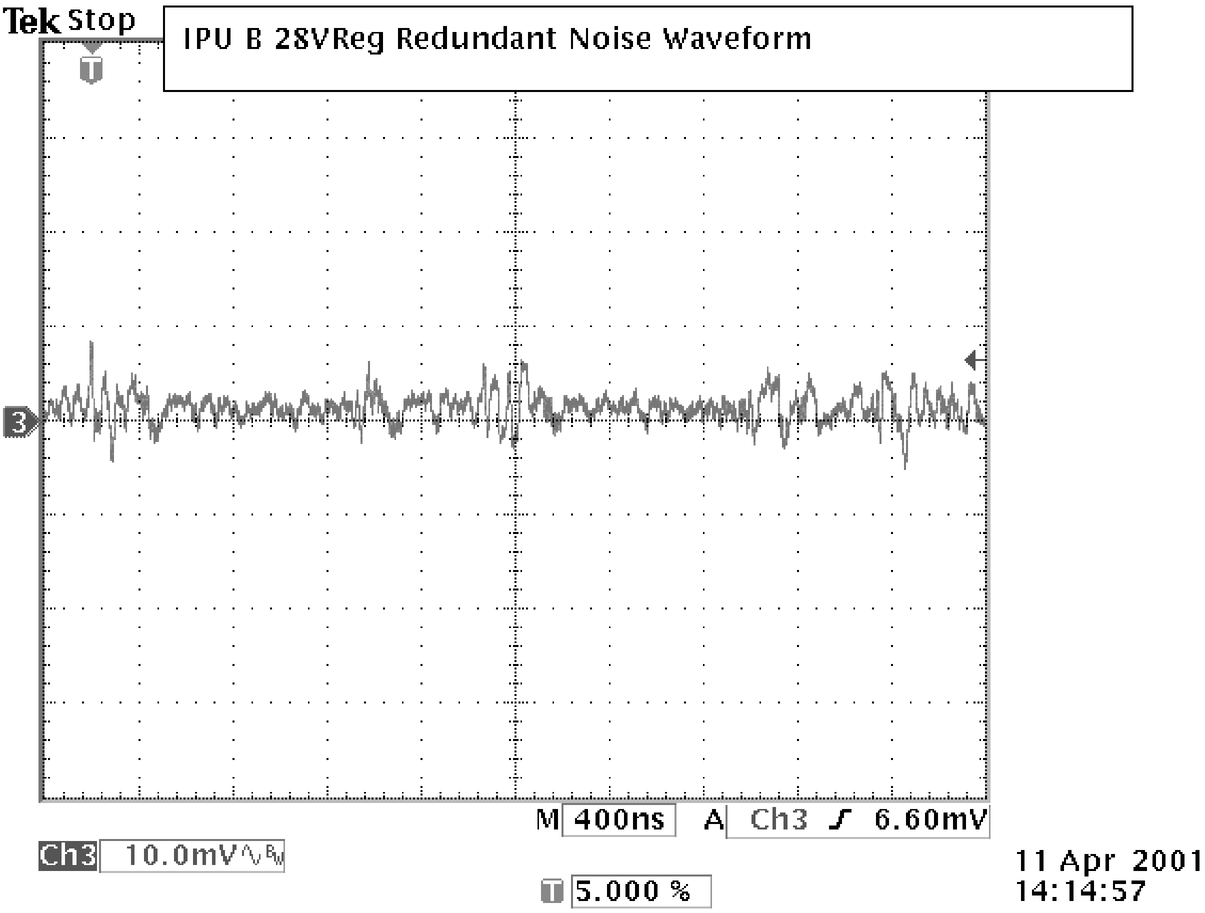

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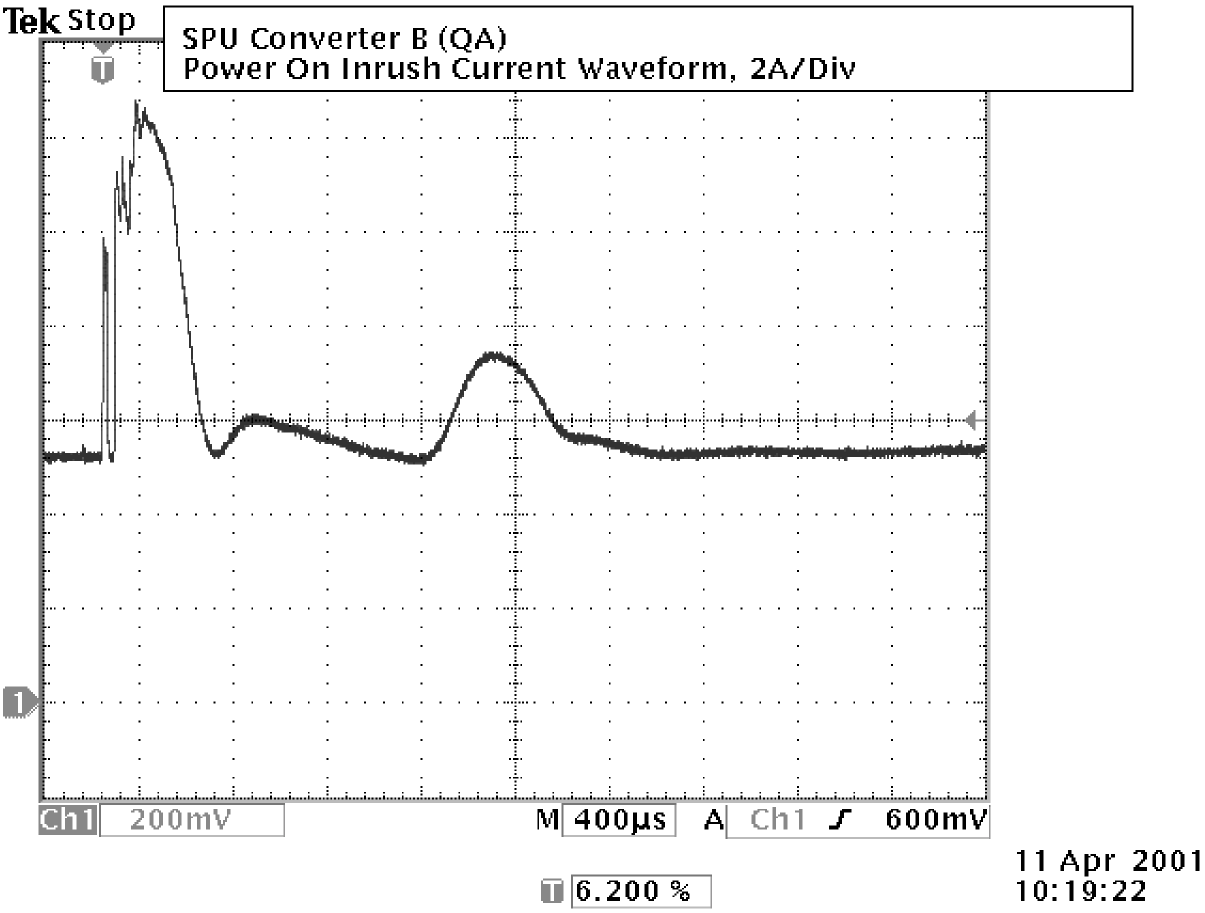

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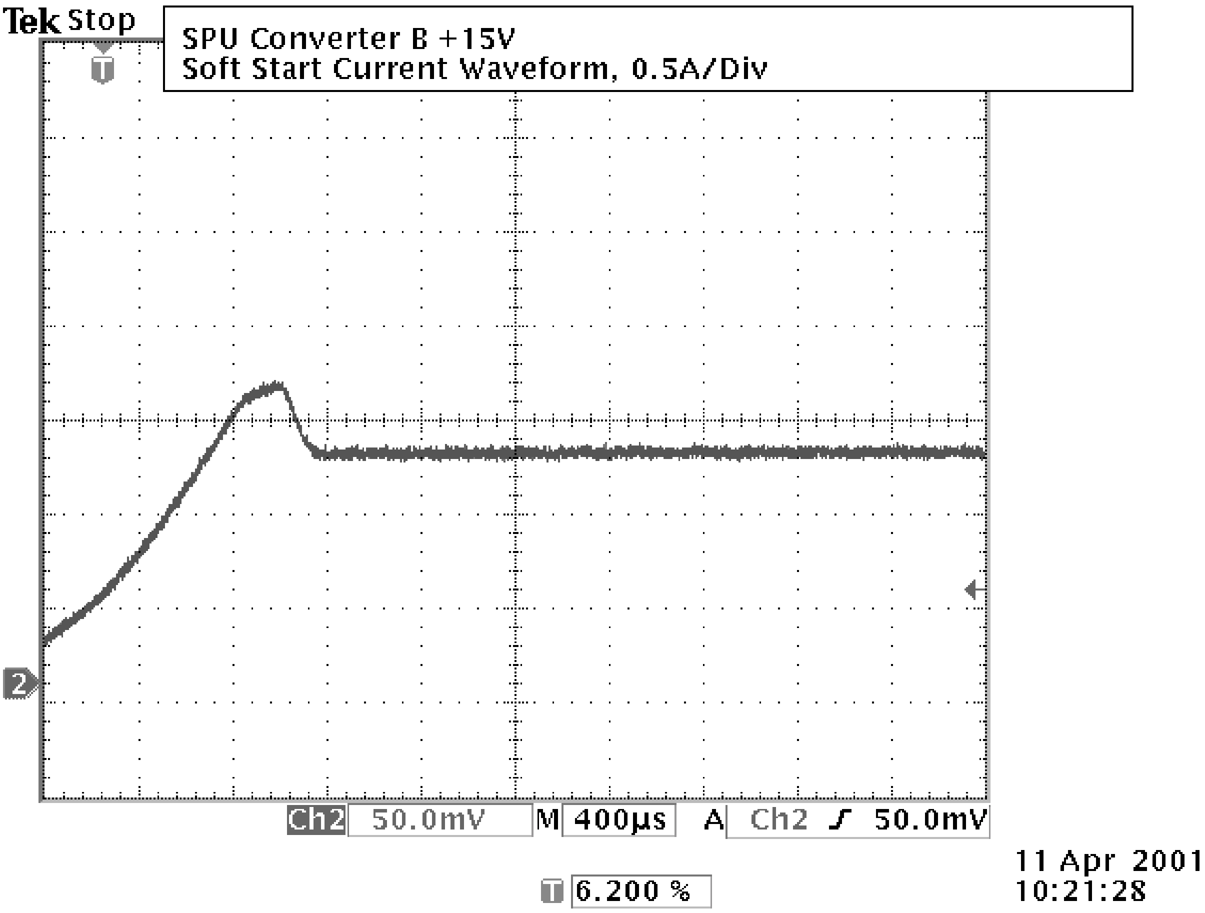

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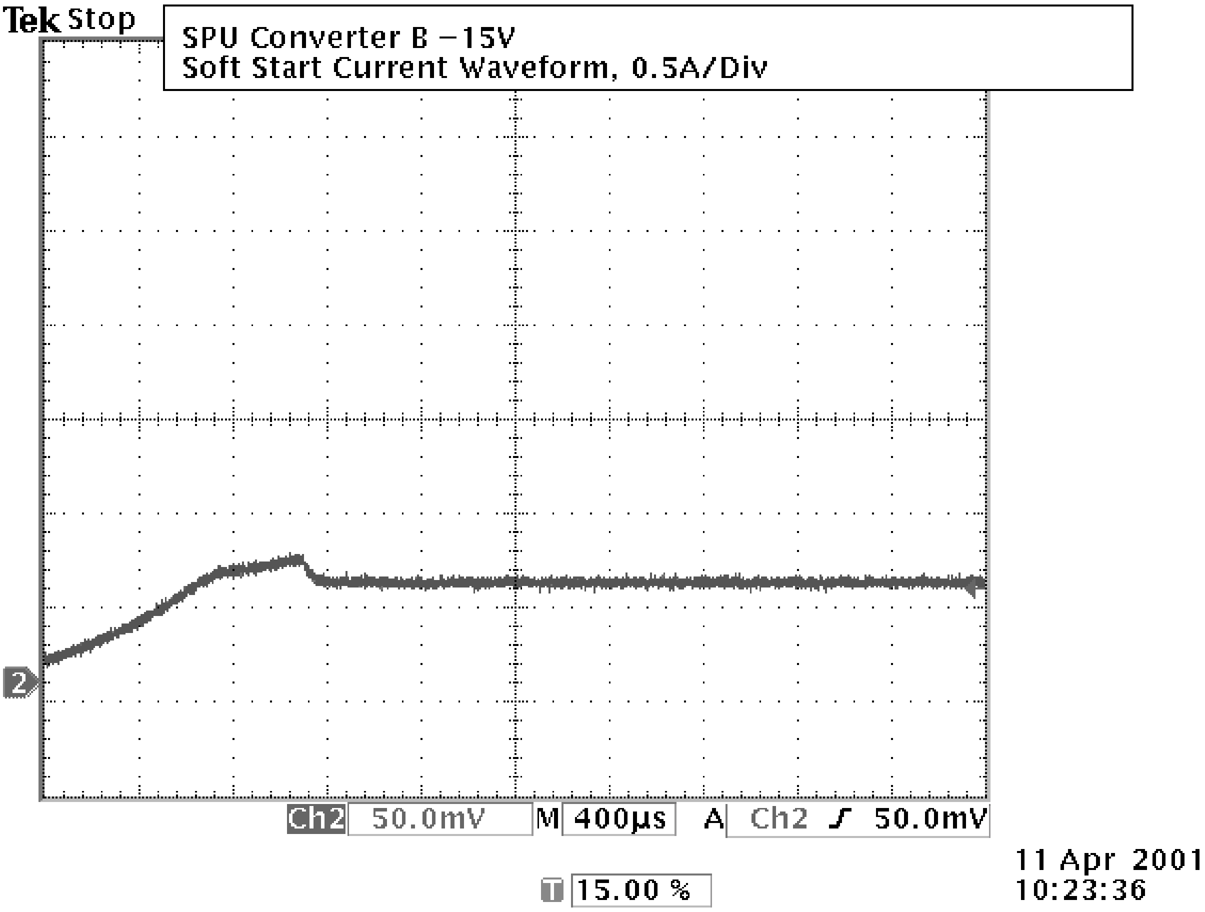

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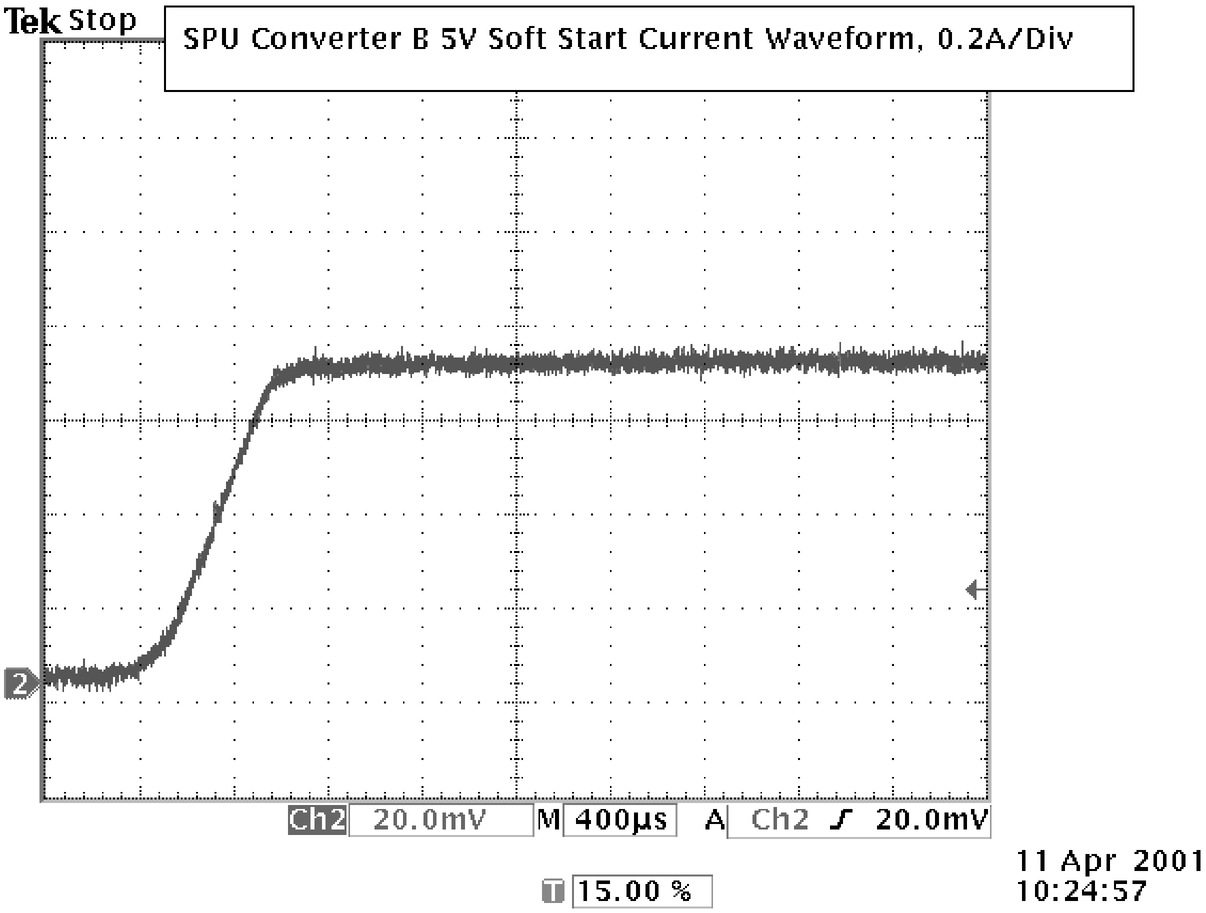

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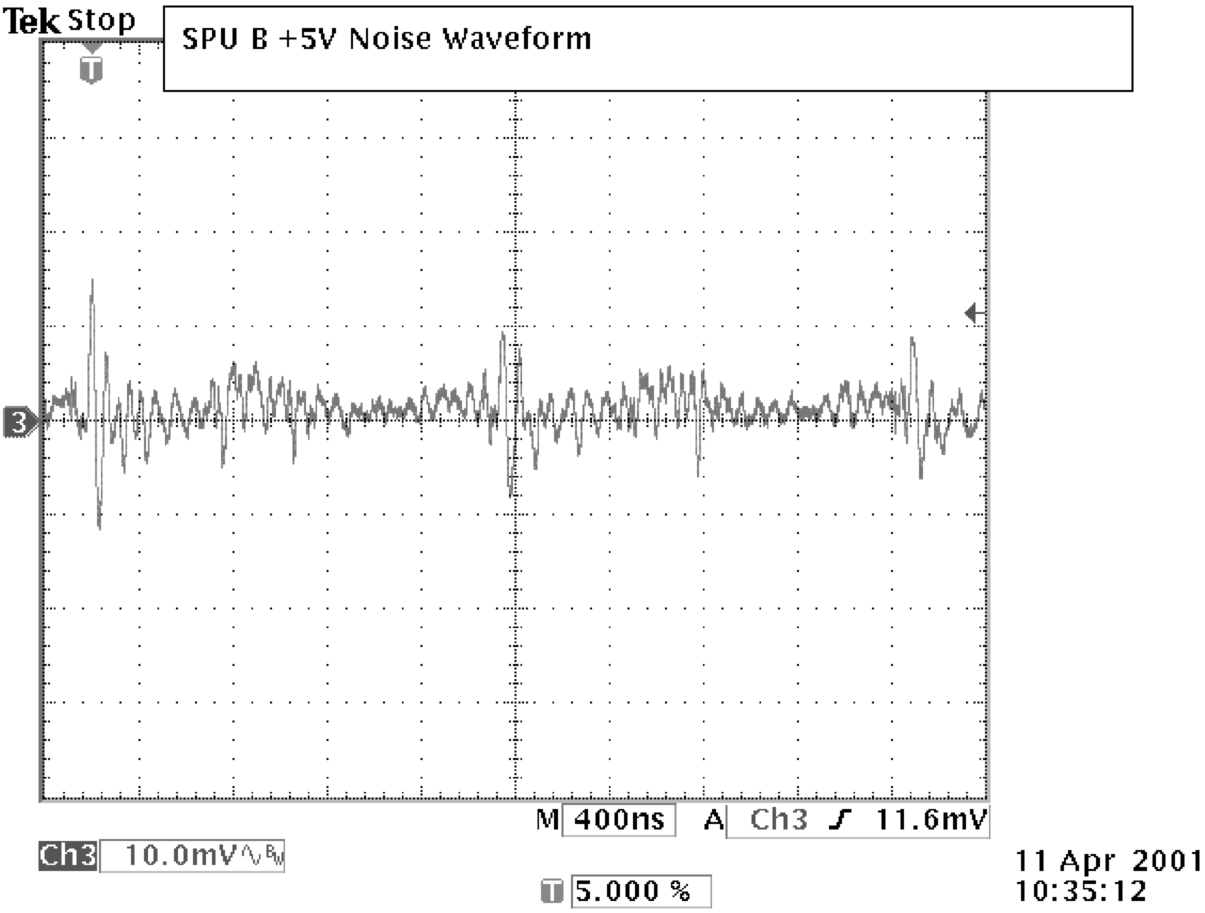

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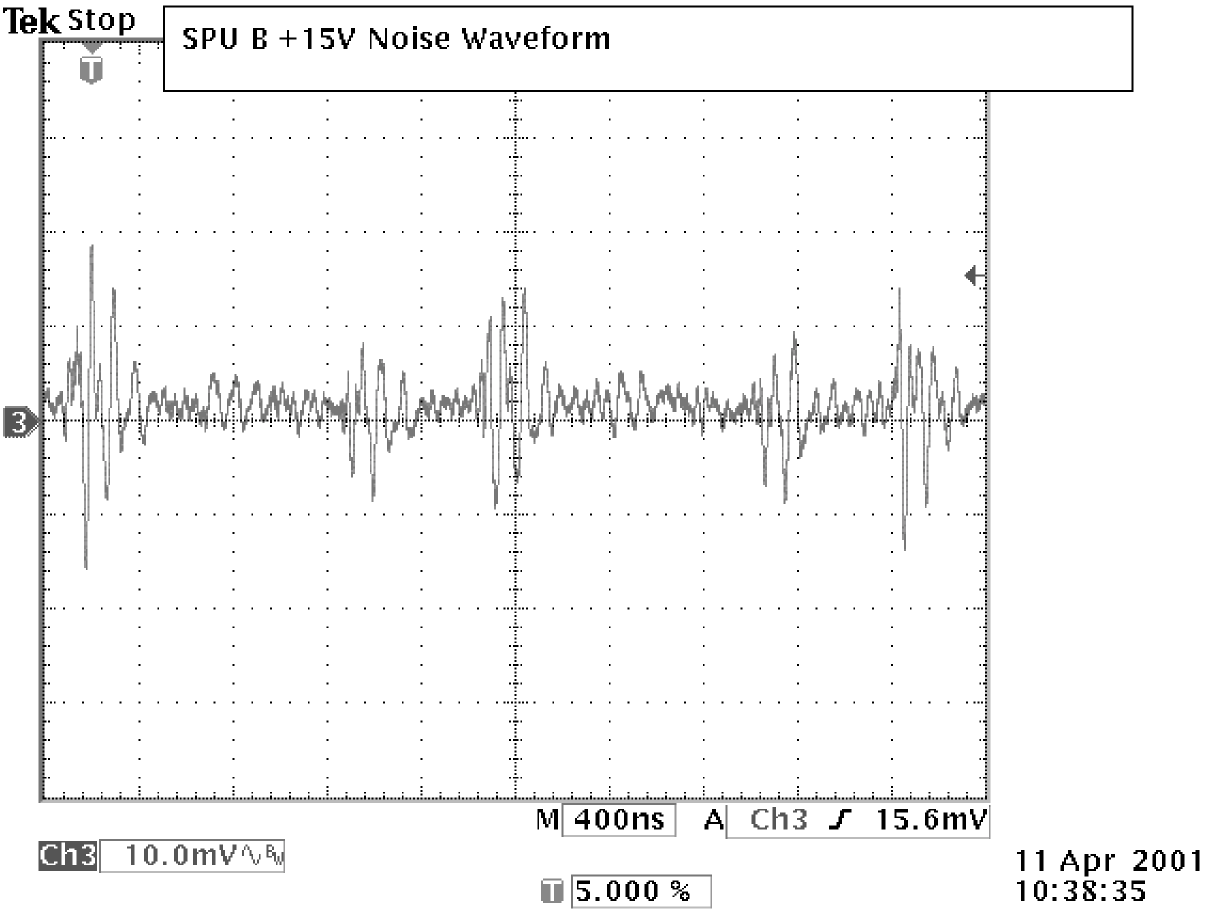

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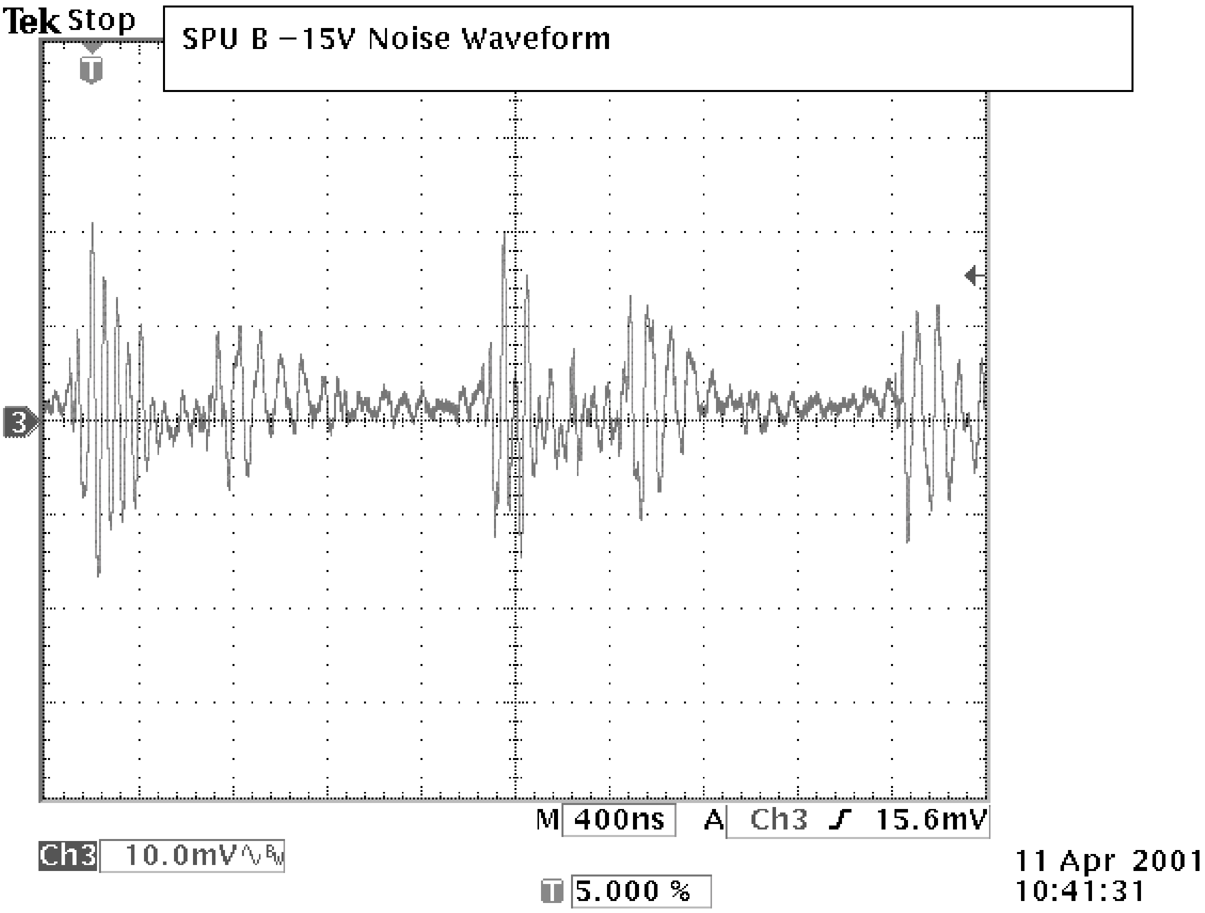

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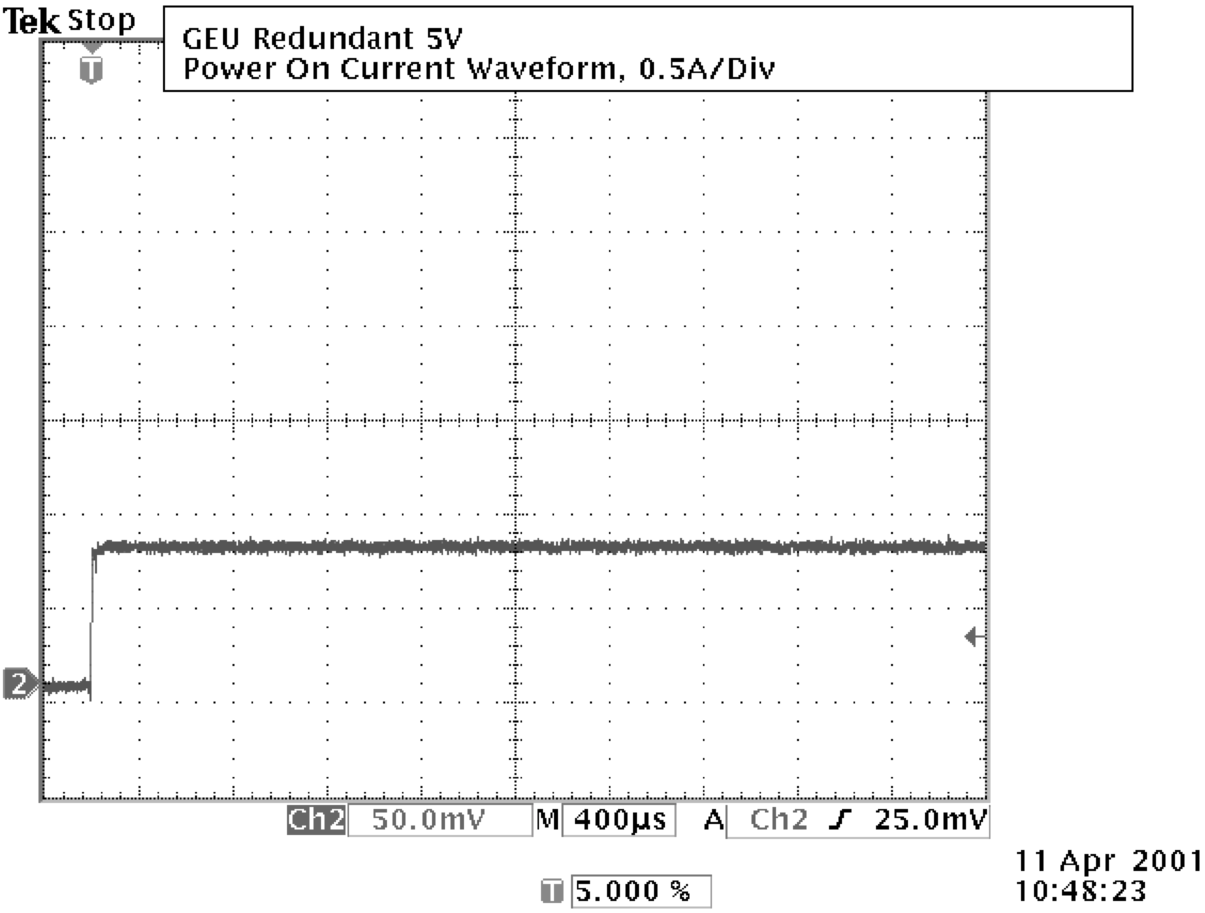

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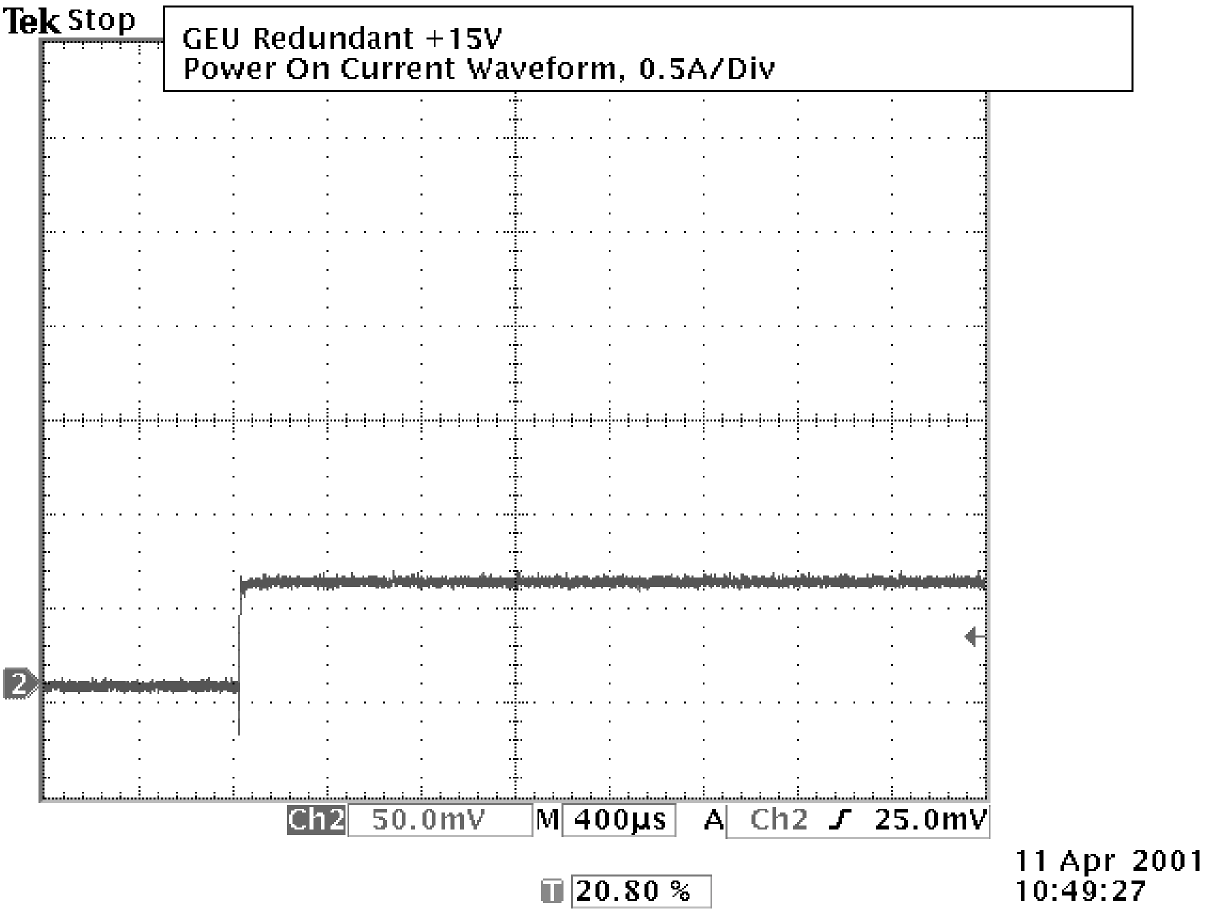

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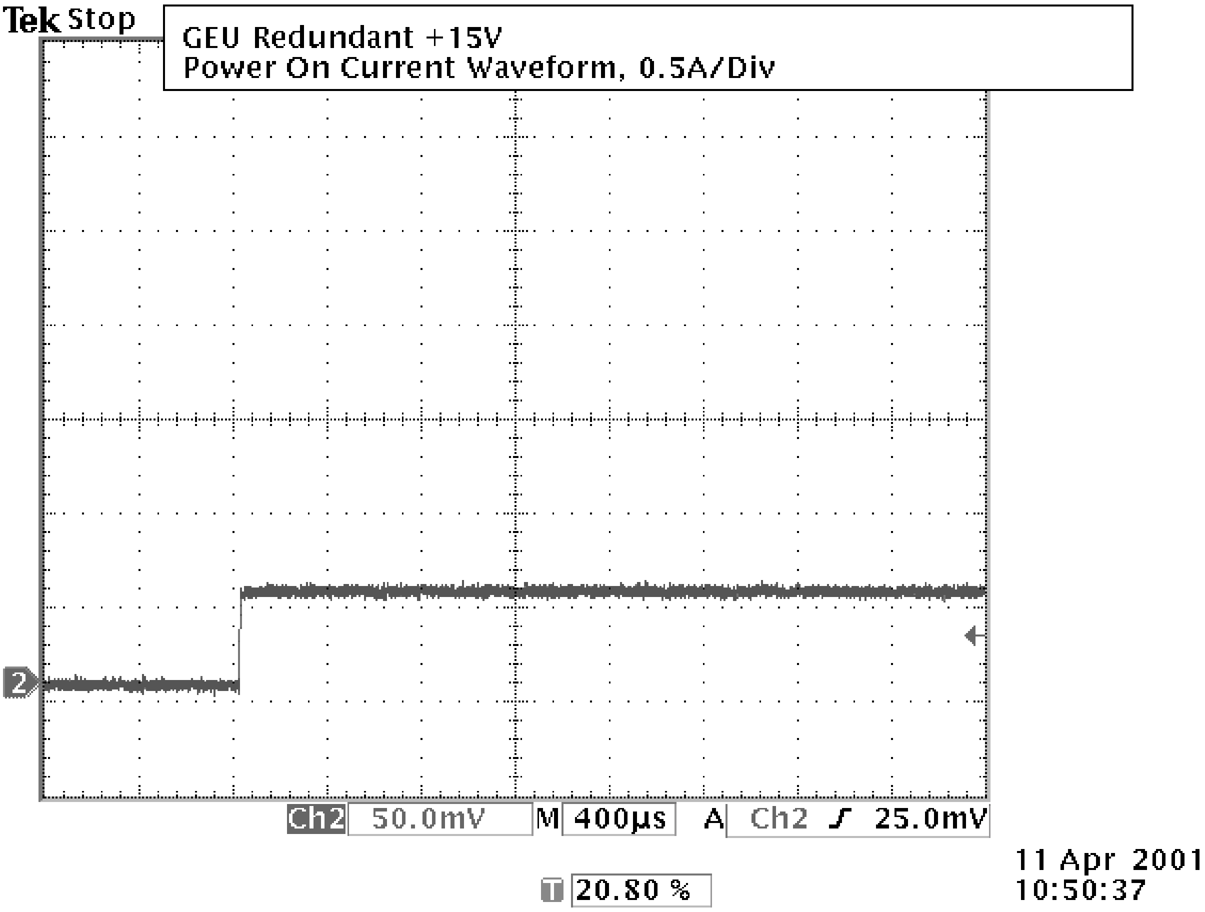

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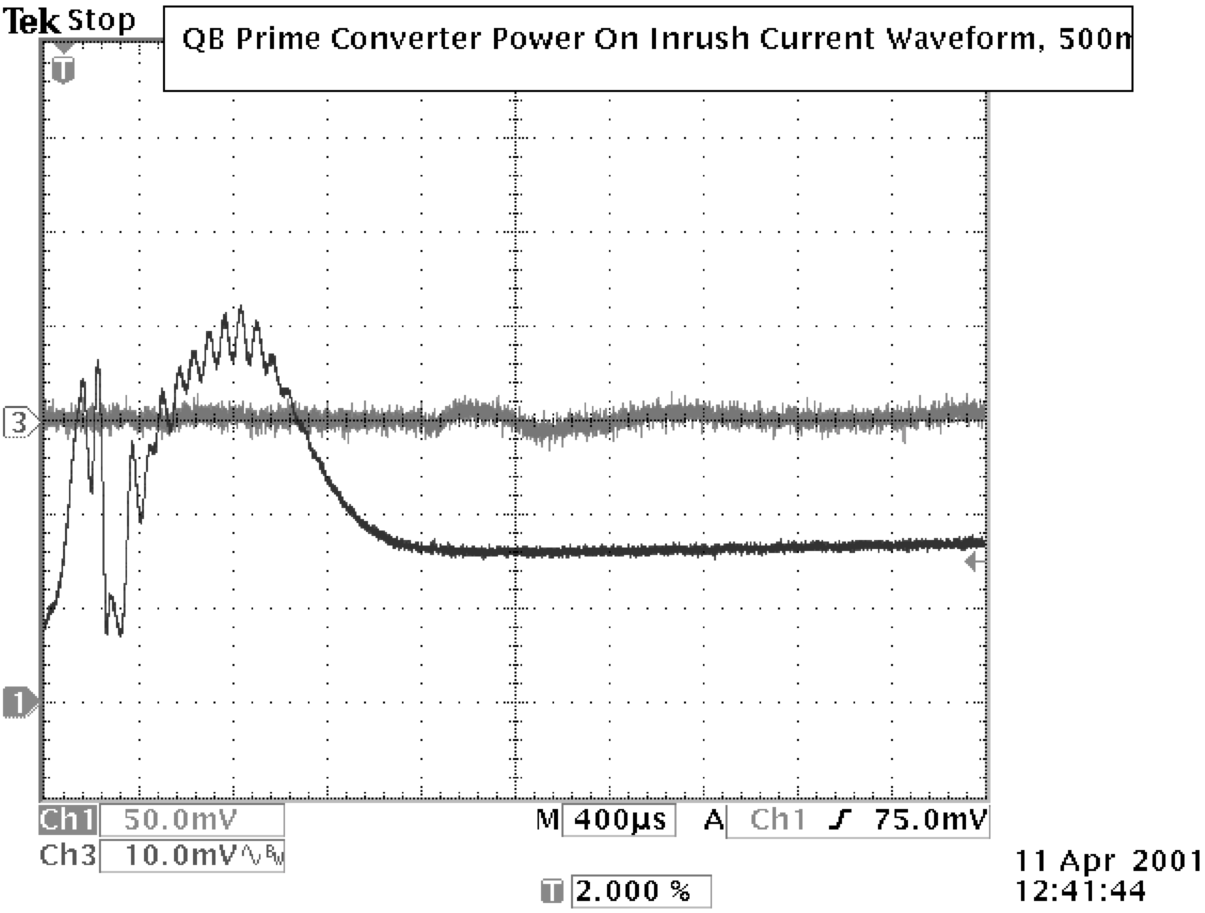

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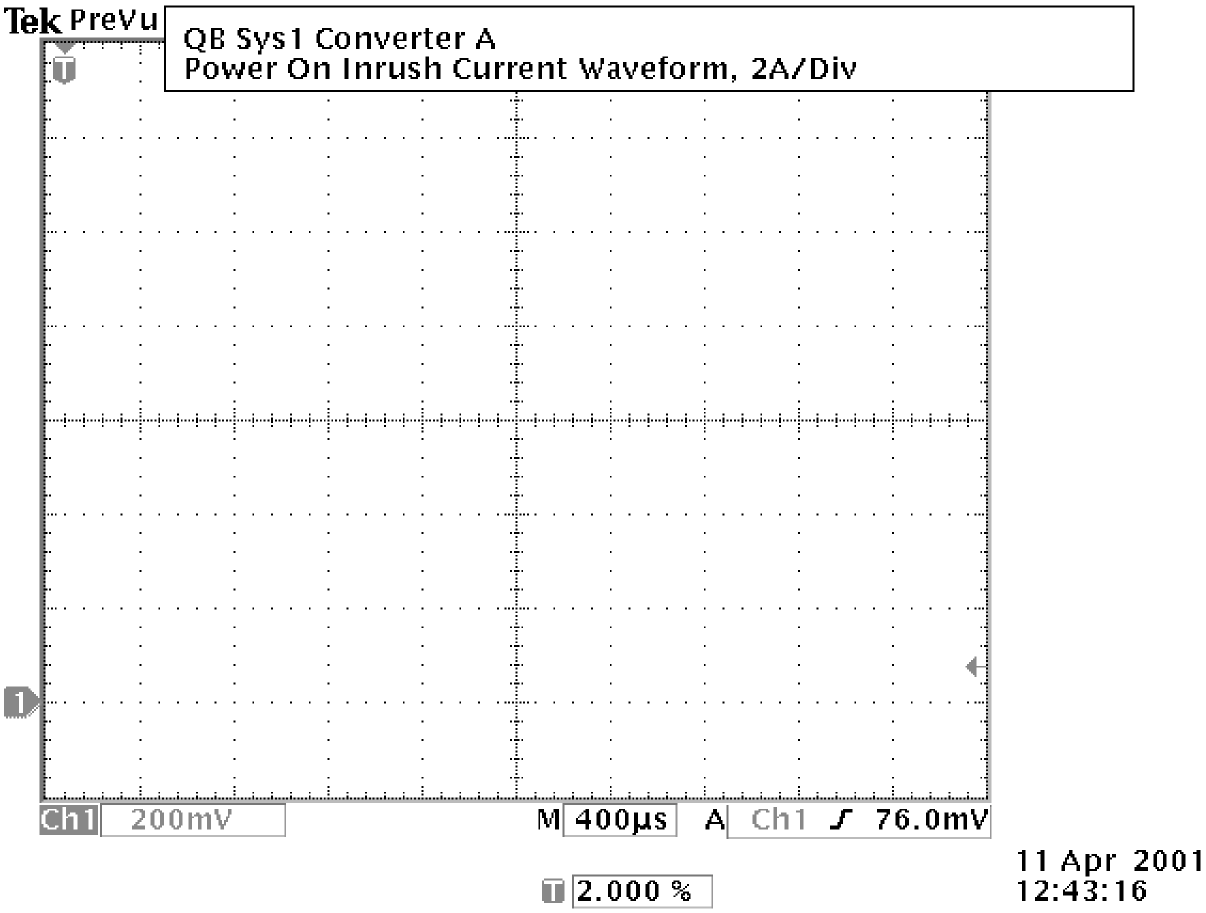

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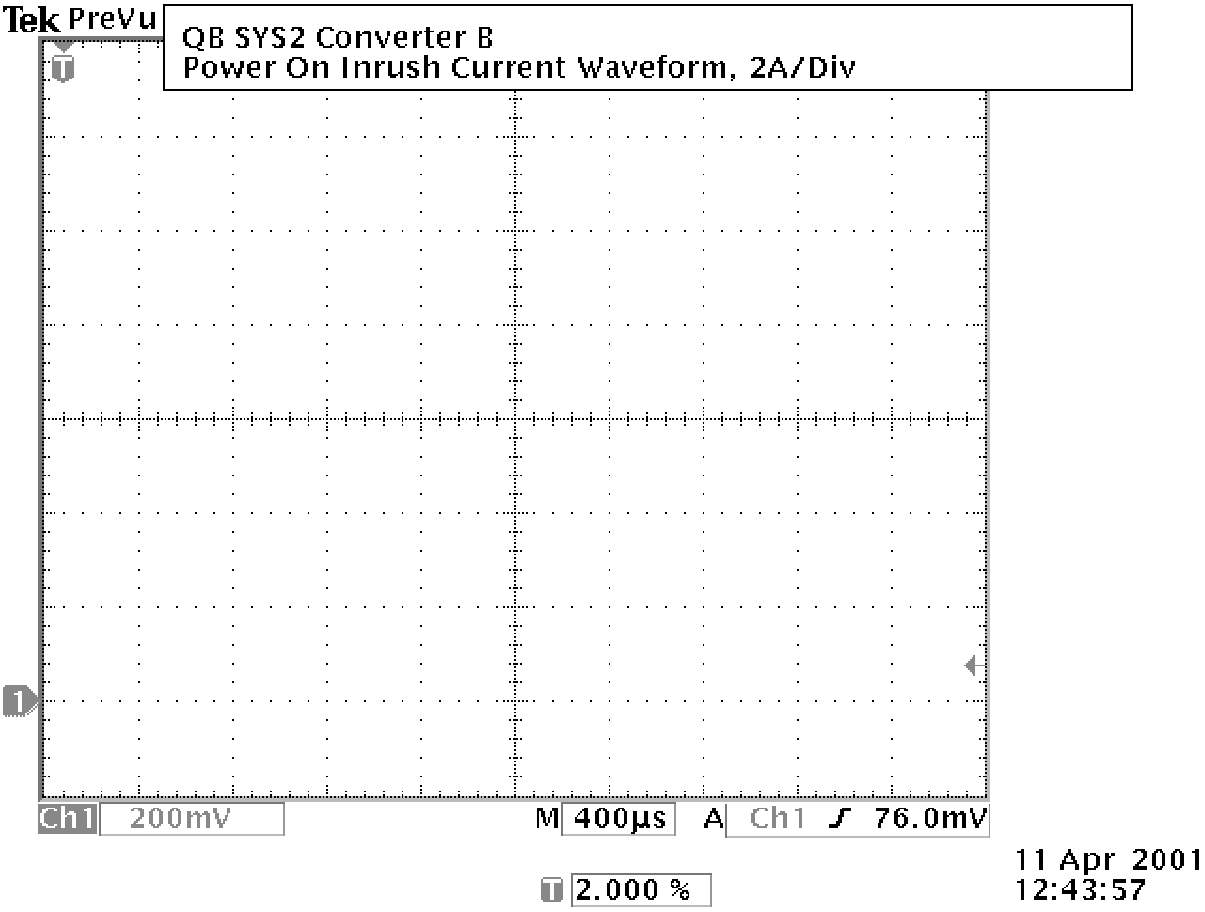

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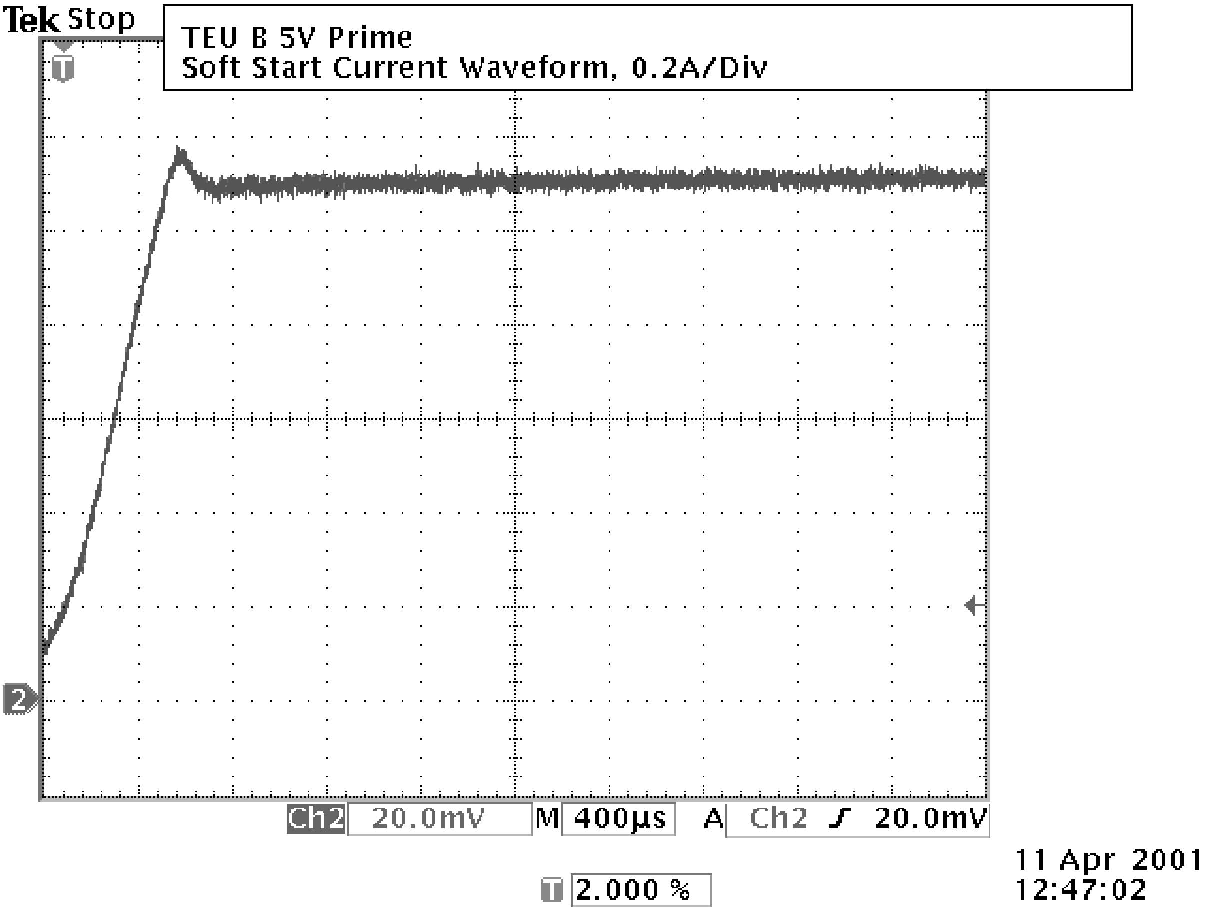

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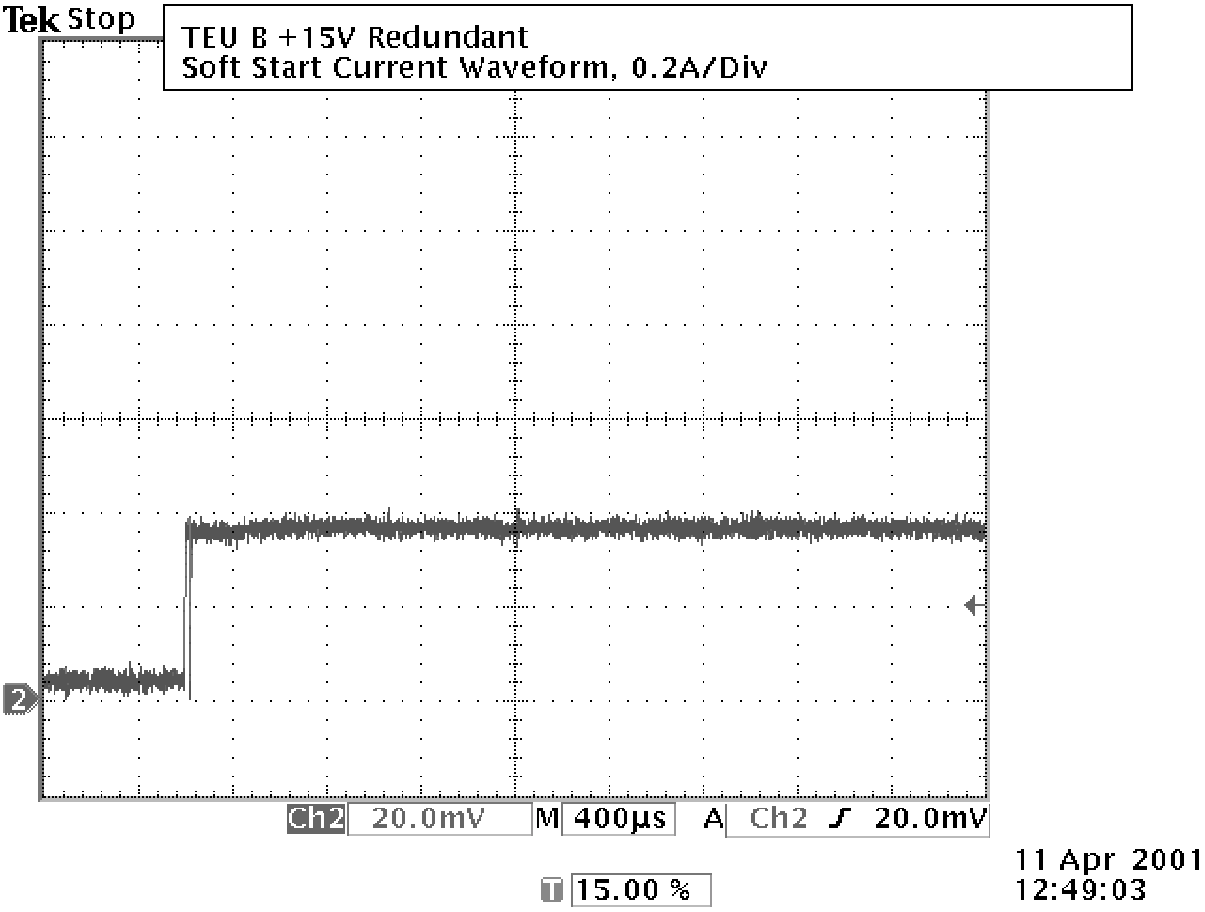

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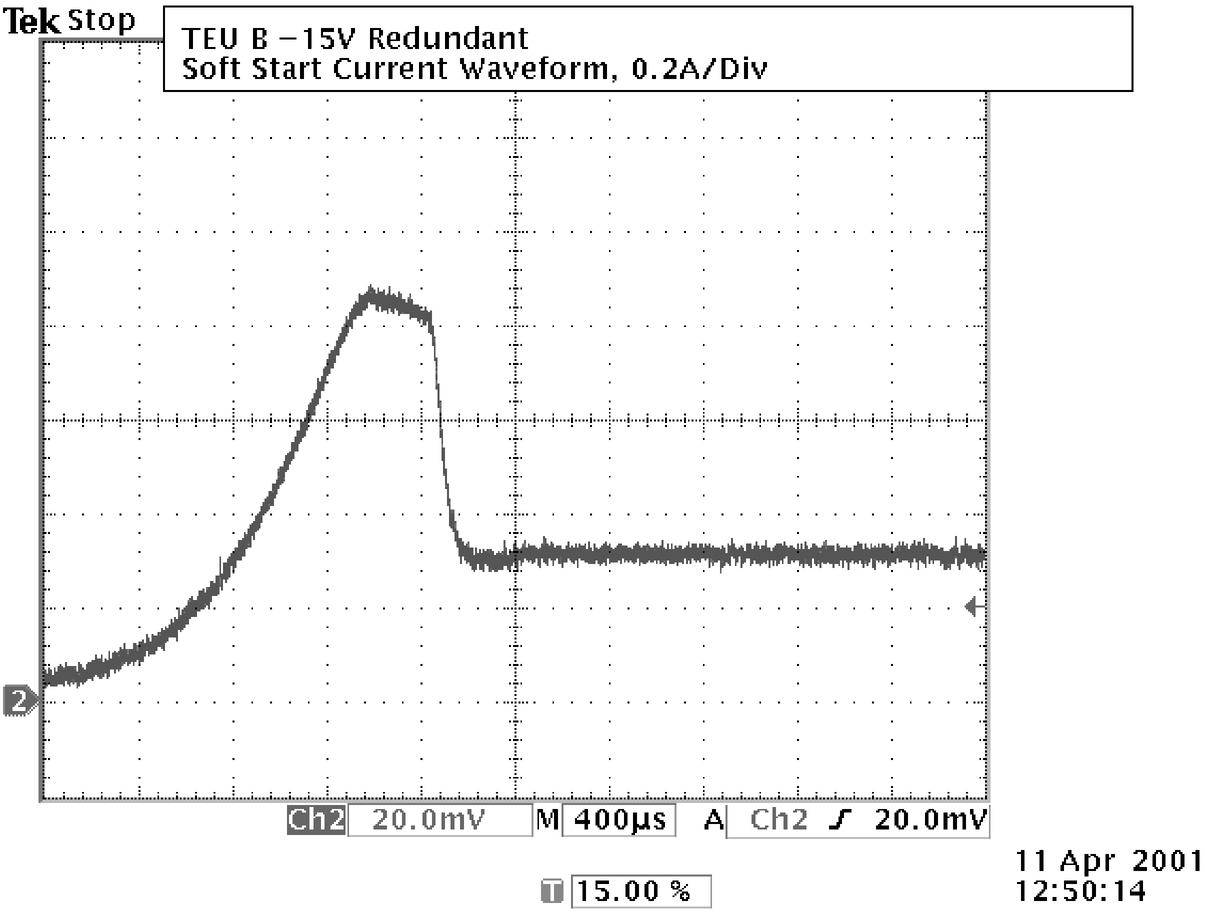

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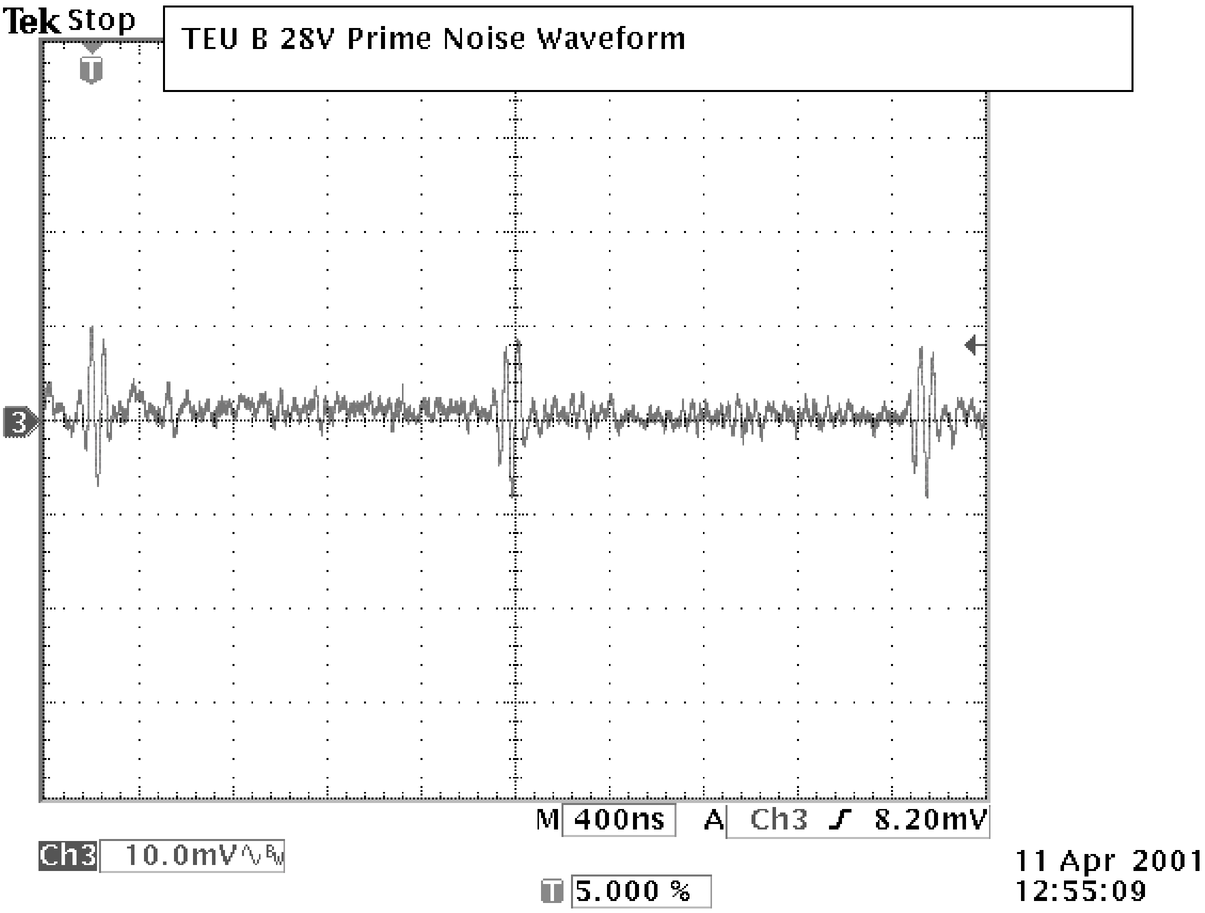

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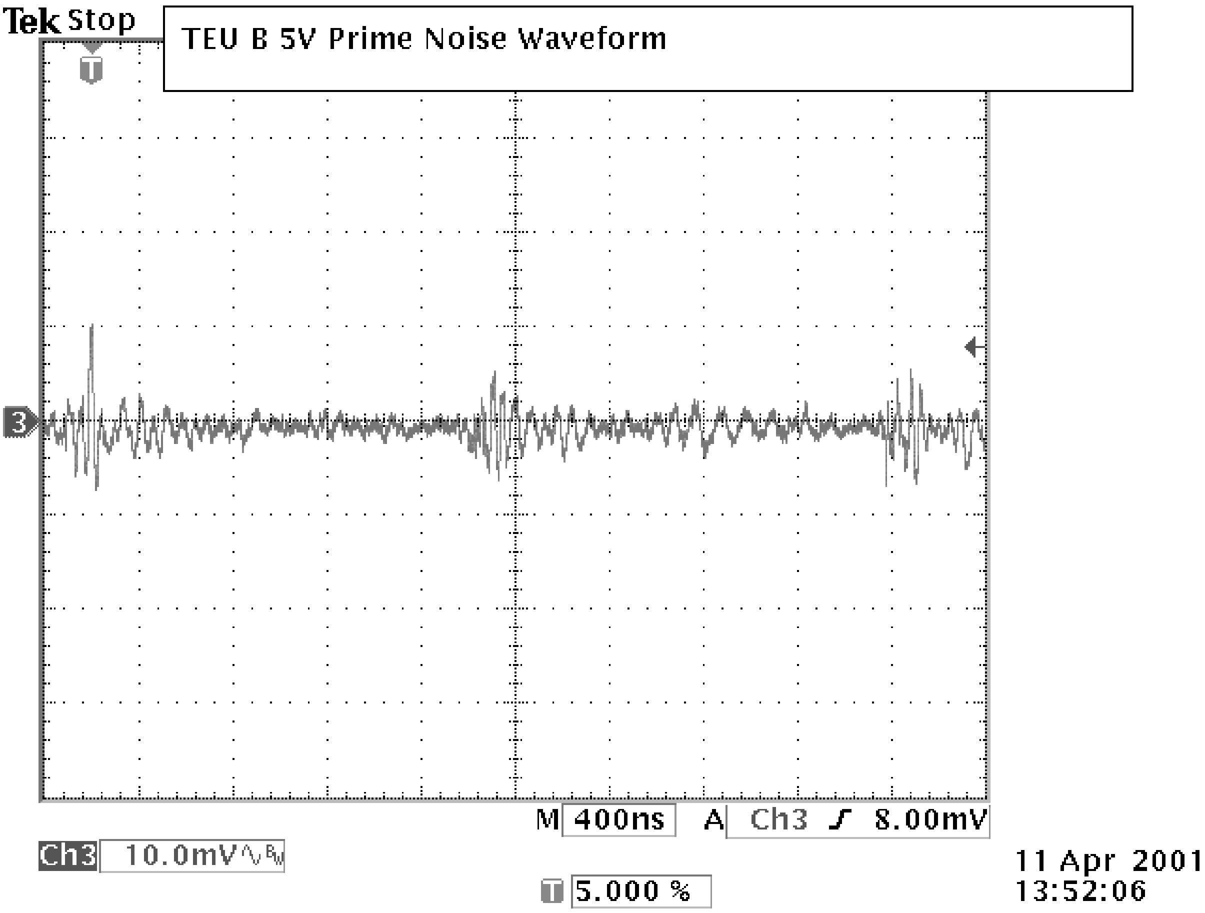

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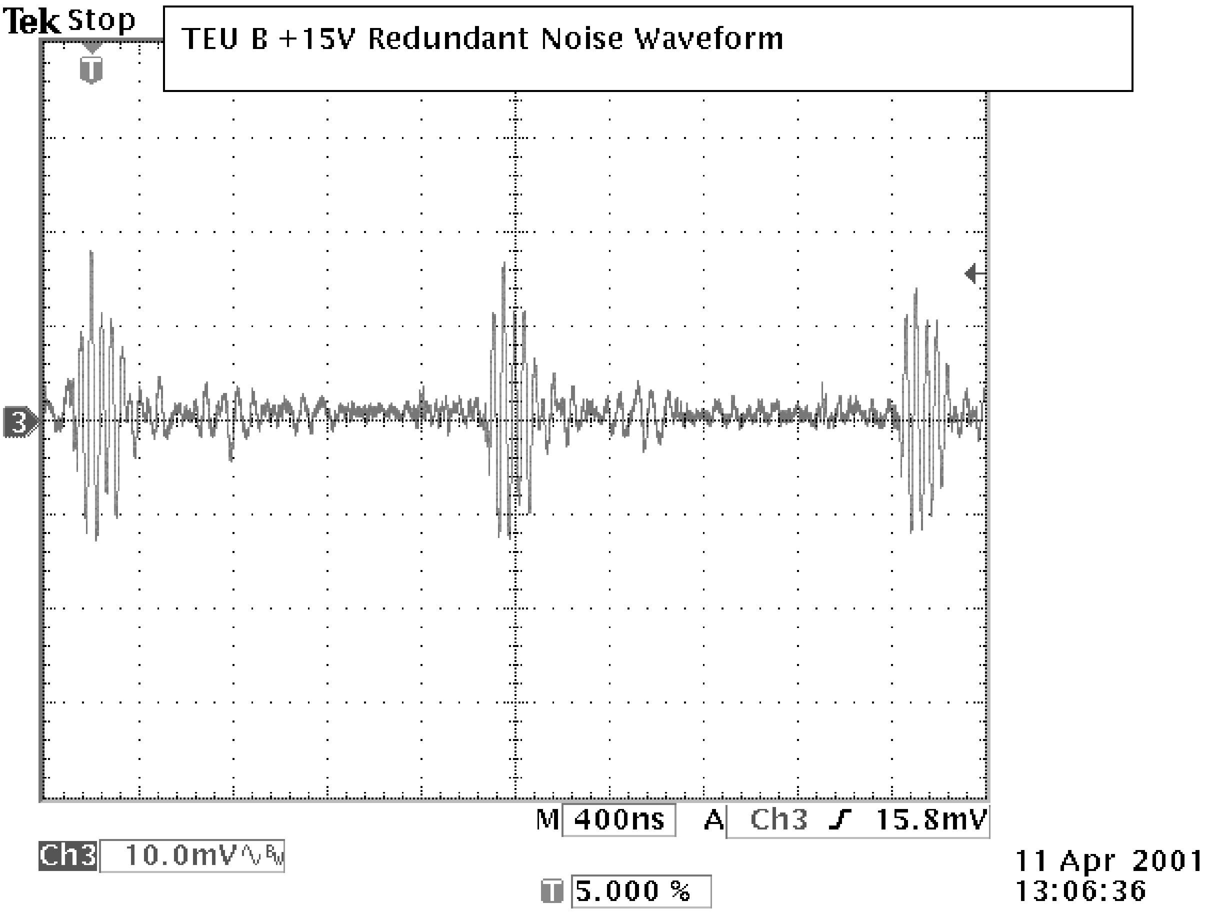

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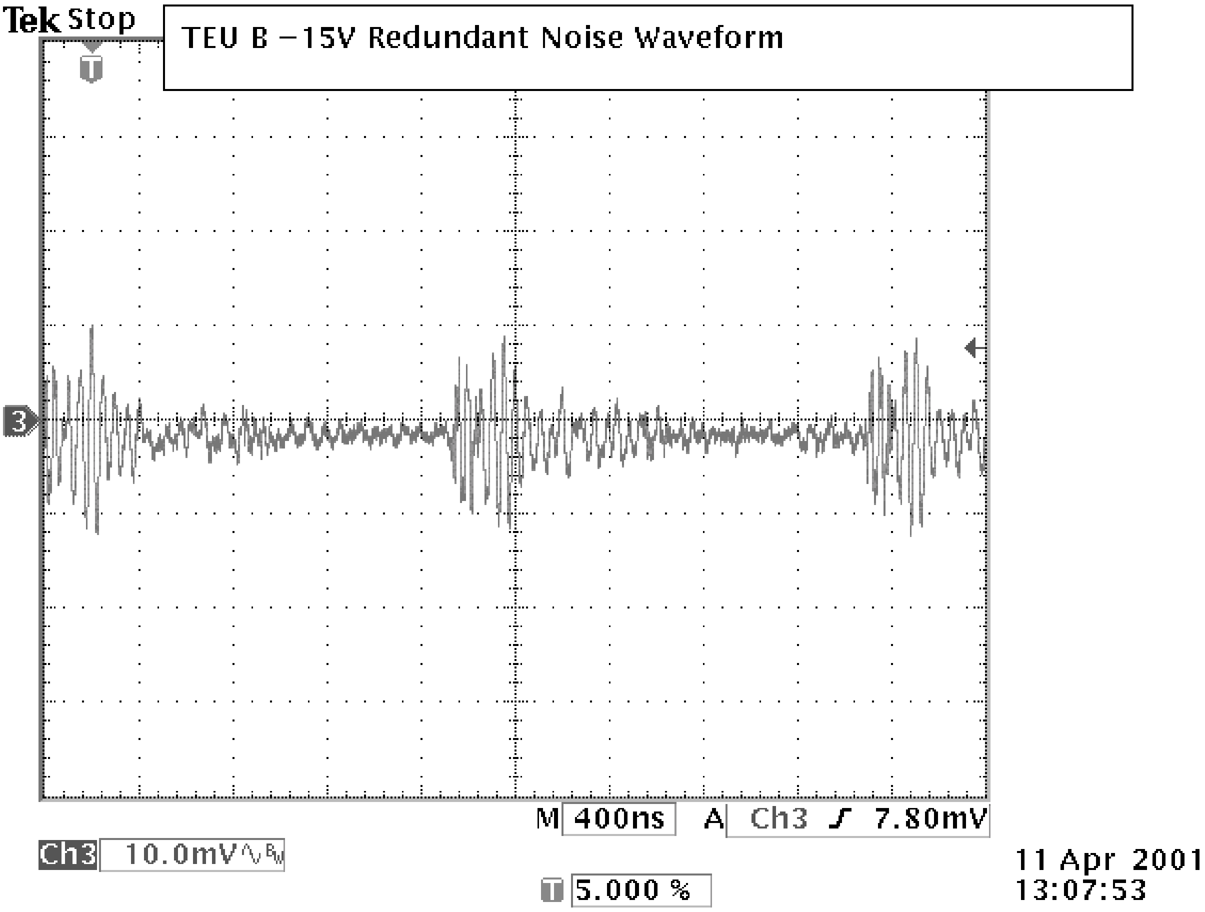

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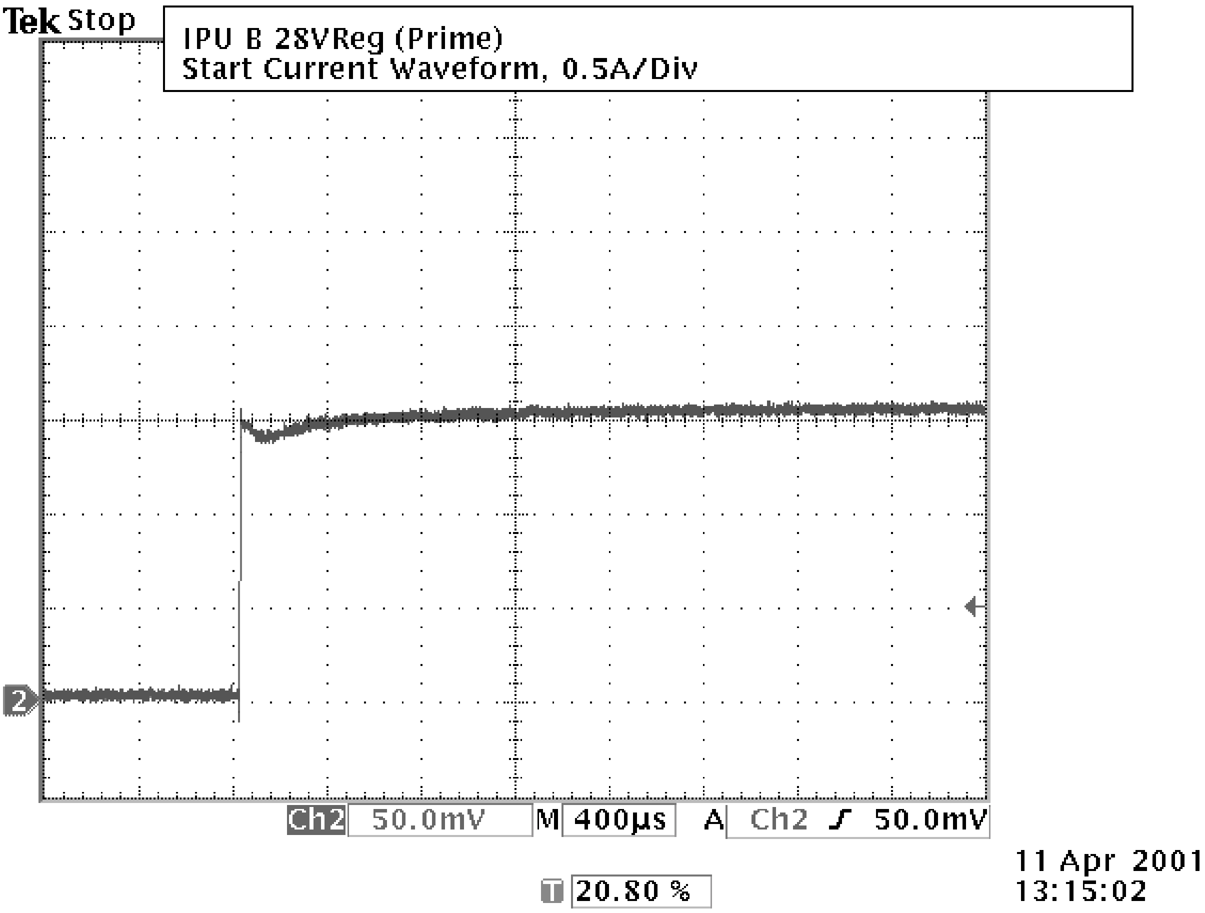

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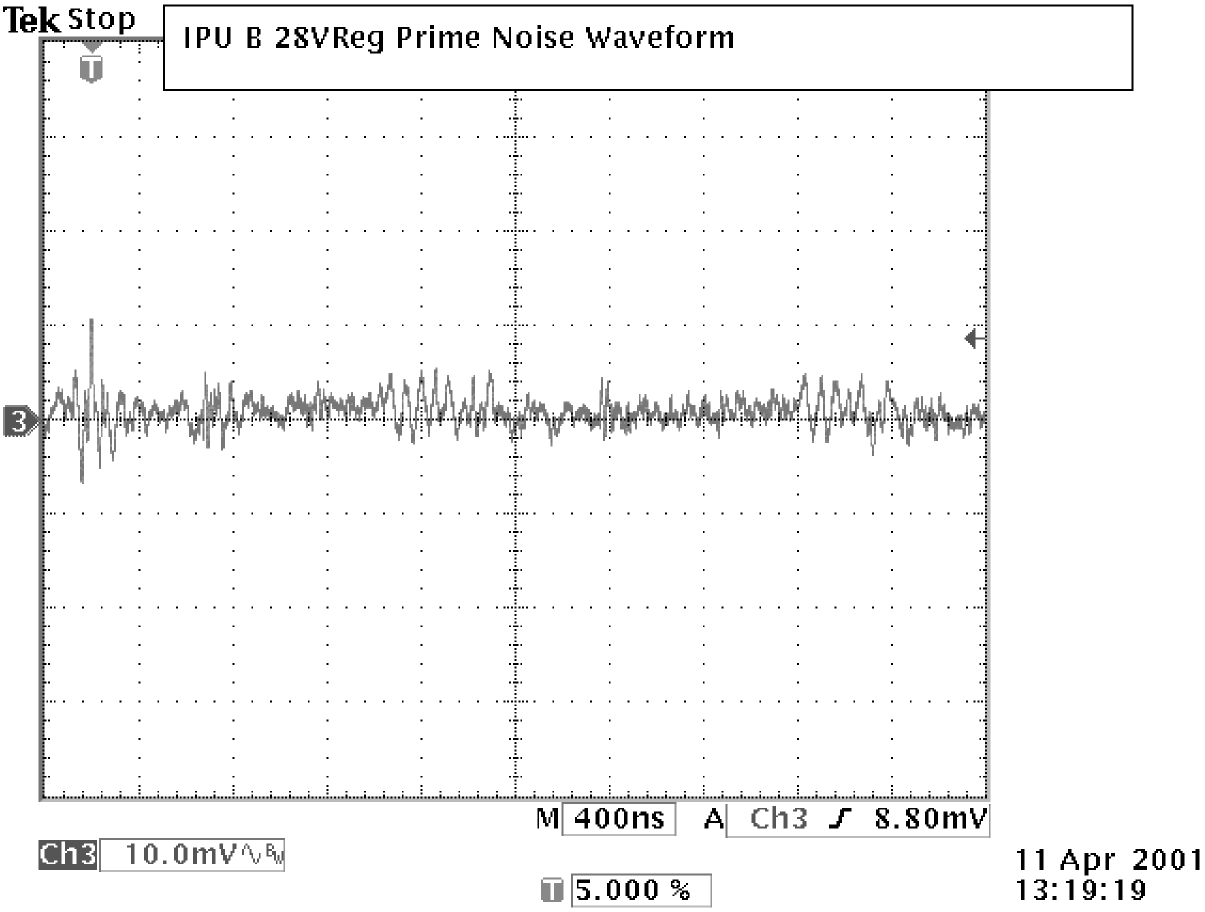

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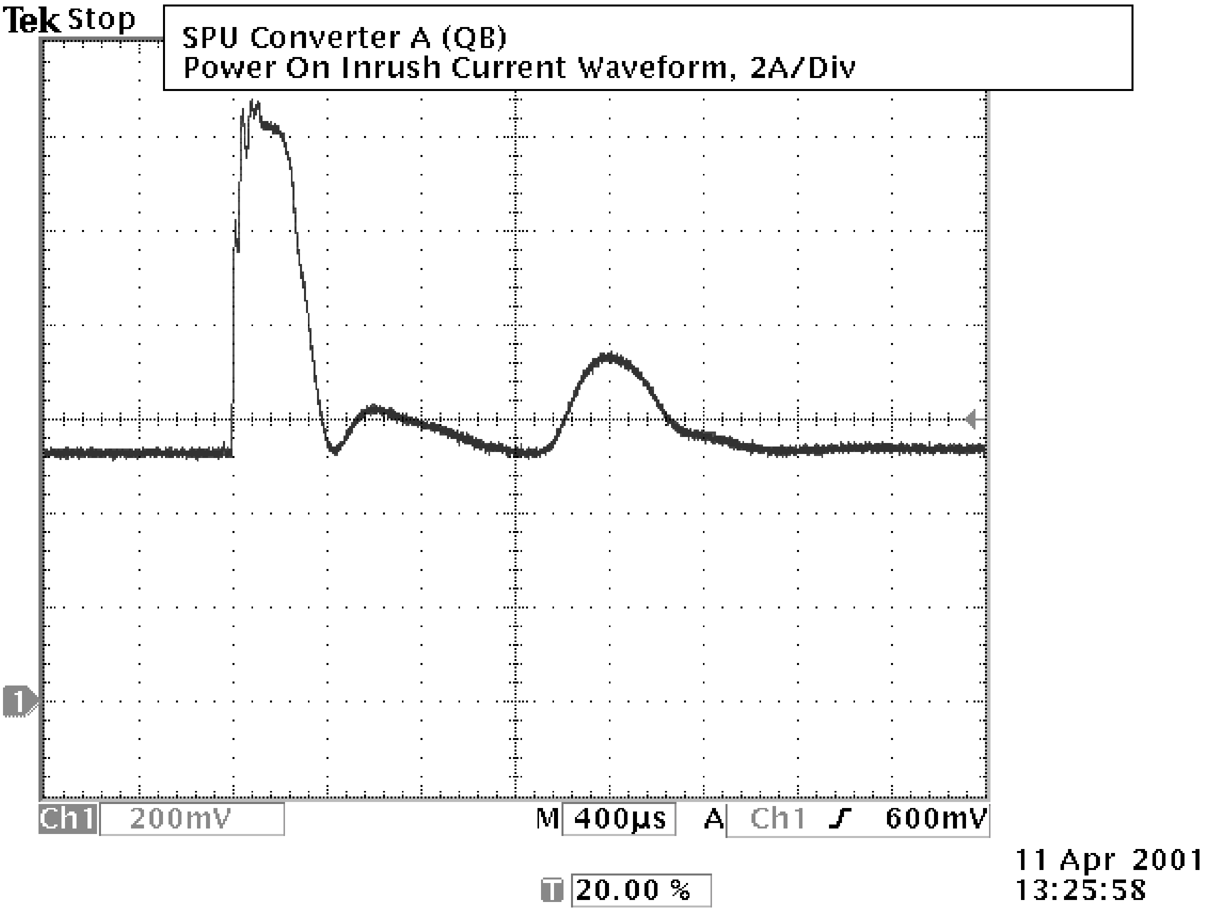

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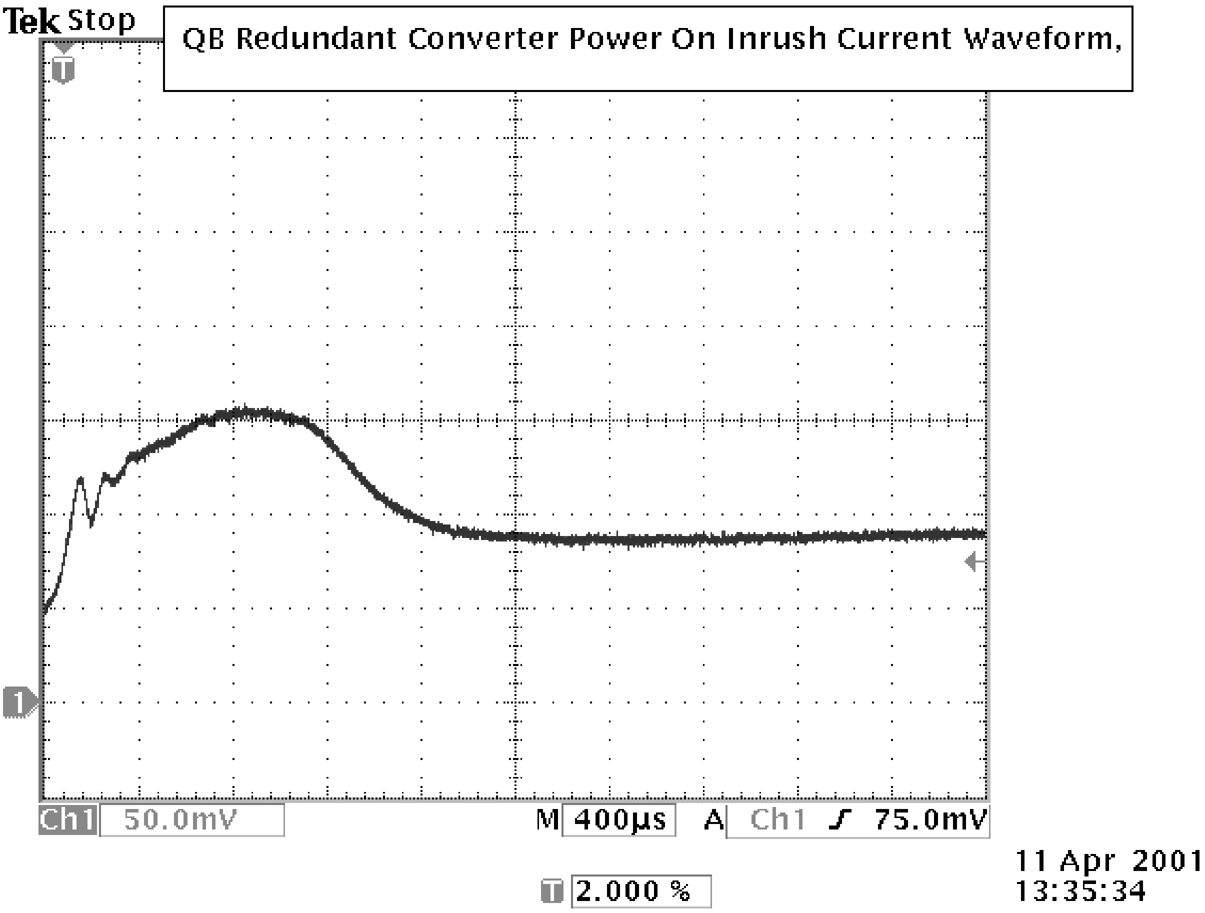

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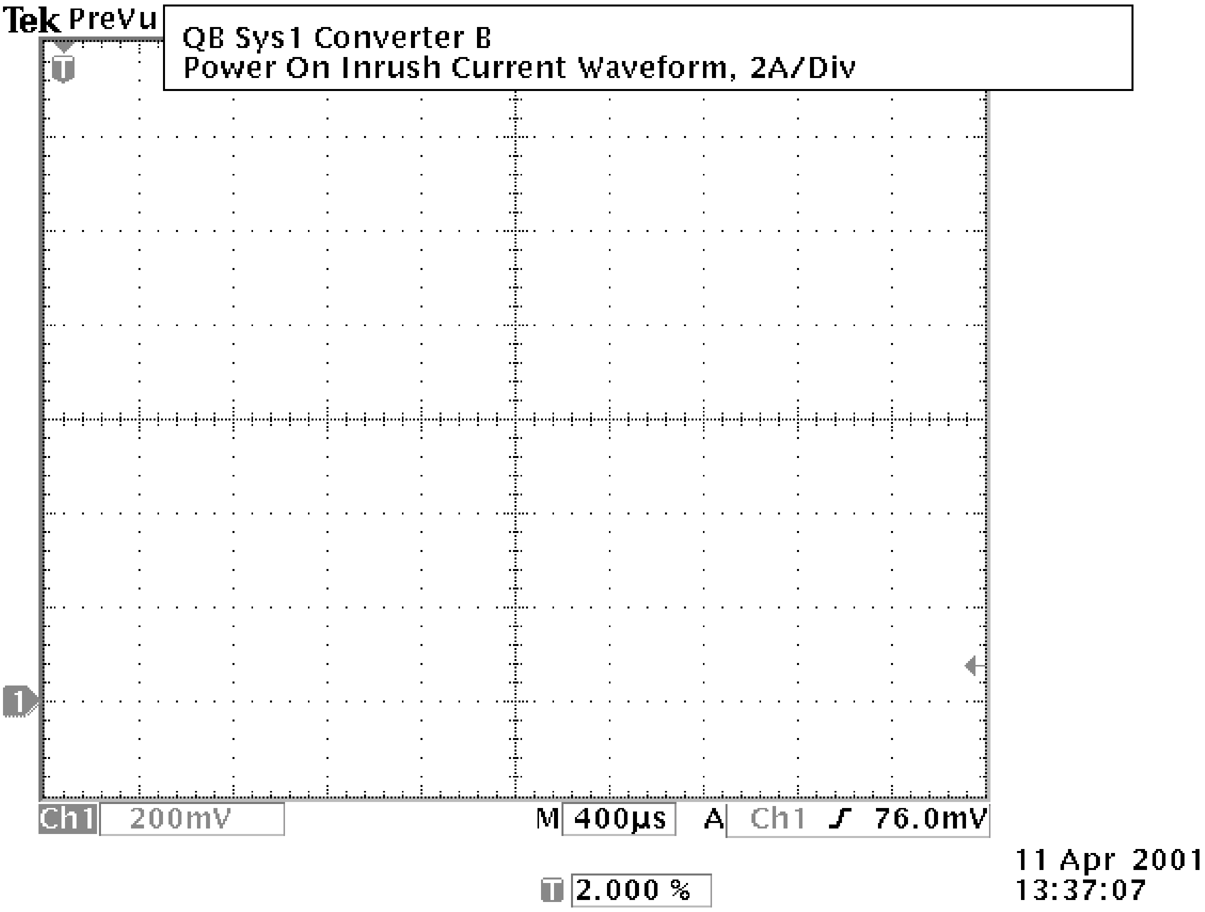

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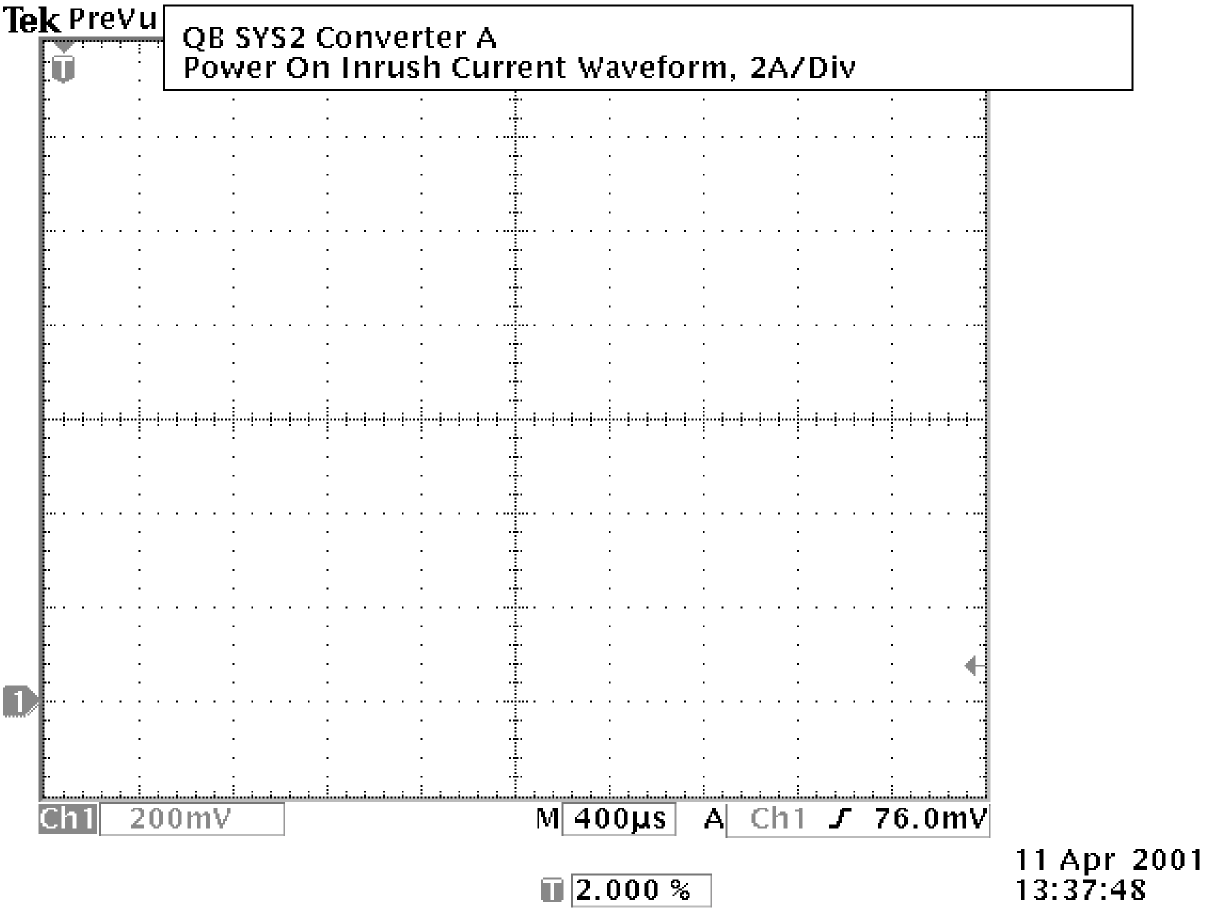

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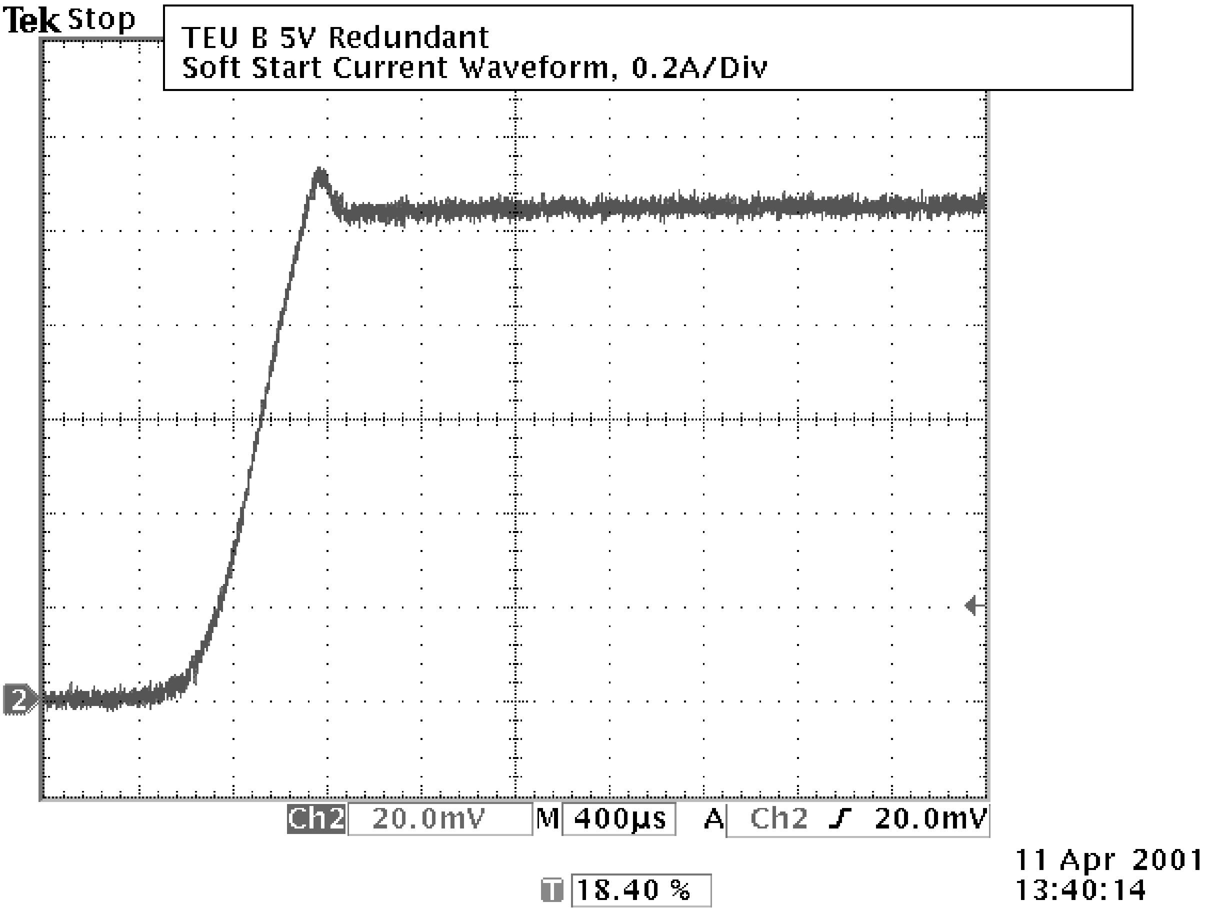

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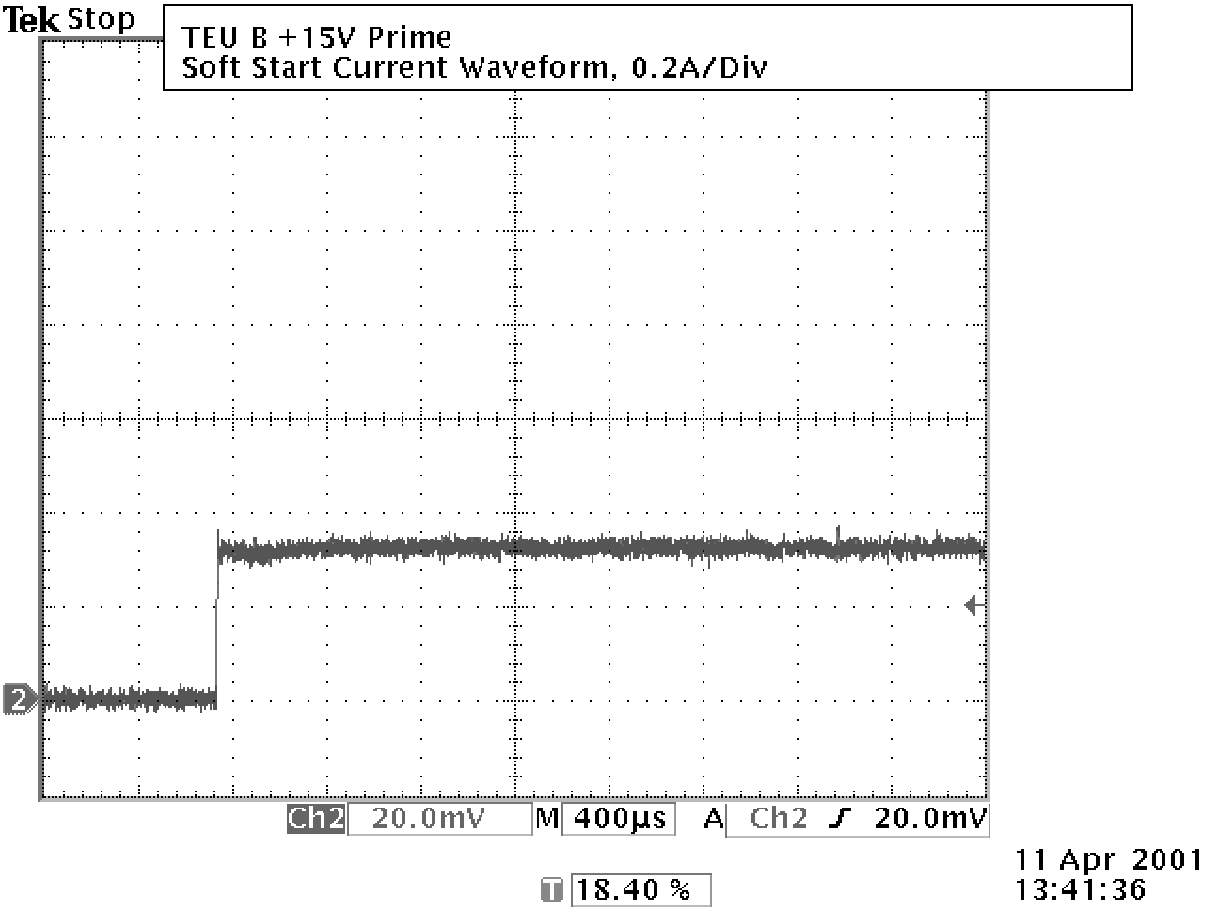

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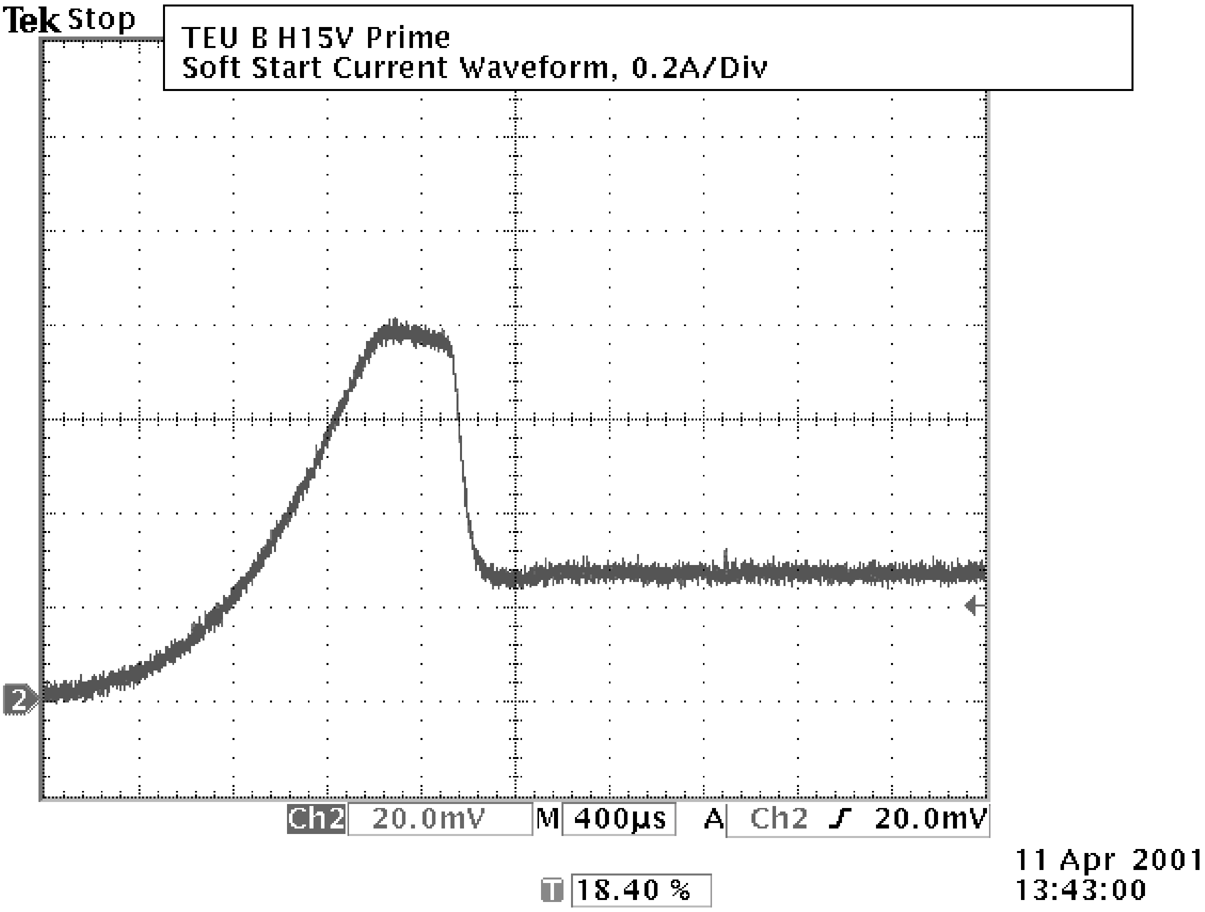

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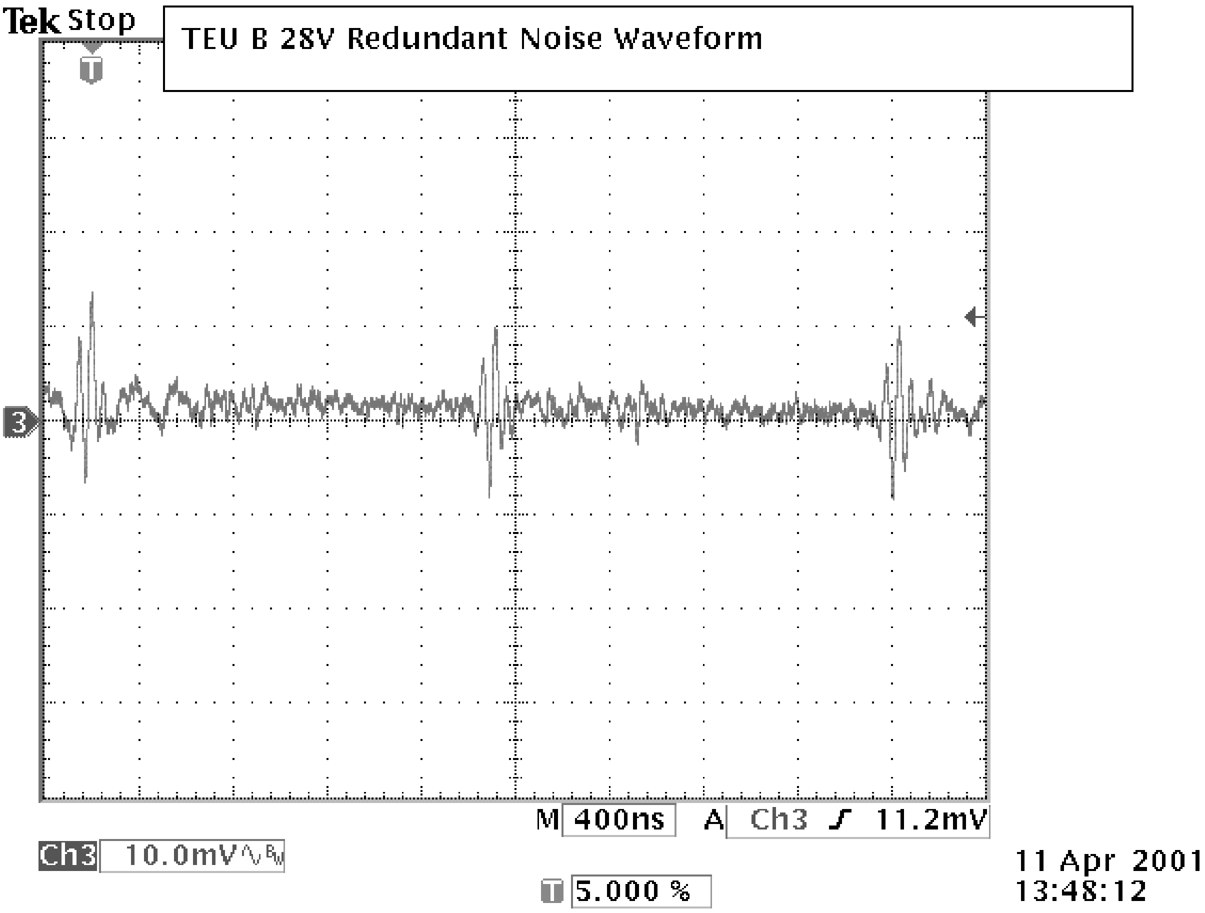

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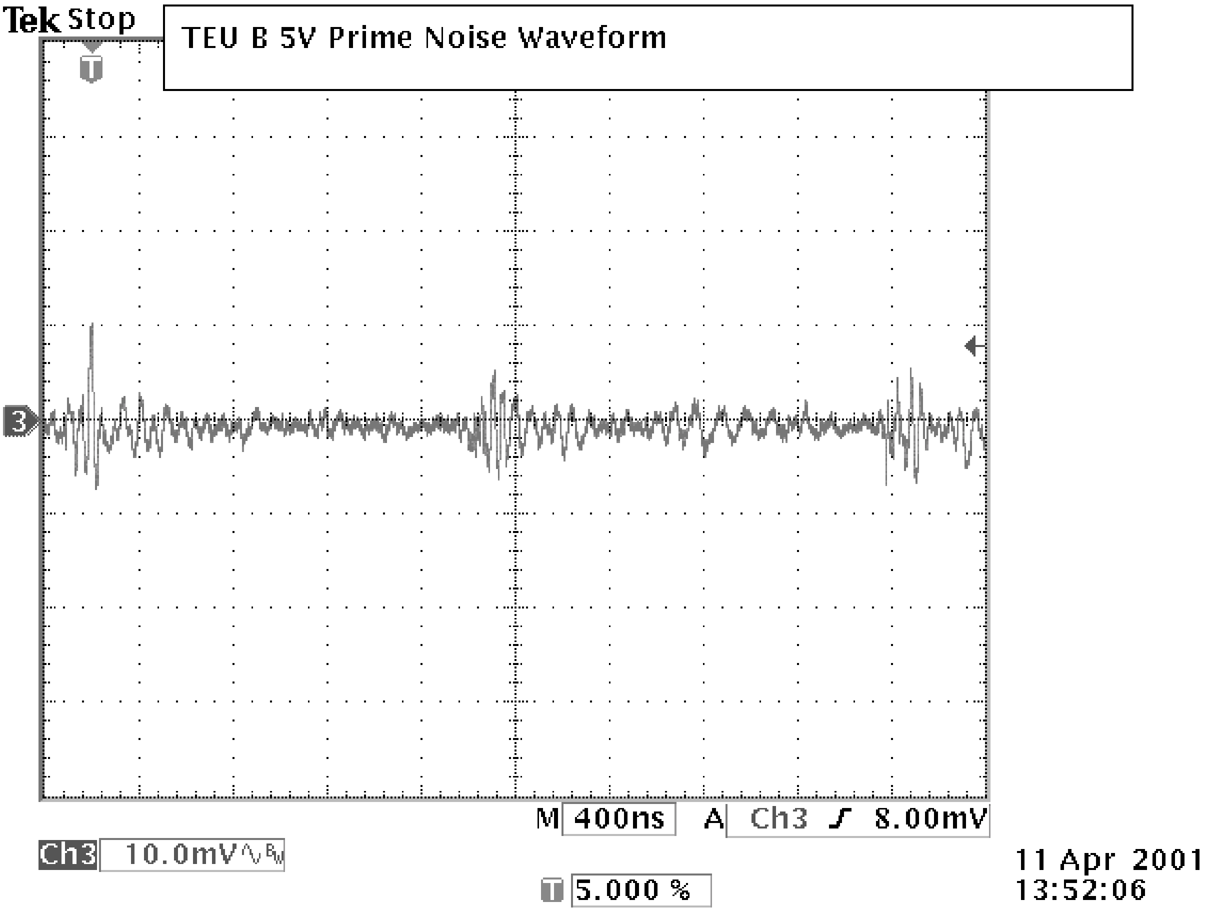

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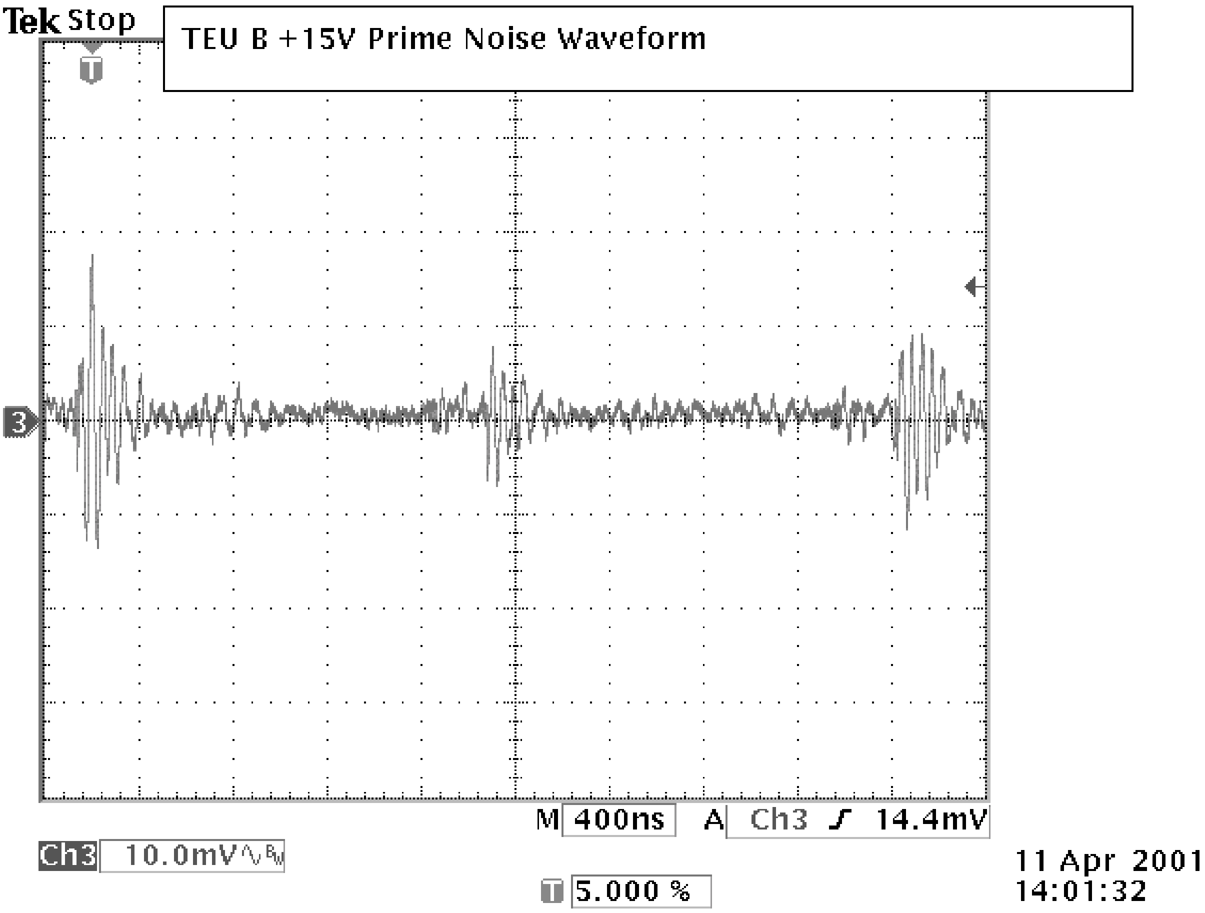

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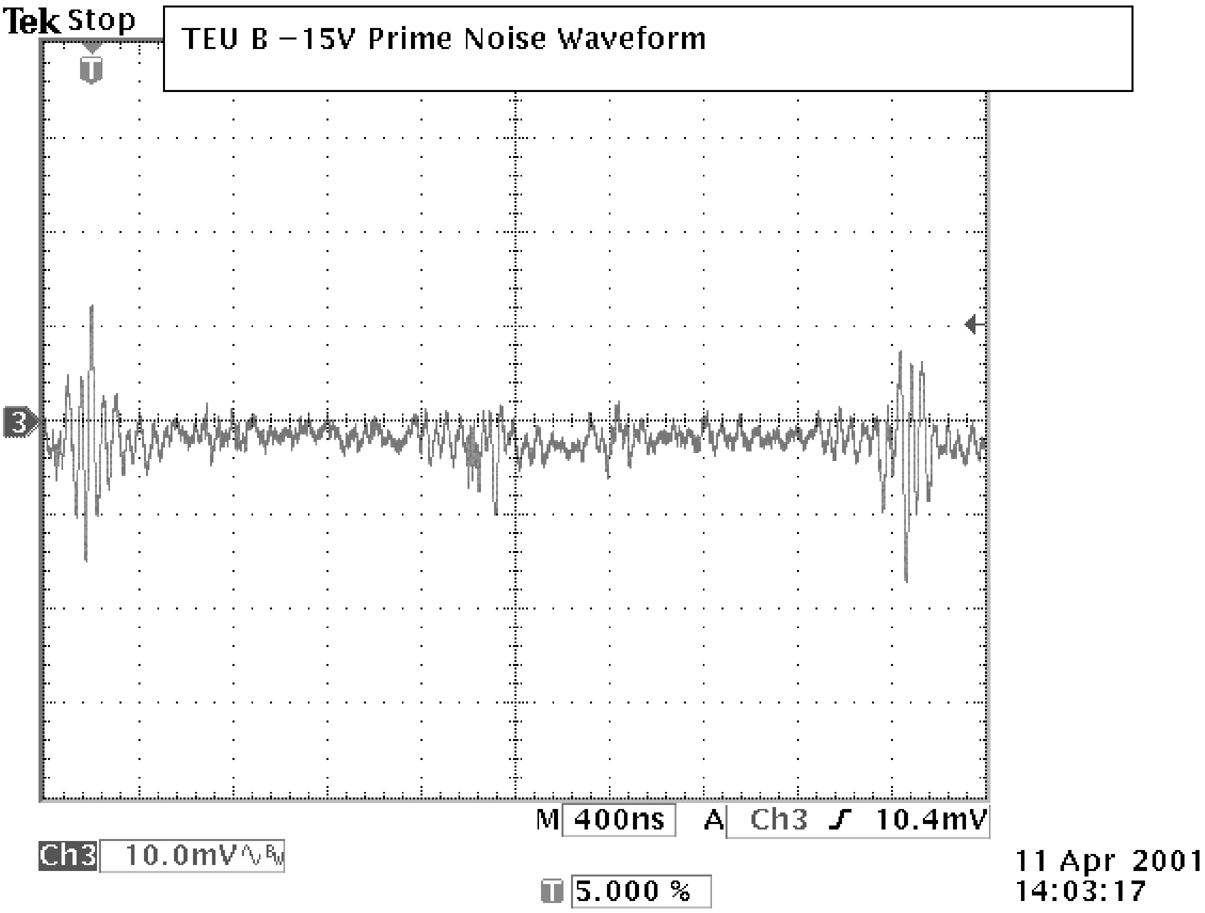

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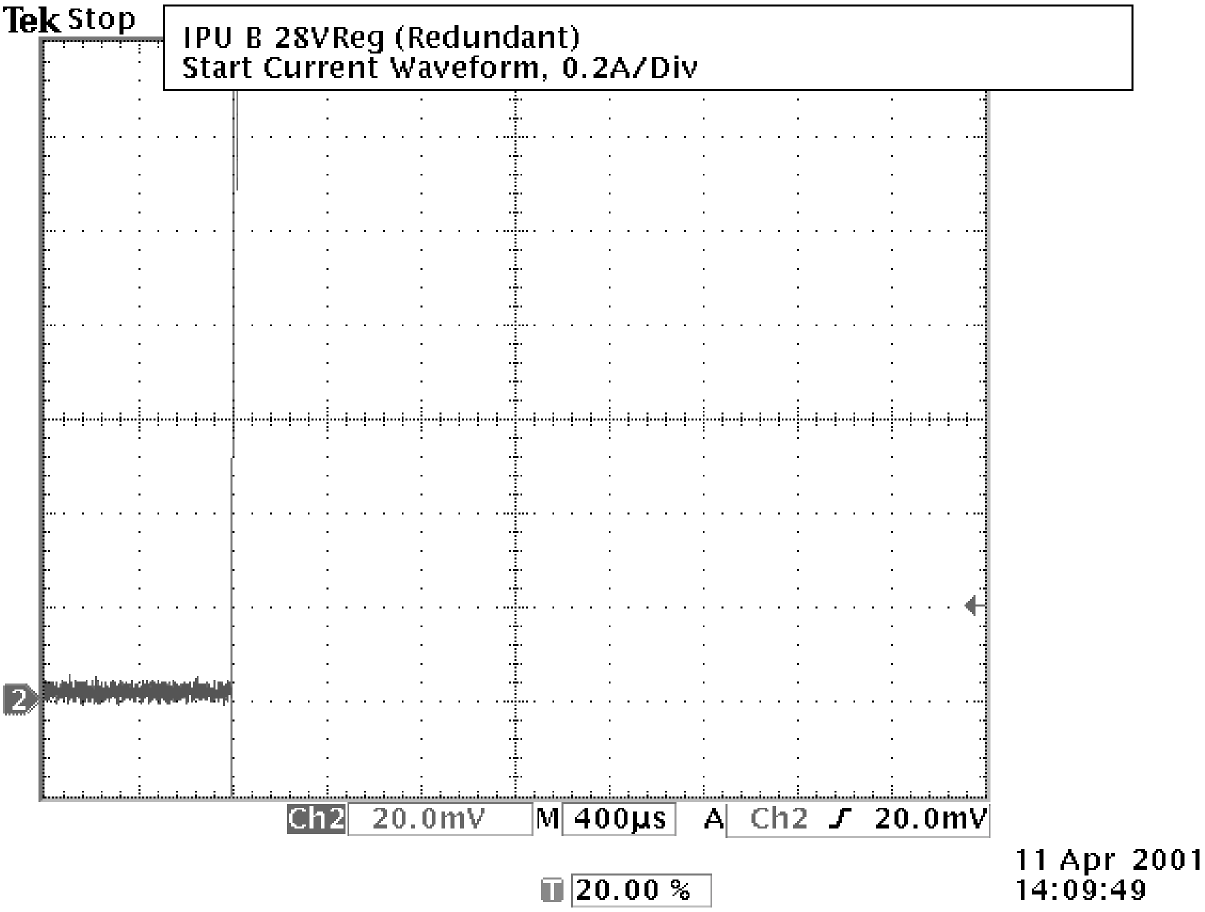

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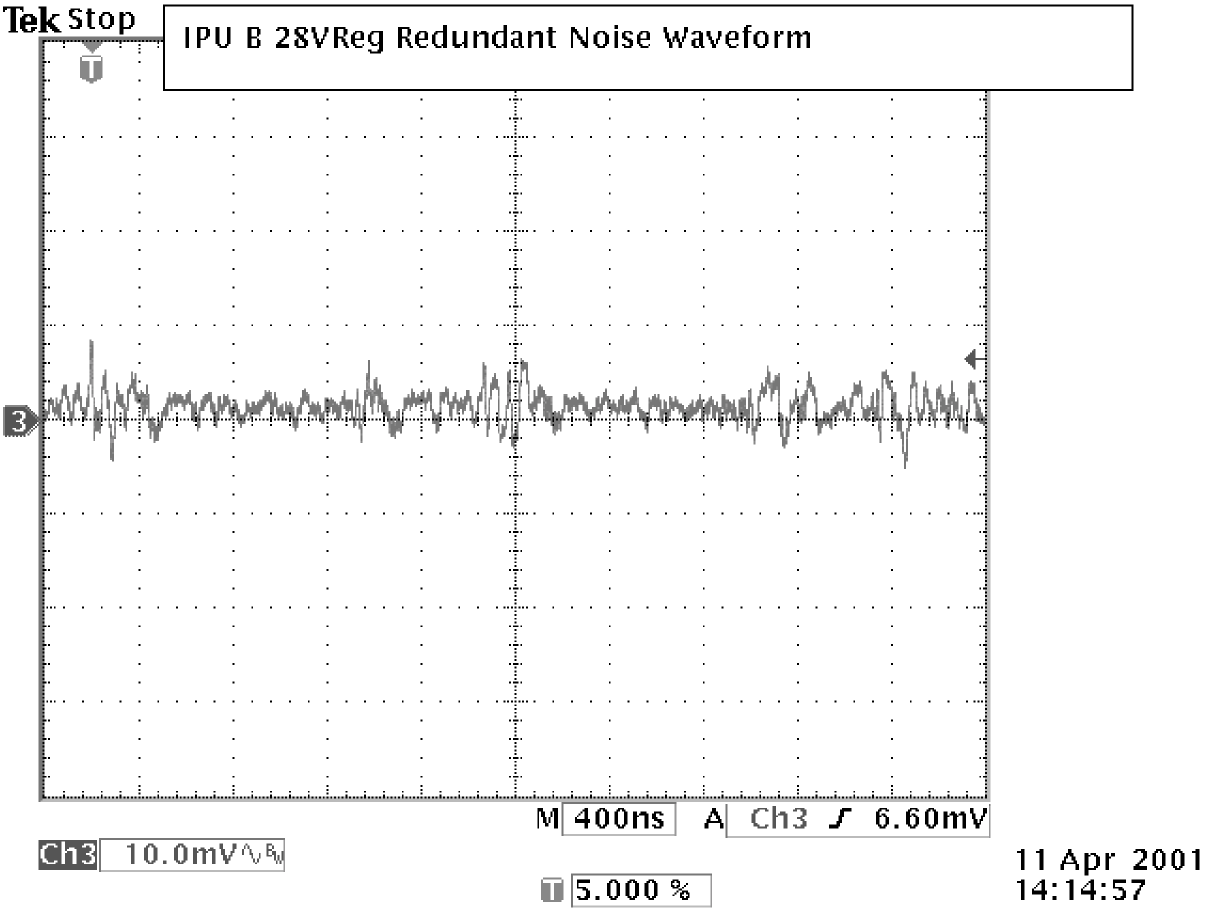

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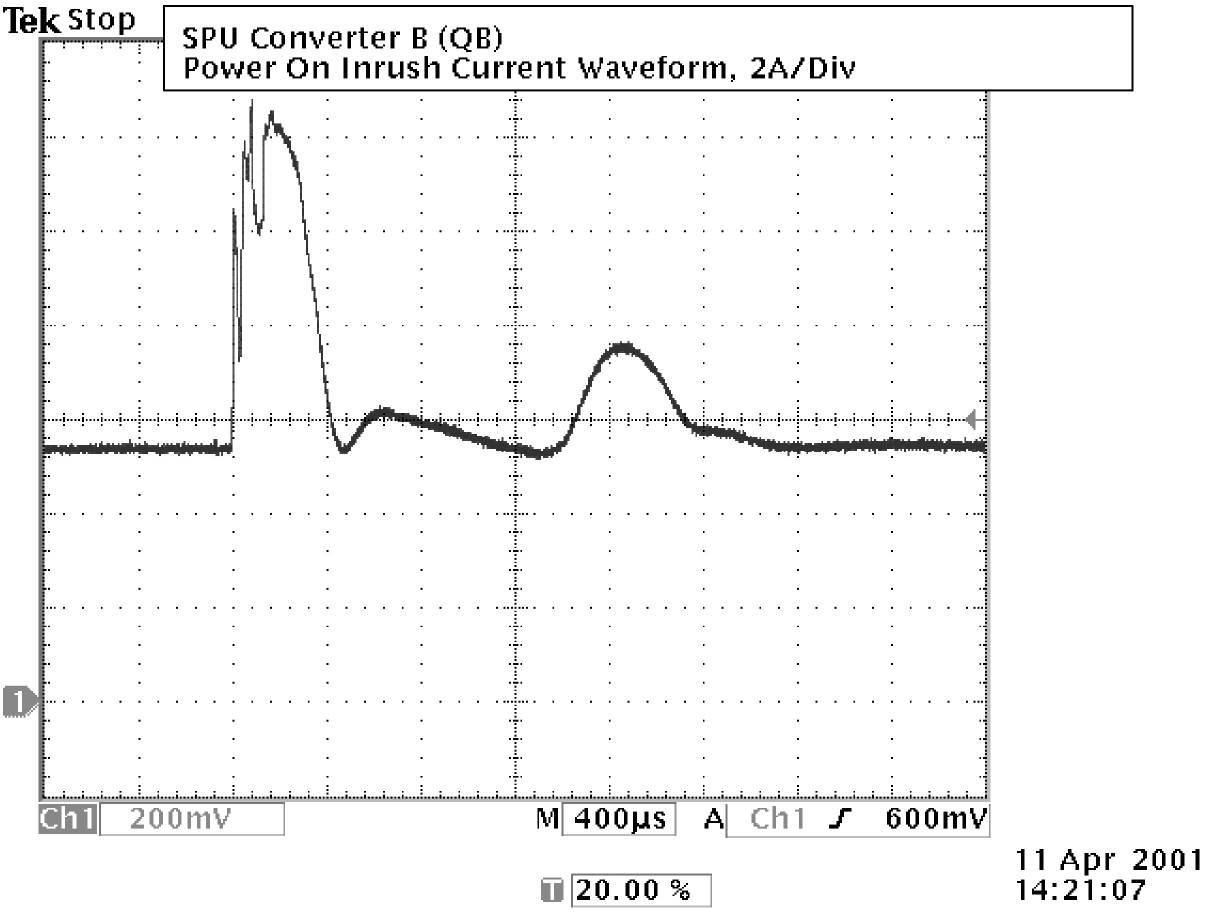


TR-RAL-253

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: G Case

Date:19-Apr-01

Subject / Title: HIRDLS PCU Bakeout Report

Contents / Description / Summary:

This report documents the results from the bakeout of the HIRDLS PFM PCU.

Key Words: PCU Bakeout Report

Purpose (20 characters maximum): Reporting of measured data

Approved By: N Morris

Date (yy–mm–dd): 01-04-19

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

CHANGE RECORD PAGE

Revision	Date	Section affected	Description of Change
-	19/04/01		First release

SST DEPARTMENT
AIV FACILITY

HIRLDS FM PCU

Vacuum Bake

REPORT No: AIV-2001-048-Bak

RUTHERFORD APPLETON LABORATORY
Chilton,
Didcot,
Oxfordshire
OX11 OQX
Tel: (01235) 821900 Ext: 5732

CONTENTS

1) Test Item Description

HIRDLS FM PCU

2) Test Specification

REQUIREMENT	TEMPERATURE
Vacuum bake	60°C
Tolerances	+3°C -0°C
Temperature Vs Time Plot	Annex B

REQUIREMENT	DURATION
Soak Time minimum	24 Hrs

REQUIREMENT	PRESSURE
Maximum Pressure	1.0E-4 mBar

3) Test Objectives

The objective of the test was to vacuum bake the HIRDLS FM PCU to remove the bulk of the volatile materials prior to the Outgassing measurements made at the end of the TVAC test. This was done with the PCU lid removed to increase the pumping rate.

4) Pre-Test Chamber Verification

A pretest was carried out to check that the vacuum showed no unusual Peaks.

5) Cleanliness

Test Type	Cleanliness	Status	Peaks	Figures
Pre Test Calibration	Satisfactory	Normal	18, 28 & 32	
Thermal Testing	Satisfactory	Normal	18, 28 & 32	Annex B

6) Test Item Mounting and Sensor Details

The PCU was placed on a shelf within the test chamber with the lid resting against the side. The temperature sensors were taped to the shelf.

7) Test Summary

Parameter	Date	Time	Temperature	Pressure
Pumpdown Initiated	11-04-2001	17:55		
Start Thermal Cycling	11-04-2001	22:35	23.7°C	4.1E-5
Finish Thermal Cycling	13-04-2001	21:30	60.0°C	1.4E-5
Letup Initiated	14-04-2001	07:20	32.1°C	2.6E-6

8) Conclusion

The thermal vacuum bakeout was successfully performed on the HIRDLS FM PCU

Reporting Officer

Facility Manager

Date

Date

Annex A – Equipment Used

EQUIPMENT USED

Equipment	Manufacturer	Type	Calibration Date	Certificate No	Comments
Mass Spectrometer 0-100 AMU	Spectra Metrics	Microvision Plus (MQH4)	19/10/2000	NA	Calibrated by Original Equipment Manufacturer
Vacuum gauges	Balzers	TPG300 Pirani/Penning	NA	NA	
Monitoring PRT's	TC LTD	PT100 Class A	12 Jan 2001	NA	In house Calibration
Temperature Controller	Eurotherm	PC 3000	12 Jan 2001	NA	In house Calibration
Thermal Sentry	Eurotherm	Eurotherm 92	12 Jan 2001	NA	In House Calibration
Data acquisition system	Measurement Systems	Datascan Modules	12 Jan 2001	NA	In house Calibration
Calibrator	Beamax	TC 303	30/05/2000	16394	Absolute Calibration Ltd

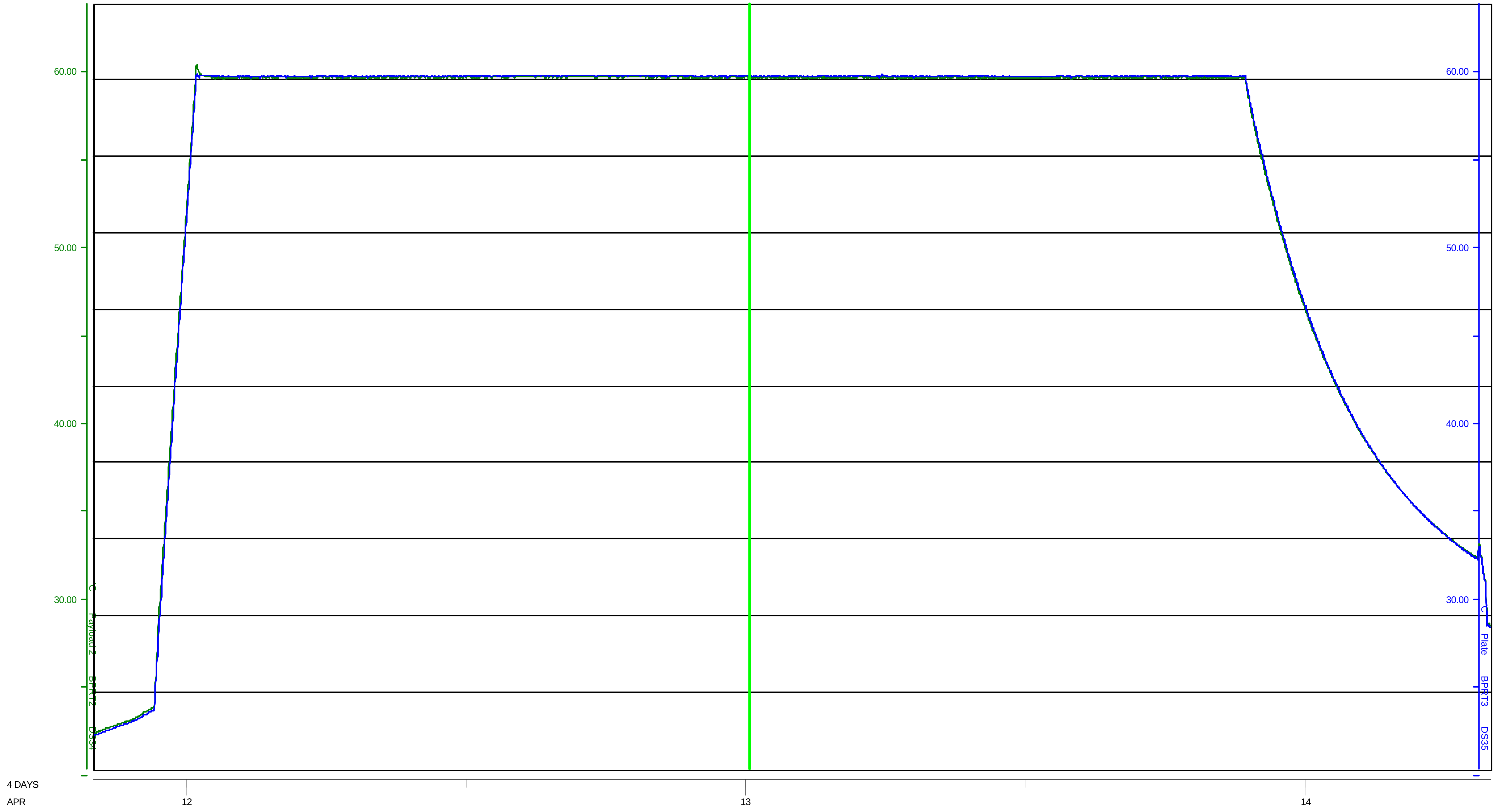
Annex B – Test Data

AIV-2001-048-BAK Thermal Trend

Logger Name : AIV-2001-048-BAK	File Name : 010411_200543.odl	Start Time : 04/11/01 08:05:43 PM	Stop Time : 04/14/01 07:55:43 AM

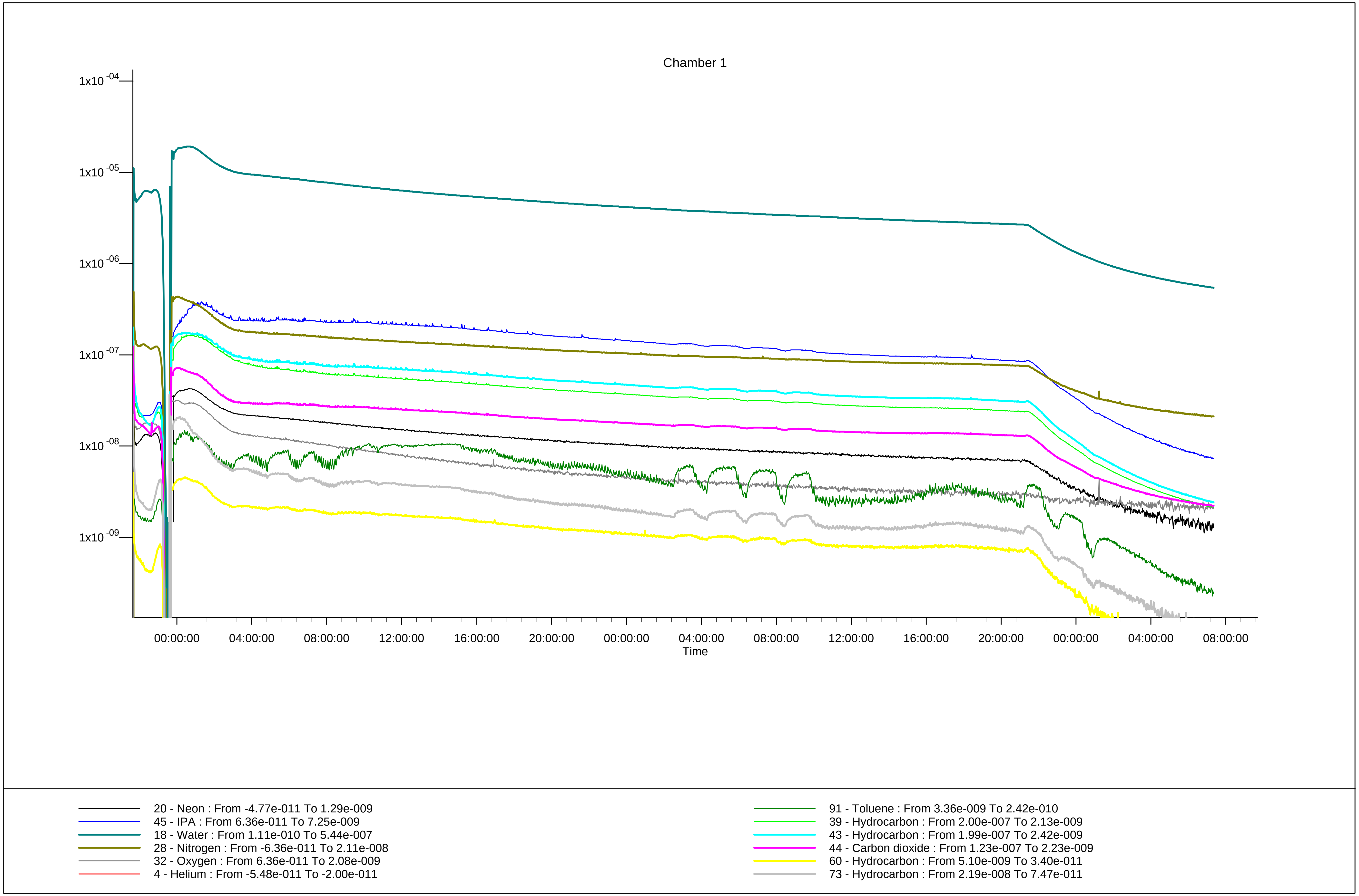
04/13/01 12:08:43 AM.004 / 04/13/01 12:10:43 AM.007

59.64 / 59.66   59.73 / 59.73



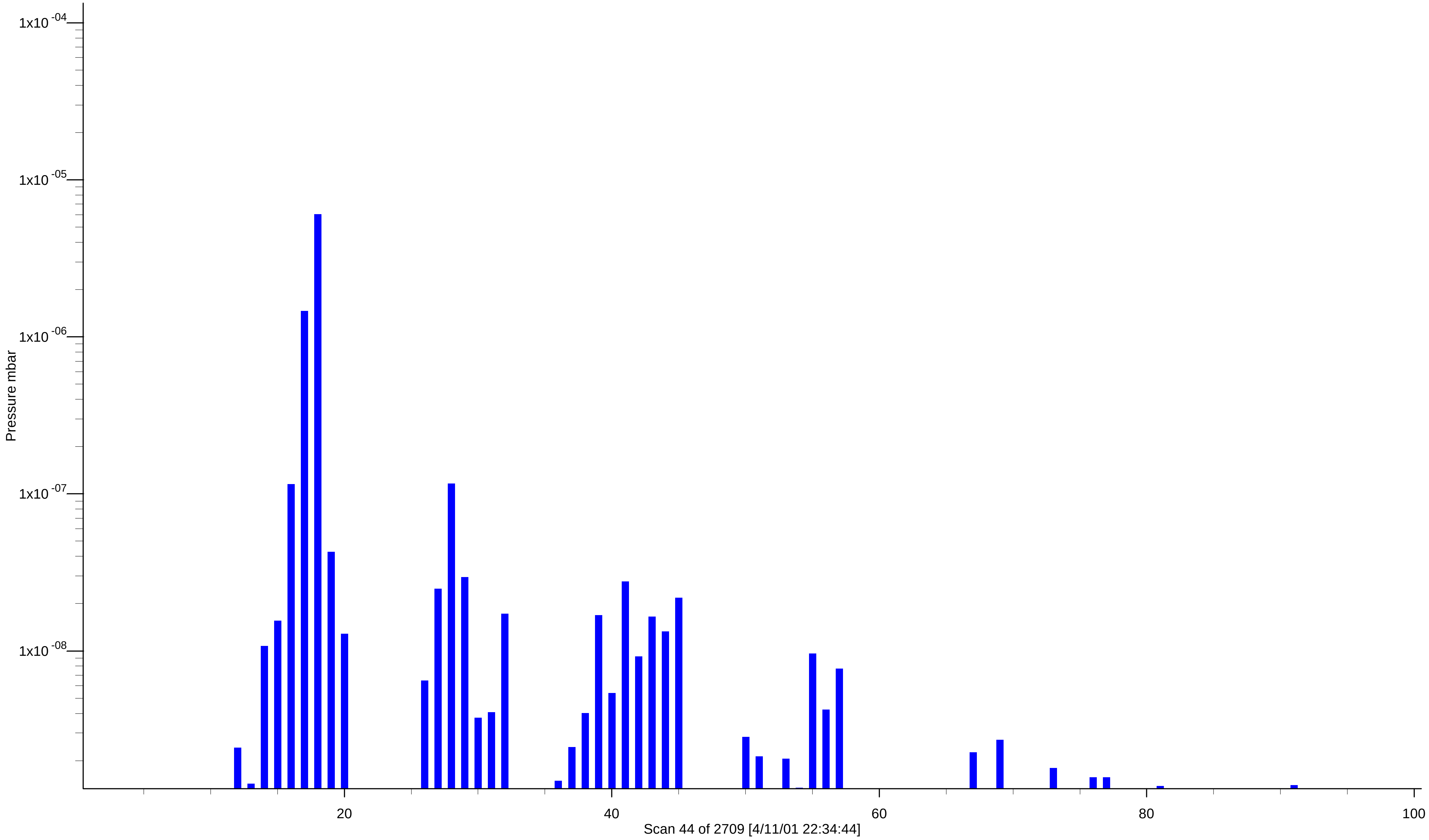
Color	Channel	Tag	Description	Units	Min	/	Max
	DS34	BPRT2	Payload 2	'C	0.00	/	100.00
	DS35	BPRT3	Plate	'C	0.00	/	100.00

AIV-2001-048-BAK RGA Trend



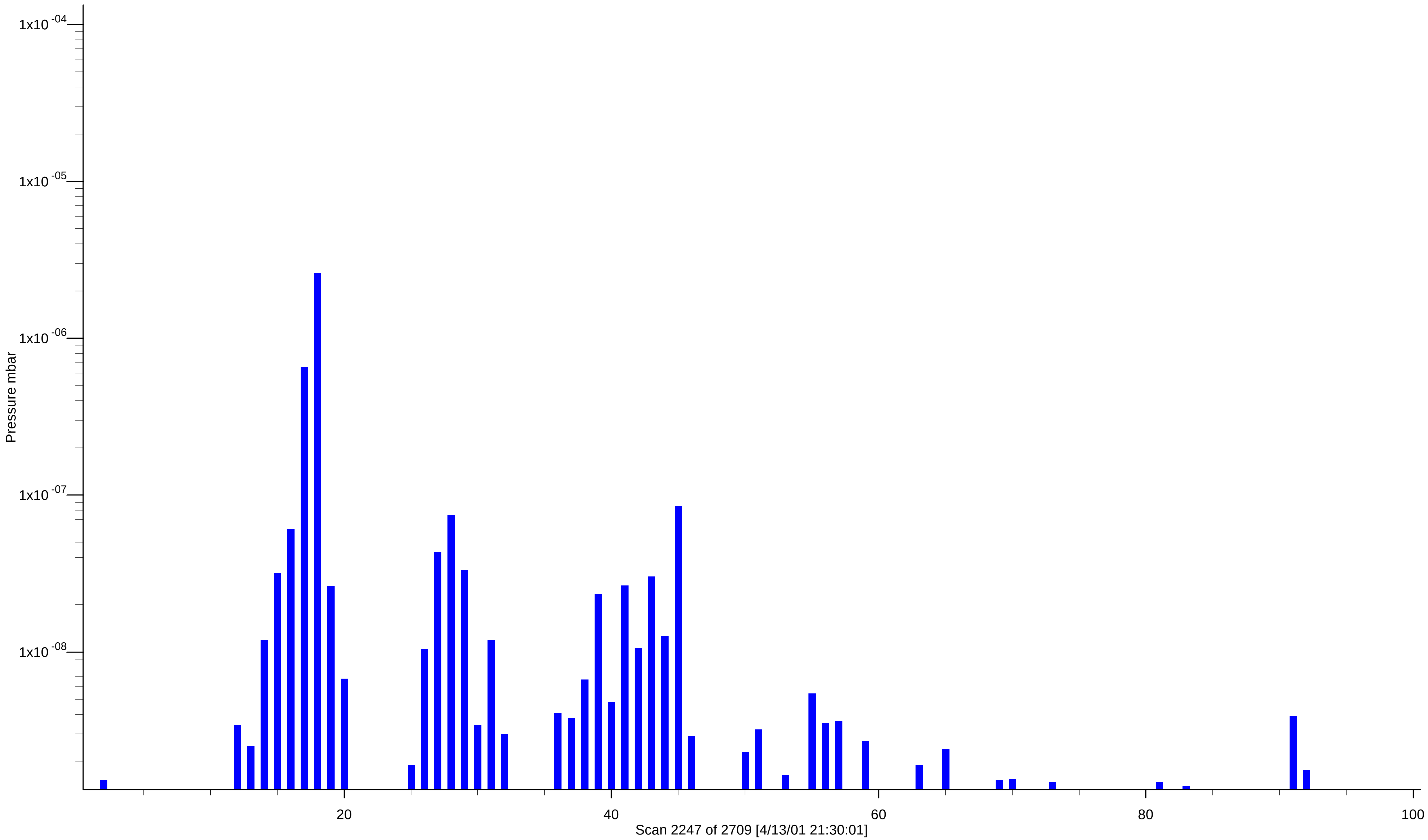
MKS Instruments, Spectra Products - Process Eye 2000

AIV-2001-048-BAK RGA Barchart before Heating



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

AIV-2001-048-BAK RGA Barchart at end of Bake (1)



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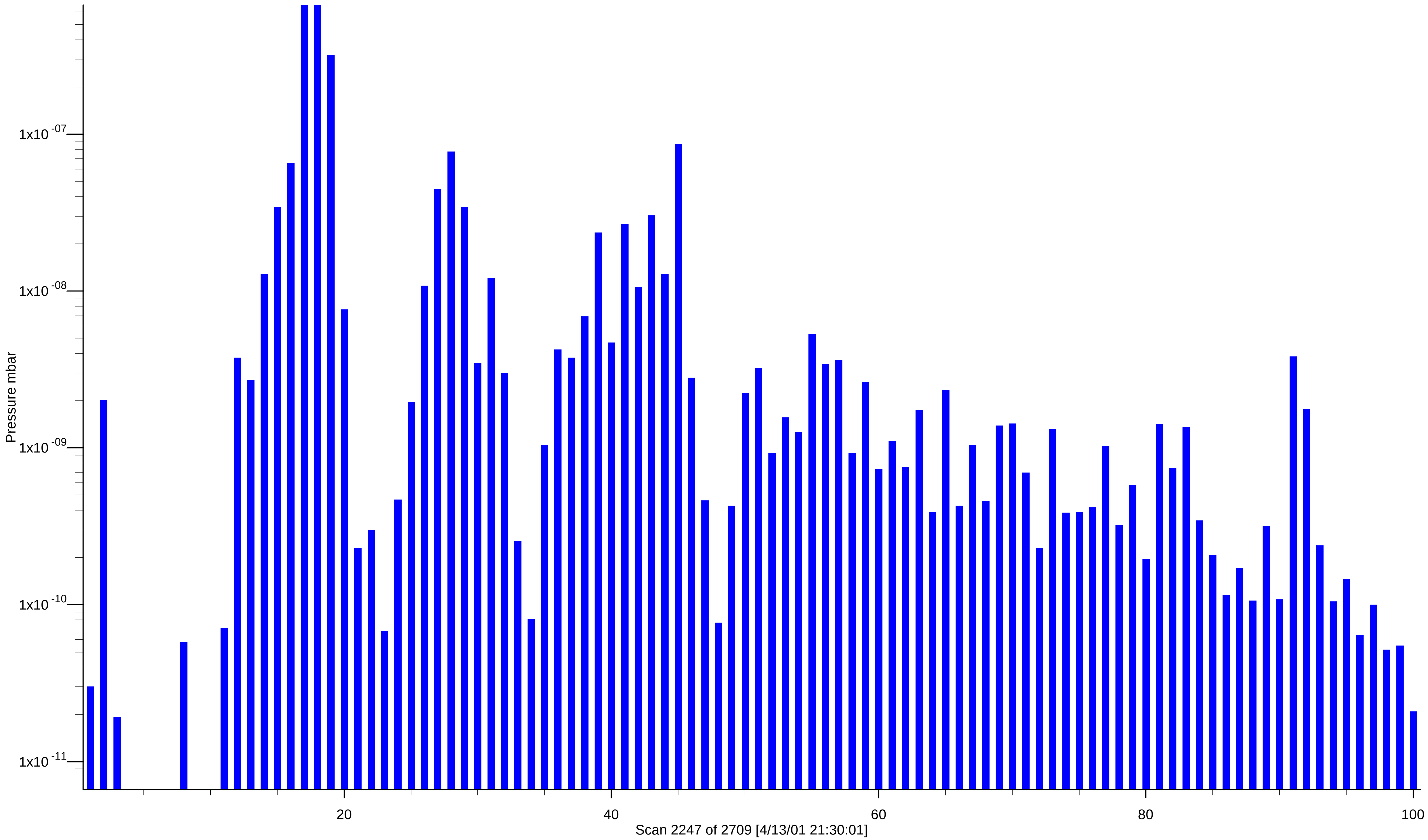
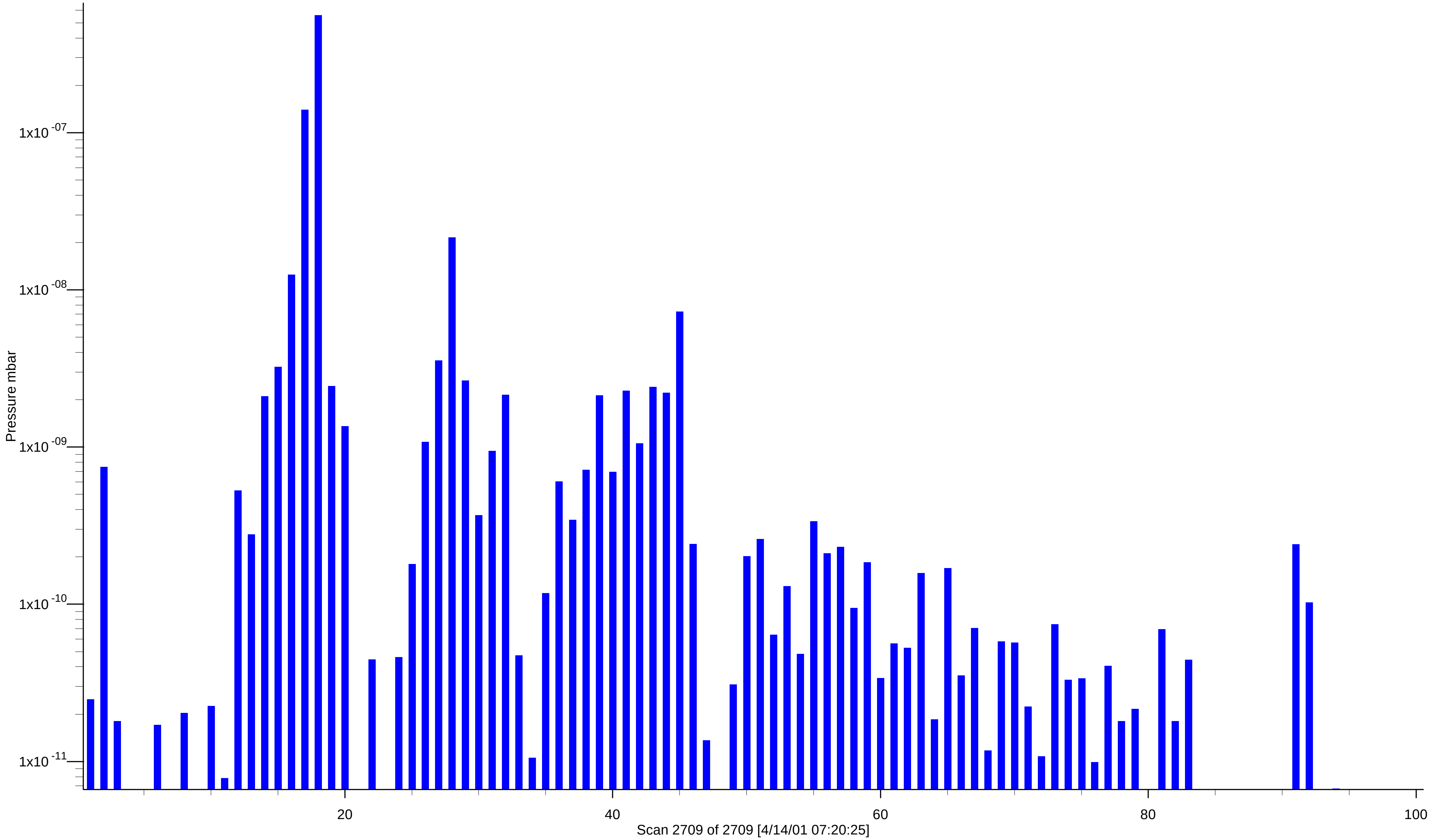
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

AIV-2001-048-BAK RGA Barchart at end of Bake (2)



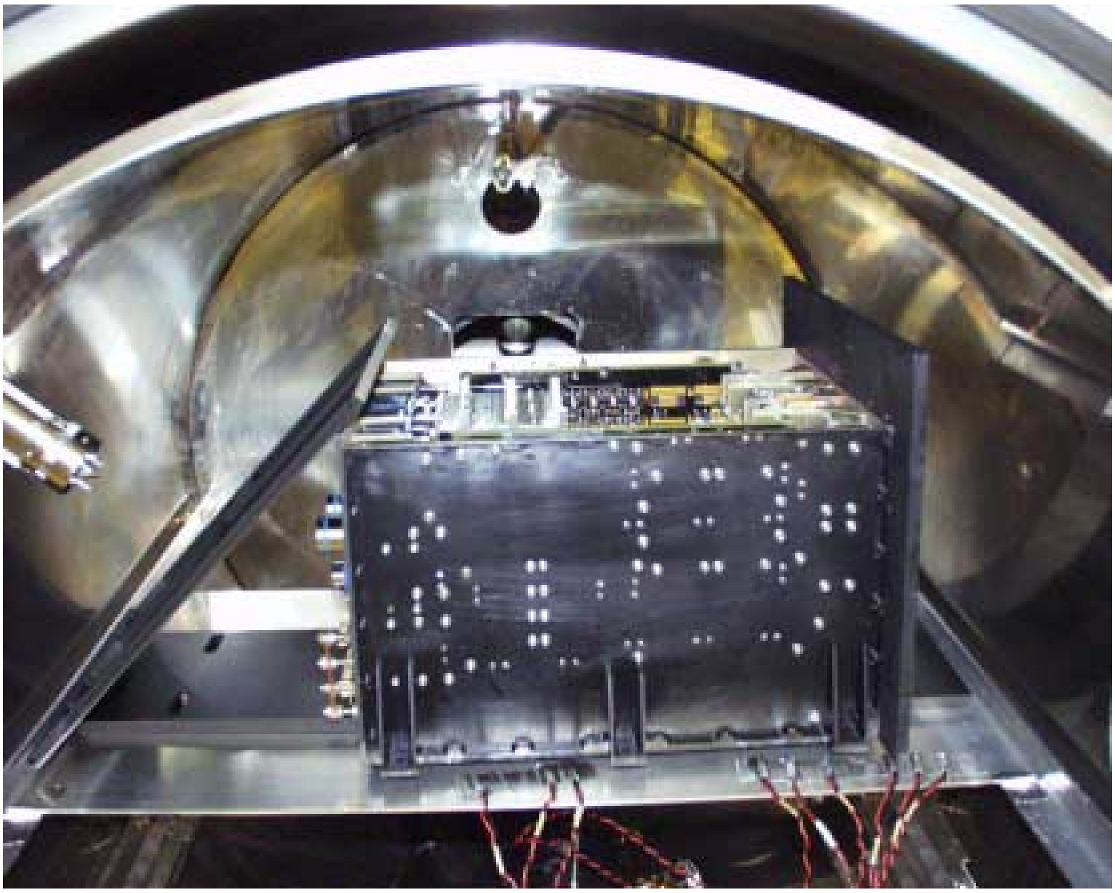
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

AIV-2001-048-BAK RGA Barchart at Letup



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

Annex C – Photograph.



HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: G Case **Date: 1st May 2001.**

Subject / Title:	**HIRDLS PCU EMC Test Report**

Contents / Description / Summary:

Test report from the PCU EMC tests conducted at RAL.

Reference RAL AIV Facility Report No. AIV-2001-028-EMC.

Key Words: EMC Test Report

Purpose (20 characters maximum): Reporting of test data

Approved By: S Jaroslawski

Date: 2001-05-01

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-05-01	-	-	First Issue

SST DEPARTMENT
AIV FACILITY

HIRLDS PCU

EMC Test
REPORT No: AIV-2001-028-EMC

REGISTERED COMPANY
ISO 9001 CERT NO.705
UKAS QUALITY MANAGEMENT

RUTHERFORD APPLETON LABORATORY
Chilton,
Didcot,
Oxfordshire
OX11 OQX
England
Tel: 44 (0)1235 445732

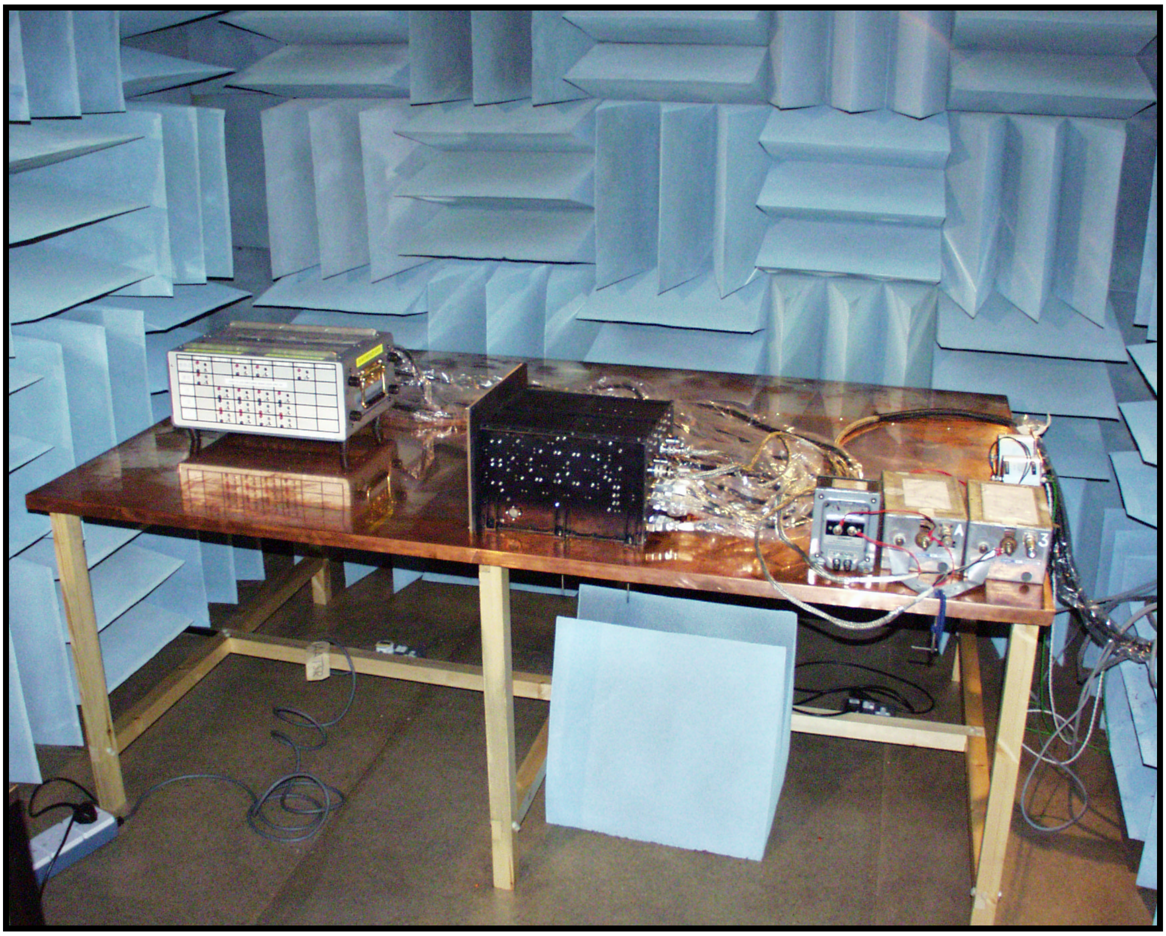
Contents.

1. Test Information

Testing Date:	30th and 31st March 2001
Organisation:	Rutherford Appleton Laboratory
Observers:	A. Pearce, A. Preece, S. Jaroslawski (RAL) V. Oag (Astrium) D. Bhathal (GSFC)
Facility Personnel:	G. Case
Test Item:	HIRDLS PFM Power Converter Unit (PCU)
Serial Number:	*#001*
Associated Procedures:	TP-RAL-203A EMC Test Plan for Reworked PFM PCU GSFC 422-11-12-01 HIRDLS GIRD Section 10.11 MIL-STD 461/462C

2. Test Setup

The testing was performed on a ground plane within a Semi Anechoic Chamber, the basic setup can be seen below.



3. Test Summary

The following tests were performed.

TEST		RESULTS	NOTES
Resistance Bonding measurements,		Pass	5.1
CS01	Conducted Susceptibility, Power Leads, 30Hz – 50KHz	Pass	5.2
CS02	Conducted Susceptibility, Power Leads, 50KHz – 150KHz	Pass	5.3
CS06	Conducted Susceptibility, Spike Injection	Fail	5.4
CE01	Conducted Emissions, Power Lines, 30Hz – 20KHz	Pass	5.5
CE03	Conducted Emissions, Power Lines, 20KHz – 50MHz	Fail	5.6

4. Test Methods

The PCU was placed on the ground plane 10 cm from it's leading edge with the connectors facing right. It was secured by bolting the two outside front feet to the ground plane. The bonding of the unit to the ground plane was checked and the results are included in section 5.1.
All cables were raised 5cm from the ground plane with non conductive spacers. The load box was placed in the rear left hand corner of the ground plane. During all of the tests Side A was powered with full load.

Testing was carried out in accordance with Mil-Std 462C test methods

5. Observations and Results

5.1 Resistance Measurements

The PCU Passed this test

From	To	+ve Polarity	-ve Polarity
LISN	Ground Plane	<2.5mΩ	<2.5 mΩ
10uF Cap	Ground Plane	<2.5mΩ	<2.5mΩ
PCU Link Bar	Ground Plane	<2.5mΩ	<2.5mΩ
Connector Panel	Vented Side Panel	0.5 mΩ	0.6 mΩ
Connector Panel	Non-Vented Side Panel	0.8 mΩ	0.7 mΩ
Radiator Panel	Vented Side Panel	1.0mΩ	1.4mΩ
Radiator Panel	Non-Vented Side Panel	0.7mΩ	0.9mΩ
Connector Panel	Connector J911	1.1mΩ	2.1mΩ
Connector Panel	Connector J912	1.3mΩ	1.4mΩ
Connector Panel	Connector J913	0.9mΩ	1.2mΩ
Connector Panel	Connector J914	0.6mΩ	1.1mΩ
Connector Panel	Connector J915	0.8mΩ	1.2mΩ
Connector Panel	Connector J916	0.8mΩ	1.0mΩ
Connector Panel	Connector J917	1.2mΩ	1.4mΩ
Connector Panel	Connector J918	0.7mΩ	1.3mΩ
Connector Panel	Connector J919	1.0mΩ	1.7mΩ
Connector Panel	Connector J920	0.9mΩ	1.8mΩ
Connector Panel	Connector J921	1.0mΩ	1.3mΩ

5.2 CS01 Conducted Susceptibility Sinewave injection, Power Leads, 30Hz – 50KHz.
The PCU Passed this test

The following lines were monitored using a breakout connector on the PCU connectors and Digital oscilloscopes.

Line	*Monitor Equipment*	*Limit*
IPU28 Reg	TDS3034 CH1	<250mV p-p
SPUA +5	TDS3034 CH2	<40mV p-p
SPUA +15	TDS3034 CH3	<25mV p-p
SPUA –15	TDS3034 CH4	<25mV p-p
TEUA +5	TDA220 CH1	<40mV p-p
TEUA +15	TDA220 CH2	<40mV p-p
TEUA –15	Lecroy CH1	<40mV p-p

With the signal injected on QA Power. (30Hz to 50KHz 3V p-p) the following was observed.
All lines within specification

With the signal injected on NA Power. (from 30Hz to 2KHz 7V p-p, from 2KHz to 50KHz linear fall to 3V p-p) the following was observed.
All lines within specification

5.3 CS02 Conducted Susceptibility Sinewave injection, Power Leads, 50KHz – 150KHz.
The PCU passed this test.

The following lines were monitored using a breakout connector on the PCU connectors and Digital oscilloscopes.

Line	*Monitor Equipment*	*Limit*
IPU28 Reg	TDS3034 CH1	<250mV p-p
SPUA +5	TDS3034 CH2	<40mV p-p
SPUA +15	TDS3034 CH3	<25mV p-p
SPUA –15	TDS3034 CH4	<25mV p-p
TEUA +5	TDA220 CH1	<40mV p-p
TEUA +15	TDA220 CH2	<40mV p-p
TEUA –15	Lecroy CH1	<40mV p-p

With the signal injected on QA Power. (50KHz to 150KHz 3V p-p) the following was observed.
50KHz (1W limit applied, actual injected waveform 300mV p-p).
to 150KHz (1W limit applied, actual injected waveform 1.1V p-p).
All Lines within specification

With the signal injected on NA Power. (50KHz to 150KHz 3V p-p) the following was observed.
50KHz (1W limit applied, actual injected waveform 500mV p-p).
to 150KHz (1W limit applied, actual injected waveform 1.86V p-p).
All lines within specification

5.4 CS06 Conducted Susceptibility, Spike Injection

The PCU failed this specification on the TEUA +5 and TEUA +15 lines with a positive going pulse (see table)

Line	*Positive going*	*Negative going*	*Limit*
IPU28 Reg	100 mV p-p	150mV p-p	<250mV p-p
SPUA +5	12 mV p-p	10 mV p-p	<40mV p-p
SPUA +15	12 mV p-p	12 mV p-p	<25mV p-p
SPUA –15	20 mV p-p	18 mV p-p	<25mV p-p
TEUA +5	**48 mV p-p**	36 mV p-p	<40mV p-p
TEUA +15	**44 mV p-p**	40 mV p-p	<40mV p-p
TEUA –15	28 mV p-p	25 mV p-p	<40mV p-p

5.5 CE01 Conducted Emissions, Power Lines, 30Hz – 20KHz

The PCU passed this (reduced) test

On the advise of Diwan we only tested the Quiet Bus A (common Mode) which passed. The Plot is included in Appendix A

5.6 CE03 Conducted Emissions, Power Lines, 20KHz – 50MHz

The PCU failed this test

On the advise of Diwan we performed the following tests.

Quiet Bus A (Common Mode)

Quiet Bus A Power (Differential Mode)

TEU_A +5 Power (Differential Mode)

Although the plots show the PCU failing to meet the specification Diwan felt was very pleased with the results obtained. The excursions above the limit line relate to the power converter frequencies and their harmonics and as such would be expected at these or higher levels.. The plots are included in Appendix A

6. Conclusions

The PCU Passed CS01, CS02 and CE01 tests.
The PCU Failed the CS06 and CE03 tests.

Reporting Officer
Giles Case

Facility Manager
Graham Toplis

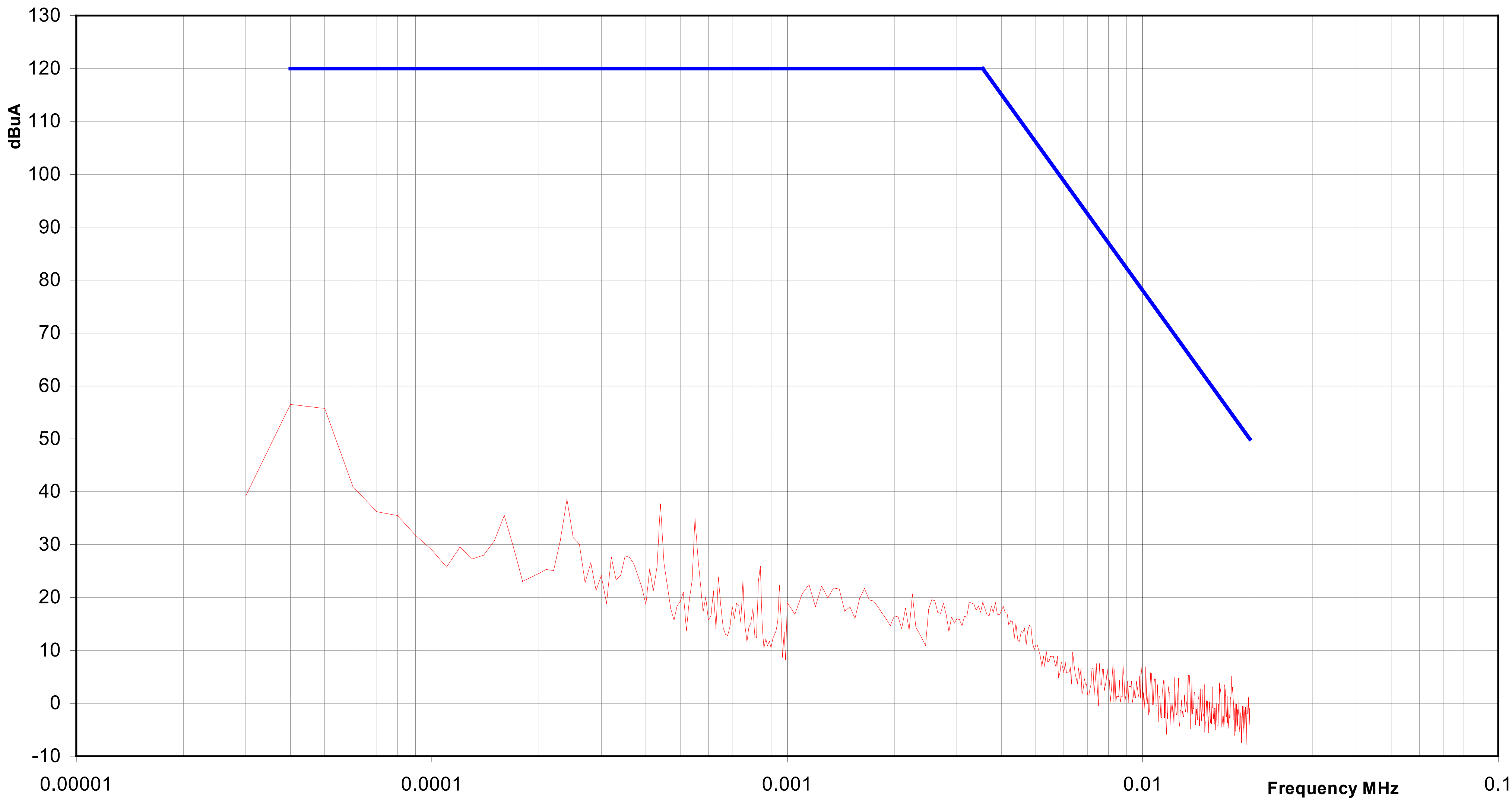
Date

Date

7. Appendix A, CE Plots

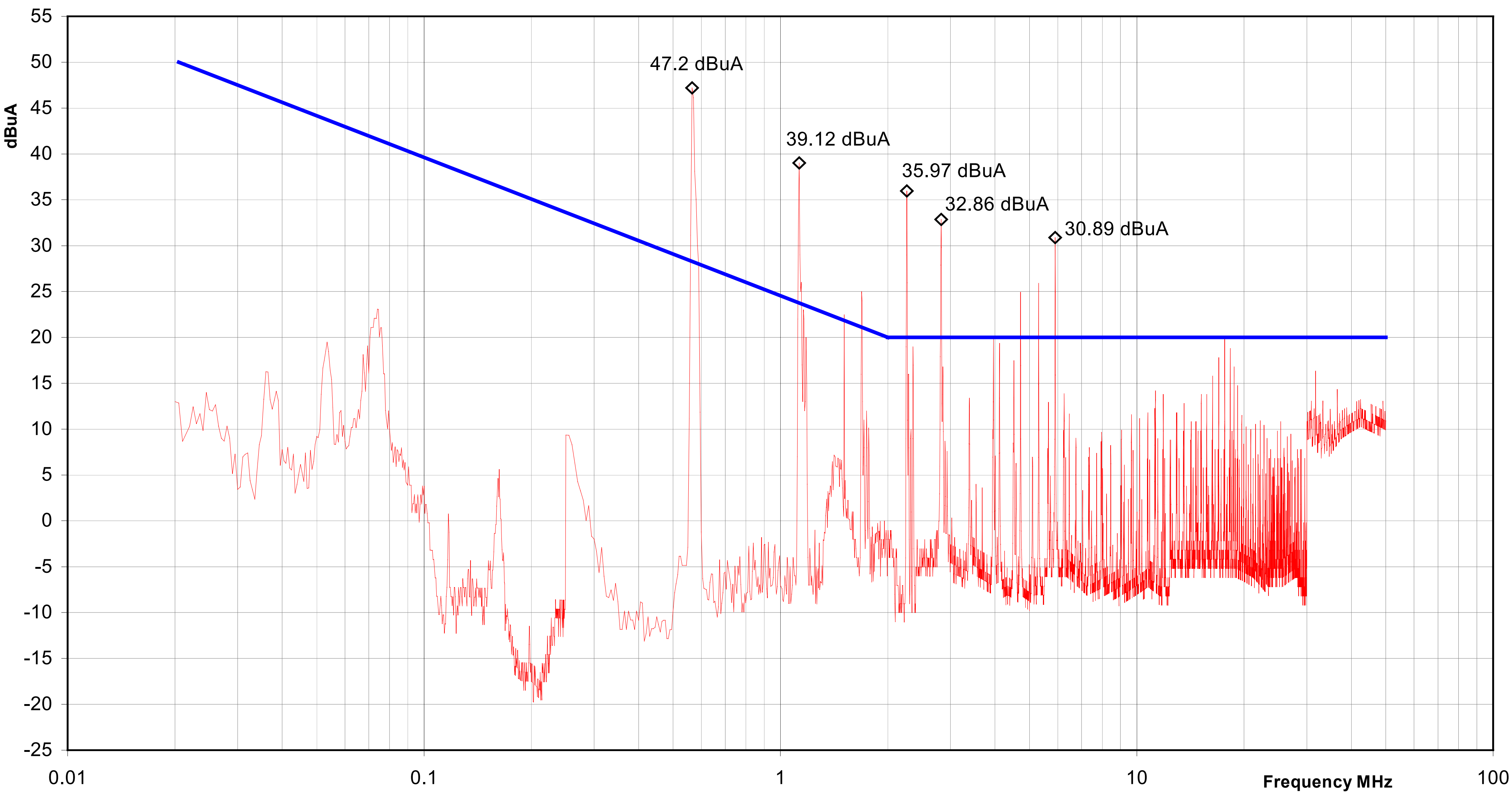
CE01: Quiet Bus A Power Common Mode

Limit line taked from GSFC422-11-12-01 Section 10.11.1 with modified bandwidths as set out in TP-RAL-203A Issue 2
EMC11 MkIV Reciever; Solar 9134-1 Current Probe;
30Hz to 1KHz 10Hz Bandwidth;
1KHz to 20KHz 100Hz Bandwidth;



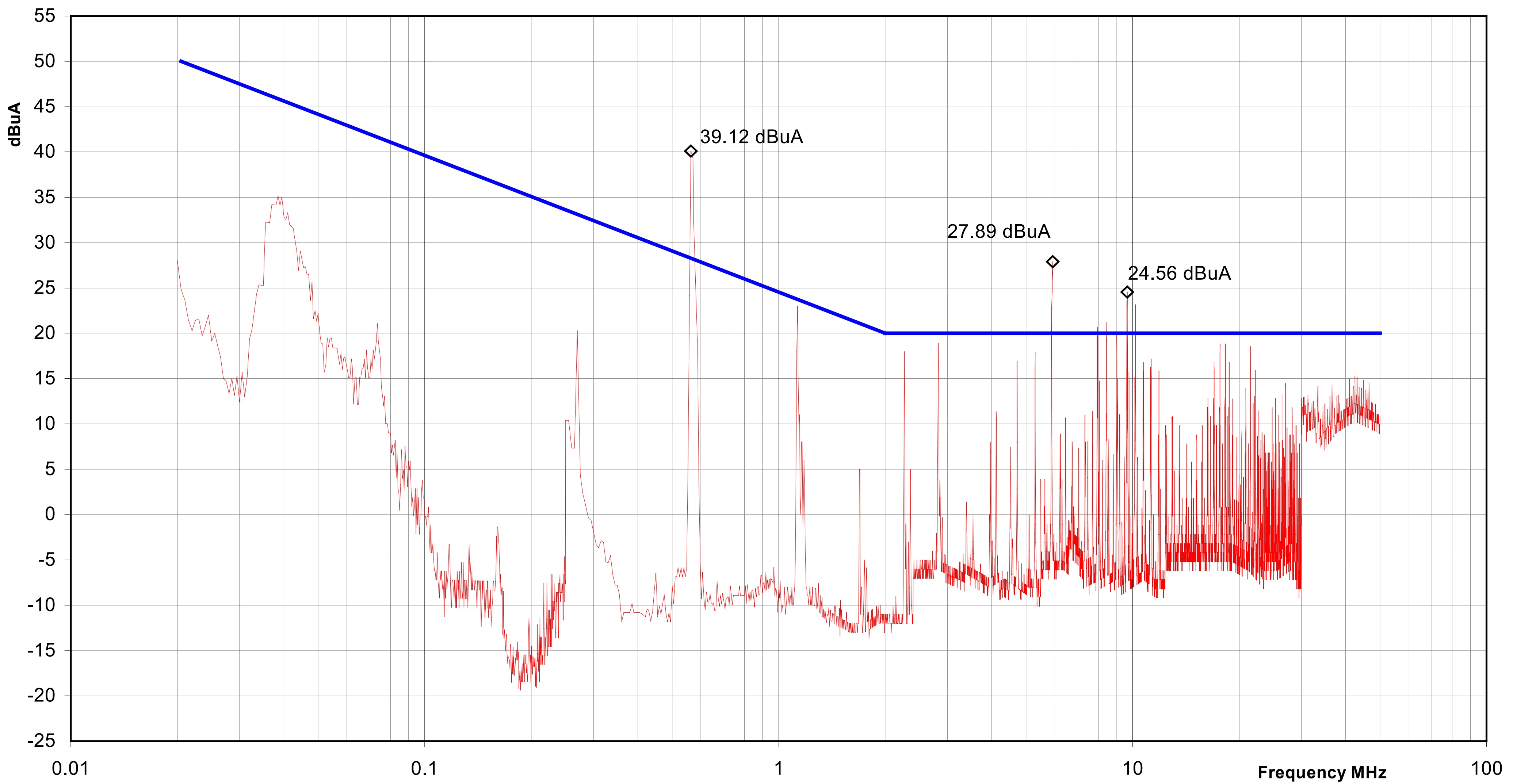
CE03: Quiet Bus A Power Common Mode

Limit line taked from GSFC422-11-12-01 Section 10.11.1 with modified bandwidths as set out in TP-RAL-203A Issue 2
EMC30 MkIV Reciever; Solar 9134-1 Current Probe;
20KHz to 250KHz 1KHz Bandwidth;
250KHz to 30MHz 10KHz Bandwidth;
30MHz to 50MHz 100KHz Bandwidth;



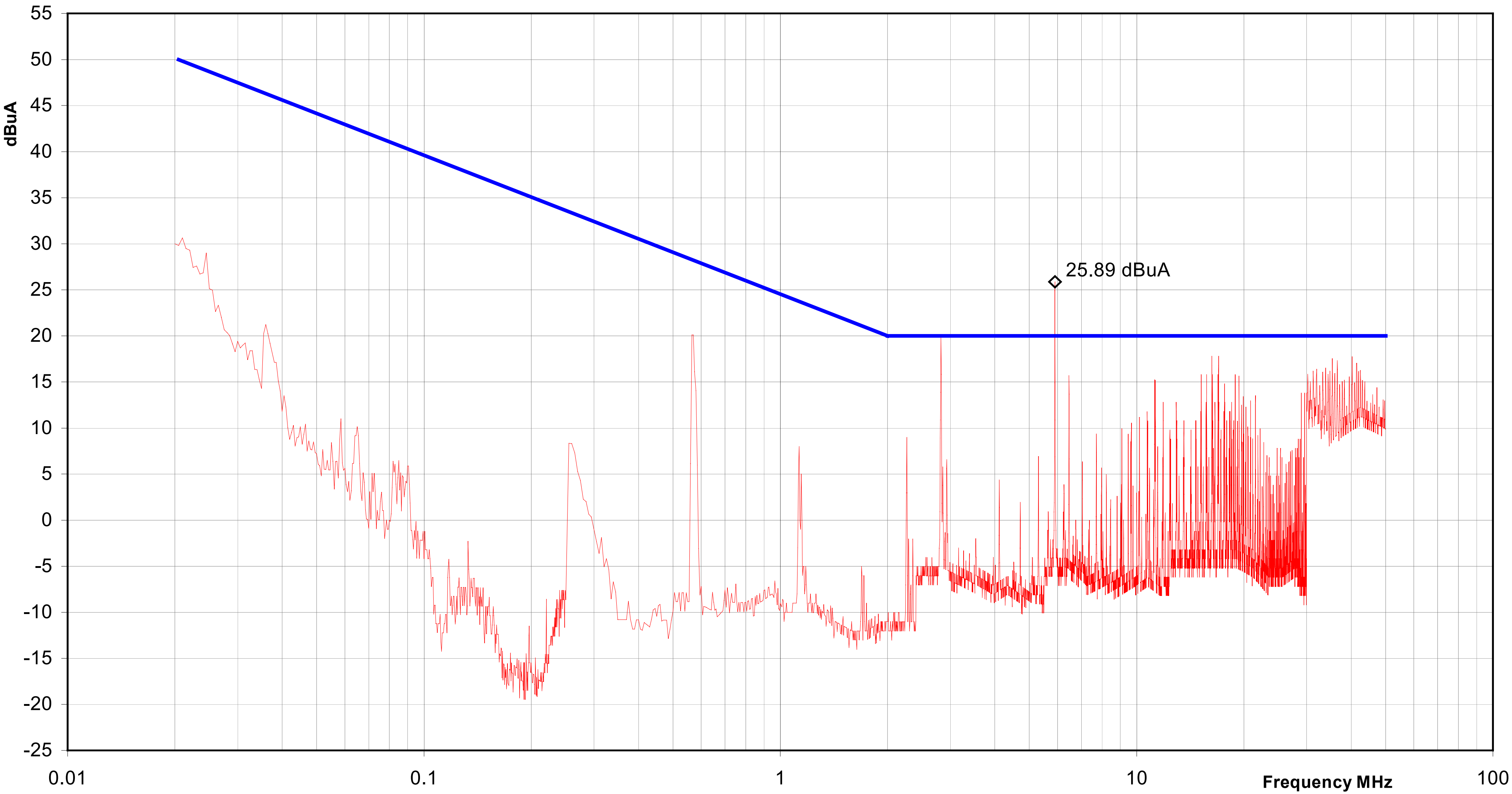
CE03: Quiet Bus A Power Differential Mode

Limit line taked from GSFC422-11-12-01 Section 10.11.1 with modified bandwidths as set out in TP-RAL-203A Issue 2
EMC30 MkIV Reciever; Solar 9134-1 Current Probe;
20KHz to 250KHz 1KHz Bandwidth;
250KHz to 30MHz 10KHz Bandwidth;
30MHz to 50MHz 100KHz Bandwidth;



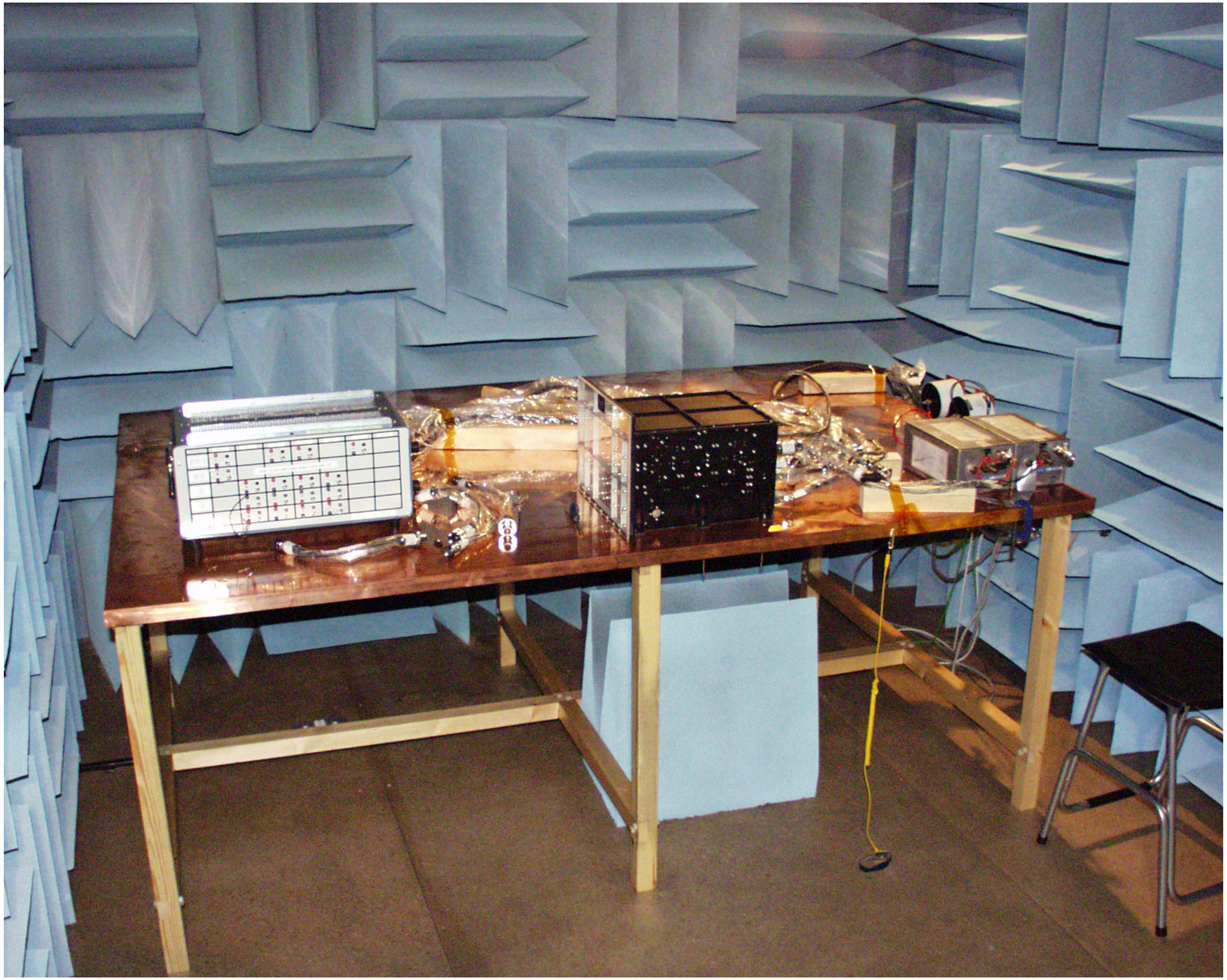
CE03: TEU_A +5 Power Differential Mode

Limit line taked from GSFC422-11-12-01 Section 10.11.1 with modified bandwidths as set out in TP-RAL-203A Issue 2
EMC30 MkIV Reciever; Solar 9134-1 Current Probe;
20KHz to 250KHz 1KHz Bandwidth;
250KHz to 30MHz 10KHz Bandwidth;
30MHz to 50MHz 100KHz Bandwidth;



8. Appendix B, Photographs

Conducted Susceptibility Setup



Conducted Emissions Setup

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: G Case **Date: 1st May 2001.**

Subject / Title:	**HIRDLS PCU Thermal Vacuum Test Report**

Contents / Description / Summary:

Test report from the PCU thermal vacuum tests conducted at RAL.

Reference RAL AIV Facility Report No. AIV-2001-027-TVC.

Key Words: Thermal Vacuum Test Report

Purpose (20 characters maximum): Reporting of test data

Approved By: S Jaroslawski

Date: 2001-05-01

Rutherford Appleton Laboratory
Chilton, Didcot
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EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-05-01	-	-	First Issue

SST DEPARTMENT
AIV FACILITY

HIRDLS FM PCU

Thermal Vacuum Test
REPORT No: AIV-2001-027-TVC

REGISTERED COMPANY
ISO 9001 CERT NO.705

UKAS QUALITY MANAGEMENT

RUTHERFORD APPLETON LABORATORY
Chilton,
Didcot,
Oxfordshire
OX11 OQX
Tel: (01235) 821900 Ext: 5732

CONTENTS

1) Test Item Description

HIRDLS PFM Power Converter Unit. Serial No #001

2) Test Specification

REQUIREMENT	TEMPERATURE
Maximum Rate of Change	20°C/Hr
Non-Operational Temperature Hot	+60°C
Operational Temperature Hot	+51°C
Radiator Plate Temperature Hot	O°C
Operational Temperature Cold	-33°C
Radiator Plate Temperature Cold	-33°C
Tolerances	+3°C -0°C Hot +0°C -3°C Cold
REQUIREMENT	**DURATION**
Soak Time	4 Hrs
REQUIREMENT	**PRESSURE**
Maximum Pressure before 1st hot cycle	<1.0E-5 mBar

3) Test Objectives

The objective was to test the performance of the HIRDLS FM PCU at the levels specified above. At the end of the test the change in frequency Measured using a TQCM (at -20°C) should be less than 64 Hz/Hr.

4) Test Summary

Parameter	Date	Time	Plate + Shroud Temperature	Pressure mBar
Pumpdown Initiated	19-04-2001	15:36		
Start Thermal Cycling	20-04-2001	08:00	24.2 / 25.6°C	9.0 E-6
Finish Thermal Cycling	24-04-2001	16:20	36.4 / 43.2°C	1.2 E-6
Letup Initiated	25-04-2001	07.55	25.7 / 25.9°C	5.3 E-7
Maximum Pressure At	21-04-2001	08:25	68.8 / 68.9°C	2.0 E-4
Minimum Pressure At	22-04-2001	04:00	-34°C	1.3 E-7

5) Test Item Mounting and Sensor Details

The HIRDLS PFM PCU was mounted on a thermally controlled plate. A second thermally controlled plate was mounted vertically, 10 mm from the radiator face.
The TQCM was placed within 25 cm of the PCU facing the vent hole. Detailed layout is shown in the photographs in Annex C. Sensor locations are detailed below.

PRT No.	Position	Function
PRT 01	Base Plate +A3 Face	Control
PRT 02	+X Side Opporsite to vent	Monitor
PRT 03	-X Side with the vent	Monitor
PRT 04	Top Panel +A1 Face	Monitor
PRT 05	Rear top face of Radiator Panel	Monitor
PRT 06	Back Foot on +X Side	Monitor

6) Comments

Temperature Vs Time plots show a full test Profile in Annex B. More detailed temperatures obtained during the test are also included.

7) Cleanliness

Test Type	Cleanliness	Status	Peaks	Figures
Pre Test Calibration	Satisfactory	Normal		
Thermal Testing	Satisfactory	Normal	18, 28, 32 & 91	Annex B

8) Conclusion

The HIRDLS PFM PCU was sucessfully put through a Thermal Vacuum Test to the levels specified in section 2 of this report by cycling the thermal shroud and the thermal plates.
The outgassing rate of the PCU at the end of the test could not be obtained.

Reporting Officer **Facility Manager**

Date **Date**

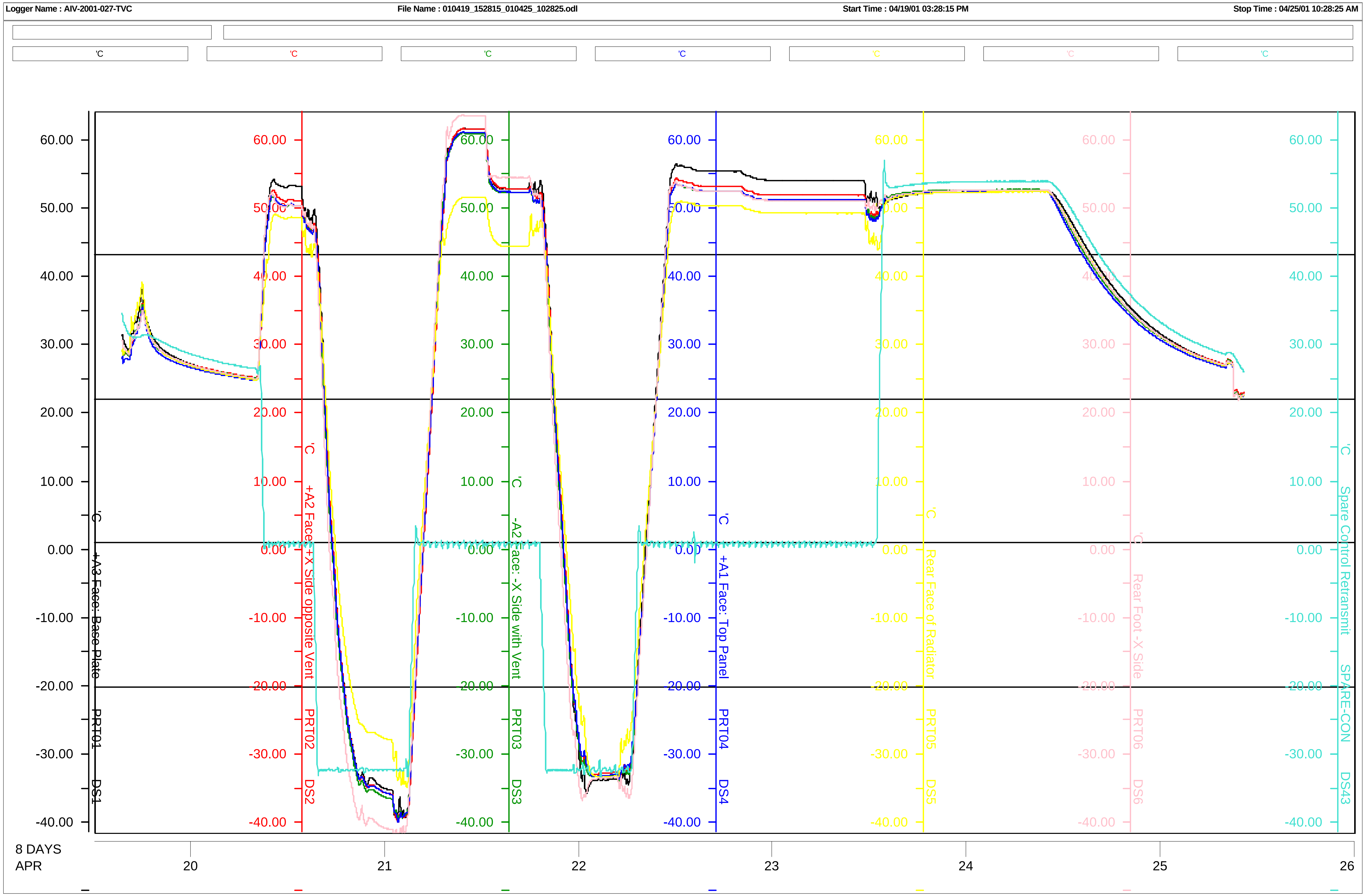
Annex A – Equipment Used

EQUIPMENT USED

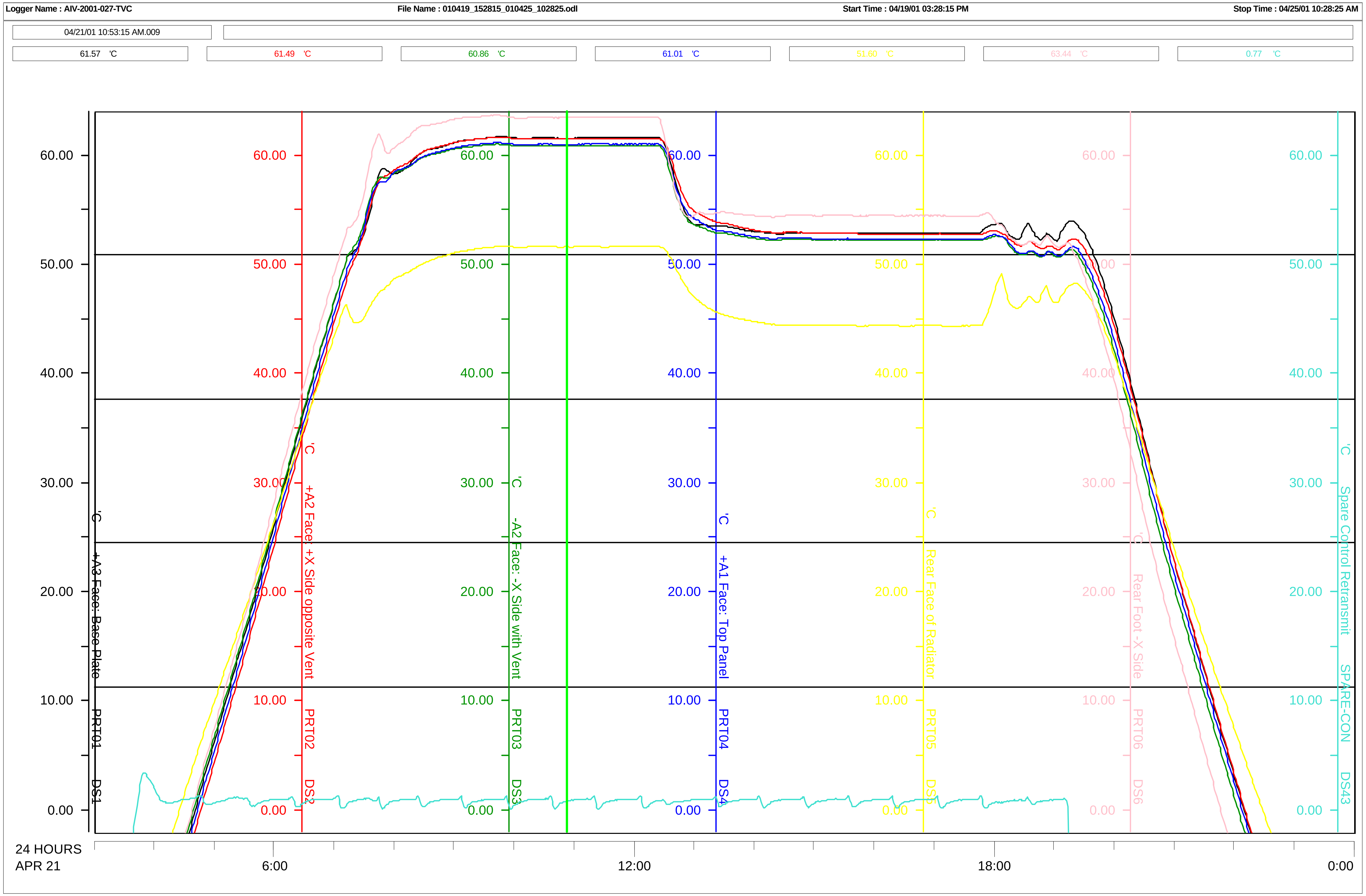
Equipment	Manufacturer	Type	Calibration Date	Certificate No	Comments
Mass Spectrometer 0-100 AMU	Spectra Metrics	Microvision Plus (MQH2)	11/08/2000	NA	Calibrated by OEM
Vacuum gauges	Balzers	TPG300 Pirani/Penning	NA	NA	
Monitoring PRT's	TC LTD	PT100 Class A	17 Jan 2001	NA	In house Calibration
Monitoring Thermocouples	In House	Type K	17 Jan 2001	NA	In House Calibration
Temperature Controller	Eurotherm	PC 3000	17 Jan 2001	NA	In house Calibration
Thermal Sentry	Eurotherm	Eurotherm 92	17 Jan 2001	NA	In House Calibration
Data acquisition system	Measurement Systems	Datascan Modules	17 Jan 2001	NA	In house Calibration
Calibrator	Beamax	TC 303	30/05/2000	16394	Absolute Calibration Ltd

Annex B – Test Data

FULL THERMAL TREND AIV-2001-027-TVC



THERMAL TREND DURING THE NON-OP HOT SOAK

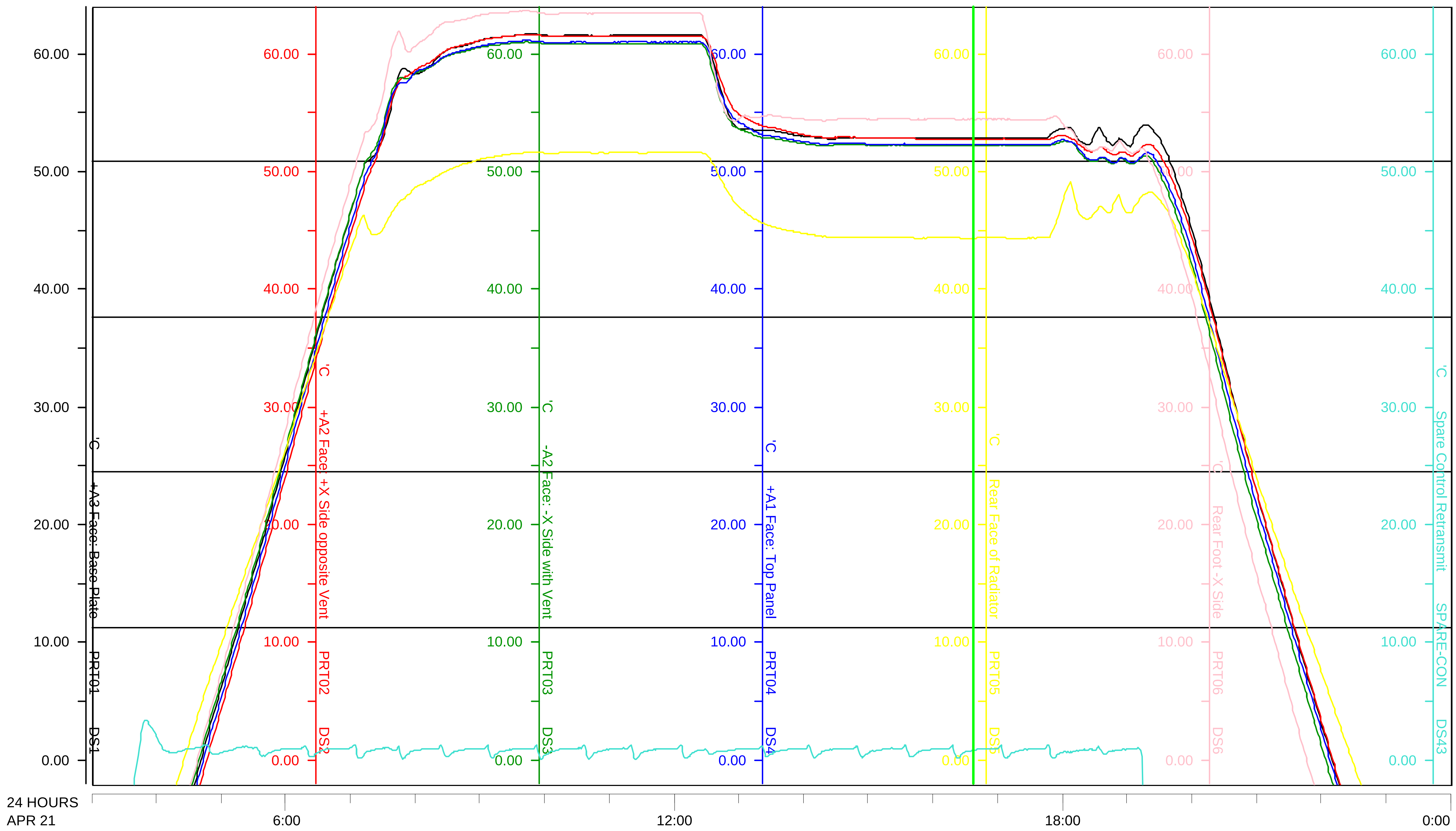


THERMAL TREND DURING OPERATIONAL HOT SOAK

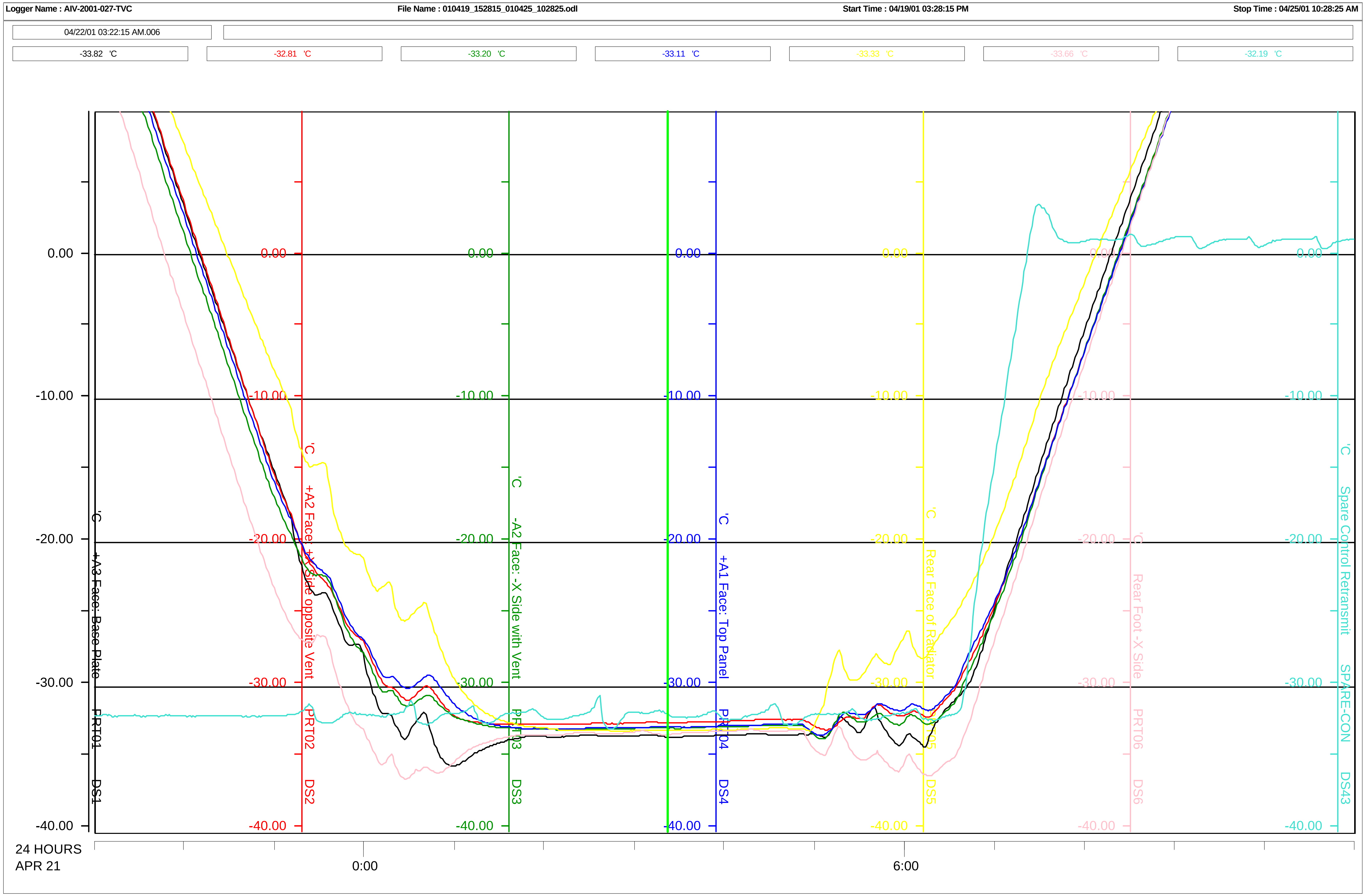
Logger Name : AIV-2001-027-TVC | File Name : 010419_152815_010425_102825.odl | Start Time : 04/19/01 03:28:15 PM | Stop Time : 04/25/01 10:28:25 AM

04/21/01 04:37:15 PM.008 / 04/21/01 04:38:15 PM.004

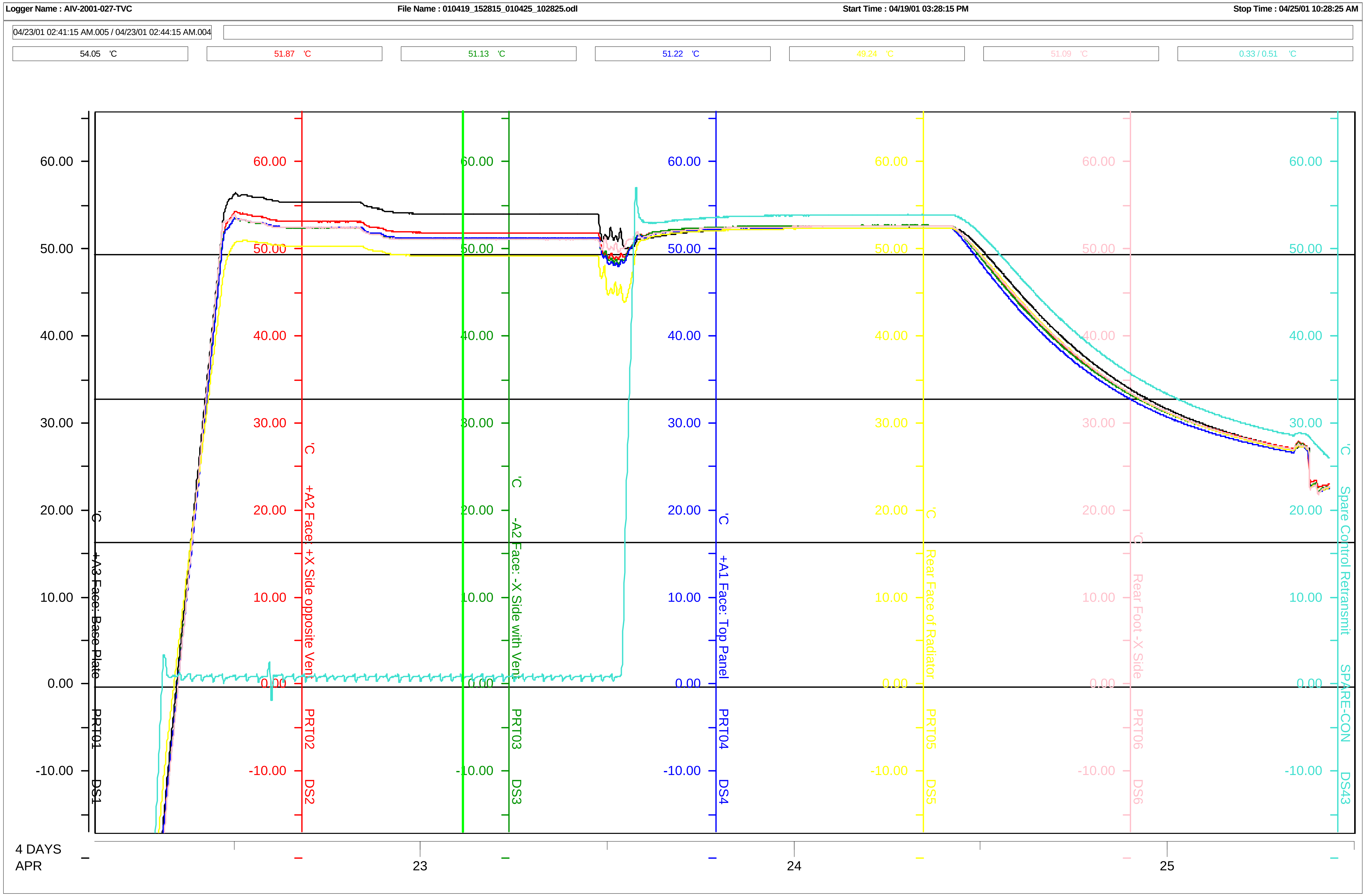
52.83 'C | 52.80 'C | 52.23 'C | 52.32 'C | 44.37 'C | 54.46 'C | 0.82 / 0.82 'C



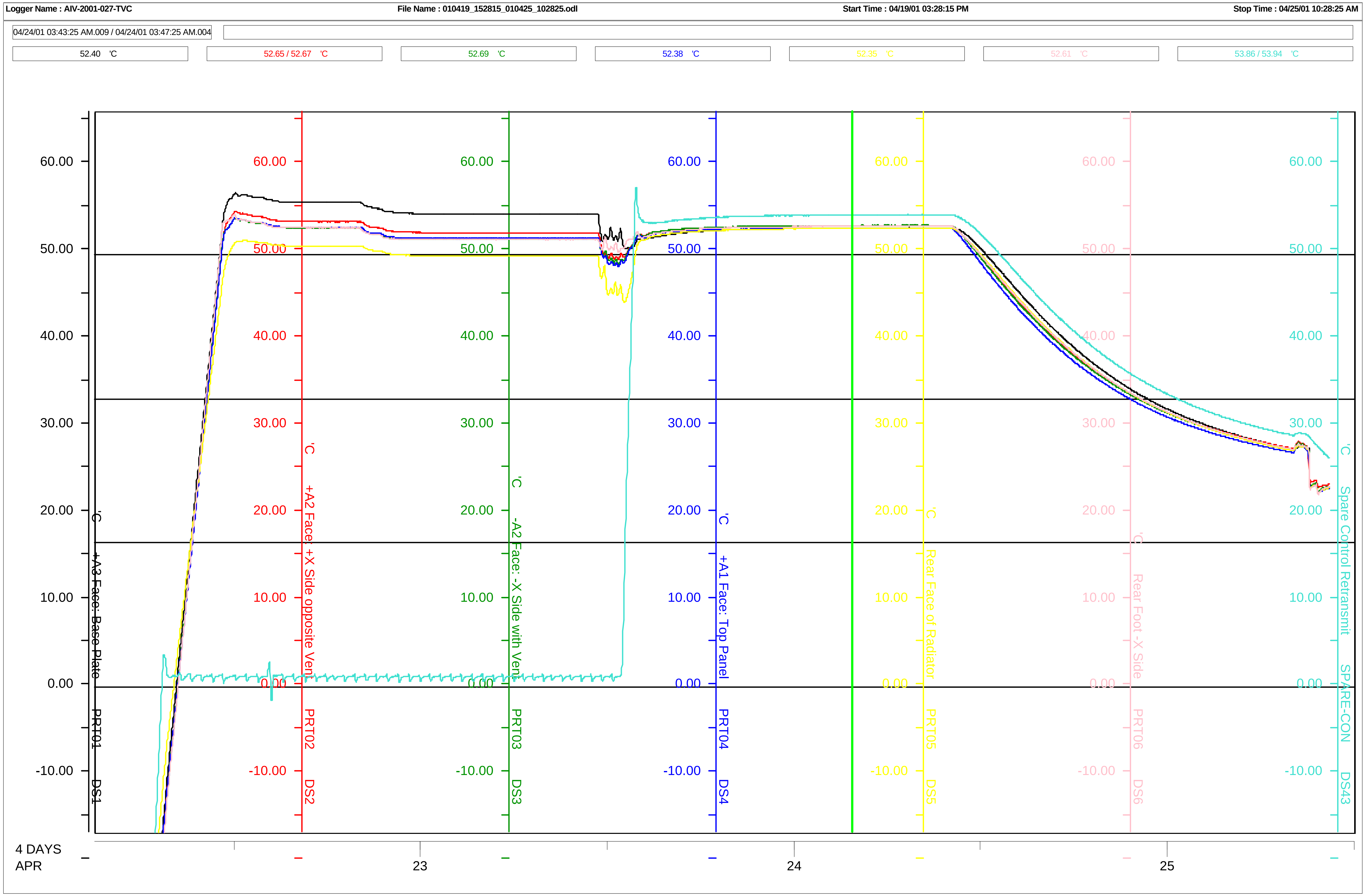
THERMAL TREND DURING 2nd COLD SOAK.

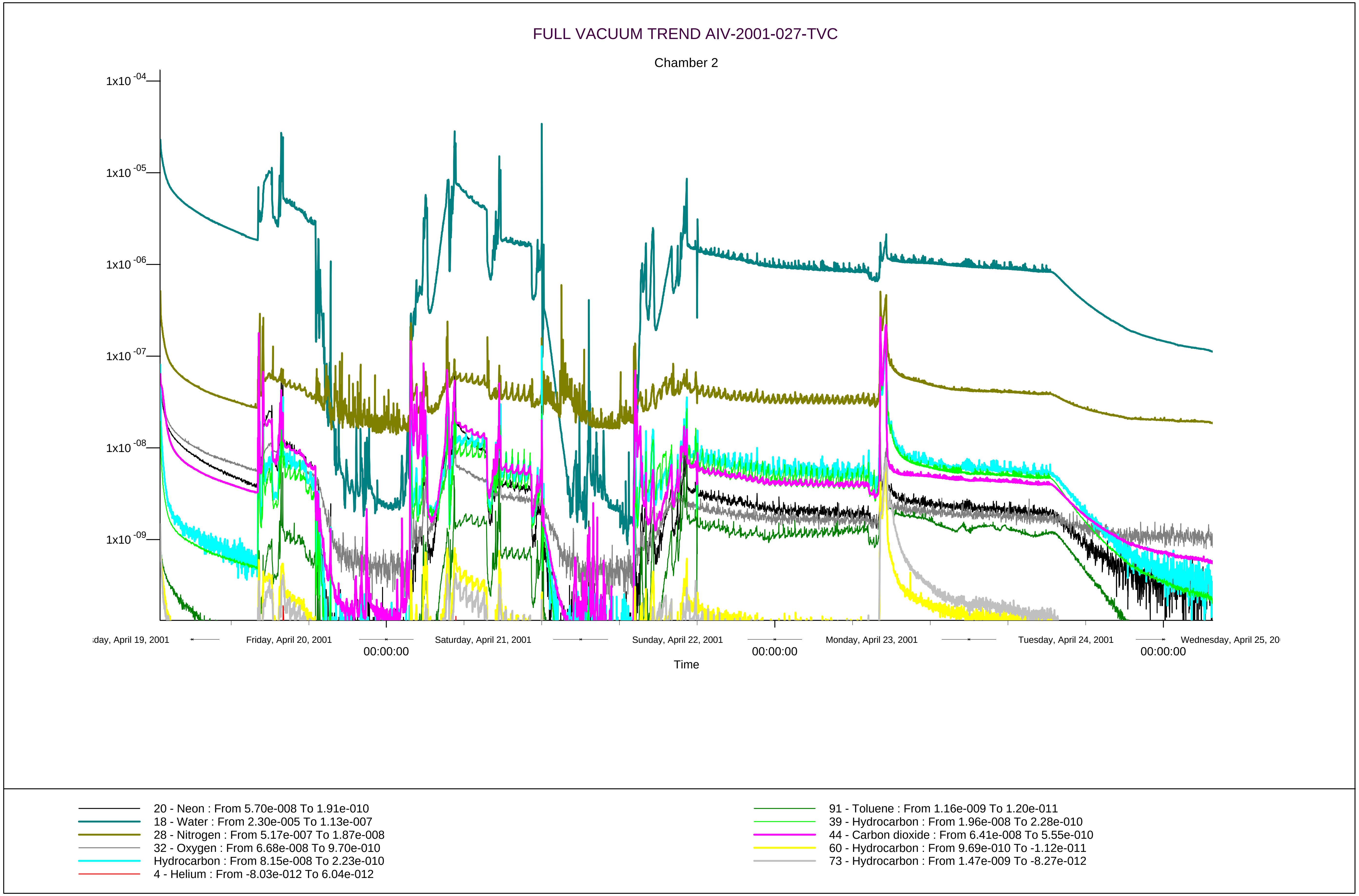


THERMAL TREND DURING OPERATIONAL OUTGASSING TRIAL.



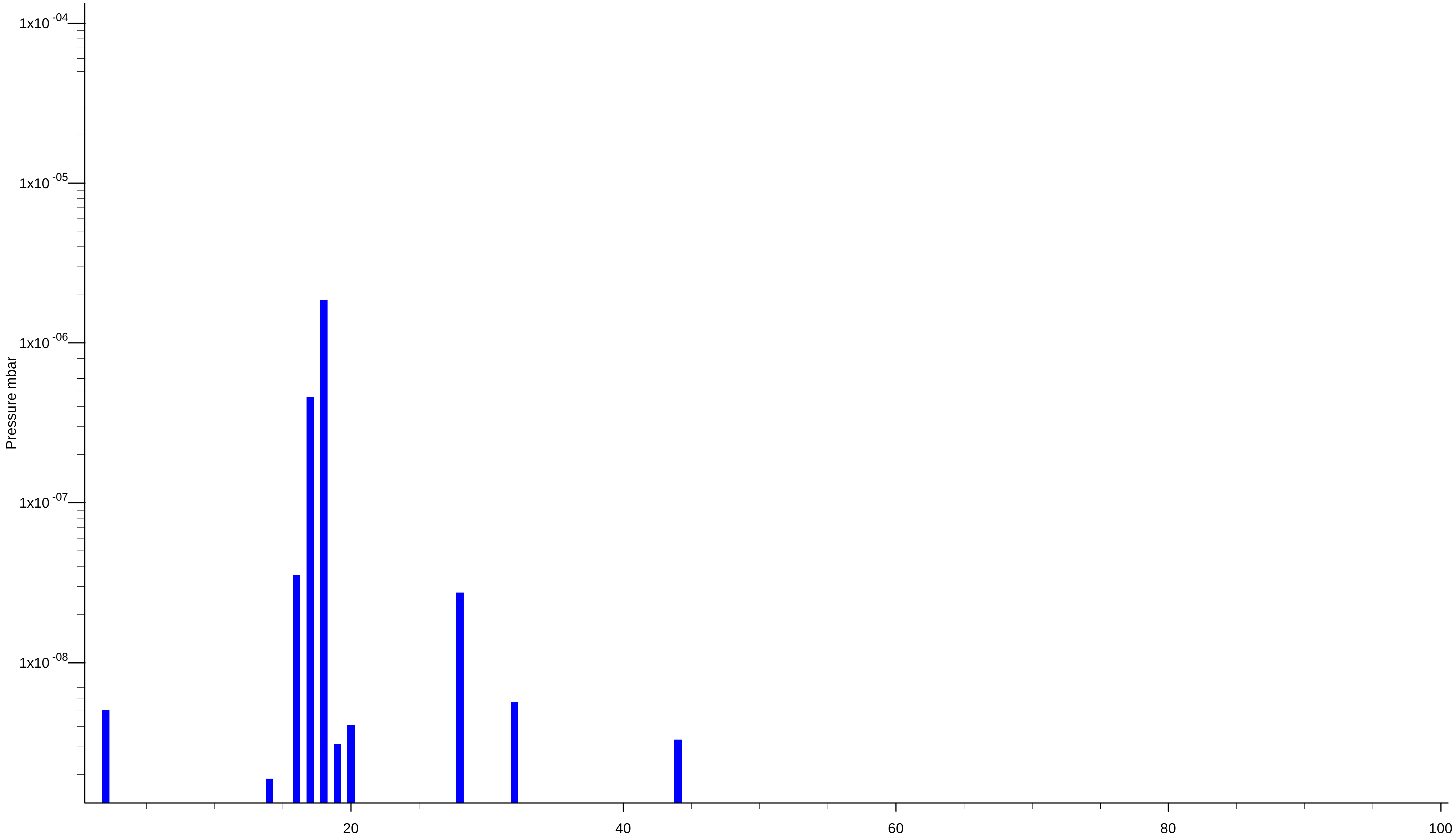
THERMAL TREND DURING NON-OPERATIONAL OUTGASSING TRIALS.





MKS Instruments, Spectra Products - Process Eye 2000

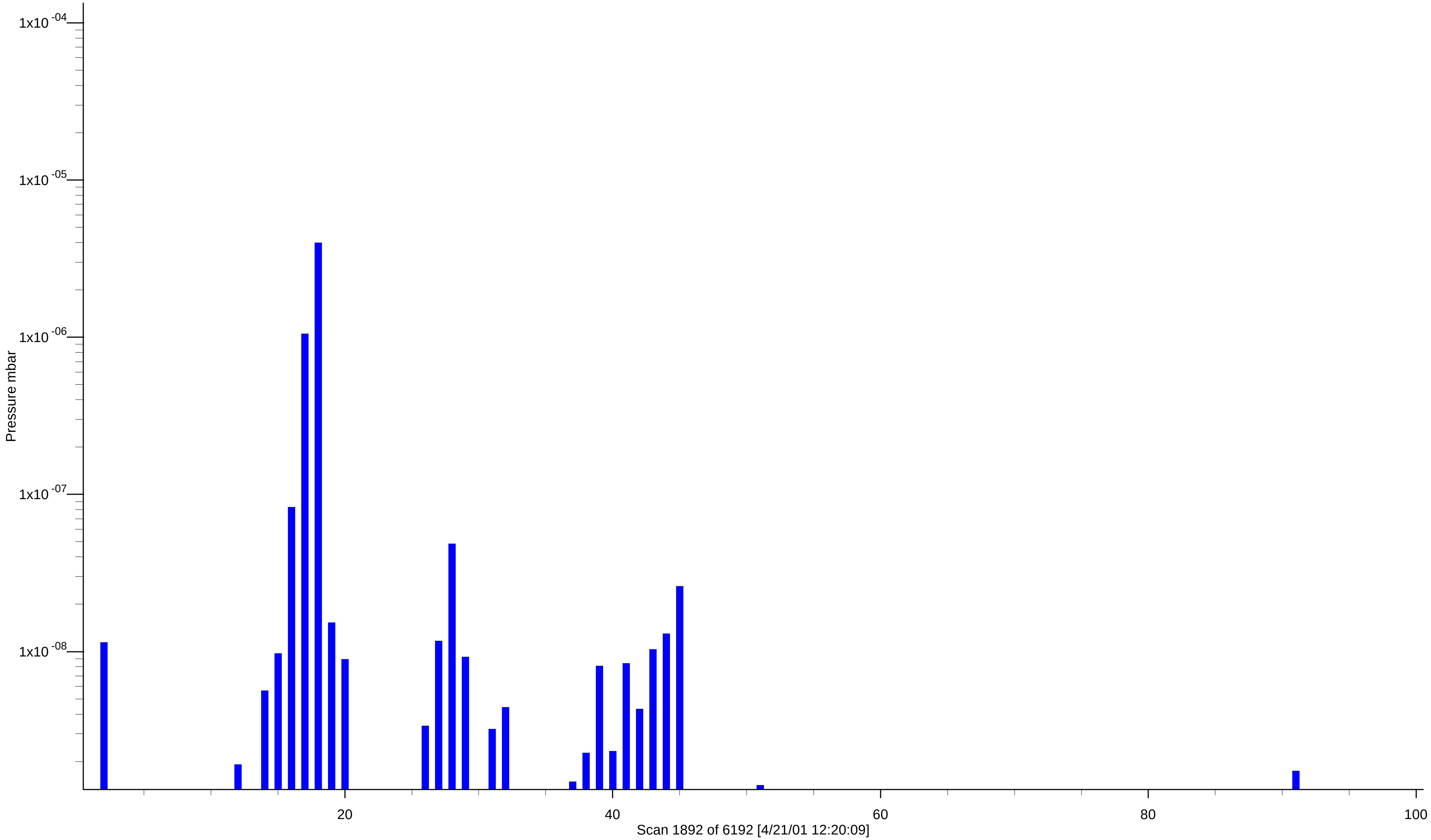
RGA SCAN TAKEN BEFORE THERMAL CYCLING.



Scan 558 of 6192 [4/20/01 07:55:27]

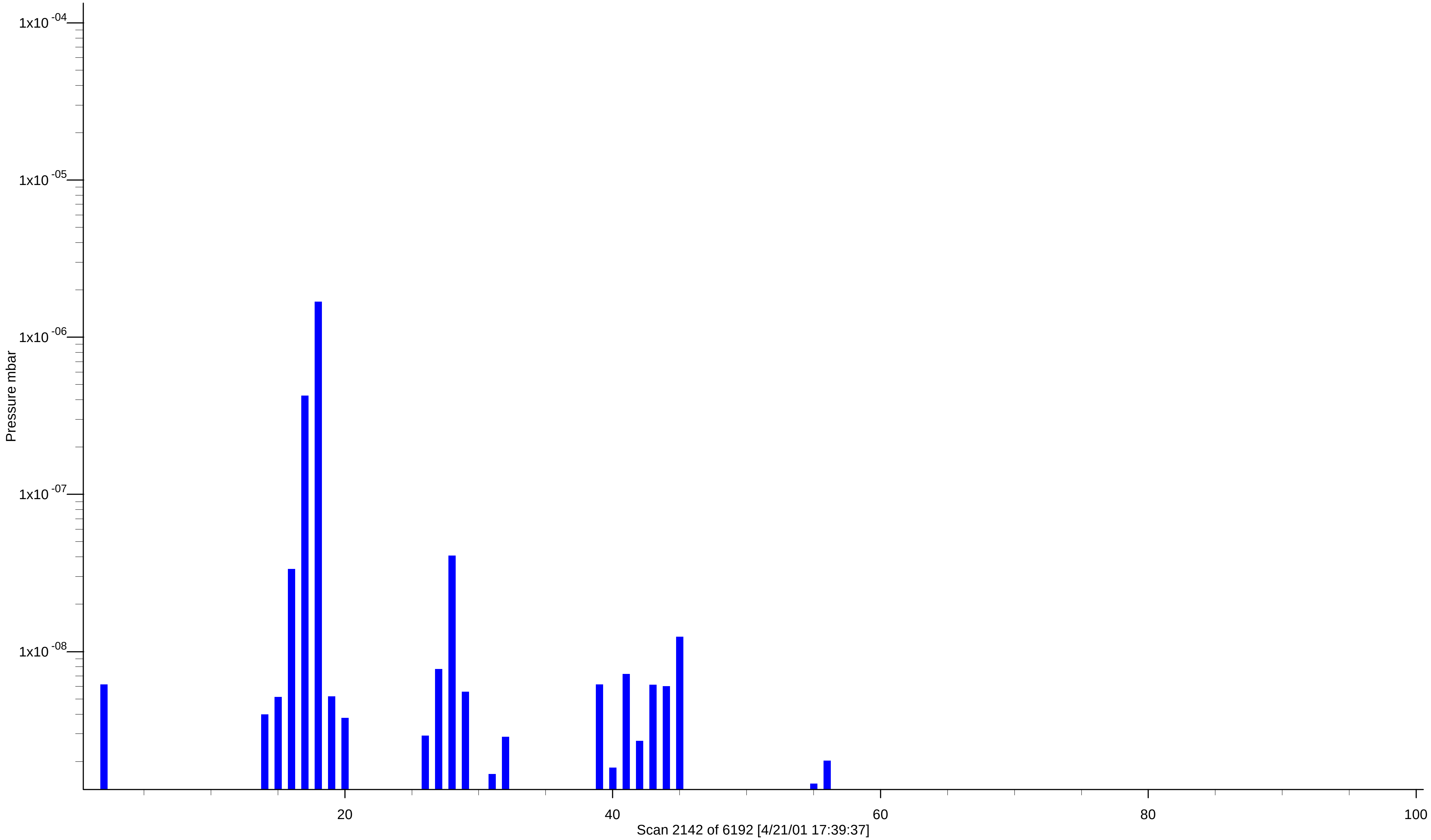
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

RGA SCAN TAKEN AT THE END OF THE NON-OP HOT SOAK.



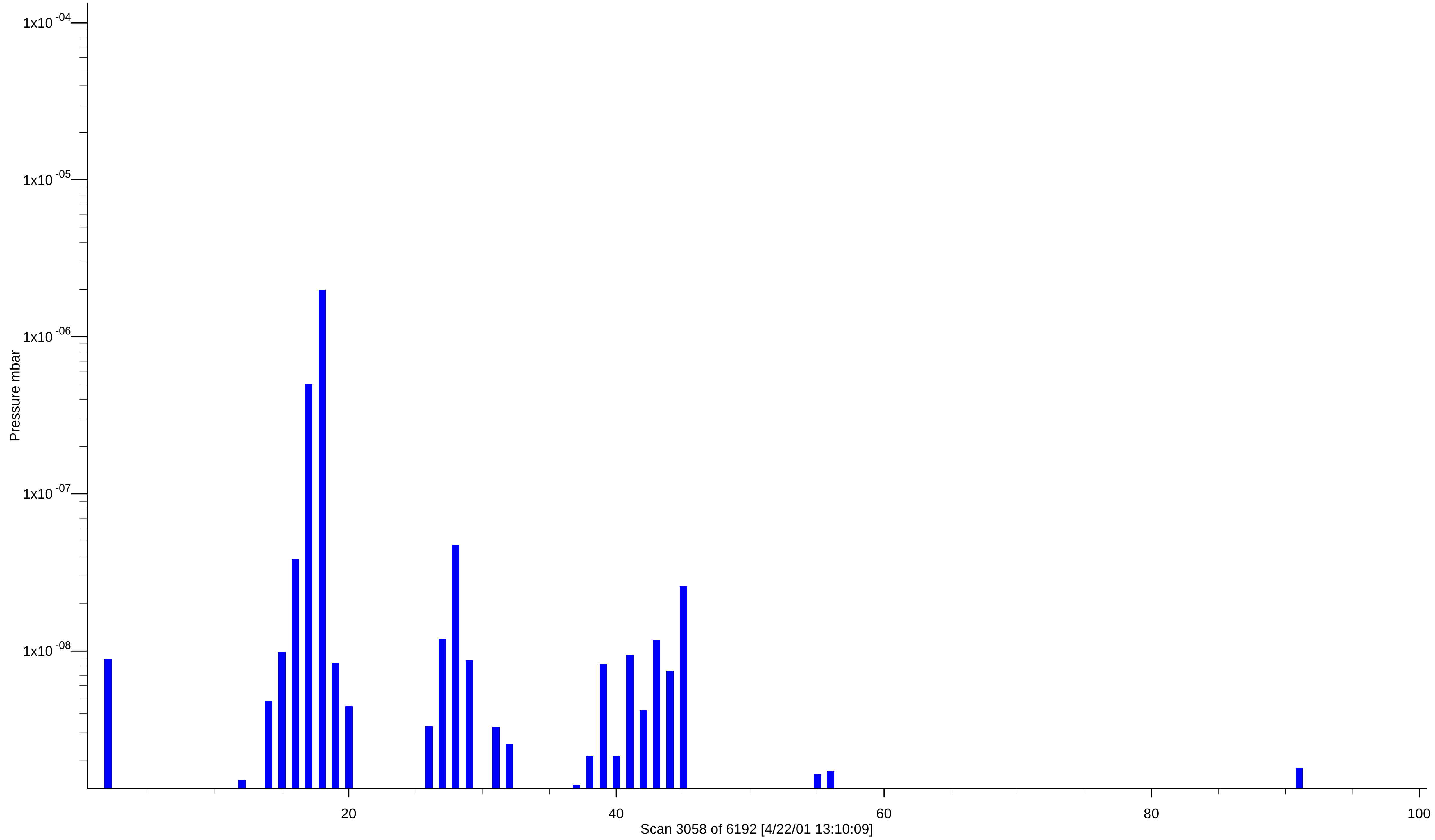
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

RGA SCAN TAKEN AT THE END OF THE OPERATIONAL HOT SOAK.



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

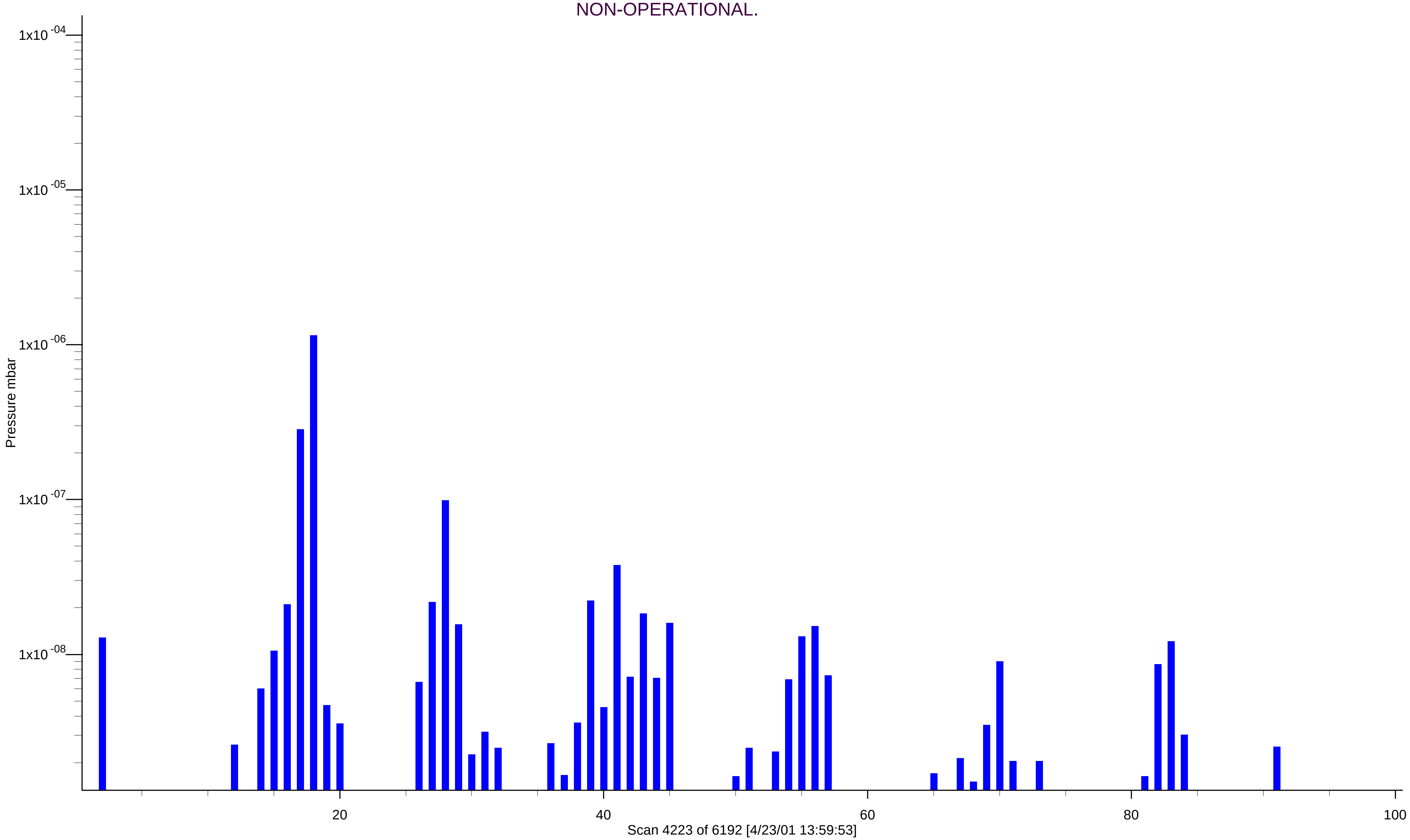
RGA SCAN TAKEN AT THE START OF THE OUTGASSING TRIALS



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

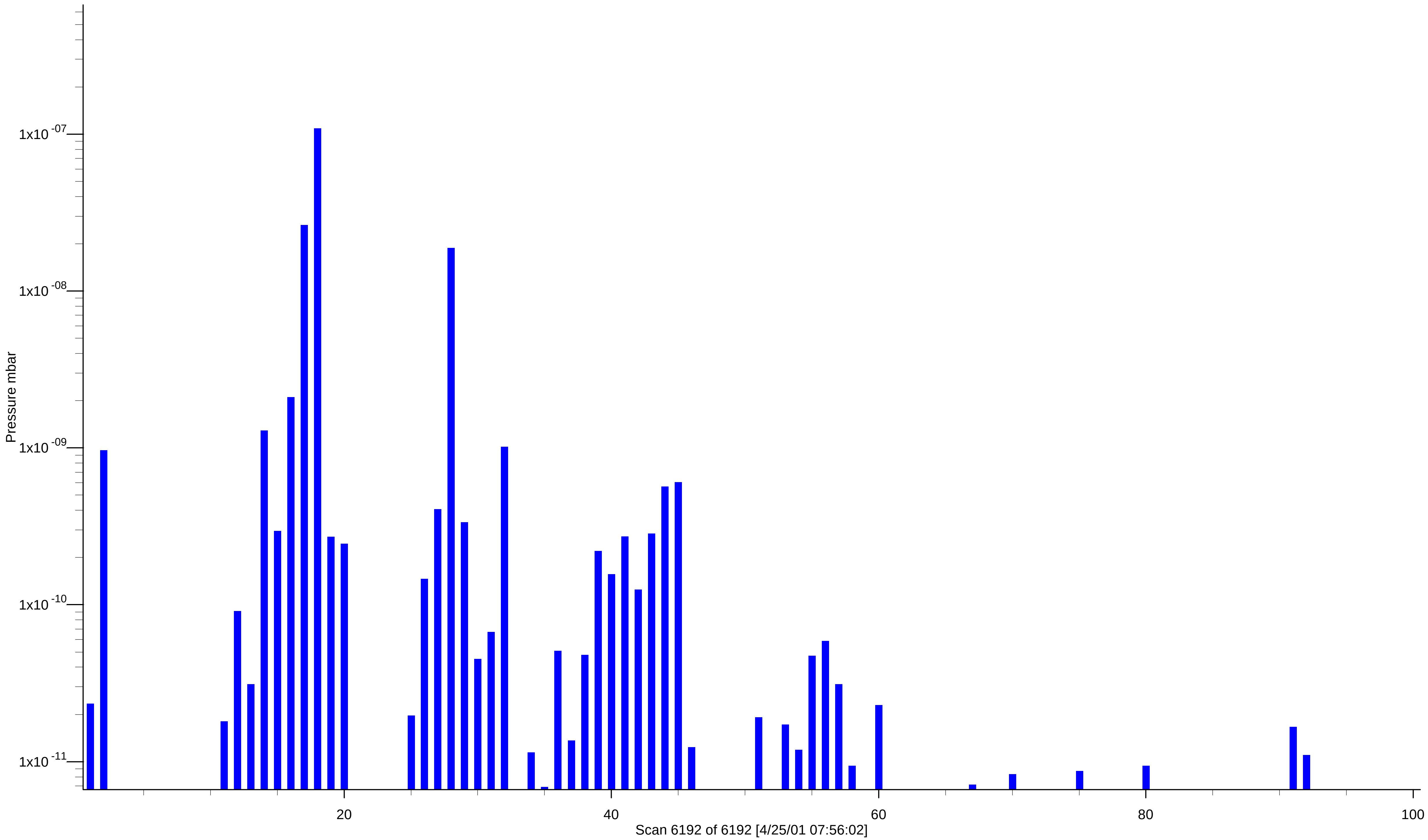
RGA SCAN AT THE START OF THE OUTGASSING TRIAL

NON-OPERATIONAL.

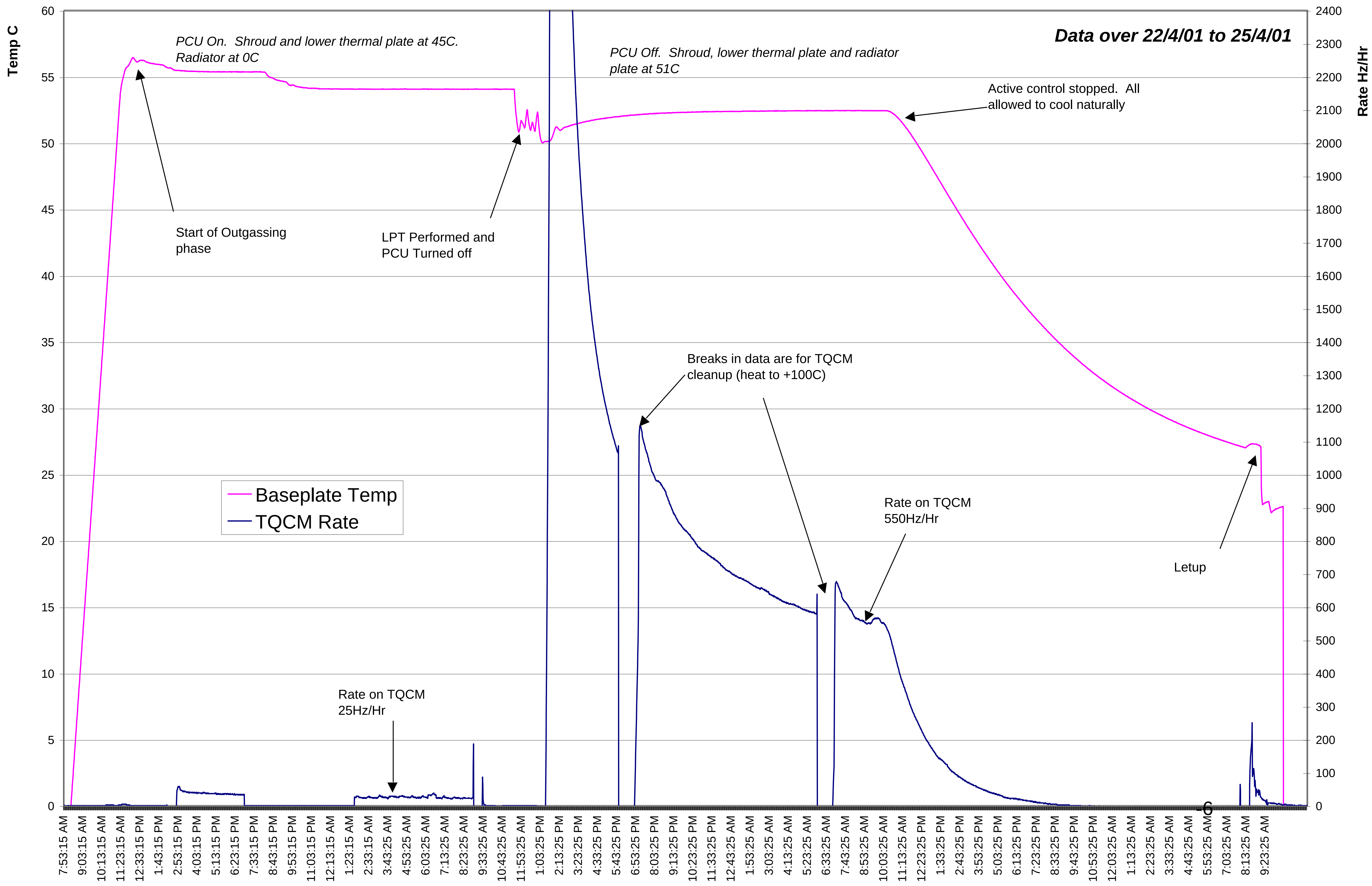


Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

RGA SCAN TAKEN BEFORE LETUP.



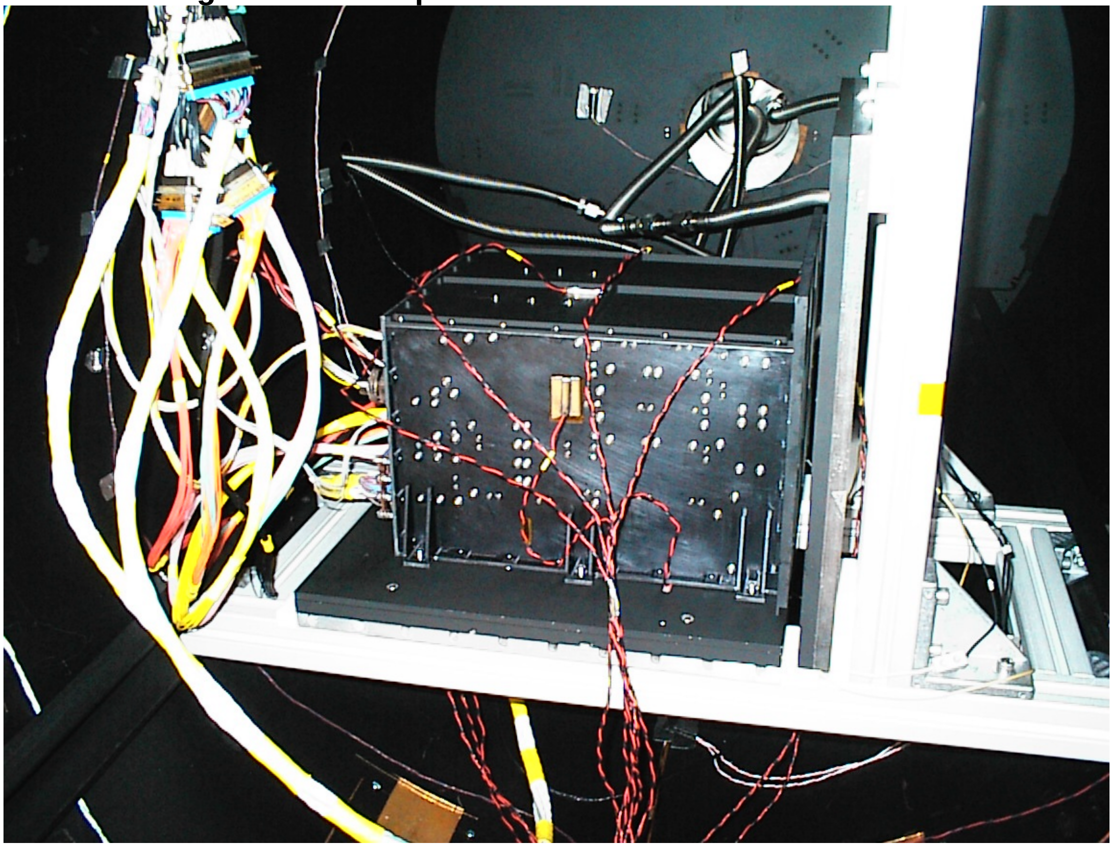
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008



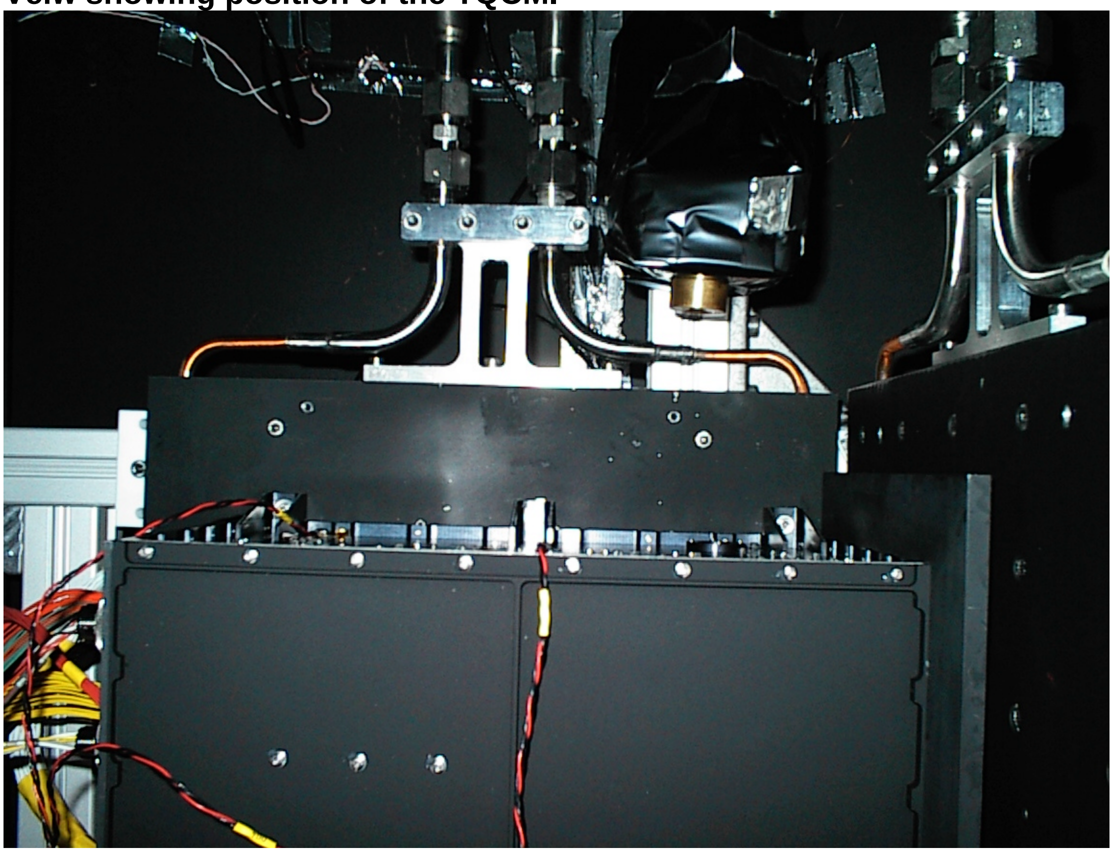
Data over 22/4/01 to 25/4/01
Temp C
Rate Hz/Hr
PCU On. Shroud and lower thermal plate at 45C. Radiator at 0C
PCU Off. Shroud, lower thermal plate and radiator plate at 51C
Active control stopped. All allowed to cool naturally
Start of Outgassing phase
LPT Performed and PCU Turned off
Breaks in data are for TQCM cleanup (heat to +100C)
Rate on TQCM 550Hz/Hr
Rate on TQCM 25Hz/Hr
Letup
Baseplate Temp
TQCM Rate

Annex C - Photograph

Veiw showing the test setup.



Veiw showing position of the TQCM.



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High & low Temperature Electrical Test Data.

During Thermal Vacuum performance of the PCU has been verified by seven Limited Performance Tests (LPT1 through to LPT3, and LPT6 through to LPT9) conducted in the periods shown in Fig. 6-1 of the TP-RAL-202c. Test results of tests designated LPT6 and LPT 8 are shown below. These tests were done for the PCU operating at the hot and at the cold temperature limits. Test results of other tests are available on request.

LPT Number	**TP Document Number**	**Included in ADP**
LPT 1	Tp17300.033	No
LPT 2	Tp17300.034	No
LPT 3	Tp17300.035	No
LPT 6	**Tp17300.036**	**Yes**
LPT 7	Tp17300.037	No
LPT 8	**Tp17300.038**	**Yes**
LPT 9	Tp17300.039	No

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HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: A. Pearce Date: 15-04-2001

Subject / Title: Limited Performance Test Procedure

Contents / Description / Summary:

Key Words: PCU Performance Test

Purpose (20 characters maximum):

Approved By:

Date (yy–mm–dd):

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

		Name	Signature	Date
Prepared by		**Alan B. Pearce**		9/12/99
Checked by	-	-		
Issued	Issue A	Alan B. Pearce		28/6/2000
Updated	Issue B	Alan B. Pearce		4/8/2000
Updated	Issue C	Alan B. Pearce		5/8/2000
Updated	Issue D	Alan B. Pearce		7/8/2000
Revised	Issue E	Alan B. Pearce		7/8/2000
Updated	Issue F	Alan B. Pearce		8/8/2000
Updated	Issue G	Alan B. Pearce		9/8/2000
Updated	Issue H	Alan B. Pearce		15/11/2000
Updated	Issue J	Alan B. Pearce		06/04/2001
Updated	Issue J-2	Alan B. Pearce		08/04/2001
Updated	Issue J-3	Alan B. Pearce		14-04-2001
Updated	Issue J-4	Alan B. Pearce		15-04-2001

Issue A – Initial release.

Issue B – Corrections to incorrect Mnemonics. Add captions for plots, not all had them. Change parameters for reading currents so oscilloscope triggers properly. Added more oscilloscope initialisation instructions. Change table field widths to better suit entries. Added internal supply change over check to verify operation under TVAC temperature extremes on both Quiet Bus supplies. Add NA and NB off instructions to PSM-02 macros. Reversed order of PSM-01 and PSM-02 macros to better observe actions on the load box. Corrected SPU temperature measurements (SPU A –15 being measured twice instead of A and B each once). Added instructions to establish A/D offset using unused AMUX instructions. Added test for 28QC_PWR Low Volts signal at end of first test block.

Issue C – Change Inrush Current measurement settings to get waveforms on oscilloscope screen. Add current monitoring in every test block where a load gets switched on (was done only at initial switch on, and under full load).

Issue D – remove instruction to switch on IPU Unregulated Quiet Bus load. Causes problems with power supplies as other loads are at peak values for tests, instead of average values.

Issue E – Cut down versions derived from TP-RAL-173 – D to have QA/NA test and QB/NB test versions for TVAC tests. Required to reduce testing time. No alteration to this document except revision level, to match that applied to trimmed versions. QA/NA version has been named TP-RAL-1731-E, and QB/NB version has been named TP-RAL-1732-E.

Issue F – Modifications to all – Change supply voltage at end of test to nominal (29V). Modification to TP-RAL-1732-E. Add SPU Inrush tests as otherwise only done when QA side tested. Add test for QC Low signal. Other minor changes to take account of test being split off.

Issue G – TP-RAL-1731-F remove instructions at end of test which turn off the PCU. All versions, change type of last test table from Manual to Mixed to make power supply instructions work correctly.

Issue H - Change test voltage range from 27-31 volts to 26-32 volts. Also change to use current probe with DC response.

Issue J – Make changes to suit TEK 3034 Oscilloscope, change document formatting to enable import of screen images from oscilloscope without images being clipped. Add tests for soft starts on outputs. Corrected some errors in digital telemetry registers checked. Added more instructions to change load box cables. Changes done to full version of test only.

Issue J2 - Split for "Half Procedure" versions and tidy up some minor errors.

Issue J3 – add instructions for DC coupling and full bandwidth on scope setup. Fixed problem with TEU A prime only 28V being tested (table error). Also added more voltage and trigger set points for oscilloscope.

Issue J4 Change timebase selection for initial power up waveform to 1000uS from 400uS to capture full waveform.

Document copy 036

1 INTRODUCTION

This document designed to be used as the source of commands for the automated testing of the HIRDLS PCU, using the Rutherford Appleton developed IPU Emulator that is based around a PC. The command sequences used in this document are taken from TC-RAL-119 Draft A4 dated 2000-01-03.

The IPU Emulator software reads this document, and produces a serialised copy, with the test results inserted into the table fields where appropriate. A separate serialised copy is produced each time this test document is run.

All tests specified within this document are designed to run with minimal operator intervention at the start of the test run, and to confirm as fully as possible that the PCU meets operational requirements using internal telemetry, without external operator measurements. A separate document is available giving a full Comprehensive Performance Test where operator action is required to probe external test points to confirm that the PCU meets all operational requirements.

The format of the document is designed to enable the document with test results to be supplied as a completed test procedure document in the ADP package. To understand the format of the instruction tables refer to the Procedure Driver Instructions (TP-RAL-xxx).

2 REFERENCE AND APPLICABLE DOCUMENTS

SP-HIR-36	Power Subsystem Specification Document
SP-HIR-13	Instrument Technical Specification
SP-HIR-103	Command and Telemetry Handbook (C&TH) (July 99 draft)
TC-RAL-119	Test Plan
TP-RAL-207	Procedure Driver Instructions (for PCU/IPU Emulator)
071-0381-01	Tektronix TDS3000 series Programmer Manual (with 071-0378-01 Advanced Trigger module supplement and 071-0378-01 FFT Module supplement)

3 TEST FOREWORD.

Instruction formats.

Each instruction line in the tables has a prefix for automated testing. If no prefix exists in a line, then the automatic procedure assumes a manual operation and prompts the operator. Further detail on table format can be found in the Procedure Driver Instructions. Prefixes used are as follows

DIR: Direct command used to send commands to the HIRDLS discrete commands, and to control certain operations within the emulator.

PORTA: Send this command through the “A” IPU port.

PORTB: send this command through the ”B” IPU port.

QA: Operation command for the QA power supply.

QB: Operation command for the QB power supply.

NA: Operation command for the NA power supply.

NB: Operation command for the NB power supply.

SCOPE: send this command to the Oscilloscope – these take the form of the Tektronix command language used by the TDS3000 series oscilloscopes. The exception is the command to down load the screen to a file. The GSE program converts a command of the format "HARDCOPY FILENAME.BMP" to "HARDCOPY START" to send to the oscilloscope and transfers the resulting screen image into the file FILENAME.BMP on the GSE.

4 EQUIPMENT REQUIRED

Power supplies, 4 required, Thandar TSX3510 or similar IEEE 488 interface.
Oscilloscope, Tektronix TDS 3034 or similar, IEEE 488 Interface.
HIRDLS EGSE PC with emulation program and interface cards.
HIRDLS Dummy Load Box.
Appropriate connection cables for bench or TVAC testing as required.
Current Probe, Tektronix model 134 or similar.

5 CONNECTION DIAGRAM

To be supplied.

6 TEST PROCEDURE

Enter initial parameters indicating conditions at start of this test. As this test makes no provision for stopping to change the dummy load between outputs, the connection being used should be noted in the second item here, when instructed to do so by the emulator software.

STEP 1	Mixed		
Enter reason for test (Eg TVAC test 1).	TVAC LPT6		21-Apr-01 17:43:13
Connect IPU load box cable to Side A at load box.	ok		21-Apr-01 17:43:13
Connect TEU load box cable to Side A at load box.	ok		21-Apr-01 17:43:13
Connect SPU load box cable to Side A at load box.	ok		21-Apr-01 17:43:13
Verify all load switches on the load box are in the 'V' position	ok		21-Apr-01 17:43:13
Verify connection of power supplies and turn on mains power	ok		21-Apr-01 17:43:13
Verify Oscilloscope is powered on and IEEE cable connected.	ok		21-Apr-01 17:43:14
Fit current probe to QA supply lead	ok		21-Apr-01 17:43:14
Connect current probe to Oscilloscope channel 1	ok		21-Apr-01 17:43:14
Set current probe power switch to 100mA/V.	ok		21-Apr-01 17:43:14
Connect second current probe to Oscilloscope Ch2.	ok		21-Apr-01 17:43:14
Set second current probe power switch to 100mA/V.	ok		21-Apr-01 17:43:14

6.1 Oscilloscope set up.

STEP 2	Mixed		
SCOPE: CLEARMENU	SCOPE:CLEARMENU done.		21-Apr-01 17:43:30
SCOPE:DISP:GRAT FULL	SCOPE:DISP:GRAT FULL done.		21-Apr-01 17:43:30
SCOPE:DISP:FORMAT YT	SCOPE:DISP:FORMAT YT done.		21-Apr-01 17:43:30
SCOPE:HARDCOPY:FORMAT BMP	SCOPE:HARDCOPY:FORMAT BMP done.		21-Apr-01 17:43:30
SCOPE:HARDCOPY:PORT GPIB	SCOPE:HARDCOPY:PORT GPIB done.		21-Apr-01 17:43:30
SCOPE:HARDC:LAYOUT PORTR	SCOPE:HARDC:LAYOUT PORTR done.		21-Apr-01 17:43:30
SCOPE:MESSAGE:STATE ON	SCOPE:MESSAGE:STATE ON done.		21-Apr-01 17:43:30
SCOPE:MESSAGE:BOX 155,0,635,45	SCOPE:MESSAGE:BOX 155,0,635,45 done.		21-Apr-01 17:43:30
SCOPE:Select:REF1 OFF	SCOPE:SELECT:REF1 OFF done.		21-Apr-01 17:43:30
SCOPE:Select:REF2 OFF	SCOPE:SELECT:REF2 OFF done.		21-Apr-01 17:43:30
SCOPE:Select:REF3 OFF	SCOPE:SELECT:REF3 OFF done.		21-Apr-01 17:43:30
SCOPE:Select:REF4 OFF	SCOPE:SELECT:REF4 OFF done.		21-Apr-01 17:43:30
SCOPE:Select: MATH OFF	SCOPE:SELECT: MATH OFF done.		21-Apr-01 17:43:30
SCOPE:Select:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		21-Apr-01 17:43:30
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		21-Apr-01 17:43:31
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH3 OFF done.		21-Apr-01 17:43:31
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH4 OFF done.		21-Apr-01 17:43:31
SCOPE:CH1:Coupling DC	SCOPE:CH1:COUPLING DC done.		21-Apr-01 17:43:31
SCOPE:CH2:Coupling DC	SCOPE:CH2:COUPLING DC done.		21-Apr-01 17:43:31
SCOPE:CH3:Coupling DC	SCOPE:CH3:COUPLING DC done.		21-Apr-01 17:43:31

SCOPE:CH4:Coupling DC	SCOPE:CH4:COUPLING DC done.		21-Apr-01 17:43:31
SCOPE:CH1:Bandwidth Full	SCOPE:CH1:BANDWIDTH Full done.		21-Apr-01 17:43:31
SCOPE:CH2:Bandwidth Full	SCOPE:CH2:BANDWIDTH Full done.		21-Apr-01 17:43:31
SCOPE:CH3:Bandwidth Full	SCOPE:CH3:BANDWIDTH Full done.		21-Apr-01 17:43:31
SCOPE:CH4:Bandwidth Full	SCOPE:CH4:BANDWIDTH Full done.		21-Apr-01 17:43:31
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		21-Apr-01 17:43:31
SCOPE: CH2:POS -3	SCOPE:CH2:POS -3 done.		21-Apr-01 17:43:31

STEP 3	Mixed		
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		21-Apr-01 17:44:12
SCOPE:TRIG:A:MODE AUTO	SCOPE:TRIG:A:MO DE AUTO done.		21-Apr-01 17:44:12
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:44:12
Verify Zero offset of current probe on CH1 (Trace in line with left hand arrow).	ok		21-Apr-01 17:44:12
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		21-Apr-01 17:44:12
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		21-Apr-01 17:44:12
Verify Zero offset of current probe on CH2 (Trace in line with left hand arrow).	ok		21-Apr-01 17:44:12
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		21-Apr-01 17:44:13
SCOPE:HOR:DELAY:STATE OFF	SCOPE:HOR:DELA Y:STATE OFF done.		21-Apr-01 17:44:13
SCOPE:TRIG:A:MODE NORMAL	SCOPE:TRIG:A:MO DE NORMAL done.		21-Apr-01 17:44:13
SCOPE:TRIG:A:EDGE:SLOPE RISE	SCOPE:TRIG:A:ED GE:SLOPE RISE done.		21-Apr-01 17:44:13
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		21-Apr-01 17:44:13
SCOPE:TRIG:A:EDGE:COUP DC	SCOPE:TRIG:A:ED GE:COUP DC done.		21-Apr-01 17:44:13
SCOPE:TRIG:A:LEVEL 0.5E-1	SCOPE:TRIG:A:LEV EL 0.5E-1 done.		21-Apr-01 17:44:13
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOL D:TIM 2.0E-2 done.		21-Apr-01 17:44:13
SCOPE:ACQ:STOPAFTER SEQ	SCOPE:ACQ:STOPA FTER SEQ done.		21-Apr-01 17:44:13
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:P OS 20 done.		21-Apr-01 17:44:13
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		21-Apr-01 17:44:13
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		21-Apr-01 17:44:13
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		21-Apr-01 17:44:14

6.2 Initial Power On conditions

Do initial operations to set the PCU to be powered from QA. The PCU is to be left powered up in the last test mode during TVAC testing (except where the test specifically requires it to be powered off), while the temperature is changed between test temperatures. The NB is left powered off during initial procedures.

STEP 4	Mixed		
QA: OFF	IEEE Error, Manual operation required		21-Apr-01 17:45:56
QB: OFF	IEEE Error, Manual operation required		21-Apr-01 17:45:56
NA: OFF	NA: OFF Done		21-Apr-01 17:45:56
NB: OFF	NB: OFF Done		21-Apr-01 17:45:57
QA: I=10	QA: I=10 Done		21-Apr-01 17:45:57
QB: I=10	QB: I=10 Done		21-Apr-01 17:45:57
NA: I=10	NA: I=10 Done		21-Apr-01 17:45:57
NB: I=10	NB: I=10 Done		21-Apr-01 17:45:57
QA: OV=35.0v	QA: OV=35.0v Done		21-Apr-01 17:45:57
QB: OV=35.0v	QB: OV=35.0v Done		21-Apr-01 17:45:57
NA: OV=35.0v	NA: OV=35.0v Done		21-Apr-01 17:45:57
NB: OV=35.0v	NB: OV=35.0v Done		21-Apr-01 17:45:57
QA: V=29v	QA: V=29v Done		21-Apr-01 17:45:57
QB: V=29v	QB: V=29v Done		21-Apr-01 17:45:57
NA: V=29v	NA: V=29v Done		21-Apr-01 17:45:57
NB: V=29v	NB: V=29v Done		21-Apr-01 17:45:57
QA: ON	QA: ON Done		21-Apr-01 17:45:57
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		21-Apr-01 17:45:57
QA: OFF	QA: OFF Done		21-Apr-01 17:45:57
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:45:57
SCOPE:MESS:SHOW 'QA Prime Converter Power On \nInrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QA Prime Converter Power On \nInrush Current Waveform, 500mA/Div' done.		21-Apr-01 17:45:57
QA: ON	QA: ON Done		21-Apr-01 17:45:57
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 17:45:57
SCOPE: HARDCOPY INRUSHAP.BMP	INRUSHAP.BMP written to Appendix.		21-Apr-01 17:45:57
QA: IO?	Current 1.42A		21-Apr-01 17:45:57

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.38A, Channel B = 1.38A		21-Apr-01 17:45:57
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		21-Apr-01 17:45:58

6.3 Set PCU start mode conditions.
This table issues commands as defined by PSM-01 and PSM-02 macros in C&TH Table 2.9.4.4-1.

This table is PSM-02 macro.

STEP 5	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		21-Apr-01 17:46:54
PORTA: SPU_+5B OFF	IFC Echo = C018		21-Apr-01 17:46:54
PORTA: SPU_+/-15A OFF	IFC Echo = E019		21-Apr-01 17:46:54
PORTA: SPU_+5A OFF	IFC Echo = E018		21-Apr-01 17:46:54
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		21-Apr-01 17:46:54
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		21-Apr-01 17:46:54
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		21-Apr-01 17:46:54
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		21-Apr-01 17:46:54
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		21-Apr-01 17:46:54
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		21-Apr-01 17:46:54
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		21-Apr-01 17:46:54
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		21-Apr-01 17:46:54
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		21-Apr-01 17:46:54
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		21-Apr-01 17:46:54
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 17:46:55
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 17:46:55
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 17:46:55
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 17:46:55
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		21-Apr-01 17:46:55
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 17:46:55
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		21-Apr-01 17:46:55
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 17:46:55
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		21-Apr-01 17:46:55
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		21-Apr-01 17:46:55
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		21-Apr-01 17:46:55
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		21-Apr-01 17:46:55
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		21-Apr-01 17:46:55
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		21-Apr-01 17:46:55
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		21-Apr-01 17:46:55
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		21-Apr-01 17:46:55
PORTA: NA (PR) OFF	IFC Echo = E01C		21-Apr-01 17:46:55
PORTA: NA (RR) OFF	IFC Echo = C01C		21-Apr-01 17:46:55
PORTA: NB (PR) OFF	IFC Echo = E01D		21-Apr-01 17:46:55
PORTA: NB (RR) OFF	IFC Echo = C01D		21-Apr-01 17:46:55

This table is PSM-01 Macro.

STEP 6	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		21-Apr-01 17:47:05
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		21-Apr-01 17:47:05
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		21-Apr-01 17:47:05
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		21-Apr-01 17:47:06
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		21-Apr-01 17:47:06
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		21-Apr-01 17:47:06

6.4 Telemetry verification after PSM-01 and PSM-02 macros.

STEP 7	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.08V		21-Apr-01 17:47:32
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.26V, Channel B = 14.26V		21-Apr-01 17:47:32
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.84V, Channel B = -14.83V		21-Apr-01 17:47:32
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.06V		21-Apr-01 17:47:32
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 17:47:32
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =54.2C, Channel B = 54.2C		21-Apr-01 17:47:32

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =53.0C, Channel B = 53.0C		21-Apr-01 17:47:32
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 17:47:32
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 17:47:32
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 17:47:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		21-Apr-01 17:47:32
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 17:47:32
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 17:47:33
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		21-Apr-01 17:47:33
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		21-Apr-01 17:47:33

6.5 QC power on with Prime relay
Carries out PSM-58 macro, and then relevant telemetry.

STEP 8	Mixed		
PORTA: QA (PR) ON	IFC Echo = F00A		21-Apr-01 17:48:00
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 17:48:00
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 17:48:00
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 17:48:00
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		21-Apr-01 17:48:01
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 17:48:01
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 17:48:01
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 17:48:01
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		21-Apr-01 17:48:01
QA: IO?	Current IEEE Timeout		21-Apr-01 17:48:01
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.48A, Channel B = 1.48A		21-Apr-01 17:48:01

6.6 Turn on System Converters – prime set.
Turn on Prime set of converters using PSM-13 and PSM-15. Outputs need to be selected using prime relay set. Telemetry checks done between and after macros.

STEP 9	Mixed		
NA: ON	NA: ON Done		21-Apr-01 17:49:27
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		21-Apr-01 17:49:27
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 17:49:27
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 17:49:27
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:49:27
SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 17:49:27
PORTA: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		21-Apr-01 17:49:27
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		21-Apr-01 17:49:27
SCOPE: HARDCOPY SYS1AQA.BMP	SYS1AQA.BMP written to Appendix.		21-Apr-01 17:49:27
PORTA: PSSV09;+5Volt DC-DC Converter SYS A	IFC Echo = 0008, Telemetry Channel A =5.33V, Channel B = 5.35V		21-Apr-01 17:49:28
PORTA: PSSV01;28Volt DC-DC Converter Sys A	IFC Echo = 000B, Telemetry Channel A =30.02V, Channel B = 30.02V		21-Apr-01 17:49:28
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.57A, Channel B = 1.57A		21-Apr-01 17:49:28
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		21-Apr-01 17:49:28
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 17:49:28
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 17:49:28

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:49:28
SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 17:49:28
PORTA: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		21-Apr-01 17:49:28
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 5009		21-Apr-01 17:49:28
SCOPE: HARDCOPY SYS2AQA.BMP	SYS2AQA.BMP written to Appendix.		21-Apr-01 17:49:28
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.64A, Channel B = 1.64A		21-Apr-01 17:49:28
PORTA: PSSV11;+15Volt DC-DC Converter SYS A	IFC Echo = 0009, Telemetry Channel A =15.25V, Channel B = 15.25V		21-Apr-01 17:49:28
PORTA: PSSV13;-15Volt DC-DC Converter SYS A	IFC Echo = 000A, Telemetry Channel A =-15.37V, Channel B = -15.37V		21-Apr-01 17:49:29
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		21-Apr-01 17:49:29
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		21-Apr-01 17:49:29
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		21-Apr-01 17:49:29

6.7 TEU A Prime relays – 28V and 5V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through prime relays. This carries out PSM-18, PSM42, and PSM-45 macros with telemetry checks between macros.

STEP 10	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		21-Apr-01 17:51:09
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		21-Apr-01 17:51:09
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		21-Apr-01 17:51:09
PORTA: A_TEU_+28QC (PR) ON	IFC Echo = F014		21-Apr-01 17:51:09
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0006		21-Apr-01 17:51:09
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =2.27A, Channel B = 2.28A		21-Apr-01 17:51:09
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 17:51:09
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		21-Apr-01 17:51:09
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		21-Apr-01 17:51:09
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 17:51:09
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 17:51:09
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 17:51:09
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 17:51:09
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:51:09
SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 17:51:10
PORTA: A_TEU_+5 (PR) ON	IFC Echo = F00C		21-Apr-01 17:51:10
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500F		21-Apr-01 17:51:10
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		21-Apr-01 17:51:10
SCOPE:HARDCOPY TEUAC2.BMP	TEUAC2.BMP written to Appendix.		21-Apr-01 17:51:10
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		21-Apr-01 17:51:10

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =2.53A, Channel B = 2.53A		21-Apr-01 17:51:10
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 17:51:10
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 17:51:10
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 17:51:10
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		21-Apr-01 17:51:10
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 17:51:10
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 17:51:10

6.8 TEU A – Prime relays – +/-15V

STEP 11	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 17:53:00
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 17:53:00
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:53:00
SCOPE:MESS:SHOW 'TEU A +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 17:53:00
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		21-Apr-01 17:53:00
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		21-Apr-01 17:53:00
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		21-Apr-01 17:53:00
SCOPE:HARDCOPY TEUAC3.BMP	TEUAC3.BMP written to Appendix.		21-Apr-01 17:53:00
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 17:53:00
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		21-Apr-01 17:53:00
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		21-Apr-01 17:53:00
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 17:53:00
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 17:53:00
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 17:53:01
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:53:01
SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 17:53:01
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		21-Apr-01 17:53:01
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		21-Apr-01 17:53:01
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		21-Apr-01 17:53:01

SCOPE:HARDCOPY TEUAC4.BMP	TEUAC4.BMP written to Appendix.		21-Apr-01 17:53:01
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.24V, Channel B = 15.22V		21-Apr-01 17:53:01
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.35V		21-Apr-01 17:53:01
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =2.94A, Channel B = 2.94A		21-Apr-01 17:53:01
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		21-Apr-01 17:53:01

6.9 Turn on EEA

Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply EEA through prime relays. This carries out PSM-54 macro, with telemetry checks between 5V and 15V operations

STEP 12	Mixed		
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		21-Apr-01 17:56:15
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		21-Apr-01 17:56:15
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 17:56:15
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 17:56:15
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 17:56:15
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 17:56:15
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:56:15
SCOPE:MESS:SHOW 'EEA 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 17:56:15
PORTA: EEA_+5 (PR) ON	IFC Echo = F008		21-Apr-01 17:56:15
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		21-Apr-01 17:56:15
SCOPE:HARDCOPY EEA5VPR.BMP	EEA5VPR.BMP written to Appendix.		21-Apr-01 17:56:15
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.04A, Channel B = 3.04A		21-Apr-01 17:56:16
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		21-Apr-01 17:56:16
Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 17:56:16
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 17:56:16
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 17:56:16
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 17:56:16
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:56:16

SCOPE:MESS:SHOW 'EEA +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 17:56:16
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		21-Apr-01 17:56:16
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 17:56:16
SCOPE:HARDCOPY EEA15PPV.BMP	EEA15PPV.BMP written to Appendix.		21-Apr-01 17:56:16
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		21-Apr-01 17:56:16
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		21-Apr-01 17:56:16
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 17:56:16
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 17:56:16
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 17:56:16
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 17:56:16
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:56:17
SCOPE:MESS:SHOW 'EEA -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 17:56:17
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		21-Apr-01 17:56:17
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 17:56:17
SCOPE:HARDCOPY EEA15NPV.BMP	EEA15NPV.BMP written to Appendix.		21-Apr-01 17:56:17
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.12A, Channel B = 3.12A		21-Apr-01 17:56:17
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.27V, Channel B = 5.27V		21-Apr-01 17:56:17
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.21V, Channel B = 15.21V		21-Apr-01 17:56:17

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.35V		21-Apr-01 17:56:17
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		21-Apr-01 17:56:17

6.10 Turn on IPU 28 volt regulated supply
Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through prime relays. This carries out PSM-24 macro.

STEP 13	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		21-Apr-01 17:57:20
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		21-Apr-01 17:57:21
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		21-Apr-01 17:57:21
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		21-Apr-01 17:57:21
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 17:57:21
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 17:57:21
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 17:57:21
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 17:57:21
SCOPE:MESS:SHOW 'IPU A 28VReg (Prime) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU A 28VReg (Prime) \nStart Current Waveform, 500mA/Div' done.		21-Apr-01 17:57:21
PORTA: A_IPU_+28REG (PR) ON	IFC Echo = F002		21-Apr-01 17:57:21
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 500F		21-Apr-01 17:57:21
SCOPE:HARDCOPY IPUA1.BMP	IPUA1.BMP written to Appendix.		21-Apr-01 17:57:21
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.93V		21-Apr-01 17:57:21
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.02A, Channel B = 5.02A		21-Apr-01 17:57:21
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		21-Apr-01 17:57:21

6.11 Turn on SPU A Supplies.
Turns on SPU supplies in order specified in C&TH Vol1 Part 2 section 5.5.5 to power SPU side A. This carries out PSM-10 and PSM-38 macros.

STEP 14	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		21-Apr-01 18:00:08
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		21-Apr-01 18:00:08
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		21-Apr-01 18:00:08
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		21-Apr-01 18:00:08
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:00:08
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEVEL 0.6 done.		21-Apr-01 18:00:08
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:00:08
SCOPE:MESS:SHOW 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:00:08
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		21-Apr-01 18:00:08
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.12A, Channel B = 5.12A		21-Apr-01 18:00:09
SCOPE: HARDCOPY SPUAQA.BMP	SPUAQA.BMP written to Appendix.		21-Apr-01 18:00:09
PORTA:PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		21-Apr-01 18:00:09
PORTA: SPU_+5B OFF	IFC Echo = C018		21-Apr-01 18:00:09
PORTA: SPU_+/-15B OFF	IFC Echo = C019		21-Apr-01 18:00:09
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		21-Apr-01 18:00:09
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		21-Apr-01 18:00:09
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		21-Apr-01 18:00:09

SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		21-Apr-01 18:00:09
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 18:00:09
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:00:09
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:00:09
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:00:09
SCOPE:MESS:SHOW 'SPU A +15V \nSoft Start Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'SPU A +15V \nSoft Start Current Waveform, 500mA/Div' done.		21-Apr-01 18:00:09
PORTA: SPU_+/-15A ON	IFC Echo = F019		21-Apr-01 18:00:09
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C0F		21-Apr-01 18:00:09
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		21-Apr-01 18:00:10
SCOPE: HARDCOPY SPUAC15P.BMP	SPUAC15P.BMP written to Appendix.		21-Apr-01 18:00:10
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:00:10
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:00:10
PORTA: SPU_+/-15A OFF	IFC Echo = E019		21-Apr-01 18:00:10
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:00:10
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:00:10
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 18:00:10
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:00:10
SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:00:10
PORTA: SPU_+/-15A ON	IFC Echo = F019		21-Apr-01 18:00:10
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C0F		21-Apr-01 18:00:10

PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		21-Apr-01 18:00:10
SCOPE: HARDCOPY SPUAC15N.BMP	SPUAC15N.BMP written to Appendix.		21-Apr-01 18:00:10
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =6.25A, Channel B = 6.26A		21-Apr-01 18:00:10

6.12 SPU A 5V Output.

STEP 15	Mixed		
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:01:26
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:01:26
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:01:26
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:01:26
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:01:26
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:01:26
SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:01:26
PORTA: SPU_+5A ON	IFC Echo = F018		21-Apr-01 18:01:26
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =6.43A, Channel B = 6.44A		21-Apr-01 18:01:26
SCOPE: HARDCOPY SPUAC5P.BMP	SPUAC5P.BMP written to Appendix.		21-Apr-01 18:01:26
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		21-Apr-01 18:01:26
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		21-Apr-01 18:01:26
PORTA:PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.51V, Channel B = 5.5V		21-Apr-01 18:01:26
PORTA:PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		21-Apr-01 18:01:27
PORTA:PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.26V, Channel B = -15.26V		21-Apr-01 18:01:27
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:01:27

6.13 Turn on GEU Supplies.
Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power GEU from prime side. This carries out PSM-33 and PSM-30 macros.

STEP 16	Mixed		
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		21-Apr-01 18:01:52
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		21-Apr-01 18:01:52
PORTA: GEU_+5 (PR) ON	IFC Echo = F004		21-Apr-01 18:01:52
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 500F		21-Apr-01 18:01:52
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =6.62A, Channel B = 6.62A		21-Apr-01 18:01:53
PORTA: GEU_+/-15 (PR) ON	IFC Echo = F005		21-Apr-01 18:01:53
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:01:53
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =7.31A, Channel B = 7.32A		21-Apr-01 18:01:53
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.24V, Channel B = 5.24V		21-Apr-01 18:01:53
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 18:01:53
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		21-Apr-01 18:01:53
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		21-Apr-01 18:01:53
PORTA: GEU_+28QC (PR) ON	IFC Echo = F016		21-Apr-01 18:01:53
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		21-Apr-01 18:01:53
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =8.13A, Channel B = 8.13A		21-Apr-01 18:01:53

6.14 Turn on Noisy Bus

Turn on the Noisy Bus Output from the NA supply through the Prime Relay. This uses PSM-04 macro.

STEP 17	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		21-Apr-01 18:02:02
PORTA: NB (RR) OFF	IFC Echo = C01D		21-Apr-01 18:02:02
PORTA: NA (RR) OFF	IFC Echo = C01C		21-Apr-01 18:02:02
PORTA: NA (PR) ON	IFC Echo = F01C		21-Apr-01 18:02:02
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		21-Apr-01 18:02:02

6.15 Do complete telemetry check of PCU.

Now all outputs are on, do Digital Telemetry first.

STEP 18	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		21-Apr-01 18:02:15
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		21-Apr-01 18:02:15
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:02:15
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		21-Apr-01 18:02:16
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		21-Apr-01 18:02:16
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:02:16
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		21-Apr-01 18:02:16
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		21-Apr-01 18:02:16

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 19	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		21-Apr-01 18:02:45
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:02:45
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.25V, Channel B = 14.25V		21-Apr-01 18:02:45
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.88V, Channel B = -14.89V		21-Apr-01 18:02:45
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		21-Apr-01 18:02:45
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:02:45
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.13A, Channel B = 8.13A		21-Apr-01 18:02:45
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		21-Apr-01 18:02:45
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.24V, Channel B = 5.24V		21-Apr-01 18:02:45
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 18:02:45

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		21-Apr-01 18:02:45
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.91V		21-Apr-01 18:02:45
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.02V, Channel B = -0.03V		21-Apr-01 18:02:45
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:02:45
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.06V, Channel B = -0.06V		21-Apr-01 18:02:45
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		21-Apr-01 18:02:46

Analogue Telemetry block 2.

STEP 20	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.5V, Channel B = 5.5V		21-Apr-01 18:03:11
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		21-Apr-01 18:03:11
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.26V, Channel B = -15.26V		21-Apr-01 18:03:11
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		21-Apr-01 18:03:11
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		21-Apr-01 18:03:11
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		21-Apr-01 18:03:11
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:03:12
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =55.4C, Channel B = 55.1C		21-Apr-01 18:03:12
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =57.7C, Channel B = 57.4C		21-Apr-01 18:03:12
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =55.7C, Channel B = 55.7C		21-Apr-01 18:03:12

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =53.9C, Channel B = 53.9C		21-Apr-01 18:03:12
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =52.7C, Channel B = 52.7C		21-Apr-01 18:03:12
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =52.2C, Channel B = 52.4C		21-Apr-01 18:03:12
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:03:12

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 21	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =48.9C, Channel B = 48.9C		21-Apr-01 18:03:39
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =49.2C, Channel B = 49.5C		21-Apr-01 18:03:39
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =47.2C, Channel B = 47.5C		21-Apr-01 18:03:39
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:03:39
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =45.7C, Channel B = 45.7C		21-Apr-01 18:03:39
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 18:03:40
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =47.5C, Channel B = 47.5C		21-Apr-01 18:03:40
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =45.4C, Channel B = 45.1C		21-Apr-01 18:03:40
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =53.9C, Channel B = 53.9C		21-Apr-01 18:03:40
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =60.4C, Channel B = 60.7C		21-Apr-01 18:03:40

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =58.9C, Channel B = 58.9C		21-Apr-01 18:03:40
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =69.2C, Channel B = 69.4C		21-Apr-01 18:03:40
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:03:40
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =54.8C, Channel B = 54.8C		21-Apr-01 18:03:40
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =55.7C, Channel B = 55.4C		21-Apr-01 18:03:40

6.16 Do High Voltage Input Limit Test
Adjust the QA and NA supplies to upper operating voltage limit, and complete telemetry test. This table has input voltage change and digital telemetry.

STEP 22	Mixed		
QA: V=32.0V	IEEE Error, Manual operation required		21-Apr-01 18:04:13
NA: V=32.0V	IEEE Error, Manual operation required		21-Apr-01 18:04:13
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		21-Apr-01 18:04:13
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		21-Apr-01 18:04:13
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:04:13
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		21-Apr-01 18:04:13
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		21-Apr-01 18:04:13
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:04:13
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		21-Apr-01 18:04:13
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		21-Apr-01 18:04:13

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 23	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:04:40
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.24V, Channel B = 14.25V		21-Apr-01 18:04:41
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.89V, Channel B = -14.89V		21-Apr-01 18:04:41
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 18:04:41
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:04:41
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.13A, Channel B = 8.13A		21-Apr-01 18:04:41
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.04A		21-Apr-01 18:04:41
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.24V, Channel B = 5.24V		21-Apr-01 18:04:41
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		21-Apr-01 18:04:41
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.33V, Channel B = -15.32V		21-Apr-01 18:04:41

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.89V		21-Apr-01 18:04:41
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:04:41
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.06V, Channel B = -0.06V		21-Apr-01 18:04:41
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:04:41
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.14V		21-Apr-01 18:04:41

Analogue Telemetry block 2.

STEP 24	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.5V, Channel B = 5.5V		21-Apr-01 18:05:07
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		21-Apr-01 18:05:07
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.26V, Channel B = -15.27V		21-Apr-01 18:05:07
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.03V, Channel B = -0.02V		21-Apr-01 18:05:07
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:05:07
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.1V		21-Apr-01 18:05:07
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:05:07
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =55.7C, Channel B = 55.4C		21-Apr-01 18:05:07
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =57.7C, Channel B = 57.7C		21-Apr-01 18:05:07
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:05:07

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =53.9C, Channel B = 53.6C		21-Apr-01 18:05:07
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:05:08
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =52.2C, Channel B = 51.9C		21-Apr-01 18:05:08
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =52.2C, Channel B = 52.4C		21-Apr-01 18:05:08

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V Regulator temperature.

STEP 25	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =49.5C, Channel B = 49.5C		21-Apr-01 18:05:33
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =50.1C, Channel B = 50.1C		21-Apr-01 18:05:33
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =48.1C, Channel B = 47.8C		21-Apr-01 18:05:33
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =53.0C, Channel B = 53.0C		21-Apr-01 18:05:33
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =46.0C, Channel B = 46.3C		21-Apr-01 18:05:33
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =46.3C, Channel B = 46.3C		21-Apr-01 18:05:34
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =47.8C, Channel B = 47.5C		21-Apr-01 18:05:34
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =45.7C, Channel B = 45.7C		21-Apr-01 18:05:34
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =61.2C, Channel B = 61.2C		21-Apr-01 18:05:34
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =59.8C, Channel B = 59.8C		21-Apr-01 18:05:34

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =70.3C, Channel B = 70.0C		21-Apr-01 18:05:34
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =56.3C, Channel B = 56.3C		21-Apr-01 18:05:34
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =54.8C, Channel B = 54.8C		21-Apr-01 18:05:34
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =55.7C, Channel B = 55.7C		21-Apr-01 18:05:34

6.17 Do Low Operating Voltage Limit Test.
Adjust the QA and NA supplies to lower operating limit, and complete telemetry test.
This table has input voltage change and digital telemetry.

STEP 26	Mixed		
QA: V=26.0V	IEEE Error, Manual operation required		21-Apr-01 18:06:17
NA: V=26.0V	IEEE Error, Manual operation required		21-Apr-01 18:06:18
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		21-Apr-01 18:06:18
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		21-Apr-01 18:06:18
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:06:18
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		21-Apr-01 18:06:18
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		21-Apr-01 18:06:18
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:06:18
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		21-Apr-01 18:06:18
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		21-Apr-01 18:06:18

Analogue telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 27	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:06:45
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.24V, Channel B = 14.25V		21-Apr-01 18:06:45
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.84V, Channel B = -14.84V		21-Apr-01 18:06:45
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.06V		21-Apr-01 18:06:46
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:06:46
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.5A, Channel B = 8.5A		21-Apr-01 18:06:46
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.03A		21-Apr-01 18:06:46
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.24V, Channel B = 5.24V		21-Apr-01 18:06:46
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.2V, Channel B = 15.19V		21-Apr-01 18:06:46
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.33V		21-Apr-01 18:06:46

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.91V, Channel B = 29.91V		21-Apr-01 18:06:46
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:06:46
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:06:46
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:06:46
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.12V		21-Apr-01 18:06:46

Analogue Telemetry block 2.

STEP 28	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.5V, Channel B = 5.5V		21-Apr-01 18:07:12
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.16V, Channel B = 15.18V		21-Apr-01 18:07:12
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.27V, Channel B = -15.26V		21-Apr-01 18:07:12
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:07:12
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:07:12
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:07:12
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:07:12
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =55.7C, Channel B = 56.0C		21-Apr-01 18:07:12
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =58.0C, Channel B = 58.0C		21-Apr-01 18:07:12
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:07:12

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =53.6C, Channel B = 53.6C		21-Apr-01 18:07:12
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:07:12
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =51.9C, Channel B = 51.9C		21-Apr-01 18:07:12
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =52.2C, Channel B = 52.2C		21-Apr-01 18:07:12

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 29	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =49.8C, Channel B = 49.8C		21-Apr-01 18:07:38
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =50.4C, Channel B = 50.4C		21-Apr-01 18:07:38
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =48.3C, Channel B = 48.6C		21-Apr-01 18:07:38
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =53.6C, Channel B = 53.6C		21-Apr-01 18:07:38
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =46.6C, Channel B = 46.6C		21-Apr-01 18:07:38
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =46.6C, Channel B = 46.9C		21-Apr-01 18:07:38
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =48.1C, Channel B = 48.3C		21-Apr-01 18:07:39
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =46.3C, Channel B = 46.0C		21-Apr-01 18:07:39
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =62.4C, Channel B = 62.4C		21-Apr-01 18:07:39
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =60.7C, Channel B = 60.7C		21-Apr-01 18:07:39

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =70.6C, Channel B = 70.6C		21-Apr-01 18:07:39
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =56.8C, Channel B = 56.6C		21-Apr-01 18:07:39
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =55.1C, Channel B = 55.1C		21-Apr-01 18:07:39
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:07:39

6.18 Turn off all relays.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.
This table is PSM-02 macro.

STEP 30	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		21-Apr-01 18:08:37
PORTB: SPU_+5B OFF	IFC Echo = C018		21-Apr-01 18:08:37
PORTB: SPU_+/-15A OFF	IFC Echo = E019		21-Apr-01 18:08:37
PORTB: SPU_+5A OFF	IFC Echo = E018		21-Apr-01 18:08:37
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		21-Apr-01 18:08:37
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		21-Apr-01 18:08:37
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		21-Apr-01 18:08:37
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		21-Apr-01 18:08:37
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		21-Apr-01 18:08:38
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		21-Apr-01 18:08:38
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		21-Apr-01 18:08:38
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		21-Apr-01 18:08:38
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		21-Apr-01 18:08:38
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		21-Apr-01 18:08:38
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 18:08:38
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:08:38
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 18:08:38
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:08:38
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		21-Apr-01 18:08:38
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 18:08:38
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		21-Apr-01 18:08:38
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:08:38
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		21-Apr-01 18:08:38
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		21-Apr-01 18:08:38
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		21-Apr-01 18:08:38
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		21-Apr-01 18:08:38
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		21-Apr-01 18:08:38
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		21-Apr-01 18:08:38
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		21-Apr-01 18:08:38
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		21-Apr-01 18:08:38
PORTB: NA (PR) OFF	IFC Echo = E01C		21-Apr-01 18:08:38
PORTB: NA (RR) OFF	IFC Echo = C01C		21-Apr-01 18:08:38
PORTB: NB (PR) OFF	IFC Echo = E01D		21-Apr-01 18:08:38
PORTB: NB (RR) OFF	IFC Echo = C01D		21-Apr-01 18:08:38

This table is PSM-01 Macro.

STEP 31	Mixed		
PORTB: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		21-Apr-01 18:08:49
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		21-Apr-01 18:08:49
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		21-Apr-01 18:08:49
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		21-Apr-01 18:08:49
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		21-Apr-01 18:08:49
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		21-Apr-01 18:08:49

6.19 Quiet Bus C Low Voltage Detect signal

Very the operation of the +28QC_PWR Low Volts signal. Bit 15 of PSS_STATUS_06 should go high when the voltage drops below 20 volts.

STEP 32	Mixed		
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:09:33
QA: V=19.8V	IEEE Error, Manual operation required		21-Apr-01 18:09:33
NA: OFF	IEEE Error, Manual operation required		21-Apr-01 18:09:33
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:09:33
QA: V=29V	IEEE Error, Manual operation required		21-Apr-01 18:09:33
PORTA: PSS_STATUS_06			21-Apr-01 18:09:33

6.20 Status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QA (important for TVAC check at temperature extremes).

STEP 33	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		21-Apr-01 18:10:31
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.26V, Channel B = 14.26V		21-Apr-01 18:10:31
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.91V, Channel B = -14.91V		21-Apr-01 18:10:31
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.06V, Channel B = 5.07V		21-Apr-01 18:10:31
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:10:31
PORTB: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =55.7C, Channel B = 55.7C		21-Apr-01 18:10:31
PORTB: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =53.6C, Channel B = 53.6C		21-Apr-01 18:10:32
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:10:32
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:10:32
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 18:10:32
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		21-Apr-01 18:10:32
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:10:32
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:10:32

PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:10:32
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		21-Apr-01 18:10:32
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		21-Apr-01 18:10:32
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:10:32
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		21-Apr-01 18:10:33
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 18:10:33
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		21-Apr-01 18:10:33
QA: OFF	IEEE Error, Manual operation required		21-Apr-01 18:10:33

7 POWER ON PCU USING QA AND NA, ACTIVATE REDUNDANT RELAY SETS.
Enters with redundant internal supply already selected at end of previous table.

STEP 34	Mixed		
QA: V=29.0v	IEEE Error, Manual operation required		21-Apr-01 18:12:25
QB: V=29.0v	IEEE Error, Manual operation required		21-Apr-01 18:12:25
NA: V=29.0v	NA: V=29.0v Done		21-Apr-01 18:12:25
NB: V=29.0v	NB: V=29.0v Done		21-Apr-01 18:12:25
SCOPE:Select:CH1 ON	SCOPE:SELECT:CH 1 ON done.		21-Apr-01 18:12:25
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		21-Apr-01 18:12:25
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		21-Apr-01 18:12:25
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH 4 OFF done.		21-Apr-01 18:12:25
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		21-Apr-01 18:12:25
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		21-Apr-01 18:12:25
SCOPE:TRIG:A:EDGE:SLOPE RISE	SCOPE:TRIG:A:ED GE:SLOPE RISE done.		21-Apr-01 18:12:25
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEV EL 0.05 done.		21-Apr-01 18:12:26
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:P OS 20 done.		21-Apr-01 18:12:26
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOL D:TIM 2.0E-2 done.		21-Apr-01 18:12:26
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		21-Apr-01 18:12:26
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		21-Apr-01 18:12:26
SCOPE: CH2:POS -3	SCOPE:CH2:POS -3 done.		21-Apr-01 18:12:26
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:12:26

SCOPE:MESS:SHOW 'QA Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QA Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		21-Apr-01 18:12:26
QA: ON	IEEE Error, Manual operation required		21-Apr-01 18:12:26
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:12:26
SCOPE: HARDCOPY INRUSHAR.BMP	INRUSHAR.BMP written to Appendix.		21-Apr-01 18:12:26
QA: IO?	Current IEEE Timeout		21-Apr-01 18:12:26
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.38A, Channel B = 1.38A		21-Apr-01 18:12:26
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		21-Apr-01 18:12:26

7.1 Power On telemetry verification.

STEP 35	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.09V		21-Apr-01 18:12:53
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.31V, Channel B = 14.31V		21-Apr-01 18:12:53
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.08V, Channel B = -15.08V		21-Apr-01 18:12:53
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:12:53
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 18:12:54
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =53.6C, Channel B = 53.6C		21-Apr-01 18:12:54
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =54.5C, Channel B = 54.5C		21-Apr-01 18:12:54
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:12:54
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:12:54
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:12:54
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		21-Apr-01 18:12:54
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:12:54
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:12:54
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		21-Apr-01 18:12:55

PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		21-Apr-01 18:12:55

7.2 Turn on QC, with redundant relay

STEP 36	Mixed		
PORTA: QA (RR) ON	IFC Echo = D00A		21-Apr-01 18:13:10
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:13:10
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:13:10
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:13:11
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		21-Apr-01 18:13:11
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:13:11
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:13:11
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:13:11
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		21-Apr-01 18:13:11

7.3 Power on System Converters, - Redundant set.
Power on using PSM-14 and PSM-16. Outputs need to be selected using redundant relay set. Telemetry checks done between and after macros.

STEP 37	Mixed		
NA: ON	NA: ON Done		21-Apr-01 18:14:38
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		21-Apr-01 18:14:39
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:14:39
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 18:14:39
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:14:39
SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:14:39
PORTA: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		21-Apr-01 18:14:39
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		21-Apr-01 18:14:39
SCOPE: HARDCOPY SYS1BQA.BMP	SYS1BQA.BMP written to Appendix.		21-Apr-01 18:14:39
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.34V		21-Apr-01 18:14:39
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =30.0V, Channel B = 30.0V		21-Apr-01 18:14:39
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.57A, Channel B = 1.57A		21-Apr-01 18:14:39
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		21-Apr-01 18:14:39
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:14:39
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 18:14:39

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:14:40
SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:14:40
PORTA: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		21-Apr-01 18:14:40
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A012		21-Apr-01 18:14:40
SCOPE: HARDCOPY SYS2BQA.BMP	SYS2BQA.BMP written to Appendix.		21-Apr-01 18:14:40
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.64A, Channel B = 1.64A		21-Apr-01 18:14:40
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.25V, Channel B = 15.25V		21-Apr-01 18:14:40
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.38V, Channel B = -15.38V		21-Apr-01 18:14:40
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		21-Apr-01 18:14:40
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH2 ON done.		21-Apr-01 18:14:40
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		21-Apr-01 18:14:40

7.4 TEU A – Redundant Output relays – 28V and 5V.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through redundant relays. This carries out PSM-19, PSM43, and PSM-46 macros with telemetry checks between macros.

STEP 38	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		21-Apr-01 18:16:03
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		21-Apr-01 18:16:03
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		21-Apr-01 18:16:03
PORTA: A_TEU_+28QC (RR) ON	IFC Echo = D014		21-Apr-01 18:16:03
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0005		21-Apr-01 18:16:03
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.27A, Channel B = 2.28A		21-Apr-01 18:16:03
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:16:03
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		21-Apr-01 18:16:03
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		21-Apr-01 18:16:03
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:16:03
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:16:03
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:16:03
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:16:03
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:16:03
SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:16:03
PORTA: A_TEU_+5 (RR) ON	IFC Echo = D00C		21-Apr-01 18:16:03
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A017		21-Apr-01 18:16:04
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		21-Apr-01 18:16:04
SCOPE:HARDCOPY TEUAC6.BMP	TEUAC6.BMP written to Appendix.		21-Apr-01 18:16:04

PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.29V, Channel B = 5.29V		21-Apr-01 18:16:04
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.53A, Channel B = 2.53A		21-Apr-01 18:16:04
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:16:04
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 18:16:04
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 18:16:04
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:16:04

7.5 TEU A Redundant relays - +/-15V.

STEP 39	Mixed		
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:18:09
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:18:09
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:18:09
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:18:09
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:18:09
SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:18:09
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		21-Apr-01 18:18:09
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		21-Apr-01 18:18:09
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		21-Apr-01 18:18:10
SCOPE:HARDCOPY TEUAC7.BMP	TEUAC7.BMP written to Appendix.		21-Apr-01 18:18:10
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:18:10
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:18:10
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		21-Apr-01 18:18:10
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 18:18:10
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:18:10
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:18:10
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:18:10

SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:18:10
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		21-Apr-01 18:18:10
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		21-Apr-01 18:18:10
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		21-Apr-01 18:18:10
SCOPE:HARDCOPY TEUAC8.BMP	TEUAC8.BMP written to Appendix.		21-Apr-01 18:18:10
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.94A, Channel B = 2.94A		21-Apr-01 18:18:10
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.24V, Channel B = 15.24V		21-Apr-01 18:18:10
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.36V, Channel B = -15.37V		21-Apr-01 18:18:11
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:18:11

7.6 EEA – Redundant Relays.

Turns on supplies in order specified in C&TH Vol1 part 2 section 5.5.1 to supply EEA through redundant relays. This carries out PSM-57 macro with interspersed telemetry checks.

STEP 40	Mixed		
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		21-Apr-01 18:22:34
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		21-Apr-01 18:22:34
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:22:34
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:22:34
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:22:34
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:22:34
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:22:34
SCOPE:MESS:SHOW 'EEA 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:22:34
PORTA: EEA_+5 (RR) ON	IFC Echo = D008		21-Apr-01 18:22:34
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		21-Apr-01 18:22:35
SCOPE:HARDCOPY EEA5VR.BMP	EEA5VR.BMP written to Appendix.		21-Apr-01 18:22:35
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.03A, Channel B = 3.03A		21-Apr-01 18:22:35
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:22:35
Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:22:35
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:22:35
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:22:35
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:22:35

SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:22:35
SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:22:35
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		21-Apr-01 18:22:35
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:22:35
SCOPE:HARDCOPY EEA15PRV.BMP	EEA15PRV.BMP written to Appendix.		21-Apr-01 18:22:35
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		21-Apr-01 18:22:35
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:22:35
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:22:36
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 18:22:36
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:22:36
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:22:36
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:22:36
SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:22:36
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		21-Apr-01 18:22:36
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:22:36
SCOPE:HARDCOPY EEA15NRV.BMP	EEA15NRV.BMP written to Appendix.		21-Apr-01 18:22:36
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.11A, Channel B = 3.12A		21-Apr-01 18:22:36
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.27V, Channel B = 5.27V		21-Apr-01 18:22:36

PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.24V		21-Apr-01 18:22:36
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.36V, Channel B = -15.36V		21-Apr-01 18:22:36
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:22:36

7.7 IPU 28 Volt Regulated supply – Redundant relay.
Turns on supply in order specified in C&TH Vol1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through redundant relays. This carries out PSM-25 macro.

STEP 41	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		21-Apr-01 18:23:43
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		21-Apr-01 18:23:43
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		21-Apr-01 18:23:43
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		21-Apr-01 18:23:43
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 18:23:43
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:23:44
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:23:44
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:23:44
SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) \nStart Current Waveform, 500mA/Div' done.		21-Apr-01 18:23:44
PORTA: A_IPU_+28REG (RR) ON	IFC Echo = D002		21-Apr-01 18:23:44
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		21-Apr-01 18:23:44
SCOPE:HARDCOPY IPUA2.BMP	IPUA2.BMP written to Appendix.		21-Apr-01 18:23:44
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.89V, Channel B = 29.89V		21-Apr-01 18:23:44
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =5.02A, Channel B = 5.02A		21-Apr-01 18:23:44
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		21-Apr-01 18:23:44

7.8 Power On SPU B Supplies
Turn on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side B using PSM-12 and PSM-40 macros.

STEP 42	Mixed		
Change SPU load box cable to Side B at load box.	ok		21-Apr-01 18:28:04
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		21-Apr-01 18:28:04
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		21-Apr-01 18:28:04
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		21-Apr-01 18:28:04
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		21-Apr-01 18:28:04
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:28:05
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		21-Apr-01 18:28:05
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:28:05
SCOPE:MESS:SHOW 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:28:05
PORTA: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		21-Apr-01 18:28:05
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry A012		21-Apr-01 18:28:05
SCOPE: HARDCOPY SPUBQA.BMP	SPUBQA.BMP written to Appendix.		21-Apr-01 18:28:05
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =5.11A, Channel B = 5.11A		21-Apr-01 18:28:05
PORTA: SPU_+5A OFF	IFC Echo = E018		21-Apr-01 18:28:05
PORTA: SPU_+/-15A OFF	IFC Echo = E019		21-Apr-01 18:28:05
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		21-Apr-01 18:28:05
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		21-Apr-01 18:28:05

SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		21-Apr-01 18:28:05
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		21-Apr-01 18:28:05
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 18:28:05
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:28:06
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:28:06
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:28:06
SCOPE:MESS:SHOW 'SPU Converter B +15V \nSoft Start Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B +15V \nSoft Start Current Waveform, 500mA/Div' done.		21-Apr-01 18:28:06
PORTA: SPU_+/-15B ON	IFC Echo = D019		21-Apr-01 18:28:06
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		21-Apr-01 18:28:06
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		21-Apr-01 18:28:06
SCOPE: HARDCOPY SPUBC15P.BMP	SPUBC15P.BMP written to Appendix.		21-Apr-01 18:28:06
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:28:06
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:28:06
PORTA: SPU_+/-15B OFF	IFC Echo = C019		21-Apr-01 18:28:06
On Load Box select "V" position of SPU +15V load switch and remove loop.	ok		21-Apr-01 18:28:06
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:28:06
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 18:28:06
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:28:06
SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:28:06

PORTA: SPU_+/-15B ON	IFC Echo = D019		21-Apr-01 18:28:06
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		21-Apr-01 18:28:06
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		21-Apr-01 18:28:07
SCOPE: HARDCOPY SPUBC15N.BMP	SPUBC15N.BMP written to Appendix.		21-Apr-01 18:28:07
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.24A, Channel B = 6.24A		21-Apr-01 18:28:07
On Load Box select "V" position of SPU -15V load switch and remove loop.	ok		21-Apr-01 18:28:07
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:28:07
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:28:07
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:28:07
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:28:07
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:28:07
SCOPE:MESS:SHOW 'SPU Converter B 5V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B 5V \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:28:07
PORTA: SPU_+5B ON	IFC Echo = D018		21-Apr-01 18:28:07
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		21-Apr-01 18:28:07
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE12		21-Apr-01 18:28:07
SCOPE: HARDCOPY SPUBC5.BMP	SPUBC5.BMP written to Appendix.		21-Apr-01 18:28:08
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.43A, Channel B = 6.43A		21-Apr-01 18:28:08
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.46V, Channel B = 5.46V		21-Apr-01 18:28:08

PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		21-Apr-01 18:28:08
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		21-Apr-01 18:28:08
On Load Box select "V" position of SPU 5V load switch and remove loop.	ok		21-Apr-01 18:28:08

7.9 Turn on GEU Supplies.
Turns on GEU supplies in order specified in C&TH Vol1 Part 2 section 5.5.5 to power GEU from prime side.

STEP 43	Mixed		
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		21-Apr-01 18:28:35
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		21-Apr-01 18:28:35
PORTA: GEU_+5 (RR) ON	IFC Echo = D004		21-Apr-01 18:28:35
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE17		21-Apr-01 18:28:35
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.61A, Channel B = 6.61A		21-Apr-01 18:28:35
PORTA: GEU_+/-15 (RR) ON	IFC Echo = D005		21-Apr-01 18:28:35
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		21-Apr-01 18:28:35
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.3A, Channel B = 7.3A		21-Apr-01 18:28:35
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 18:28:35
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.21V, Channel B = 15.21V		21-Apr-01 18:28:35
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.33V		21-Apr-01 18:28:35
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		21-Apr-01 18:28:35
PORTA: GEU_+28QC (RR) ON	IFC Echo = D016		21-Apr-01 18:28:35
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		21-Apr-01 18:28:35
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.12A, Channel B = 8.12A		21-Apr-01 18:28:36

7.10 Turn on Noisy Bus – Redundant relay
Turn on the Noisy Bus Output from the NA supply through the Redundant Relay.

STEP 44	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		21-Apr-01 18:28:44
PORTA: NB (RR) OFF	IFC Echo = C01D		21-Apr-01 18:28:44
PORTA: NA (PR) OFF	IFC Echo = E01C		21-Apr-01 18:28:44
PORTA: NA (RR) ON	IFC Echo = D01C		21-Apr-01 18:28:44
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:28:44

7.11 Do complete telemetry check of PCU now all outputs are on.

STEP 45	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		21-Apr-01 18:28:58
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		21-Apr-01 18:28:58
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		21-Apr-01 18:28:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:28:58
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		21-Apr-01 18:28:59
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:28:59
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		21-Apr-01 18:28:59
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		21-Apr-01 18:28:59

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 46	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		21-Apr-01 18:29:29
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:29:29
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.29V, Channel B = 14.29V		21-Apr-01 18:29:29
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.18V, Channel B = -15.18V		21-Apr-01 18:29:29
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:29:29
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.06V		21-Apr-01 18:29:29
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.12A, Channel B = 8.12A		21-Apr-01 18:29:29
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		21-Apr-01 18:29:29
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.02V		21-Apr-01 18:29:29
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.06V		21-Apr-01 18:29:29

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.06V, Channel B = -0.06V		21-Apr-01 18:29:29
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.08V, Channel B = -0.1V		21-Apr-01 18:29:29
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 18:29:29
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.21V		21-Apr-01 18:29:29
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.33V		21-Apr-01 18:29:29
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.87V, Channel B = 29.89V		21-Apr-01 18:29:30

Analogue Telemetry block 2.

STEP 47	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		21-Apr-01 18:29:56
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.09V, Channel B = -0.1V		21-Apr-01 18:29:56
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.1V		21-Apr-01 18:29:56
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.46V, Channel B = 5.46V		21-Apr-01 18:29:56
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		21-Apr-01 18:29:56
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.28V, Channel B = -15.29V		21-Apr-01 18:29:56
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:29:56
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 18:29:56
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 18:29:56
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =49.8C, Channel B = 49.8C		21-Apr-01 18:29:56

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =55.4C, Channel B = 55.1C		21-Apr-01 18:29:57
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =54.2C, Channel B = 53.9C		21-Apr-01 18:29:57
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =56.6C, Channel B = 56.6C		21-Apr-01 18:29:57
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =54.8C, Channel B = 55.1C		21-Apr-01 18:29:57

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 48	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =46.3C, Channel B = 46.6C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =47.2C, Channel B = 47.2C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =46.9C, Channel B = 46.9C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =51.9C, Channel B = 51.9C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =49.2C, Channel B = 48.9C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =50.4C, Channel B = 50.4C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:30:25
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =53.3C, Channel B = 53.3C		21-Apr-01 18:30:25
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =58.9C, Channel B = 59.2C		21-Apr-01 18:30:25

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =57.7C, Channel B = 57.7C		21-Apr-01 18:30:26
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =55.4C, Channel B = 55.4C		21-Apr-01 18:30:26
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =68.0C, Channel B = 68.3C		21-Apr-01 18:30:26
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =53.9C, Channel B = 53.9C		21-Apr-01 18:30:26
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:30:26

7.12 Do High Voltage Input Limit Test
Adjust the QA and NA supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 49	Mixed		
QA:V= 32.0V	IEEE Error, Manual operation required		21-Apr-01 18:30:48
NA:V= 32.0V	NA:V= 32.0V Done		21-Apr-01 18:30:48
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		21-Apr-01 18:30:48
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		21-Apr-01 18:30:48
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		21-Apr-01 18:30:48
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:30:48
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		21-Apr-01 18:30:48
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:30:48
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		21-Apr-01 18:30:48
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		21-Apr-01 18:30:48

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 50	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:31:16
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.28V, Channel B = 14.28V		21-Apr-01 18:31:16
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.08V, Channel B = -15.08V		21-Apr-01 18:31:16
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:31:16
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 18:31:16
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.91A, Channel B = 7.91A		21-Apr-01 18:31:16
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		21-Apr-01 18:31:17
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:31:17
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.08V		21-Apr-01 18:31:17
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:31:17

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:31:17
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 18:31:17
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 18:31:17
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		21-Apr-01 18:31:17
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.87V, Channel B = 29.87V		21-Apr-01 18:31:17

Analogue Telemetry block 2.

STEP 51	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:31:43
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:31:43
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:31:43
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.46V, Channel B = 5.46V		21-Apr-01 18:31:43
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		21-Apr-01 18:31:43
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		21-Apr-01 18:31:43
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =52.4C, Channel B = 52.2C		21-Apr-01 18:31:44
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 18:31:44
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 18:31:44
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =49.8C, Channel B = 49.8C		21-Apr-01 18:31:44

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =55.4C, Channel B = 55.4C		21-Apr-01 18:31:44
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =54.8C, Channel B = 54.8C		21-Apr-01 18:31:44
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =56.8C, Channel B = 57.1C		21-Apr-01 18:31:44
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =55.4C, Channel B = 55.4C		21-Apr-01 18:31:44

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 52	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =46.6C, Channel B = 46.6C		21-Apr-01 18:32:10
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =47.5C, Channel B = 47.5C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =46.3C, Channel B = 46.3C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =46.9C, Channel B = 46.9C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =52.7C, Channel B = 52.7C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =49.5C, Channel B = 49.5C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =51.0C, Channel B = 51.0C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =52.7C, Channel B = 53.0C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =60.1C, Channel B = 60.1C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =58.3C, Channel B = 58.3C		21-Apr-01 18:32:11

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =55.7C, Channel B = 55.4C		21-Apr-01 18:32:11
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =68.9C, Channel B = 68.9C		21-Apr-01 18:32:12
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =53.9C, Channel B = 53.9C		21-Apr-01 18:32:12
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =56.3C, Channel B = 56.0C		21-Apr-01 18:32:12

7.13 Do Low Operating Voltage Limit Test.
Adjust the QA and NA supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 53	Mixed		
QA: V=26.0V	IEEE Error, Manual operation required		21-Apr-01 18:32:32
NA: V=26.0V	NA: V=26.0V Done		21-Apr-01 18:32:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:33
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:33
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:33
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		21-Apr-01 18:32:33

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 54	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:33:01
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.27V, Channel B = 14.29V		21-Apr-01 18:33:01
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.09V, Channel B = -15.09V		21-Apr-01 18:33:01
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:33:01
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 18:33:01
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.48A, Channel B = 8.48A		21-Apr-01 18:33:01
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		21-Apr-01 18:33:01
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:33:01
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:33:01
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:33:01

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:33:01
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 18:33:02
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 18:33:02
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		21-Apr-01 18:33:02
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.89V, Channel B = 29.89V		21-Apr-01 18:33:02

Analogue Telemetry block 2.

STEP 55	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:33:28
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:33:28
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:33:28
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.46V, Channel B = 5.46V		21-Apr-01 18:33:28
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.16V, Channel B = 15.17V		21-Apr-01 18:33:28
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		21-Apr-01 18:33:28
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =52.2C, Channel B = 52.4C		21-Apr-01 18:33:28
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =51.9C, Channel B = 51.9C		21-Apr-01 18:33:28
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 18:33:28
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =49.8C, Channel B = 49.8C		21-Apr-01 18:33:28

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =55.4C, Channel B = 55.4C		21-Apr-01 18:33:29
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =55.1C, Channel B = 54.8C		21-Apr-01 18:33:29
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =57.4C, Channel B = 57.1C		21-Apr-01 18:33:29
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =55.7C, Channel B = 55.7C		21-Apr-01 18:33:29

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 56	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =46.9C, Channel B = 46.9C		21-Apr-01 18:33:55
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =47.5C, Channel B = 47.5C		21-Apr-01 18:33:55
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =46.6C, Channel B = 46.6C		21-Apr-01 18:33:55
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =47.2C, Channel B = 47.5C		21-Apr-01 18:33:55
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =52.2C, Channel B = 52.4C		21-Apr-01 18:33:55
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =49.5C, Channel B = 49.8C		21-Apr-01 18:33:56
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =51.0C, Channel B = 51.0C		21-Apr-01 18:33:56
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =53.0C, Channel B = 53.0C		21-Apr-01 18:33:56
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =61.2C, Channel B = 60.9C		21-Apr-01 18:33:56
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =59.2C, Channel B = 59.5C		21-Apr-01 18:33:56

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =55.7C, Channel B = 55.7C		21-Apr-01 18:33:56
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =69.4C, Channel B = 69.4C		21-Apr-01 18:33:56
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =53.9C, Channel B = 53.9C		21-Apr-01 18:33:57
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =56.3C, Channel B = 56.6C		21-Apr-01 18:33:57

7.14 Turn off all relays.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.
This table is PSM-02 macro.

STEP 57	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		21-Apr-01 18:34:56
PORTB: SPU_+5B OFF	IFC Echo = C018		21-Apr-01 18:34:56
PORTB: SPU_+/-15A OFF	IFC Echo = E019		21-Apr-01 18:34:56
PORTB: SPU_+5A OFF	IFC Echo = E018		21-Apr-01 18:34:56
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		21-Apr-01 18:34:56
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		21-Apr-01 18:34:57
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		21-Apr-01 18:34:57
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		21-Apr-01 18:34:57
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		21-Apr-01 18:34:57
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		21-Apr-01 18:34:57
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		21-Apr-01 18:34:57
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		21-Apr-01 18:34:57
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		21-Apr-01 18:34:57
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		21-Apr-01 18:34:57
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 18:34:57
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:34:57
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 18:34:57
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:34:57
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		21-Apr-01 18:34:57
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 18:34:57
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		21-Apr-01 18:34:57
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:34:57
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		21-Apr-01 18:34:57
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		21-Apr-01 18:34:57
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		21-Apr-01 18:34:57
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		21-Apr-01 18:34:57
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		21-Apr-01 18:34:57
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		21-Apr-01 18:34:57
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		21-Apr-01 18:34:57
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		21-Apr-01 18:34:57
PORTB: NA (PR) OFF	IFC Echo = E01C		21-Apr-01 18:34:57
PORTB: NA (RR) OFF	IFC Echo = C01C		21-Apr-01 18:34:57
PORTB: NB (PR) OFF	IFC Echo = E01D		21-Apr-01 18:34:57
PORTB: NB (RR) OFF	IFC Echo = C01D		21-Apr-01 18:34:57

This table is PSM-01 Macro.

STEP 58	Mixed		
PORTB:SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		21-Apr-01 18:35:08
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		21-Apr-01 18:35:08
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		21-Apr-01 18:35:08
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		21-Apr-01 18:35:08
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		21-Apr-01 18:35:08
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		21-Apr-01 18:35:08

7.15 Do status check and turn off QC bus relay.

STEP 59	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:35:40
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.3V, Channel B = 14.3V		21-Apr-01 18:35:40
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.23V, Channel B = -15.23V		21-Apr-01 18:35:40
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:35:40
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 18:35:40
PORTB: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =52.7C, Channel B = 52.7C		21-Apr-01 18:35:40

PORTB: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =55.7C, Channel B = 55.7C		21-Apr-01 18:35:40
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:35:41
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:35:41
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:35:41
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		21-Apr-01 18:35:41
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:35:41
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:35:41
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:35:41
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		21-Apr-01 18:35:42
NA: OFF	NA: OFF Done		21-Apr-01 18:35:42
QA: OFF	IEEE Error, Manual operation required		21-Apr-01 18:35:42

8 DO ALL TESTS WITH QB AND NB, SYS1 PRIMARY AND SYS2 REDUNDANT SUPPLIES.

Enters with Primary Internal Supply connected to QB from previous test block.

STEP 60	Mixed		
Move scope CH1 current probe to QB Supply lead	ok		21-Apr-01 18:37:23
Change IPU load box cable to Side B at load box.	ok		21-Apr-01 18:37:23
QA: V=29.0v	QA: V=29.0v Done		21-Apr-01 18:37:23
QB: V=29.0v	QB: V=29.0v Done		21-Apr-01 18:37:23
NA: V=29.0v	NA: V=29.0v Done		21-Apr-01 18:37:23
NB: V=29.0v	NB: V=29.0v Done		21-Apr-01 18:37:23
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		21-Apr-01 18:37:23
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:POS 20 done.		21-Apr-01 18:37:23
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		21-Apr-01 18:37:23
SCOPE: CH1:POS –3	SCOPE:CH1:POS –3 done.		21-Apr-01 18:37:23
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		21-Apr-01 18:37:23
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		21-Apr-01 18:37:23
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 18:37:23
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		21-Apr-01 18:37:24
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:37:24
SCOPE:MESS:SHOW 'QB Prime Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Prime Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		21-Apr-01 18:37:24
QB: ON	QB: ON Done		21-Apr-01 18:37:24
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 18:37:24
SCOPE: HARDCOPY INRUSHBP.BMP	INRUSHBP.BMP written to Appendix.		21-Apr-01 18:37:24
QB: IO?	Current 1.41A		21-Apr-01 18:37:24

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.37A, Channel B = 1.37A		21-Apr-01 18:37:24
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		21-Apr-01 18:37:24

8.1 Power On telemetry verification.

STEP 61	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.08V		21-Apr-01 18:37:52
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.27V, Channel B = 14.27V		21-Apr-01 18:37:52
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.83V, Channel B = -14.83V		21-Apr-01 18:37:52
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.06V		21-Apr-01 18:37:52
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:37:52
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =53.3C, Channel B = 53.3C		21-Apr-01 18:37:53
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =53.6C, Channel B = 53.3C		21-Apr-01 18:37:53
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:37:53
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:37:53
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 18:37:53
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		21-Apr-01 18:37:53
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:37:53
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:37:53
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		21-Apr-01 18:37:54

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		21-Apr-01 18:37:54

8.2 QC Power On with QB Prime relay.
Carries out PSM-60 macro, and then relevant telemetry.

STEP 62	Mixed		
PORTB: QB (PR) ON	IFC Echo = F00B		21-Apr-01 18:38:10
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:38:11
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:38:11
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 18:38:11
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		21-Apr-01 18:38:11
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:38:11
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:38:12
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:38:12
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		21-Apr-01 18:38:12

8.3 System Converters, Prime SYS1 and Redundant SYS2.
Power on SYS1A and SYS2B converters using PSM-13 and PSM-16. Outputs need to be selected using prime relay set for 5V and 28V, and redundant relay set for +/-15V. Telemetry checks done between and after macros.

STEP 63	Mixed		
NB: ON	NB: ON Done		21-Apr-01 18:39:41
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		21-Apr-01 18:39:41
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:39:41
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 18:39:41
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:39:41
SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:39:41
PORTB: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		21-Apr-01 18:39:41
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		21-Apr-01 18:39:41
SCOPE: HARDCOPY SYS1AQB.BMP	SYS1AQB.BMP written to Appendix.		21-Apr-01 18:39:41
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.56A, Channel B = 1.56A		21-Apr-01 18:39:41
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.35V, Channel B = 5.35V		21-Apr-01 18:39:41
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =30.02V, Channel B = 30.04V		21-Apr-01 18:39:42
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		21-Apr-01 18:39:42
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:39:42
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 18:39:42

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:39:42
SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:39:42
PORTB: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		21-Apr-01 18:39:42
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		21-Apr-01 18:39:42
SCOPE: HARDCOPY SYS2BQB.BMP	SYS2BQB.BMP written to Appendix.		21-Apr-01 18:39:42
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.64A, Channel B = 1.64A		21-Apr-01 18:39:42
PORTB: PSSV12;+15Volt DC-DC Converter SYS B	IFC Echo = 000D, Telemetry Channel A =15.25V, Channel B = 15.25V		21-Apr-01 18:39:42
PORTB: PSSV14;-15Volt DC-DC Converter SYS B	IFC Echo = 000E, Telemetry Channel A =-15.38V, Channel B = -15.38V		21-Apr-01 18:39:43
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		21-Apr-01 18:39:43
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		21-Apr-01 18:39:43
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		21-Apr-01 18:39:43

8.4 TEU B – Prime relays – 28V and 5V.

Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-21, PSM48, and PSM-52 macros with telemetry checks between macros.

STEP 64	Mixed		
Change TEU load box cable to Side B at load box.	ok		21-Apr-01 18:41:26
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		21-Apr-01 18:41:26
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		21-Apr-01 18:41:26
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		21-Apr-01 18:41:26
PORTB: B_TEU_+28QC (PR) ON	IFC Echo = F015		21-Apr-01 18:41:27
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0030		21-Apr-01 18:41:27
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.27A, Channel B = 2.27A		21-Apr-01 18:41:27
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		21-Apr-01 18:41:27
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:41:27
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 18:41:27
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:41:27
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:41:27
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:41:27
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:41:27
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:41:27
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:41:27
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:41:27
SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:41:27
PORTB: B_TEU_+5 (PR) ON	IFC Echo = F010		21-Apr-01 18:41:27
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		21-Apr-01 18:41:27
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0017		21-Apr-01 18:41:27
SCOPE:HARDCOPY TEUBC2.BMP	TEUBC2.BMP written to Appendix.		21-Apr-01 18:41:27

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.52A, Channel B = 2.52A		21-Apr-01 18:41:28
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		21-Apr-01 18:41:28
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 18:41:28
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:41:28
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:41:28
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:41:28

8.5 TEU B Redundant Relays - +/-15V.

STEP 65	Mixed		
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:43:33
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:43:33
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 18:43:33
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:43:33
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:43:33
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:43:33
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:43:33
SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:43:33
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		21-Apr-01 18:43:34
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		21-Apr-01 18:43:34
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 18:43:34
SCOPE:HARDCOPY TEUBC3.BMP	TEUBC3.BMP written to Appendix.		21-Apr-01 18:43:34
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 18:43:34
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:43:34
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		21-Apr-01 18:43:34
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 18:43:34
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:43:34
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:43:34
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:43:34

SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:43:34
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		21-Apr-01 18:43:34
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		21-Apr-01 18:43:34
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 18:43:35
SCOPE:HARDCOPY TEUBC4.BMP	TEUBC4.BMP written to Appendix.		21-Apr-01 18:43:35
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.93A, Channel B = 2.93A		21-Apr-01 18:43:35
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.24V, Channel B = 15.24V		21-Apr-01 18:43:35
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.37V, Channel B = -15.37V		21-Apr-01 18:43:35
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		21-Apr-01 18:43:35

8.6 Turn on EEA.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1.
Primary and Redundant measurements already made. No A or B selection.

STEP 66	Mixed		
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		21-Apr-01 18:43:54
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		21-Apr-01 18:43:54
PORTB: EEA_+5 (PR) ON	IFC Echo = F008		21-Apr-01 18:43:54
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		21-Apr-01 18:43:54
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.02A, Channel B = 3.02A		21-Apr-01 18:43:54
PORTB: EEA_+/-15 (RR) ON	IFC Echo = D009		21-Apr-01 18:43:54
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:43:54
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.11A, Channel B = 3.11A		21-Apr-01 18:43:54
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.27V, Channel B = 5.27V		21-Apr-01 18:43:54
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.23V, Channel B = 15.23V		21-Apr-01 18:43:54
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.37V, Channel B = -15.37V		21-Apr-01 18:43:55

8.7 Turn on IPU Regulated 28 Volt Supply
Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B Regulated 28 volts through prime relays. This carries out PSM-27 macro.

STEP 67	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		21-Apr-01 18:45:04
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		21-Apr-01 18:45:04
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		21-Apr-01 18:45:04
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		21-Apr-01 18:45:04
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 18:45:04
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:45:04
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:45:04
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:45:04
SCOPE:MESS:SHOW 'IPU B 28VReg (Prime) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU B 28VReg (Prime) \nStart Current Waveform, 500mA/Div' done.		21-Apr-01 18:45:04
PORTB: B_IPU_+28REG (PR) ON	IFC Echo = F003		21-Apr-01 18:45:04
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5039		21-Apr-01 18:45:05
SCOPE:HARDCOPY IPUB1.BMP	IPUB1.BMP written to Appendix.		21-Apr-01 18:45:05
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		21-Apr-01 18:45:05
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =4.99A, Channel B = 4.99A		21-Apr-01 18:45:05
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		21-Apr-01 18:45:05

8.8 Power on SPU A Supplies from QB.
Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-10 and PSM-38 macros.

STEP 68	Mixed		
Change SPU load box cable to Side A at load box.	ok		21-Apr-01 18:46:36
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		21-Apr-01 18:46:36
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		21-Apr-01 18:46:36
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		21-Apr-01 18:46:36
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		21-Apr-01 18:46:36
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:46:36
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		21-Apr-01 18:46:36
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:46:36
SCOPE:MESS:SHOW 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:46:36
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		21-Apr-01 18:46:36
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		21-Apr-01 18:46:36
SCOPE: HARDCOPY SPUAQB.BMP	SPUAQB.BMP written to Appendix.		21-Apr-01 18:46:37
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.09A, Channel B = 5.09A		21-Apr-01 18:46:37
PORTB: SPU_+5B OFF	IFC Echo = C018		21-Apr-01 18:46:37
PORTB: SPU_+/-15B OFF	IFC Echo = C019		21-Apr-01 18:46:37
PORTB: SPU_+/-15A ON	IFC Echo = F019		21-Apr-01 18:46:37
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C39		21-Apr-01 18:46:37

PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		21-Apr-01 18:46:37
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.21A, Channel B = 6.21A		21-Apr-01 18:46:37
PORTB: SPU_+5A ON	IFC Echo = F018		21-Apr-01 18:46:37
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		21-Apr-01 18:46:37
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		21-Apr-01 18:46:37
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.4A, Channel B = 6.4A		21-Apr-01 18:46:37
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		21-Apr-01 18:46:37
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		21-Apr-01 18:46:37
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		21-Apr-01 18:46:38

8.9 GEU Supplies – Prime and Redundant relays.
Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5.
This carries out PSM-34 and PSM-30 macros.

STEP 69	Mixed		
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		21-Apr-01 18:47:03
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		21-Apr-01 18:47:03
PORTB: GEU_+5 (PR) ON	IFC Echo = F004		21-Apr-01 18:47:03
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		21-Apr-01 18:47:04
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.58A, Channel B = 6.58A		21-Apr-01 18:47:04
PORTB: GEU_+/-15 (RR) ON	IFC Echo = D005		21-Apr-01 18:47:04
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:47:04
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.26A, Channel B = 7.26A		21-Apr-01 18:47:04
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.24V, Channel B = 5.24V		21-Apr-01 18:47:04
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.21V, Channel B = 15.21V		21-Apr-01 18:47:04
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.33V, Channel B = -15.33V		21-Apr-01 18:47:05
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		21-Apr-01 18:47:05
PORTB: GEU_+28QC (PR) ON	IFC Echo = F016		21-Apr-01 18:47:05
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		21-Apr-01 18:47:05
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.07A, Channel B = 8.07A		21-Apr-01 18:47:05

8.10 Turn on Noisy Bus.
Turn on the Noisy Bus Output from the NB supply through the Prime Relay.

STEP 70	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		21-Apr-01 18:47:13
PORTB: NA (RR) OFF	IFC Echo = C01C		21-Apr-01 18:47:13
PORTB: NB (RR) OFF	IFC Echo = C01D		21-Apr-01 18:47:13
PORTB: NB (PR) ON	IFC Echo = F01D		21-Apr-01 18:47:13
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		21-Apr-01 18:47:14

8.11 Do complete telemetry check of PCU.

STEP 71	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		21-Apr-01 18:47:27
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		21-Apr-01 18:47:27
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:47:27
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		21-Apr-01 18:47:27
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 18:47:27
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:47:27
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		21-Apr-01 18:47:27
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		21-Apr-01 18:47:27

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 72	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		21-Apr-01 18:47:56
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:47:56
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.25V, Channel B = 14.25V		21-Apr-01 18:47:56
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.88V, Channel B = -14.88V		21-Apr-01 18:47:56
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		21-Apr-01 18:47:56
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:47:56
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.03A, Channel B = -0.02A		21-Apr-01 18:47:56
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.07A, Channel B = 8.07A		21-Apr-01 18:47:56
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.23V, Channel B = 5.24V		21-Apr-01 18:47:56
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.06V		21-Apr-01 18:47:57

PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.06V		21-Apr-01 18:47:57
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		21-Apr-01 18:47:57
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.02V, Channel B = -0.02V		21-Apr-01 18:47:57
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.21V, Channel B = 15.21V		21-Apr-01 18:47:57
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.33V		21-Apr-01 18:47:57
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.1V, Channel B = -0.12V		21-Apr-01 18:47:57

Analogue Telemetry block 2.

STEP 73	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.51V, Channel B = 5.51V		21-Apr-01 18:48:22
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		21-Apr-01 18:48:22
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.26V, Channel B = -15.26V		21-Apr-01 18:48:22
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		21-Apr-01 18:48:22
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		21-Apr-01 18:48:22
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		21-Apr-01 18:48:23
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =54.5C, Channel B = 54.5C		21-Apr-01 18:48:23
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =53.3C, Channel B = 53.0C		21-Apr-01 18:48:23
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =54.8C, Channel B = 55.1C		21-Apr-01 18:48:23
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =53.0C, Channel B = 53.0C		21-Apr-01 18:48:23

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =52.4C, Channel B = 52.7C		21-Apr-01 18:48:23
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =51.6C, Channel B = 51.3C		21-Apr-01 18:48:23
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =51.0C, Channel B = 51.3C		21-Apr-01 18:48:23
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =51.3C, Channel B = 51.3C		21-Apr-01 18:48:23

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 74	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =49.5C, Channel B = 49.5C		21-Apr-01 18:48:50
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =46.6C, Channel B = 46.6C		21-Apr-01 18:48:50
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =45.7C, Channel B = 46.0C		21-Apr-01 18:48:50
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =52.4C, Channel B = 52.7C		21-Apr-01 18:48:50
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =46.0C, Channel B = 46.3C		21-Apr-01 18:48:50
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =48.9C, Channel B = 48.9C		21-Apr-01 18:48:51
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =49.8C, Channel B = 49.5C		21-Apr-01 18:48:51
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 18:48:51
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =52.7C, Channel B = 52.7C		21-Apr-01 18:48:51
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =58.3C, Channel B = 58.6C		21-Apr-01 18:48:51

PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =56.8C, Channel B = 56.8C		21-Apr-01 18:48:51
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =53.3C, Channel B = 53.3C		21-Apr-01 18:48:52
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =55.7C, Channel B = 55.7C		21-Apr-01 18:48:52
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =63.9C, Channel B = 64.2C		21-Apr-01 18:48:52
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =54.8C, Channel B = 55.1C		21-Apr-01 18:48:52

8.12 Do High Voltage Input Limit Test
Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 75	Mixed		
QB: V=32.0V	QB: V=32.0V Done		21-Apr-01 18:49:06
NB: V=32.0V	NB: V=32.0V Done		21-Apr-01 18:49:06
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		21-Apr-01 18:49:06
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		21-Apr-01 18:49:06
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:49:06
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		21-Apr-01 18:49:07
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 18:49:07
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:49:07
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		21-Apr-01 18:49:07
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		21-Apr-01 18:49:07

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 76	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:49:33
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.25V, Channel B = 14.24V		21-Apr-01 18:49:34
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.75V, Channel B = -14.74V		21-Apr-01 18:49:34
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.06V, Channel B = 5.07V		21-Apr-01 18:49:34
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:49:34
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.03A, Channel B = -0.03A		21-Apr-01 18:49:34
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.87A, Channel B = 7.87A		21-Apr-01 18:49:34
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.24V, Channel B = 5.24V		21-Apr-01 18:49:34
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:49:34
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.06V		21-Apr-01 18:49:34

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		21-Apr-01 18:49:34
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:49:34
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 18:49:34
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		21-Apr-01 18:49:34
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		21-Apr-01 18:49:34

Analogue Telemetry block 2.

STEP 77	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.5V, Channel B = 5.51V		21-Apr-01 18:49:59
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		21-Apr-01 18:49:59
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.26V, Channel B = -15.26V		21-Apr-01 18:50:00
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:50:00
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:50:00
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:50:00
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =54.5C, Channel B = 54.5C		21-Apr-01 18:50:00
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =54.2C, Channel B = 53.9C		21-Apr-01 18:50:00
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =56.0C, Channel B = 56.0C		21-Apr-01 18:50:00
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =54.2C, Channel B = 54.2C		21-Apr-01 18:50:00

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:50:00
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =51.3C, Channel B = 51.3C		21-Apr-01 18:50:00
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =51.0C, Channel B = 51.0C		21-Apr-01 18:50:00
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =51.3C, Channel B = 51.0C		21-Apr-01 18:50:00

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 78	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =49.8C, Channel B = 49.8C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =46.9C, Channel B = 46.6C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =53.3C, Channel B = 53.0C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =49.2C, Channel B = 49.5C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =50.1C, Channel B = 50.1C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =59.2C, Channel B = 59.2C		21-Apr-01 18:50:26
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =57.7C, Channel B = 57.7C		21-Apr-01 18:50:26

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =53.0C, Channel B = 53.0C		21-Apr-01 18:50:27
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =55.4C, Channel B = 55.1C		21-Apr-01 18:50:27
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =64.8C, Channel B = 65.1C		21-Apr-01 18:50:27
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =55.1C, Channel B = 55.1C		21-Apr-01 18:50:27

8.13 Do Low Operating Voltage Limit Test.
Adjust the QB and NB supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 79	Mixed		
QB: V=26.0V	QB: V=26.0V Done		21-Apr-01 18:50:42
NB: V=26.0V	NB: V=26.0V Done		21-Apr-01 18:50:42
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		21-Apr-01 18:50:42
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		21-Apr-01 18:50:42
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		21-Apr-01 18:50:42
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		21-Apr-01 18:50:42
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 18:50:42
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 18:50:42
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		21-Apr-01 18:50:42
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		21-Apr-01 18:50:42

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 80	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:51:09
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.24V, Channel B = 14.25V		21-Apr-01 18:51:09
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.83V, Channel B = -14.83V		21-Apr-01 18:51:09
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.06V		21-Apr-01 18:51:09
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:51:09
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.03A, Channel B = -0.03A		21-Apr-01 18:51:09
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.44A, Channel B = 8.44A		21-Apr-01 18:51:09
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.23V, Channel B = 5.24V		21-Apr-01 18:51:10
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 18:51:10
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.06V, Channel B = -0.08V		21-Apr-01 18:51:10

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		21-Apr-01 18:51:10
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 18:51:10
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 18:51:10
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.35V, Channel B = -15.35V		21-Apr-01 18:51:10
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		21-Apr-01 18:51:10

Analogue Telemetry block 2.

STEP 81	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.5V, Channel B = 5.5V		21-Apr-01 18:51:35
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.18V, Channel B = 15.18V		21-Apr-01 18:51:35
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.26V, Channel B = -15.27V		21-Apr-01 18:51:35
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.03V, Channel B = -0.02V		21-Apr-01 18:51:35
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:51:35
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 18:51:35
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =54.5C, Channel B = 54.8C		21-Apr-01 18:51:35
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =54.2C, Channel B = 54.5C		21-Apr-01 18:51:35
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =56.6C, Channel B = 56.6C		21-Apr-01 18:51:36
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =54.2C, Channel B = 54.5C		21-Apr-01 18:51:36

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:51:36
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 18:51:36
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =51.0C, Channel B = 51.0C		21-Apr-01 18:51:36
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =51.0C, Channel B = 51.0C		21-Apr-01 18:51:36

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 82	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =50.1C, Channel B = 50.1C		21-Apr-01 18:52:01
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =46.9C, Channel B = 46.9C		21-Apr-01 18:52:01
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =46.3C, Channel B = 46.3C		21-Apr-01 18:52:01
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =53.3C, Channel B = 53.6C		21-Apr-01 18:52:01
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =46.3C, Channel B = 46.3C		21-Apr-01 18:52:01
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =49.8C, Channel B = 49.5C		21-Apr-01 18:52:01
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =50.4C, Channel B = 50.4C		21-Apr-01 18:52:02
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =46.6C, Channel B = 46.6C		21-Apr-01 18:52:02
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =60.4C, Channel B = 60.4C		21-Apr-01 18:52:02
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =58.6C, Channel B = 58.9C		21-Apr-01 18:52:02

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =53.0C, Channel B = 53.0C		21-Apr-01 18:52:02
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =55.4C, Channel B = 55.7C		21-Apr-01 18:52:02
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =65.9C, Channel B = 65.6C		21-Apr-01 18:52:03
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =55.4C, Channel B = 55.7C		21-Apr-01 18:52:03

8.14 Turn of all relays ready to activate alternate relay set.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTA to verify alternate channel communication.
This is PSM-02

STEP 83	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		21-Apr-01 18:53:00
PORTA: SPU_+5B OFF	IFC Echo = C018		21-Apr-01 18:53:00
PORTA: SPU_+/-15A OFF	IFC Echo = E019		21-Apr-01 18:53:00
PORTA: SPU_+5A OFF	IFC Echo = E018		21-Apr-01 18:53:00
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		21-Apr-01 18:53:00
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		21-Apr-01 18:53:00
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		21-Apr-01 18:53:00
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		21-Apr-01 18:53:00
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		21-Apr-01 18:53:00
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		21-Apr-01 18:53:00
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		21-Apr-01 18:53:00
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		21-Apr-01 18:53:01
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		21-Apr-01 18:53:01
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		21-Apr-01 18:53:01
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 18:53:01
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:53:01
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 18:53:01
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:53:01
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		21-Apr-01 18:53:01
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 18:53:01
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		21-Apr-01 18:53:01
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:53:01
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		21-Apr-01 18:53:01
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		21-Apr-01 18:53:01
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		21-Apr-01 18:53:01
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		21-Apr-01 18:53:01
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		21-Apr-01 18:53:01
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		21-Apr-01 18:53:01
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		21-Apr-01 18:53:01
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		21-Apr-01 18:53:01
PORTA: NA (PR) OFF	IFC Echo = E01C		21-Apr-01 18:53:01
PORTA: NA (RR) OFF	IFC Echo = C01C		21-Apr-01 18:53:01
PORTA: NB (PR) OFF	IFC Echo = E01D		21-Apr-01 18:53:01
PORTA: NB (RR) OFF	IFC Echo = C01D		21-Apr-01 18:53:01

This is PSM-01

STEP 84	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		21-Apr-01 18:53:12
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		21-Apr-01 18:53:12
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		21-Apr-01 18:53:12
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		21-Apr-01 18:53:12
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		21-Apr-01 18:53:12
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		21-Apr-01 18:53:12

8.15 Do status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QB (important for TVAC check at temperature extremes).

STEP 85	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 18:53:45
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.26V, Channel B = 14.26V		21-Apr-01 18:53:45
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.91V, Channel B = -14.91V		21-Apr-01 18:53:45
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.06V		21-Apr-01 18:53:45
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:53:45
PORTA: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =54.8C, Channel B = 54.8C		21-Apr-01 18:53:45
PORTA: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 18:53:45
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:53:45
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:53:45
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 18:53:45
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		21-Apr-01 18:53:46
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:53:46
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:53:46

PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:53:46
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		21-Apr-01 18:53:46
NB: OFF	NB: OFF Done		21-Apr-01 18:53:46
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		21-Apr-01 18:53:46
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:53:46
DIR: (IPU B) HIR_PSS_DISCRETE(2)	(IPU B) HIR_PSS_DISCRETE(2) Enabled		21-Apr-01 18:53:46
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		21-Apr-01 18:53:46
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		21-Apr-01 18:53:46
QB: OFF	QB: OFF Done		21-Apr-01 18:53:47

9 POWER ON PCU USING QB AND NB, SYS1 REDUNDANT AND SYS2 PRIMARY.
Enters with Redundant Internal Supply connected to QB from previous test block.

STEP 86	Mixed		
QA: V=29.0v	QA: V=29.0v Done		21-Apr-01 18:54:28
QB: V=29.0v	QB: V=29.0v Done		21-Apr-01 18:54:28
NA: V=29.0v	NA: V=29.0v Done		21-Apr-01 18:54:28
NB: V=29.0v	NB: V=29.0v Done		21-Apr-01 18:54:28
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		21-Apr-01 18:54:28
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:POS 20 done.		21-Apr-01 18:54:29
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		21-Apr-01 18:54:29
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		21-Apr-01 18:54:29
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		21-Apr-01 18:54:29
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		21-Apr-01 18:54:29
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 18:54:29
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		21-Apr-01 18:54:29
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:54:30
SCOPE:MESS:SHOW 'QB Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		21-Apr-01 18:54:30
QB: ON	QB: ON Done		21-Apr-01 18:54:30
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:54:30
SCOPE: HARDCOPY INRUSHBR.BMP	INRUSHBR.BMP written to Appendix.		21-Apr-01 18:54:30
QB: IO?	Current 1.42A		21-Apr-01 18:54:30
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.38A, Channel B = 1.38A		21-Apr-01 18:54:30

SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		21-Apr-01 18:54:30

9.1 Power On telemetry verification.

STEP 87	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		21-Apr-01 18:54:57
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.31V, Channel B = 14.31V		21-Apr-01 18:54:57
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.08V, Channel B = -15.08V		21-Apr-01 18:54:57
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 18:54:57
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 18:54:57
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =53.3C, Channel B = 53.6C		21-Apr-01 18:54:57
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =53.6C, Channel B = 53.6C		21-Apr-01 18:54:58
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:54:58
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:54:58
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:54:58
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		21-Apr-01 18:54:58
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:54:58
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:54:58
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		21-Apr-01 18:54:59

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		21-Apr-01 18:54:59

9.2 QC Power On with QB Redundant relay.
Carries out PSM-61 macro, and then relevant telemetry.

STEP 88	Mixed		
PORTB: QB (RR) ON	IFC Echo = D00B		21-Apr-01 18:55:15
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		21-Apr-01 18:55:16
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		21-Apr-01 18:55:16
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		21-Apr-01 18:55:16
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		21-Apr-01 18:55:17
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		21-Apr-01 18:55:17
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		21-Apr-01 18:55:17
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		21-Apr-01 18:55:17
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		21-Apr-01 18:55:17
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:55:17
SCOPE: CH2:VOLT 0.2	SCOPE:CH2:VOLT 0.2 done.		21-Apr-01 18:55:17

9.3 Turn on System Converters - Redundant SYS1 and Prime SYS2.
Power on SYS1B and SYS2A converters using PSM-14 and PSM-15. Outputs need to be selected using redundant relay set for 5V and 28V, and prime relay set for +/-15V. Telemetry checks done between and after macros.

STEP 89	Mixed		
NB: ON	NB: ON Done		21-Apr-01 18:56:43
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		21-Apr-01 18:56:43
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:56:43
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 18:56:44
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:56:44
SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:56:44
PORTB: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		21-Apr-01 18:56:44
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		21-Apr-01 18:56:44
SCOPE: HARDCOPY SYS1BQB.BMP	SYS1BQB.BMP written to Appendix.		21-Apr-01 18:56:44
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.57A, Channel B = 1.57A		21-Apr-01 18:56:44
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.35V		21-Apr-01 18:56:44
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =30.0V, Channel B = 30.0V		21-Apr-01 18:56:44
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		21-Apr-01 18:56:44
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 18:56:44
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		21-Apr-01 18:56:44

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:56:44
SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 18:56:44
PORTB: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		21-Apr-01 18:56:45
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		21-Apr-01 18:56:45
SCOPE: HARDCOPY SYS2AQB.BMP	SYS2AQB.BMP written to Appendix.		21-Apr-01 18:56:45
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.64A, Channel B = 1.64A		21-Apr-01 18:56:45
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.25V, Channel B = 15.25V		21-Apr-01 18:56:45
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.37V, Channel B = -15.36V		21-Apr-01 18:56:45
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		21-Apr-01 18:56:45
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH2 ON done.		21-Apr-01 18:56:46
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		21-Apr-01 18:56:46

9.4 TEU B – Redundant relays – 28V and 5V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-22, PSM49, and PSM-51 macros with telemetry checks between macros.

STEP 90	Mixed		
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		21-Apr-01 18:58:20
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		21-Apr-01 18:58:20
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		21-Apr-01 18:58:20
PORTB: B_TEU_+28QC (RR) ON	IFC Echo = D015		21-Apr-01 18:58:20
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0028		21-Apr-01 18:58:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.27A, Channel B = 2.27A		21-Apr-01 18:58:20
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		21-Apr-01 18:58:20
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:58:20
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 18:58:20
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:58:20
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:58:20
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 18:58:20
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 18:58:20
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 18:58:20
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 18:58:20
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 18:58:20
SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 18:58:20
PORTB: B_TEU_+5 (RR) ON	IFC Echo = D010		21-Apr-01 18:58:20
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		21-Apr-01 18:58:21
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 000F		21-Apr-01 18:58:21
SCOPE:HARDCOPY TEUBC6.BMP	TEUBC6.BMP written to Appendix.		21-Apr-01 18:58:21

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.52A, Channel B = 2.52A		21-Apr-01 18:58:21
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.29V, Channel B = 5.29V		21-Apr-01 18:58:21
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		21-Apr-01 18:58:22
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		21-Apr-01 18:58:22
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		21-Apr-01 18:58:22
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		21-Apr-01 18:58:22
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		21-Apr-01 18:58:22

9.5 TEU B – Prime relays – +/-15V.

STEP 91	Mixed		
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		21-Apr-01 19:00:40
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 19:00:41
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 19:00:41
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 19:00:41
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 19:00:41
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 19:00:41
SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 19:00:41
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		21-Apr-01 19:00:41
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		21-Apr-01 19:00:41
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 19:00:41
SCOPE:HARDCOPY TEUBC7.BMP	TEUBC7.BMP written to Appendix.		21-Apr-01 19:00:41
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		21-Apr-01 19:00:41
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		21-Apr-01 19:00:41
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		21-Apr-01 19:00:41
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		21-Apr-01 19:00:41
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		21-Apr-01 19:00:41
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		21-Apr-01 19:00:41
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 19:00:41

SCOPE:MESS:SHOW 'TEU B -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		21-Apr-01 19:00:41
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		21-Apr-01 19:00:41
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		21-Apr-01 19:00:41
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 19:00:42
SCOPE:HARDCOPY TEUBC8.BMP	TEUBC8.BMP written to Appendix.		21-Apr-01 19:00:42
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.93A, Channel B = 2.93A		21-Apr-01 19:00:42
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.24V, Channel B = 15.24V		21-Apr-01 19:00:42
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.36V		21-Apr-01 19:00:42
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		21-Apr-01 19:00:42

9.6 Power on EEA.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1
Primary and Redundant measurements already made. No A or B selection.

STEP 92	Mixed		
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		21-Apr-01 19:01:01
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		21-Apr-01 19:01:01
PORTB: EEA_+5 (RR) ON	IFC Echo = D008		21-Apr-01 19:01:01
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		21-Apr-01 19:01:02
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.02A, Channel B = 3.02A		21-Apr-01 19:01:02
PORTB: EEA_+/-15 (PR) ON	IFC Echo = F009		21-Apr-01 19:01:02
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 19:01:02
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.1A, Channel B = 3.11A		21-Apr-01 19:01:02
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.27V, Channel B = 5.27V		21-Apr-01 19:01:02
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.22V, Channel B = 15.22V		21-Apr-01 19:01:02
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.35V, Channel B = -15.35V		21-Apr-01 19:01:03

9.7 Turn on IPU regulated 28 Volt Supply.
Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B side regulated 28 Volts through redundant relays.

STEP 93	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		21-Apr-01 19:02:07
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		21-Apr-01 19:02:07
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		21-Apr-01 19:02:07
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		21-Apr-01 19:02:07
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		21-Apr-01 19:02:07
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		21-Apr-01 19:02:07
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		21-Apr-01 19:02:08
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 19:02:08
SCOPE:MESS:SHOW 'IPU B 28VReg (Redundant) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU B 28VReg (Redundant) \nStart Current Waveform, 500mA/Div' done.		21-Apr-01 19:02:08
PORTB: B_IPU_+28REG (RR) ON	IFC Echo = D003		21-Apr-01 19:02:08
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		21-Apr-01 19:02:08
SCOPE:HARDCOPY IPUB2.BMP	IPUB2.BMP written to Appendix.		21-Apr-01 19:02:08
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =4.99A, Channel B = 4.99A		21-Apr-01 19:02:09
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.91V, Channel B = 29.91V		21-Apr-01 19:02:09
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		21-Apr-01 19:02:09

9.8 Power on SPU B supplies from QB.
Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5. to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-12 and PSM-40 macros.

STEP 94	Mixed		
Change SPU load box cable to Side B at load box.	ok		21-Apr-01 19:03:39
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		21-Apr-01 19:03:39
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		21-Apr-01 19:03:40
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		21-Apr-01 19:03:40
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		21-Apr-01 19:03:40
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		21-Apr-01 19:03:40
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		21-Apr-01 19:03:40
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		21-Apr-01 19:03:40
SCOPE:MESS:SHOW 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		21-Apr-01 19:03:40
PORTB: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		21-Apr-01 19:03:40
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry A00A		21-Apr-01 19:03:40
SCOPE: HARDCOPY SPUBQB.BMP	SPUBQB.BMP written to Appendix.		21-Apr-01 19:03:40
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.08A, Channel B = 5.09A		21-Apr-01 19:03:40
PORTB: SPU_+5A OFF	IFC Echo = E018		21-Apr-01 19:03:40
PORTB: SPU_+/-15A OFF	IFC Echo = E019		21-Apr-01 19:03:40
PORTB: SPU_+/-15B ON	IFC Echo = D019		21-Apr-01 19:03:40
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		21-Apr-01 19:03:40
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC0A		21-Apr-01 19:03:41

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.21A, Channel B = 6.21A		21-Apr-01 19:03:41
PORTB: SPU_+5B ON	IFC Echo = D018		21-Apr-01 19:03:41
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		21-Apr-01 19:03:41
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0A		21-Apr-01 19:03:41
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.39A, Channel B = 6.39A		21-Apr-01 19:03:41
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.47V, Channel B = 5.46V		21-Apr-01 19:03:41
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		21-Apr-01 19:03:41
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.28V, Channel B = -15.28V		21-Apr-01 19:03:42

9.9 Turn on GEU supplies.
Turn on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5.

STEP 95	Mixed		
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		21-Apr-01 19:04:05
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		21-Apr-01 19:04:05
PORTB: GEU_+5 (RR) ON	IFC Echo = D004		21-Apr-01 19:04:05
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0F		21-Apr-01 19:04:06
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.57A, Channel B = 6.58A		21-Apr-01 19:04:06
PORTB: GEU_+/-15 (PR) ON	IFC Echo = F005		21-Apr-01 19:04:06
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.26A, Channel B = 7.26A		21-Apr-01 19:04:06
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		21-Apr-01 19:04:06
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 19:04:06
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 19:04:06
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		21-Apr-01 19:04:07
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		21-Apr-01 19:04:07
PORTB: GEU_+28QC (RR) ON	IFC Echo = D016		21-Apr-01 19:04:07
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		21-Apr-01 19:04:07

9.10 Turn on Noisy Bus.
Turn on the Noisy Bus Output from the NB supply through the Redundant Relay.

STEP 96	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		21-Apr-01 19:04:15
PORTB: NA (RR) OFF	IFC Echo = C01C		21-Apr-01 19:04:15
PORTB: NB (PR) OFF	IFC Echo = E01D		21-Apr-01 19:04:16
PORTB: NB (RR) ON	IFC Echo = D01D		21-Apr-01 19:04:16
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		21-Apr-01 19:04:16

9.11 Do complete telemetry check of PCU now all outputs are on.

STEP 97	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		21-Apr-01 19:04:29
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		21-Apr-01 19:04:29
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		21-Apr-01 19:04:29
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		21-Apr-01 19:04:29
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 19:04:29
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 19:04:29
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		21-Apr-01 19:04:30
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		21-Apr-01 19:04:30

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 98	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		21-Apr-01 19:04:58
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		21-Apr-01 19:04:58
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.29V, Channel B = 14.29V		21-Apr-01 19:04:58
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.17V, Channel B = -15.17V		21-Apr-01 19:04:58
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 19:04:58
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		21-Apr-01 19:04:58
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.03A, Channel B = -0.02A		21-Apr-01 19:04:58
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.07A, Channel B = 8.07A		21-Apr-01 19:04:59
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 19:04:59
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.2V, Channel B = 15.2V		21-Apr-01 19:04:59

PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		21-Apr-01 19:04:59
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.12V, Channel B = -0.14V		21-Apr-01 19:04:59
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 19:04:59
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.06V, Channel B = -0.06V		21-Apr-01 19:04:59
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.06V, Channel B = -0.06V		21-Apr-01 19:04:59
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.91V, Channel B = 29.91V		21-Apr-01 19:04:59

Analogue Telemetry block 2.

STEP 99	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		21-Apr-01 19:05:24
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.09V, Channel B = -0.09V		21-Apr-01 19:05:24
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.09V		21-Apr-01 19:05:24
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.47V, Channel B = 5.46V		21-Apr-01 19:05:24
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.19V		21-Apr-01 19:05:24
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.28V		21-Apr-01 19:05:25
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =52.2C, Channel B = 52.2C		21-Apr-01 19:05:25
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =51.3C, Channel B = 51.3C		21-Apr-01 19:05:25
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 19:05:25
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =49.8C, Channel B = 50.1C		21-Apr-01 19:05:25

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =54.8C, Channel B = 54.8C		21-Apr-01 19:05:25
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =53.3C, Channel B = 53.0C		21-Apr-01 19:05:25
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =55.1C, Channel B = 54.8C		21-Apr-01 19:05:25
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =53.6C, Channel B = 53.6C		21-Apr-01 19:05:25

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 100	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =45.7C, Channel B = 46.0C		21-Apr-01 19:05:52
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =49.8C, Channel B = 49.8C		21-Apr-01 19:05:52
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =47.8C, Channel B = 47.8C		21-Apr-01 19:05:52
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =46.9C, Channel B = 46.9C		21-Apr-01 19:05:52
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 19:05:52
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 19:05:53
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =48.1C, Channel B = 48.1C		21-Apr-01 19:05:53
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 19:05:53
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 19:05:53
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =58.3C, Channel B = 58.3C		21-Apr-01 19:05:53

PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =56.8C, Channel B = 56.8C		21-Apr-01 19:05:53
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =52.7C, Channel B = 52.7C		21-Apr-01 19:05:54
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =55.1C, Channel B = 55.1C		21-Apr-01 19:05:54
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =56.8C, Channel B = 57.1C		21-Apr-01 19:05:54
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =64.2C, Channel B = 64.2C		21-Apr-01 19:05:54

9.12 Do High Voltage Input Limit Test
Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 101	Mixed		
QB: V=32.0V	QB: V=32.0V Done		21-Apr-01 19:06:09
NB: V=32.0V	NB: V=32.0V Done		21-Apr-01 19:06:09
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		21-Apr-01 19:06:09
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		21-Apr-01 19:06:09
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		21-Apr-01 19:06:09
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		21-Apr-01 19:06:09
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 19:06:09
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 19:06:09
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		21-Apr-01 19:06:09
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		21-Apr-01 19:06:09

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 102	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 19:06:36
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.28V, Channel B = 14.29V		21-Apr-01 19:06:36
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.08V, Channel B = -15.08V		21-Apr-01 19:06:36
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 19:06:36
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 19:06:36
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.03A, Channel B = -0.03A		21-Apr-01 19:06:36
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.87A, Channel B = 7.86A		21-Apr-01 19:06:36
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 19:06:36
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.19V, Channel B = 15.19V		21-Apr-01 19:06:36
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.33V		21-Apr-01 19:06:36

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		21-Apr-01 19:06:37
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 19:06:37
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 19:06:37
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 19:06:37
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.89V, Channel B = 29.89V		21-Apr-01 19:06:37

Analogue Telemetry block 2.

STEP 103	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 19:07:02
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.09V		21-Apr-01 19:07:02
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.09V		21-Apr-01 19:07:02
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.46V, Channel B = 5.46V		21-Apr-01 19:07:02
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		21-Apr-01 19:07:02
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		21-Apr-01 19:07:02
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =51.9C, Channel B = 51.9C		21-Apr-01 19:07:02
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =51.3C, Channel B = 51.3C		21-Apr-01 19:07:02
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =50.7C, Channel B = 51.3C		21-Apr-01 19:07:02
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =49.8C, Channel B = 49.5C		21-Apr-01 19:07:02

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =55.1C, Channel B = 55.1C		21-Apr-01 19:07:02
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =53.6C, Channel B = 53.6C		21-Apr-01 19:07:03
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =56.0C, Channel B = 56.3C		21-Apr-01 19:07:03
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =54.5C, Channel B = 54.5C		21-Apr-01 19:07:03

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 104	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =45.7C, Channel B = 46.0C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =50.1C, Channel B = 50.4C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =48.1C, Channel B = 48.1C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =46.9C, Channel B = 46.9C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =52.4C, Channel B = 52.4C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =46.0C, Channel B = 46.3C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =48.1C, Channel B = 48.3C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =52.2C, Channel B = 52.2C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =59.2C, Channel B = 59.5C		21-Apr-01 19:07:28
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =57.7C, Channel B = 57.7C		21-Apr-01 19:07:28

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =52.7C, Channel B = 52.4C		21-Apr-01 19:07:29
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =55.1C, Channel B = 55.1C		21-Apr-01 19:07:29
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =56.8C, Channel B = 56.8C		21-Apr-01 19:07:29
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =65.1C, Channel B = 65.1C		21-Apr-01 19:07:29

9.13 Low Operating Voltage Limit Test.
Adjust the QB and NB supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 105	Mixed		
QB: V=26.0V	QB: V=26.0V Done		21-Apr-01 19:07:44
NB: V=26.0V	NB: V=26.0V Done		21-Apr-01 19:07:44
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		21-Apr-01 19:07:44
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		21-Apr-01 19:07:44
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		21-Apr-01 19:07:44
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		21-Apr-01 19:07:44
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		21-Apr-01 19:07:44
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		21-Apr-01 19:07:44
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		21-Apr-01 19:07:44
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		21-Apr-01 19:07:44

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 106	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.08V, Channel B = 5.08V		21-Apr-01 19:08:11
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.28V, Channel B = 14.29V		21-Apr-01 19:08:11
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.09V, Channel B = -15.09V		21-Apr-01 19:08:11
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		21-Apr-01 19:08:12
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		21-Apr-01 19:08:12
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.03A, Channel B = -0.03A		21-Apr-01 19:08:12
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.43A, Channel B = 8.43A		21-Apr-01 19:08:12
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 19:08:12
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.2V, Channel B = 15.19V		21-Apr-01 19:08:12
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.32V, Channel B = -15.32V		21-Apr-01 19:08:12

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		21-Apr-01 19:08:12
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.23V, Channel B = 5.23V		21-Apr-01 19:08:12
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 19:08:12
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		21-Apr-01 19:08:12
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.91V, Channel B = 29.91V		21-Apr-01 19:08:12

Analogue Telemetry block 2.

STEP 107	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		21-Apr-01 19:08:37
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 19:08:37
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		21-Apr-01 19:08:37
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.46V, Channel B = 5.46V		21-Apr-01 19:08:37
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.17V, Channel B = 15.17V		21-Apr-01 19:08:37
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.29V, Channel B = -15.29V		21-Apr-01 19:08:37
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =52.2C, Channel B = 51.9C		21-Apr-01 19:08:38
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =51.3C, Channel B = 51.3C		21-Apr-01 19:08:38
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =51.6C, Channel B = 51.6C		21-Apr-01 19:08:38
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =49.8C, Channel B = 49.8C		21-Apr-01 19:08:38

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =55.1C, Channel B = 55.1C		21-Apr-01 19:08:38
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =54.2C, Channel B = 54.2C		21-Apr-01 19:08:38
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =56.6C, Channel B = 56.6C		21-Apr-01 19:08:38
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =54.8C, Channel B = 54.8C		21-Apr-01 19:08:38

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 108	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =46.0C, Channel B = 46.0C		21-Apr-01 19:09:03
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =50.4C, Channel B = 50.7C		21-Apr-01 19:09:03
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =48.3C, Channel B = 48.3C		21-Apr-01 19:09:03
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =47.2C, Channel B = 47.2C		21-Apr-01 19:09:03
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =52.4C, Channel B = 51.9C		21-Apr-01 19:09:03
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =46.3C, Channel B = 46.3C		21-Apr-01 19:09:04
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =48.3C, Channel B = 48.3C		21-Apr-01 19:09:04
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =52.7C, Channel B = 52.4C		21-Apr-01 19:09:04
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =60.4C, Channel B = 60.4C		21-Apr-01 19:09:04
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =58.9C, Channel B = 58.9C		21-Apr-01 19:09:04

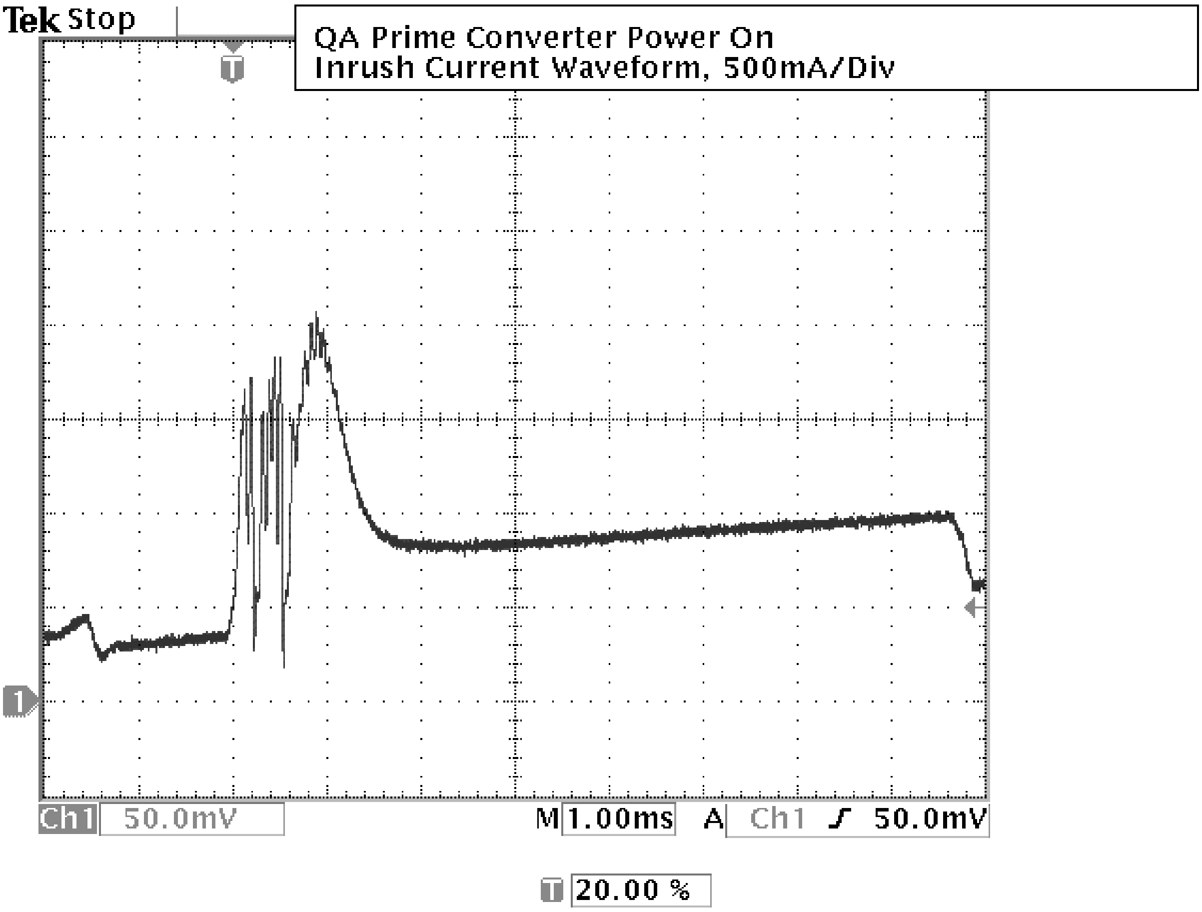
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =52.7C, Channel B = 52.7C		21-Apr-01 19:09:04
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =55.4C, Channel B = 55.4C		21-Apr-01 19:09:05
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =56.8C, Channel B = 56.8C		21-Apr-01 19:09:05
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =65.9C, Channel B = 65.9C		21-Apr-01 19:09:05

9.14 End Of Test. – Leave PCU Powered Up.

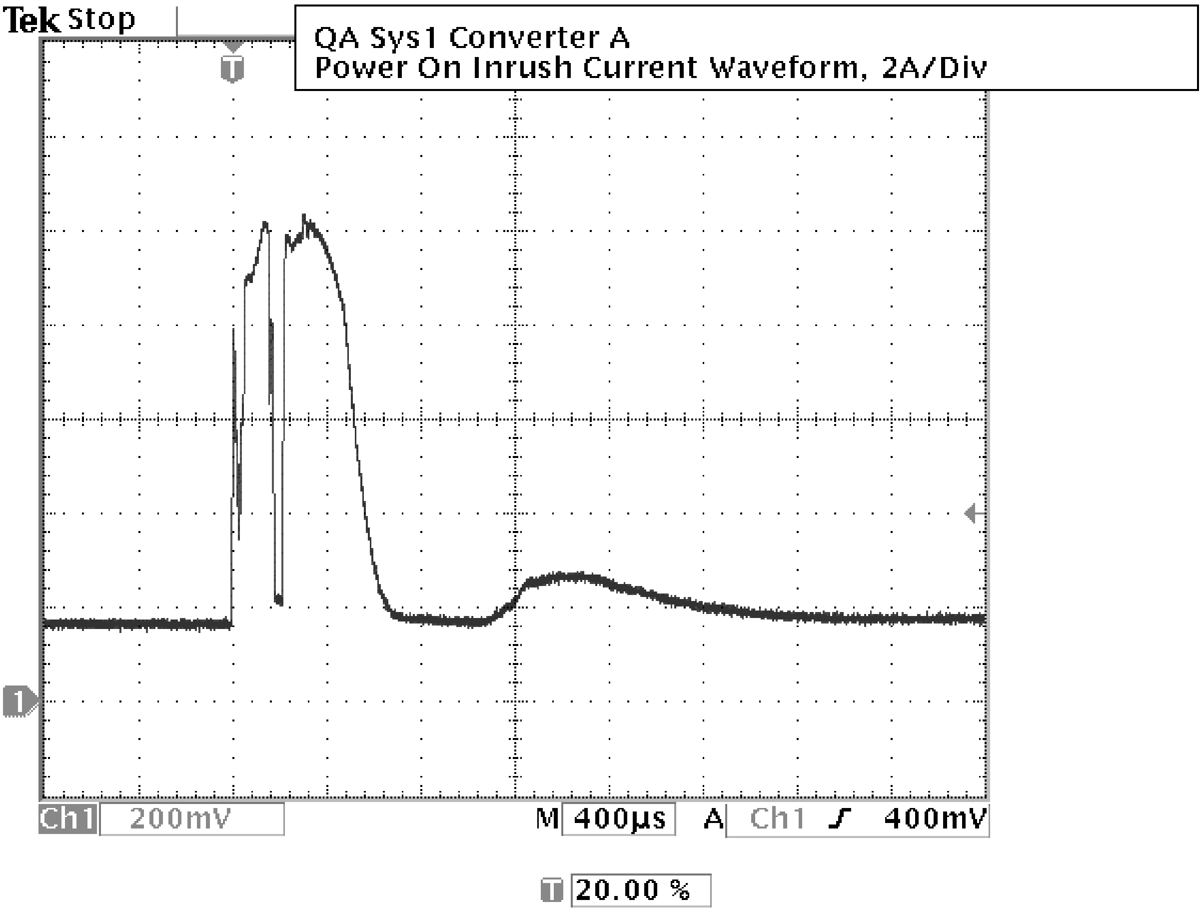
STEP 109	Mixed		
QB: V=29.0V	QB: V=29.0V Done		21-Apr-01 19:09:29
NB: V=29.0V	NB: V=29.0V Done		21-Apr-01 19:09:29
Turn off Current Probes	ok		21-Apr-01 19:09:29
Ensure all test certification is signed and annotated on diary cards.	ok		21-Apr-01 19:09:29
Ensure QA are notified of file name and test number for archiving.	ok		21-Apr-01 19:09:29
PCU left powered for TVAC test. Power down using Shutdown_PCU macro if required.	ok		21-Apr-01 19:09:29

10 APPENDIX

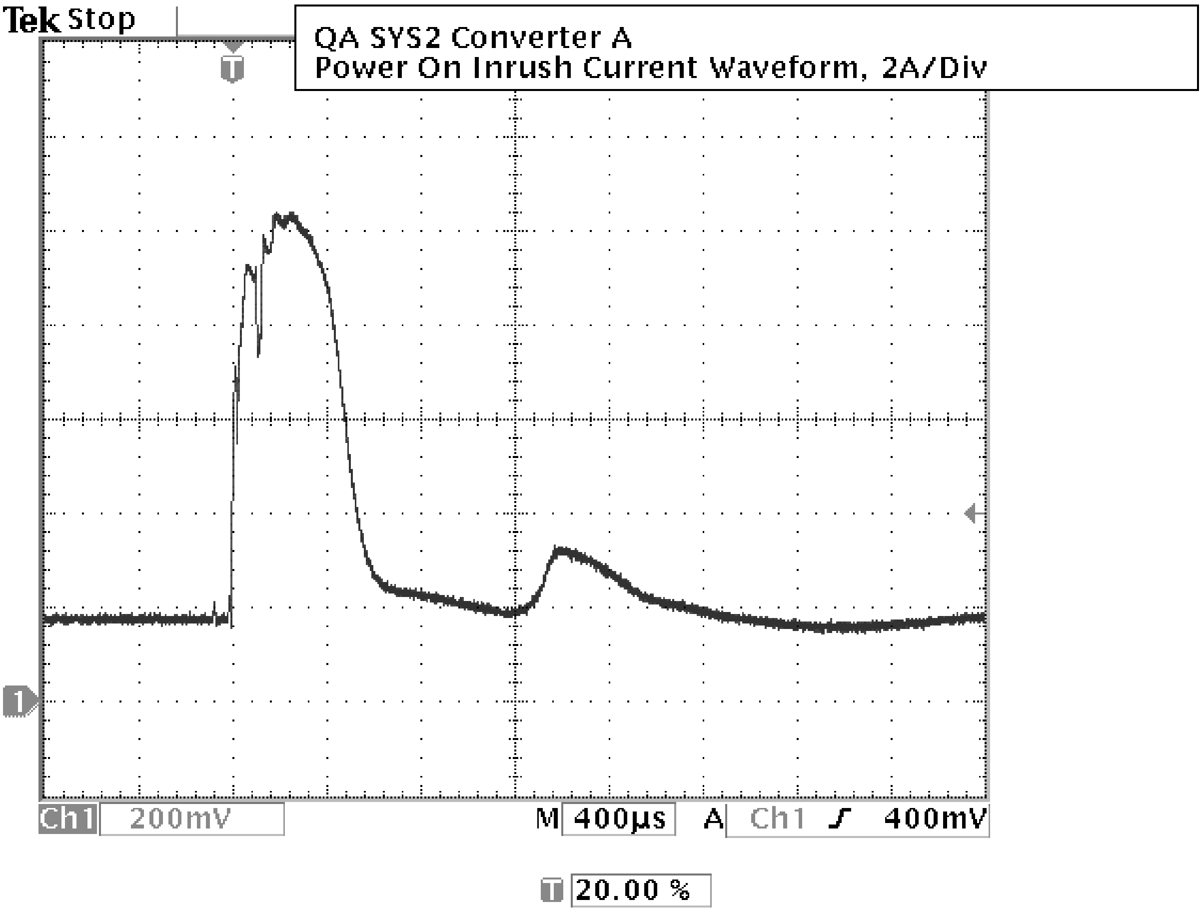
10.1 Waveform INRUSHAP.BMP



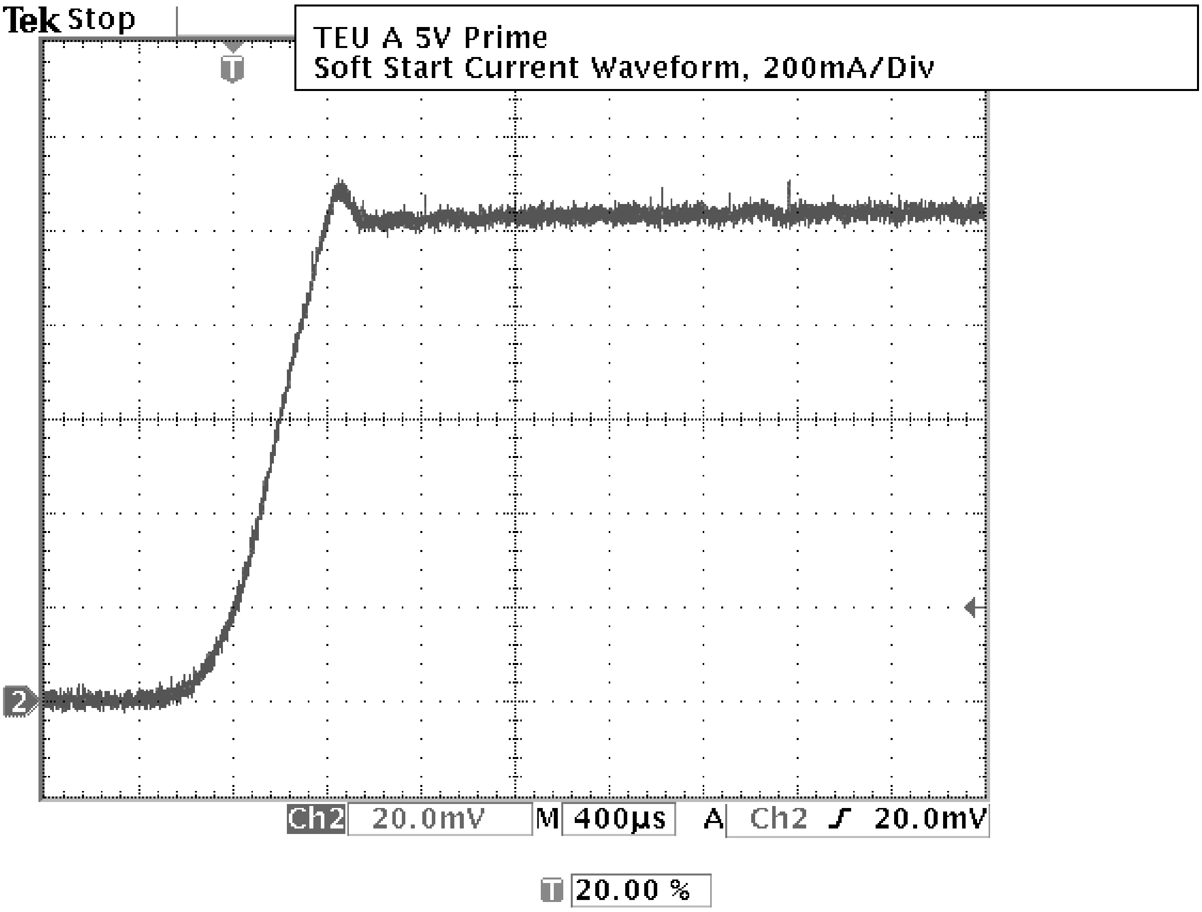
10.2 Waveform SYS1AQA.BMP



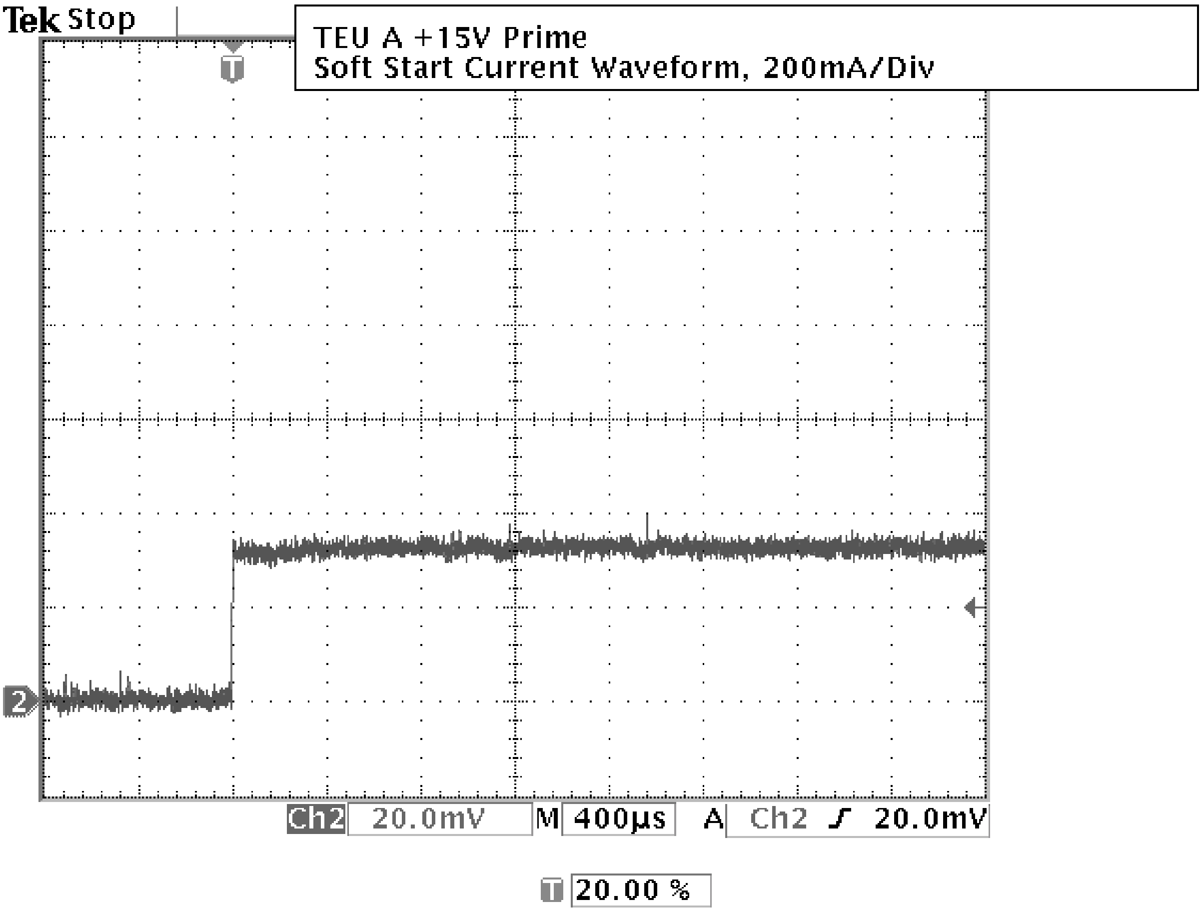
10.3 Waveform SYS2AQA.BMP



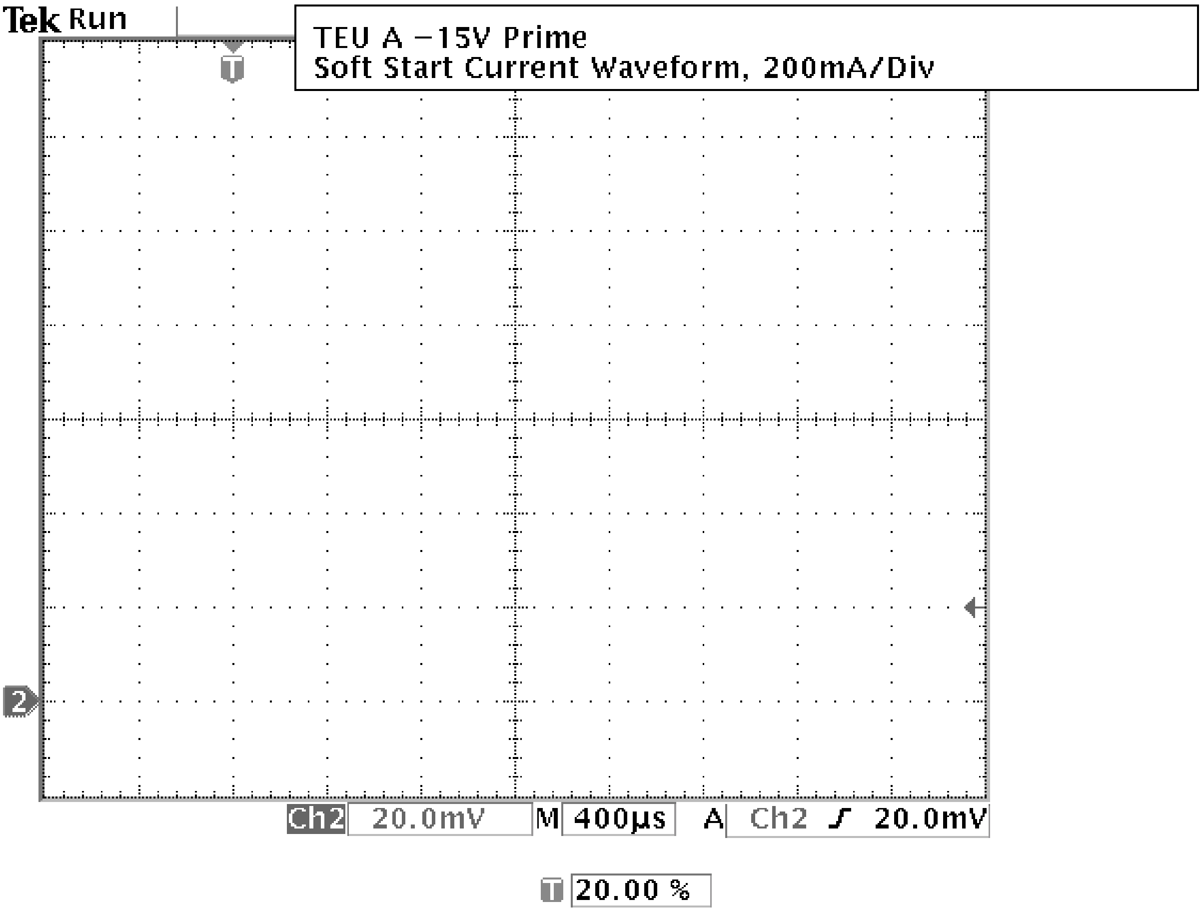
10.4 Waveform TEUAC2.BMP



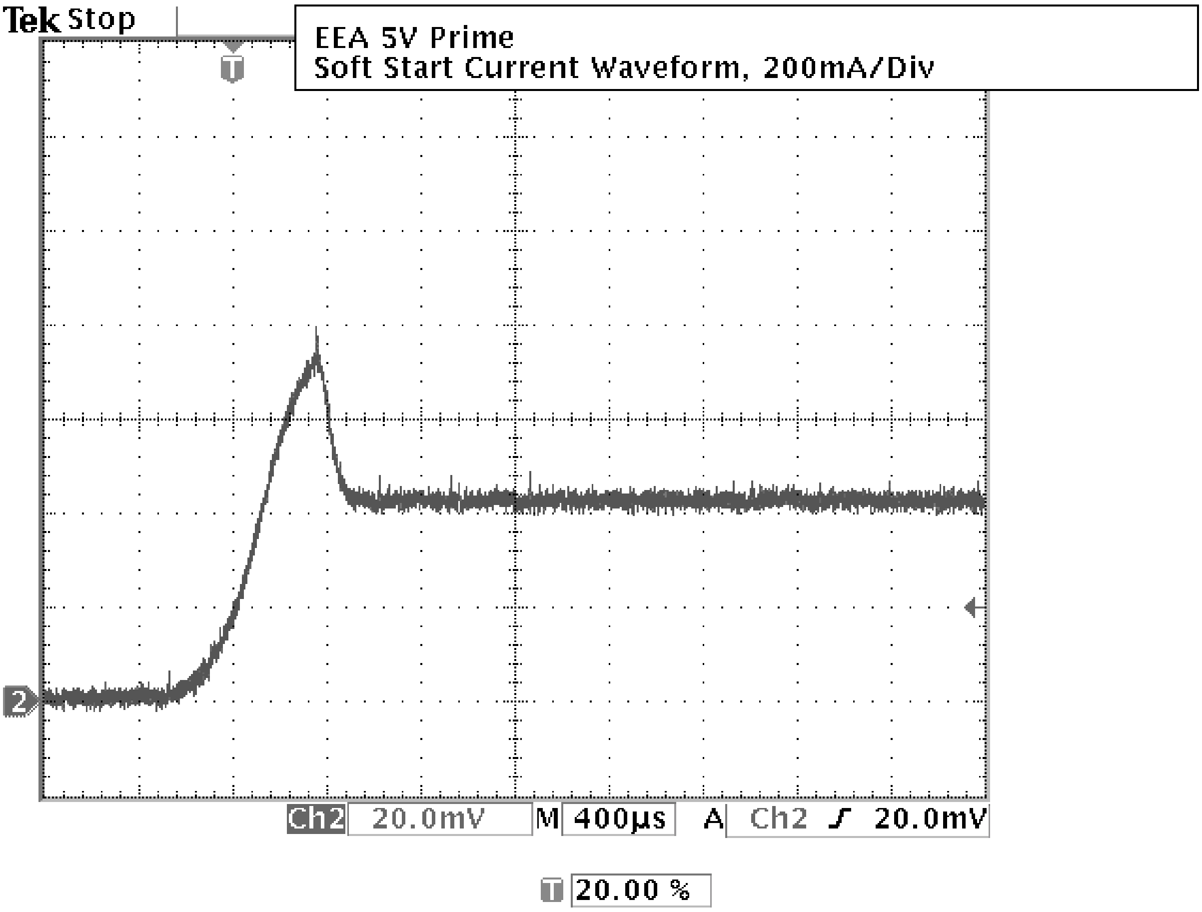
10.5 Waveform TEUAC3.BMP



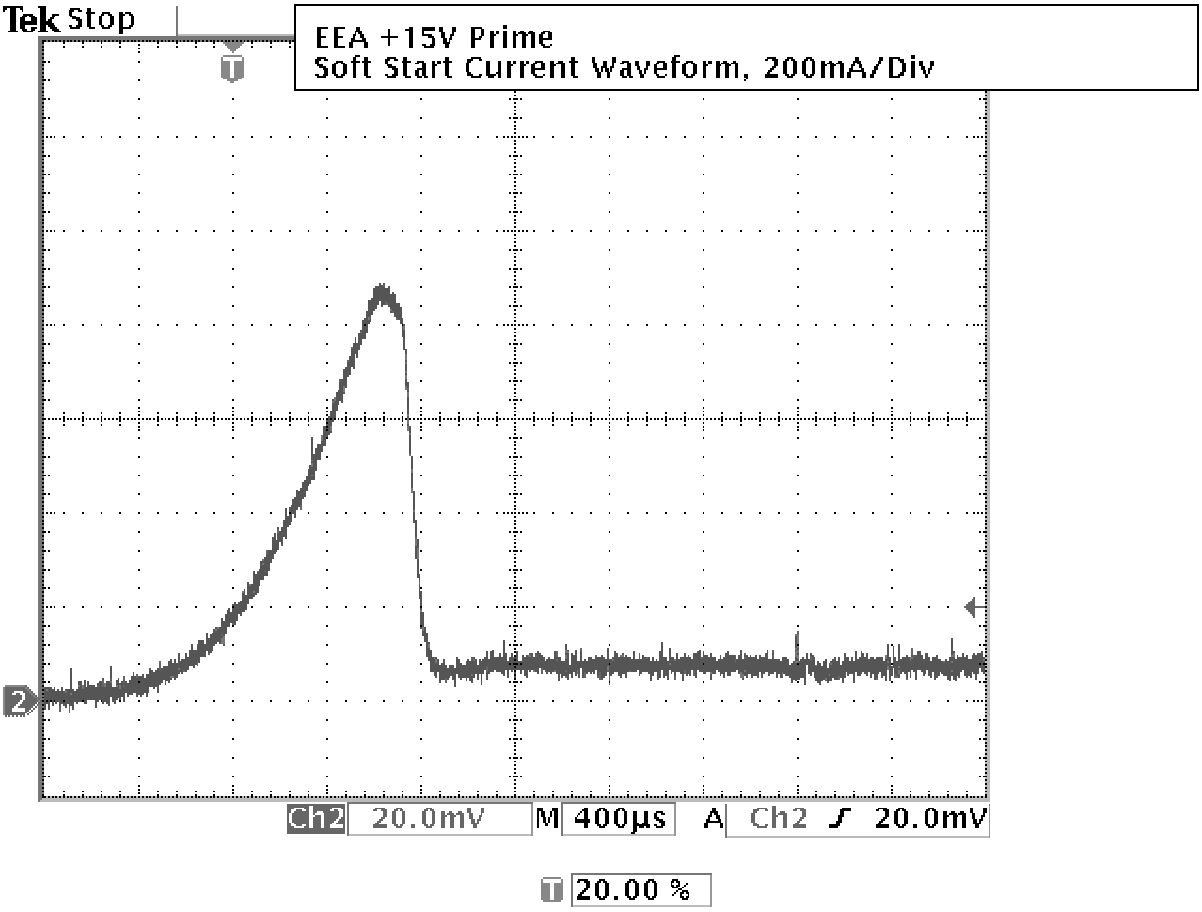
10.6 Waveform TEUAC4.BMP



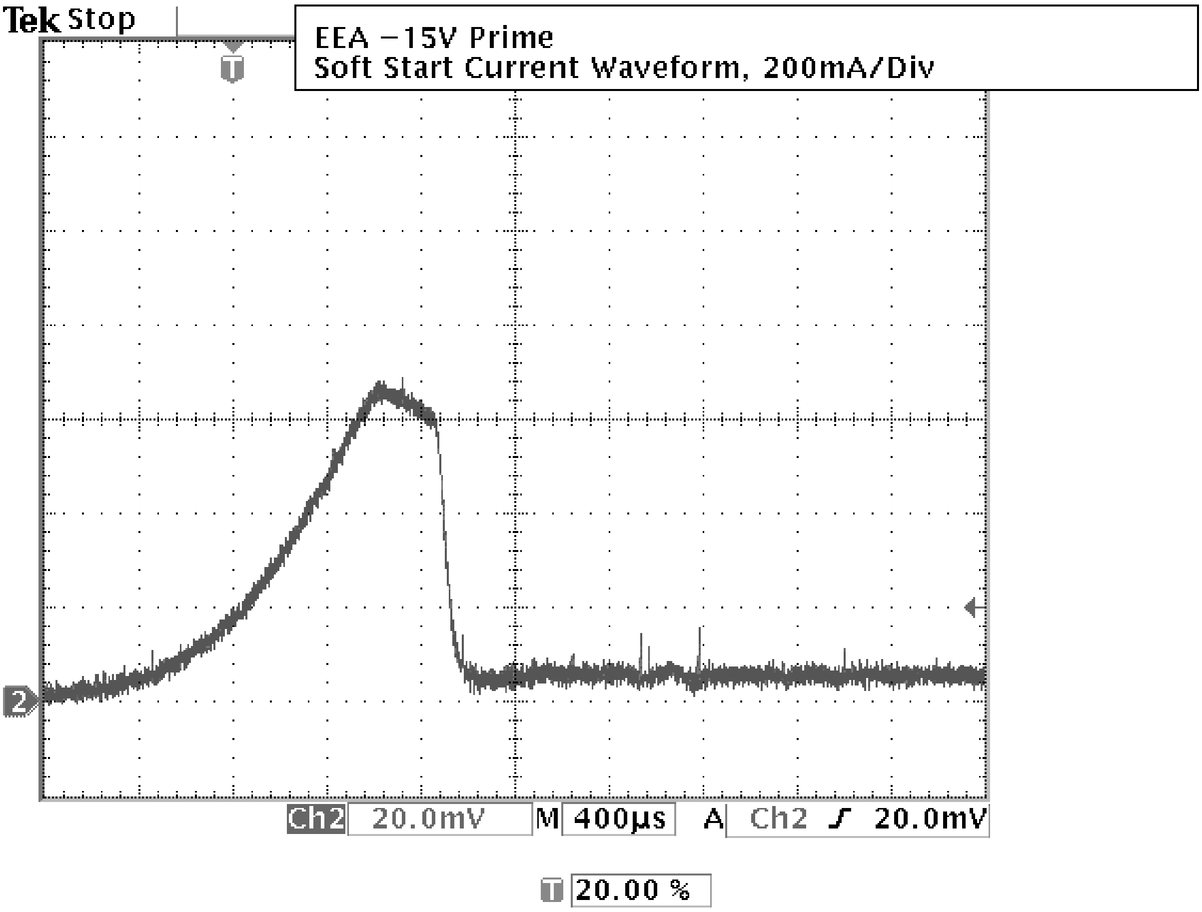
10.7 Waveform EEA5VPR.BMP



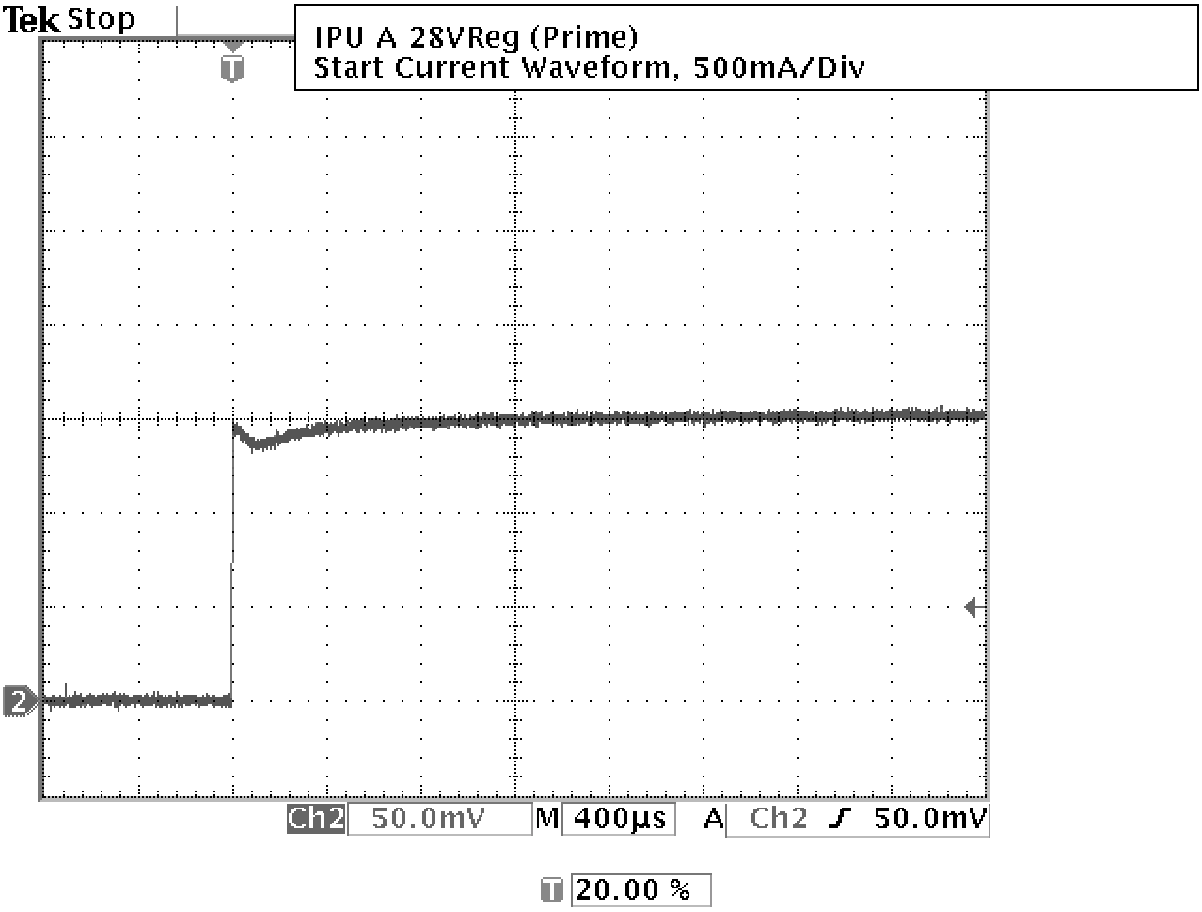
10.8 Waveform EEA15PPV.BMP



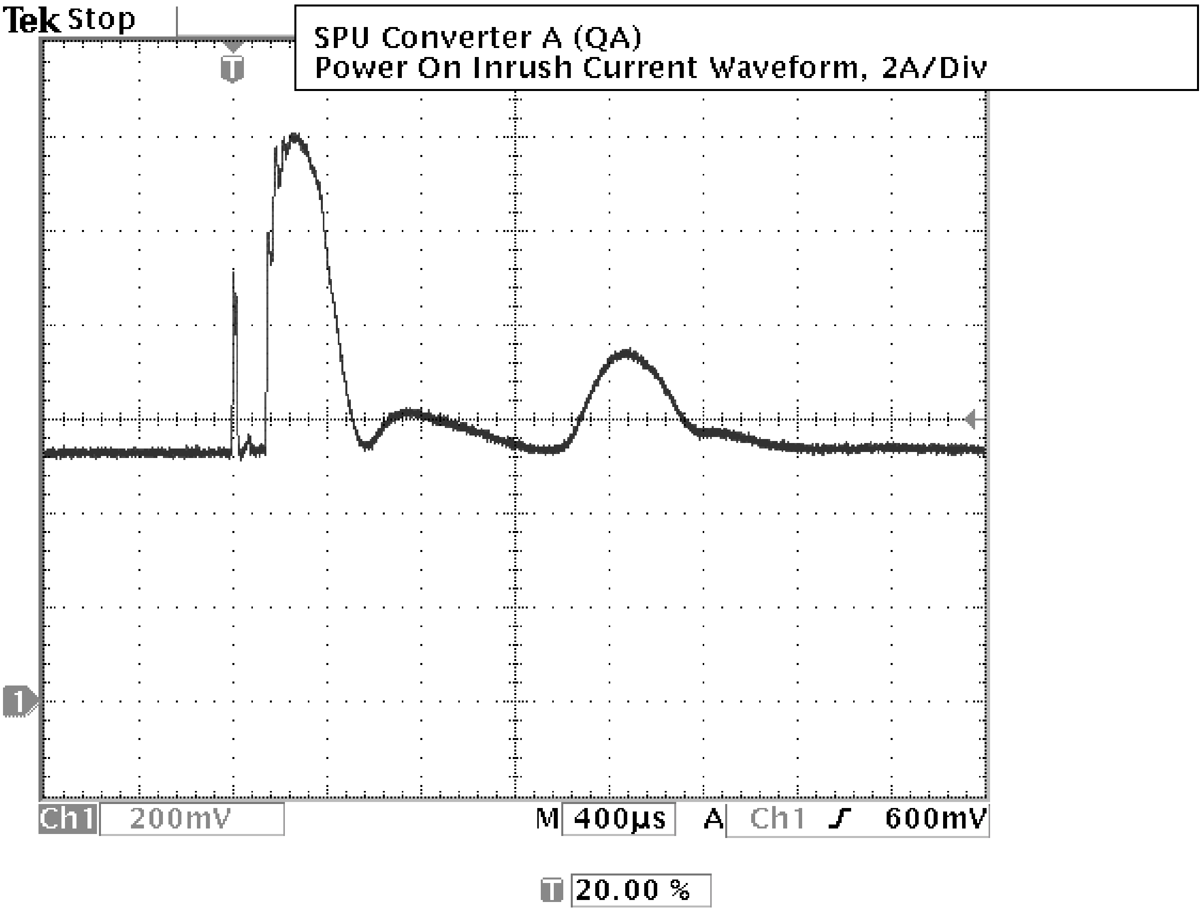
10.9 Waveform EEA15NPV.BMP



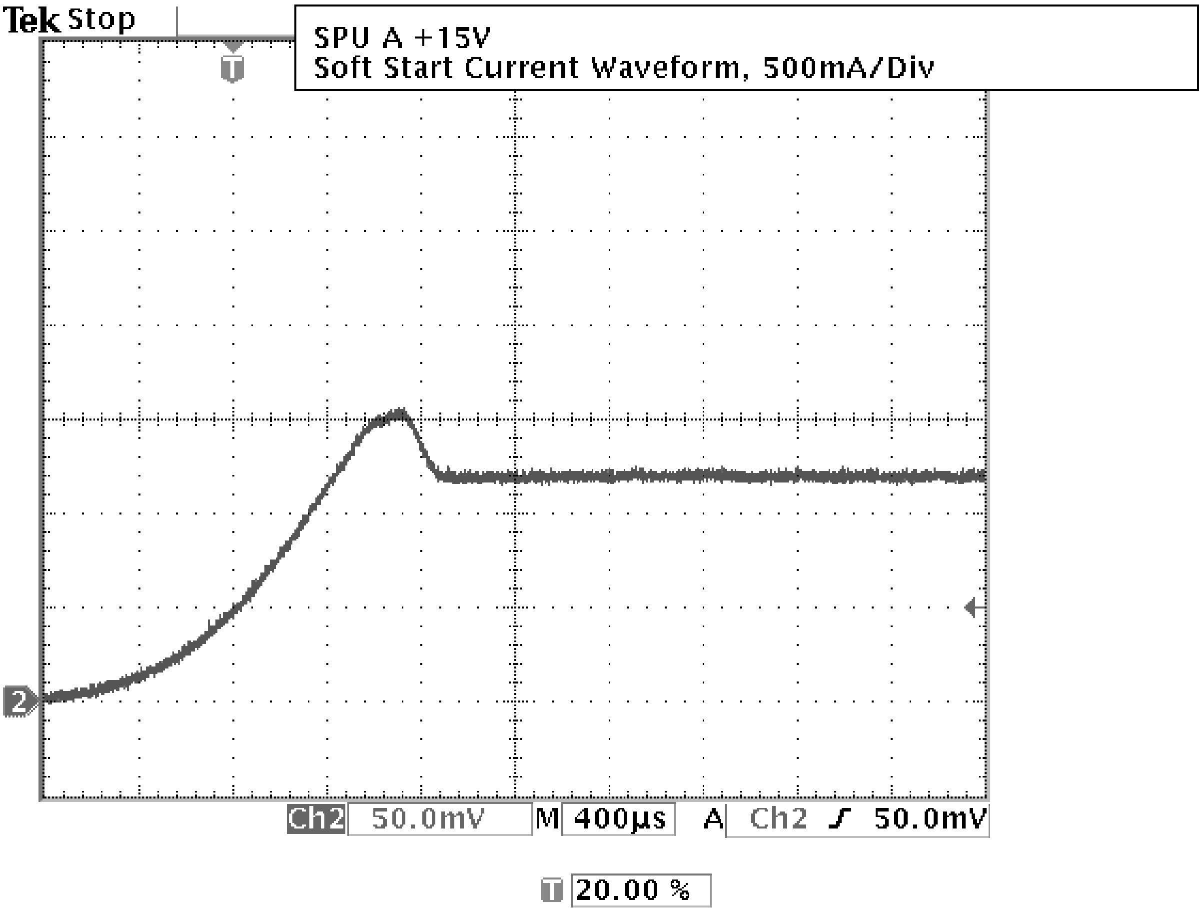
10.10 Waveform IPUA1.BMP



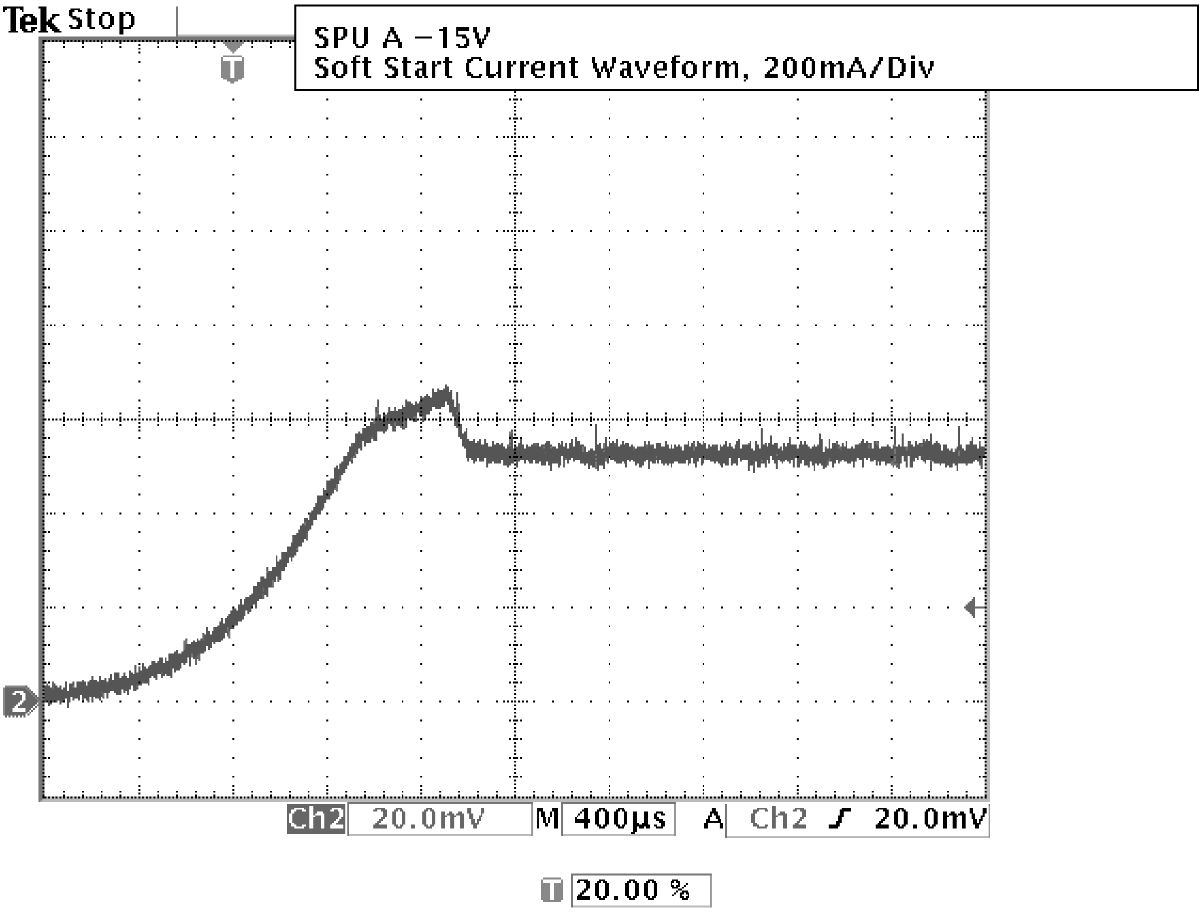
10.11 Waveform SPUAQA.BMP



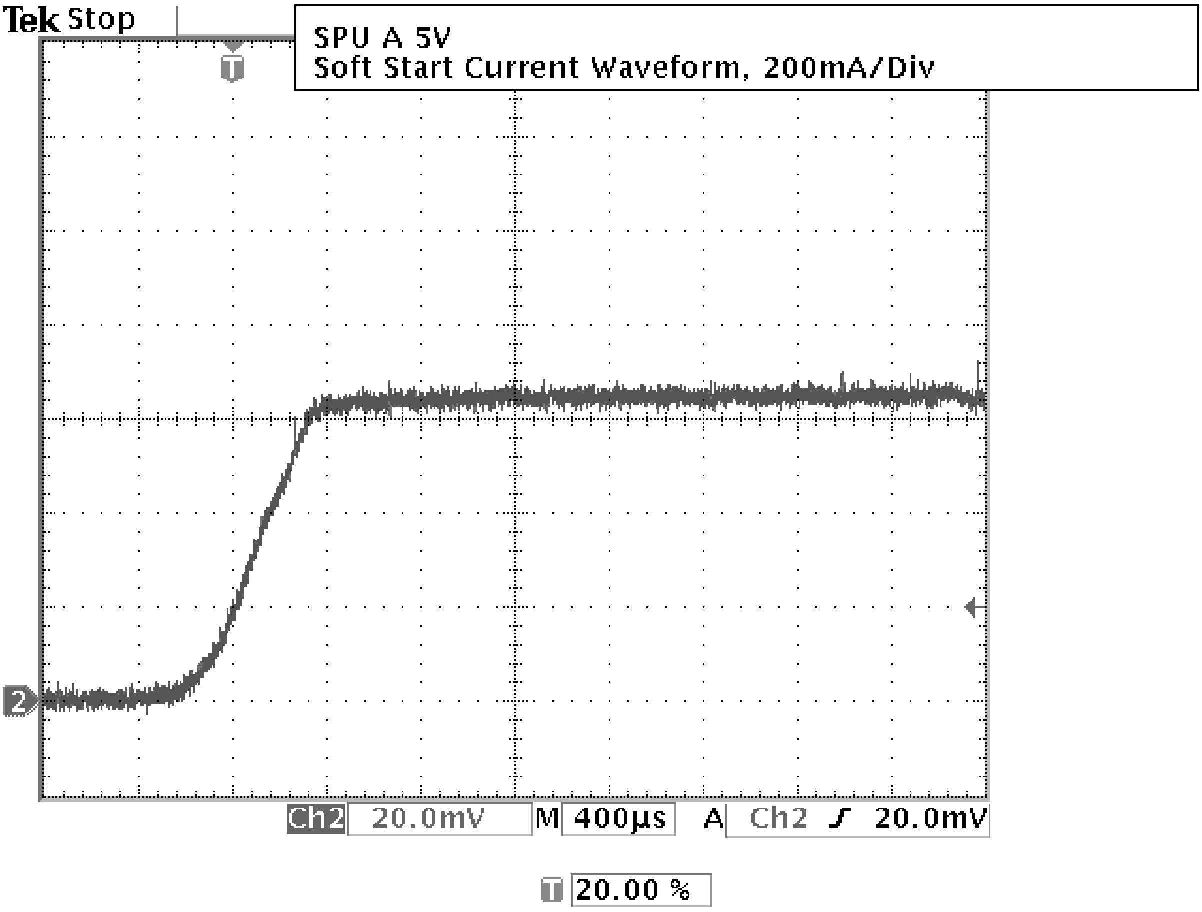
10.12 Waveform SPUAC15P.BMP



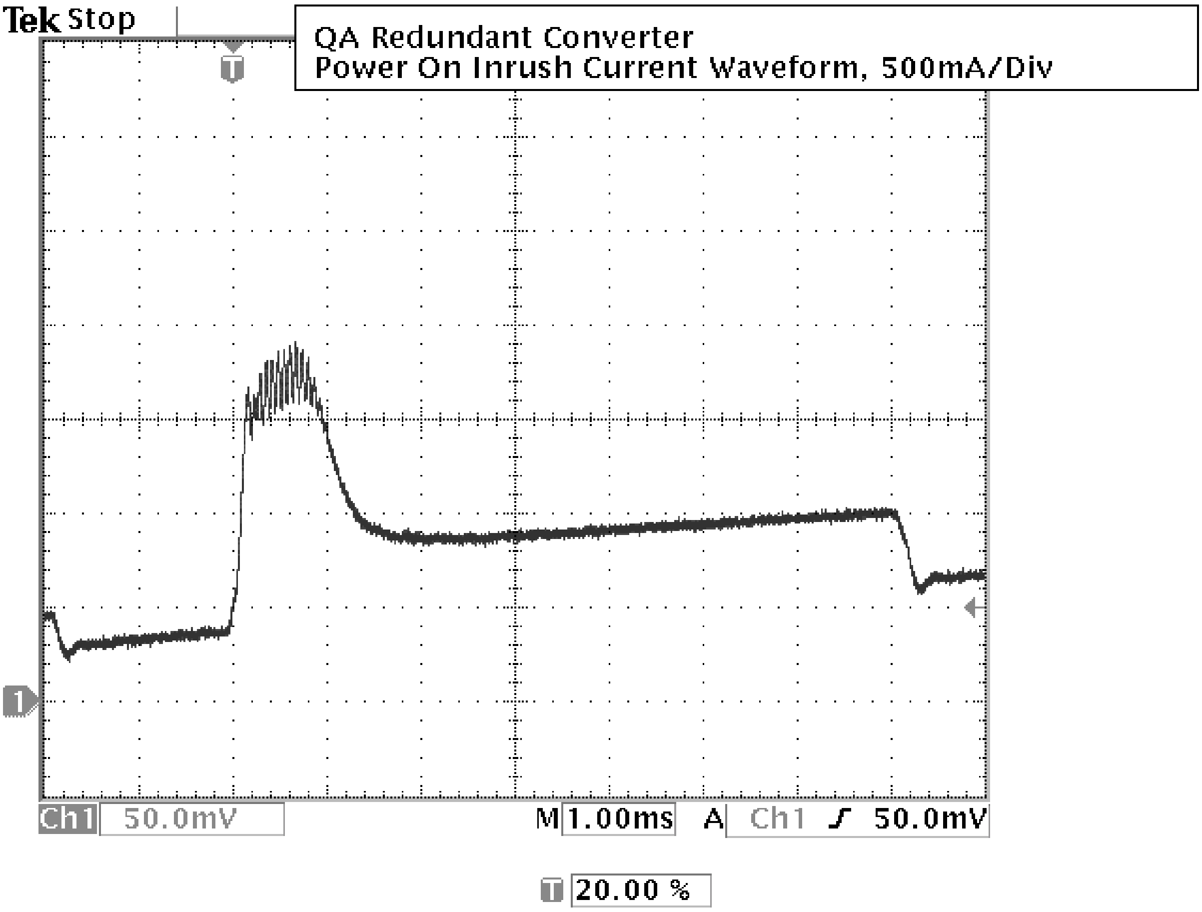
10.13 Waveform SPUAC15N.BMP



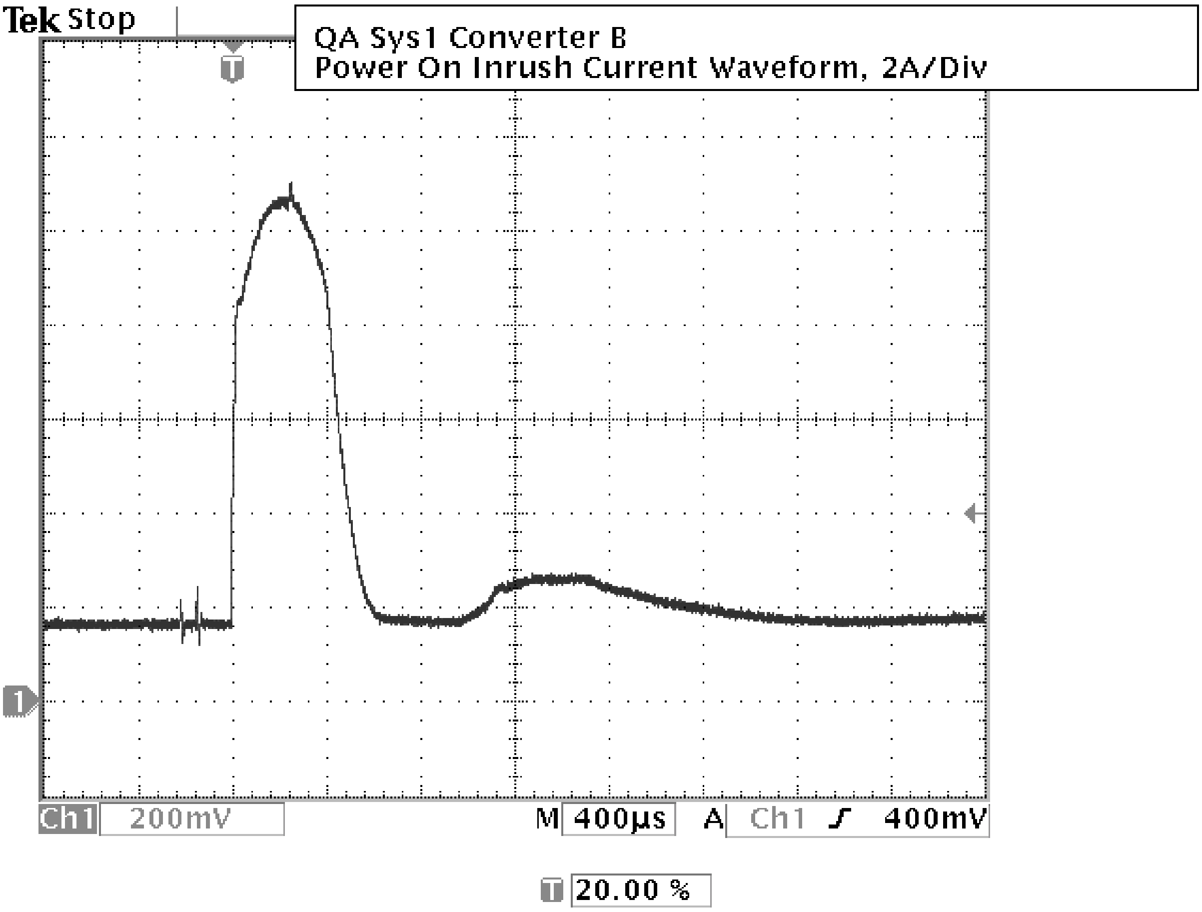
10.14 Waveform SPUAC5P.BMP



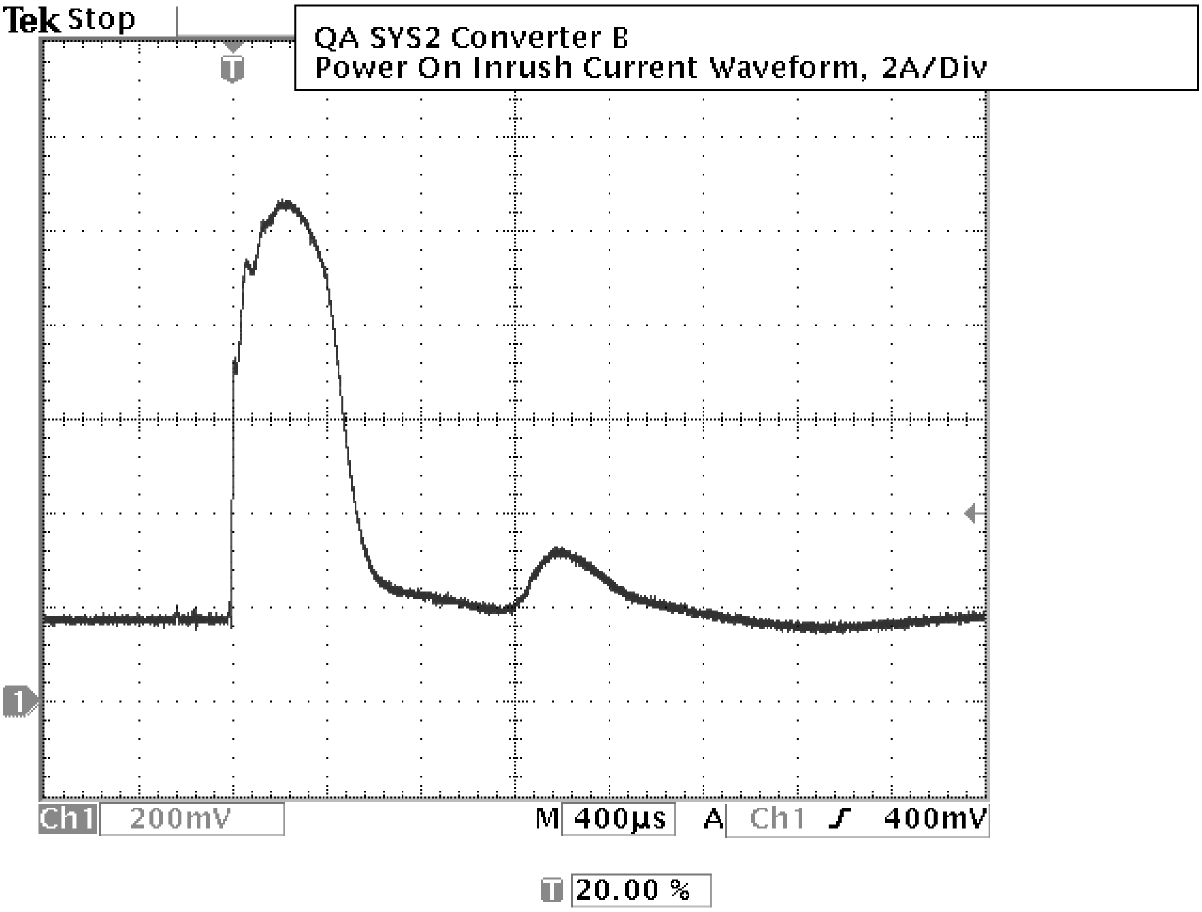
10.15 Waveform INRUSHAR.BMP



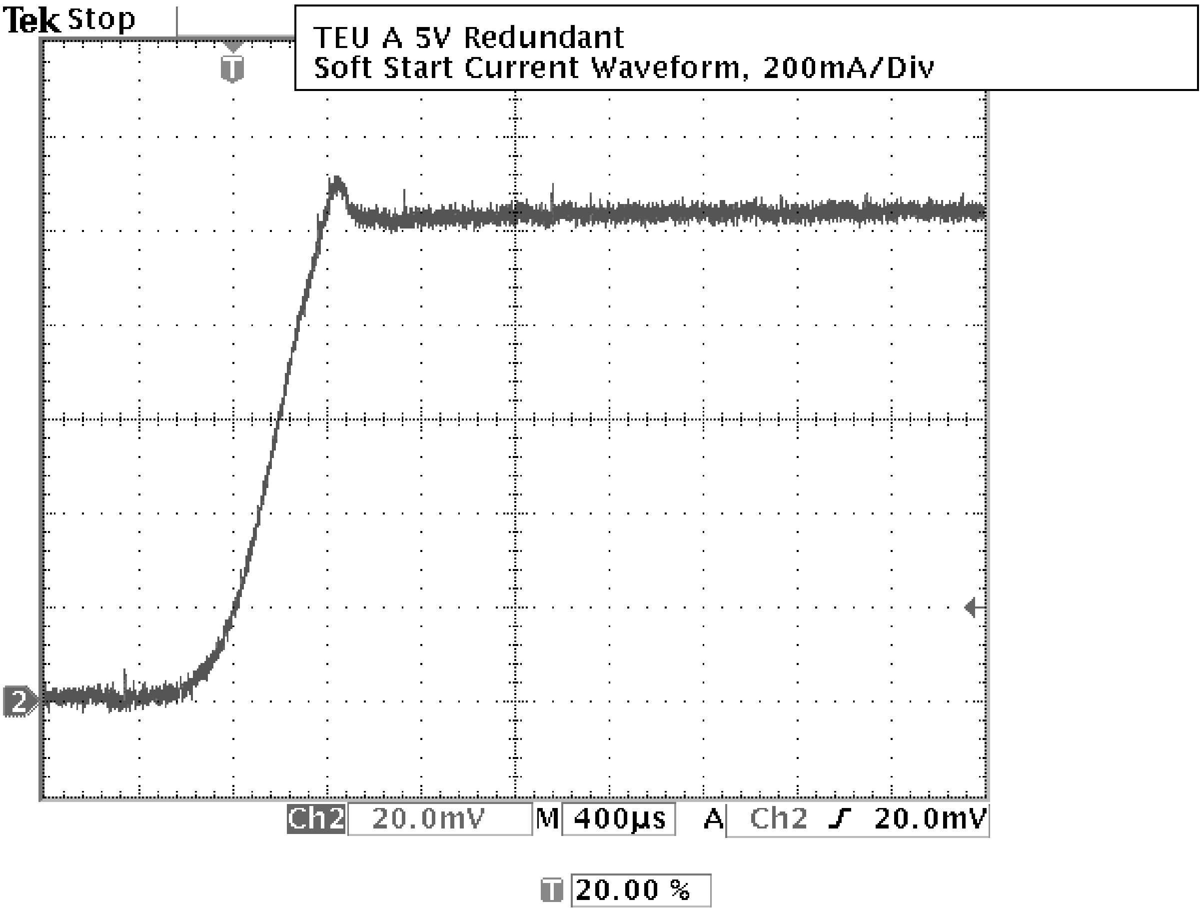
10.16 Waveform SYS1BQA.BMP



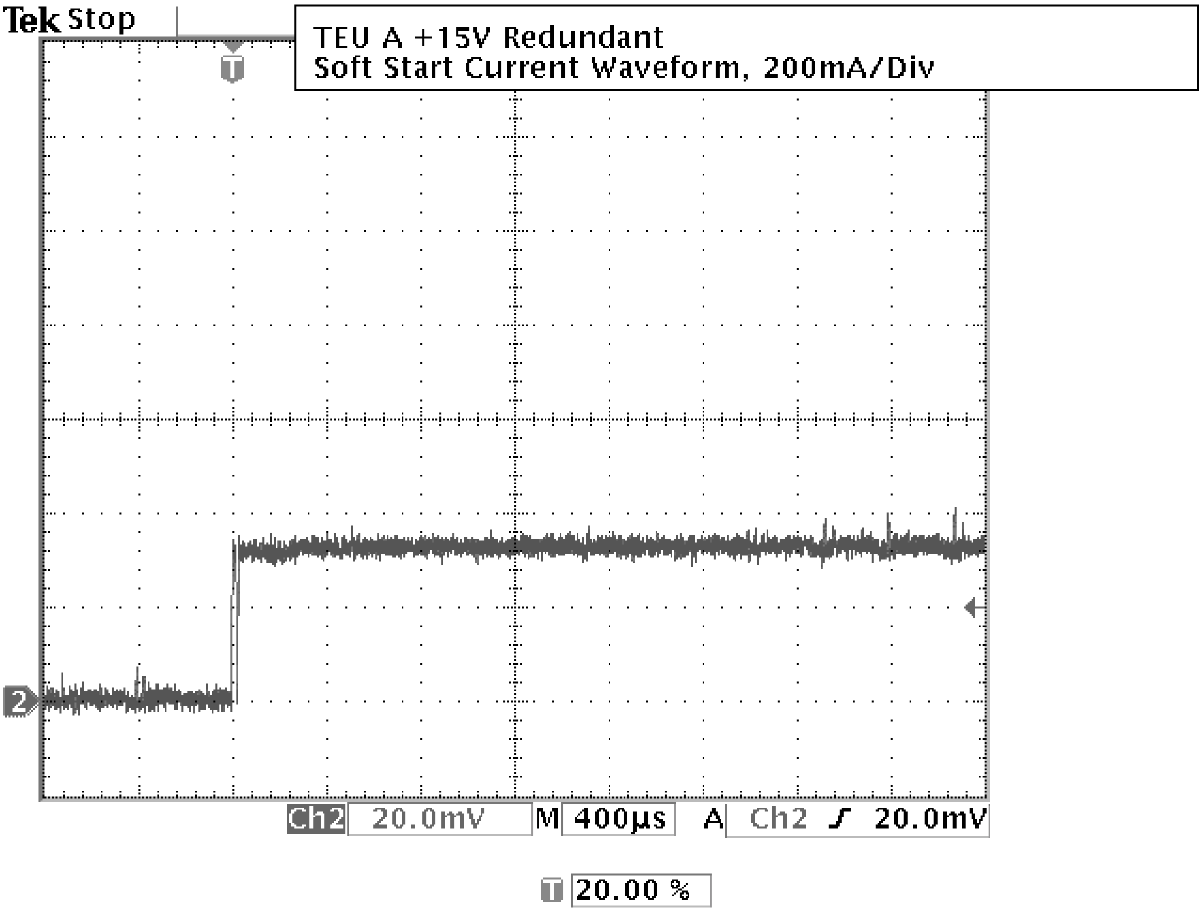
10.17 Waveform SYS2BQA.BMP



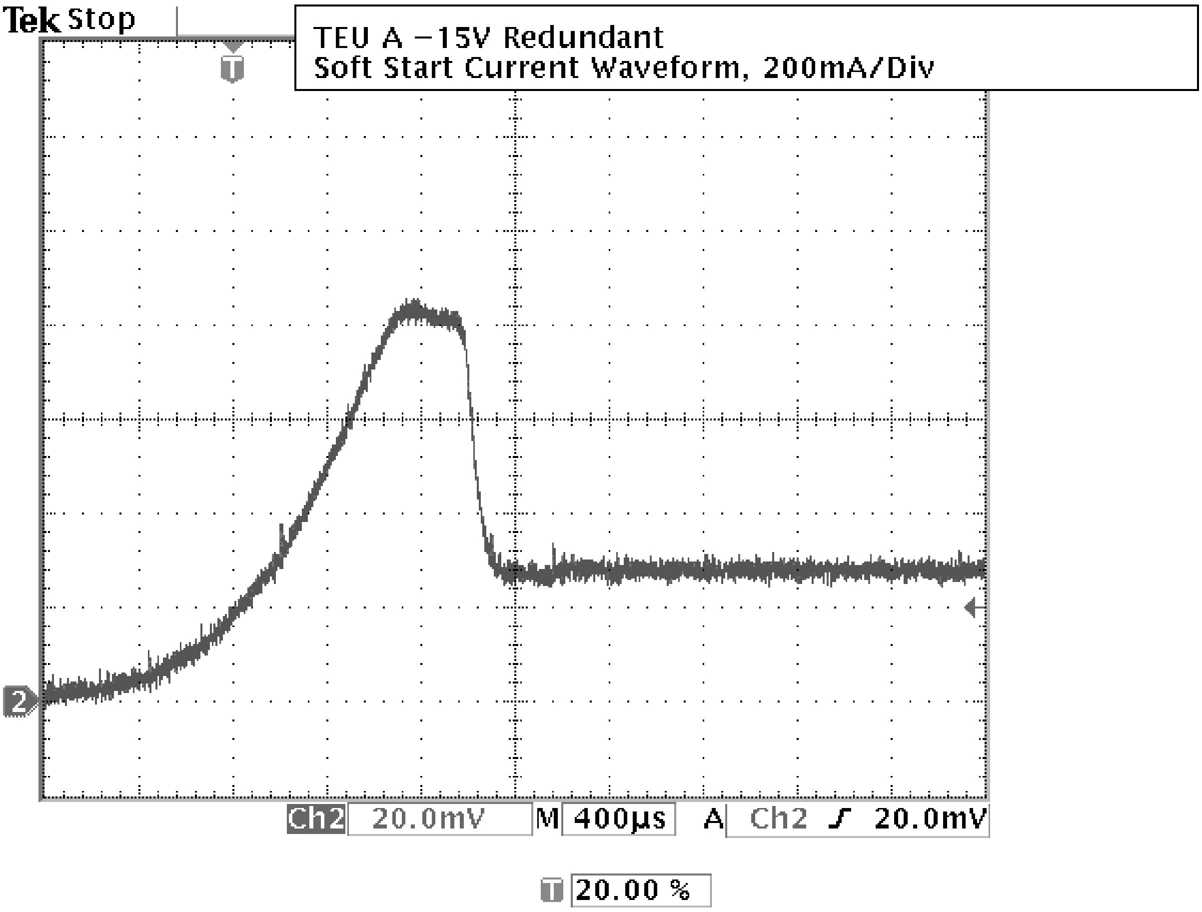
10.18 Waveform TEUAC6.BMP



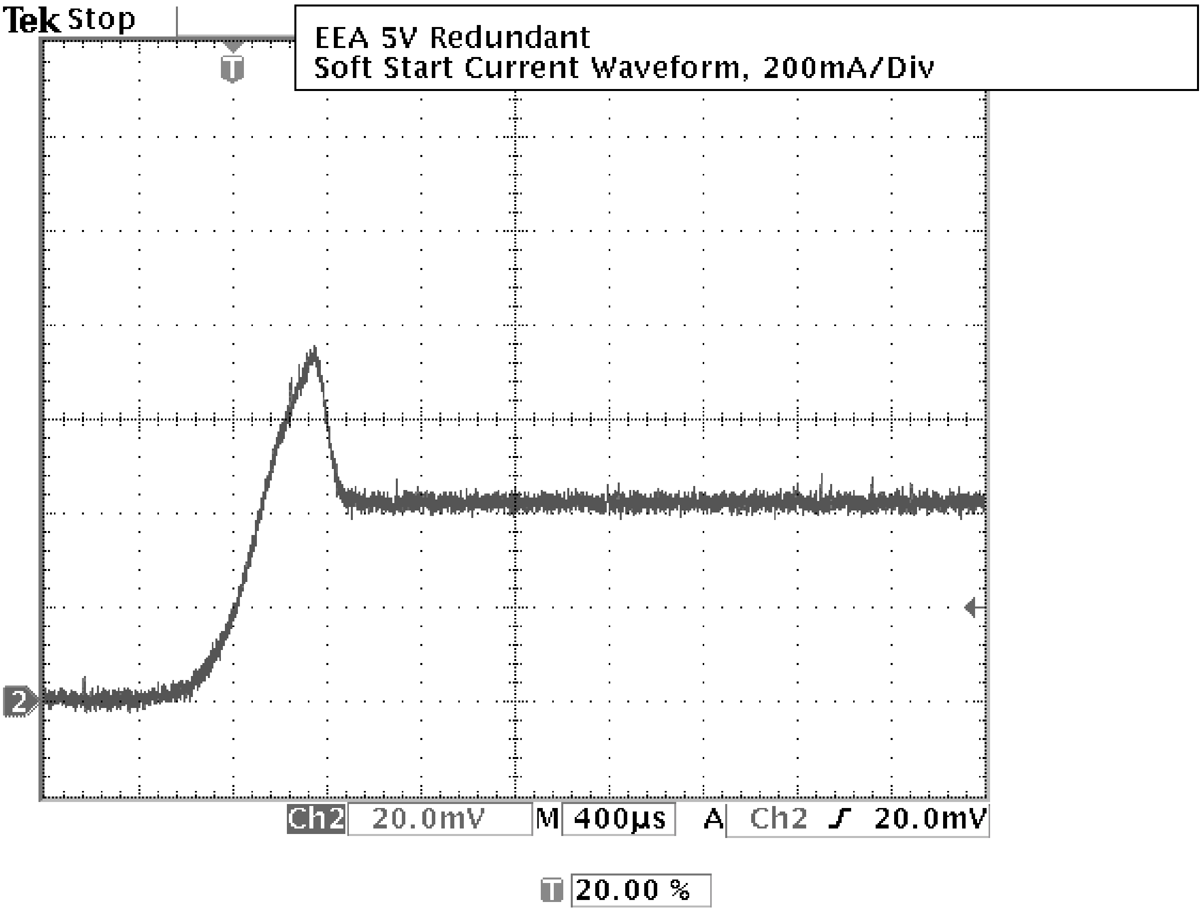
10.19 Waveform TEUAC7.BMP



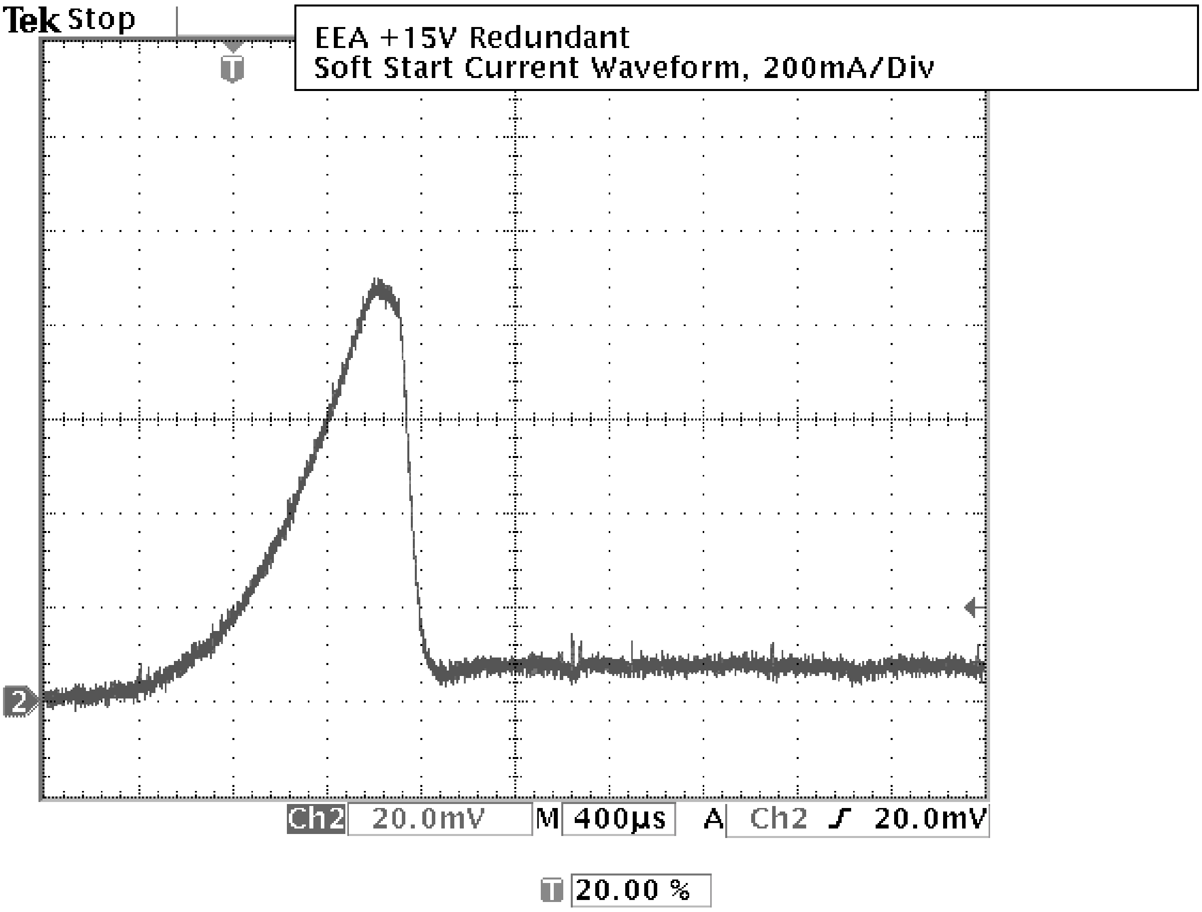
10.20 Waveform TEUAC8.BMP



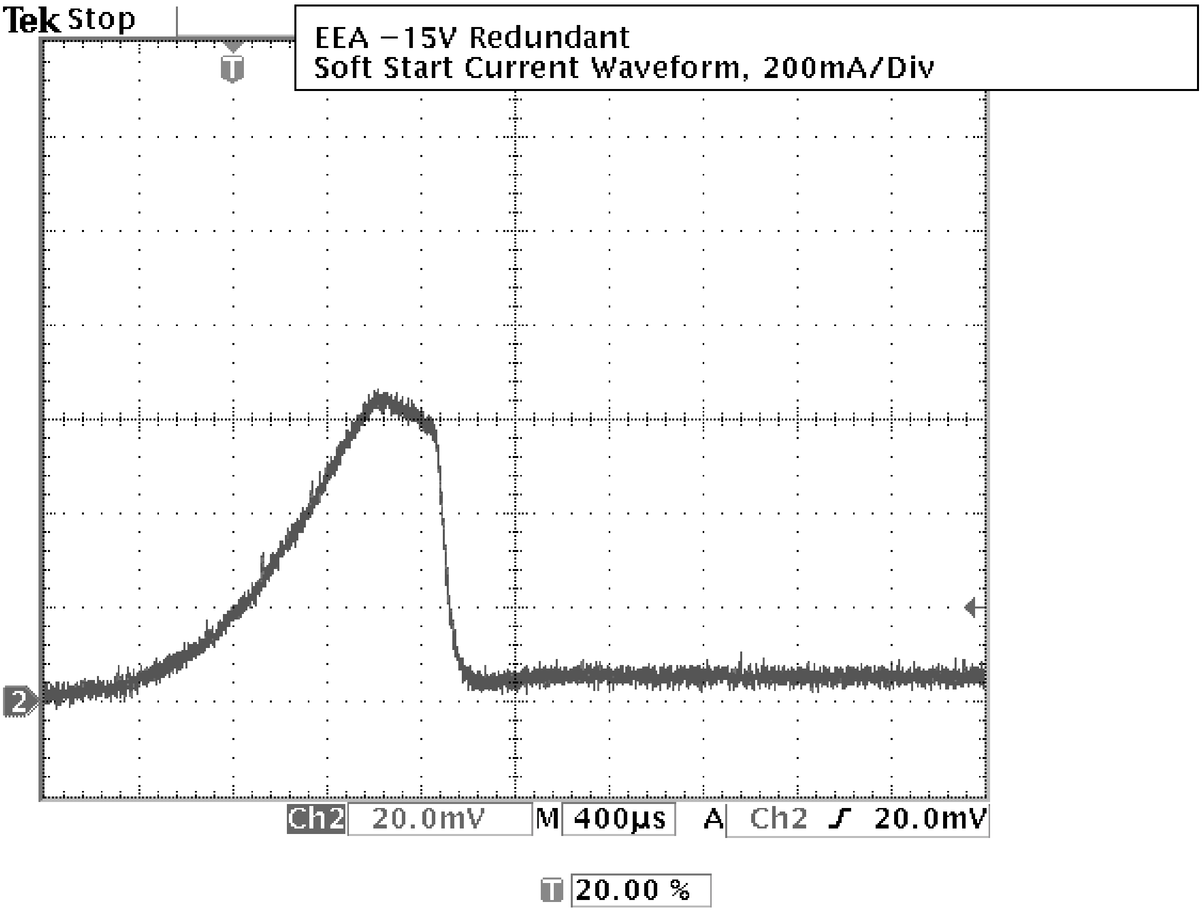
10.21 Waveform EEA5VR.BMP



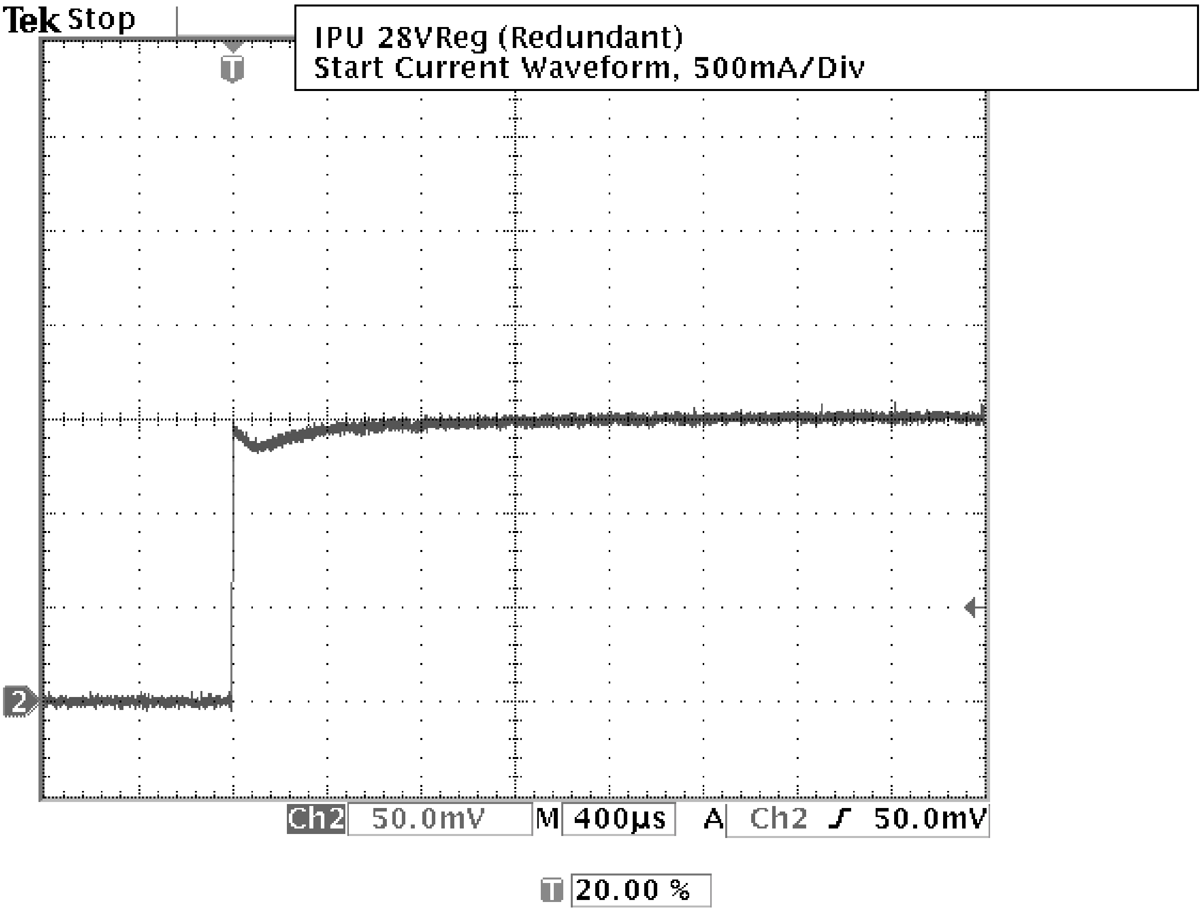
10.22 Waveform EEA15PRV.BMP



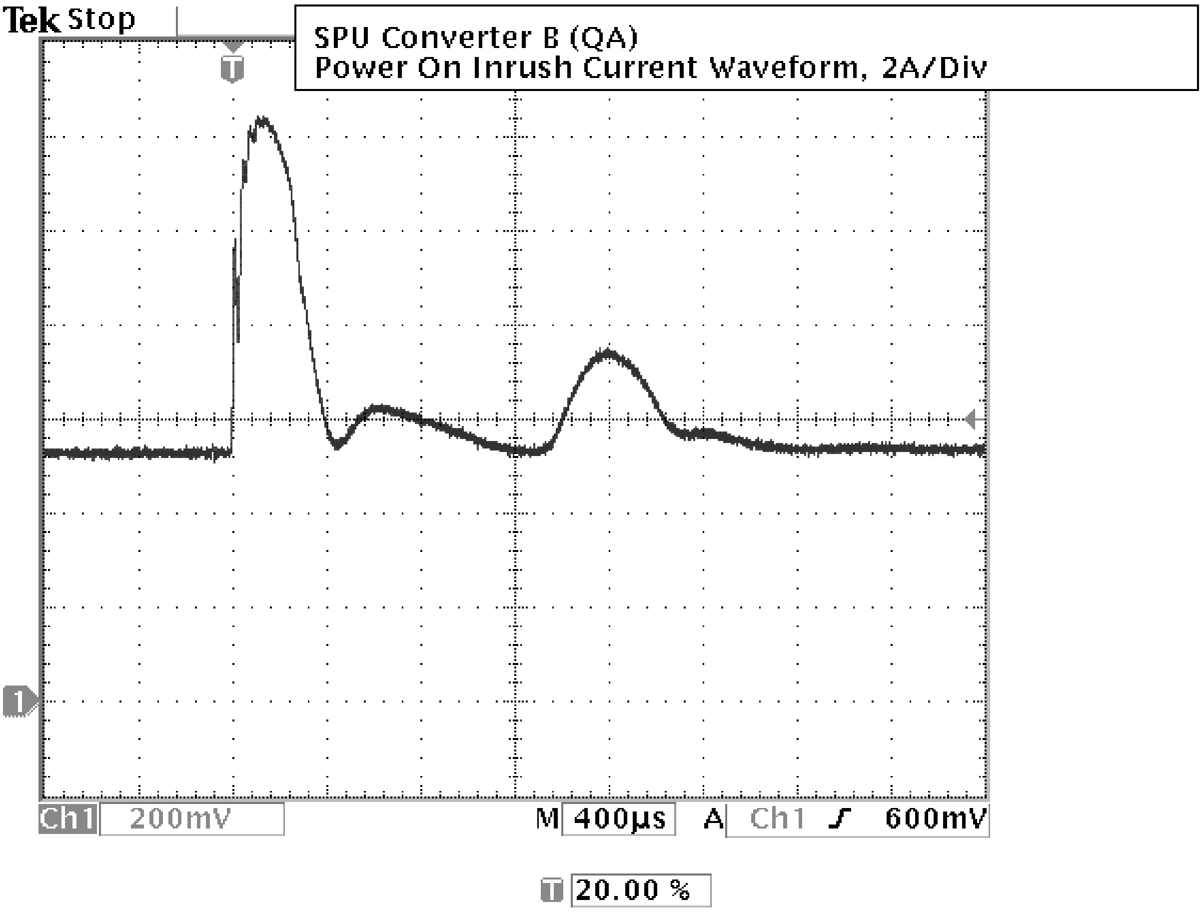
10.23 Waveform EEA15NRV.BMP



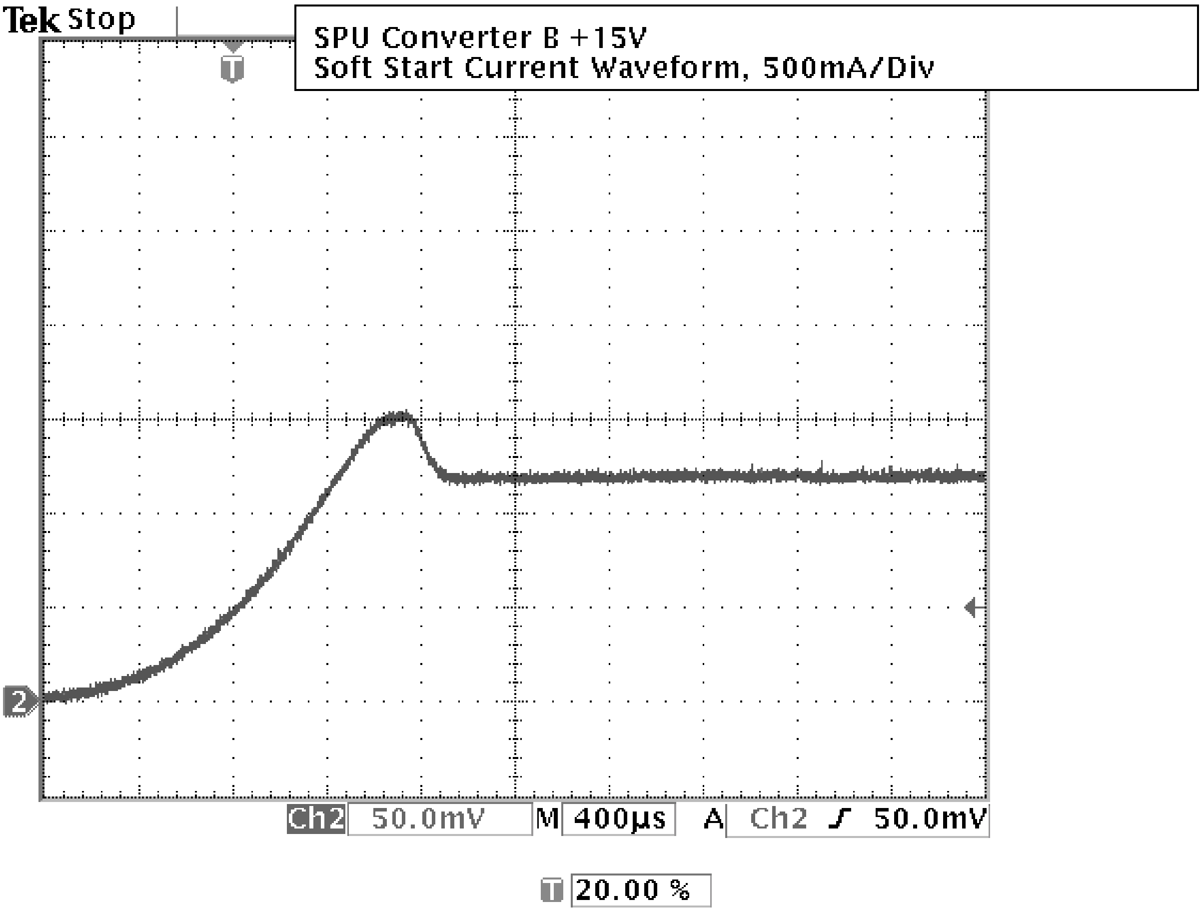
10.24 Waveform IPUA2.BMP



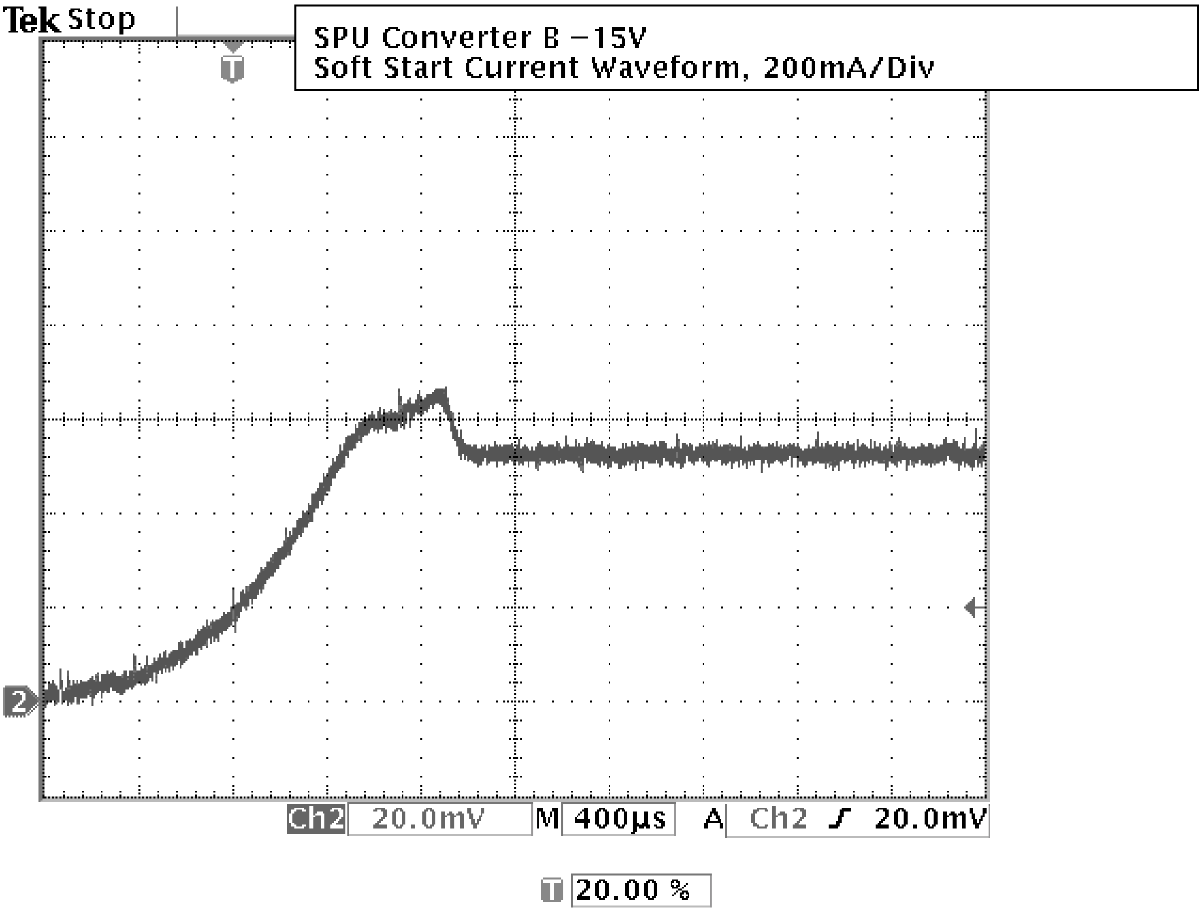
10.25 Waveform SPUBQA.BMP



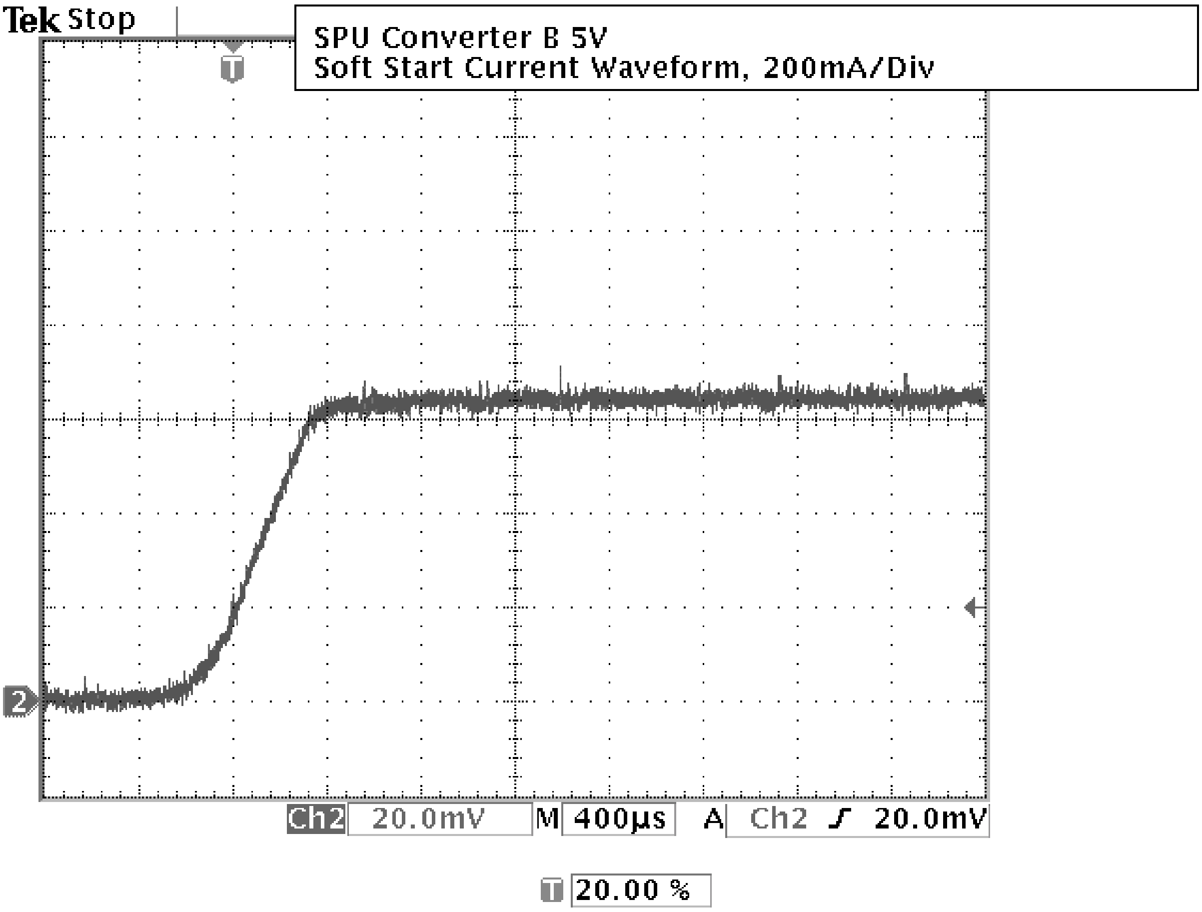
10.26 Waveform SPUBC15P.BMP



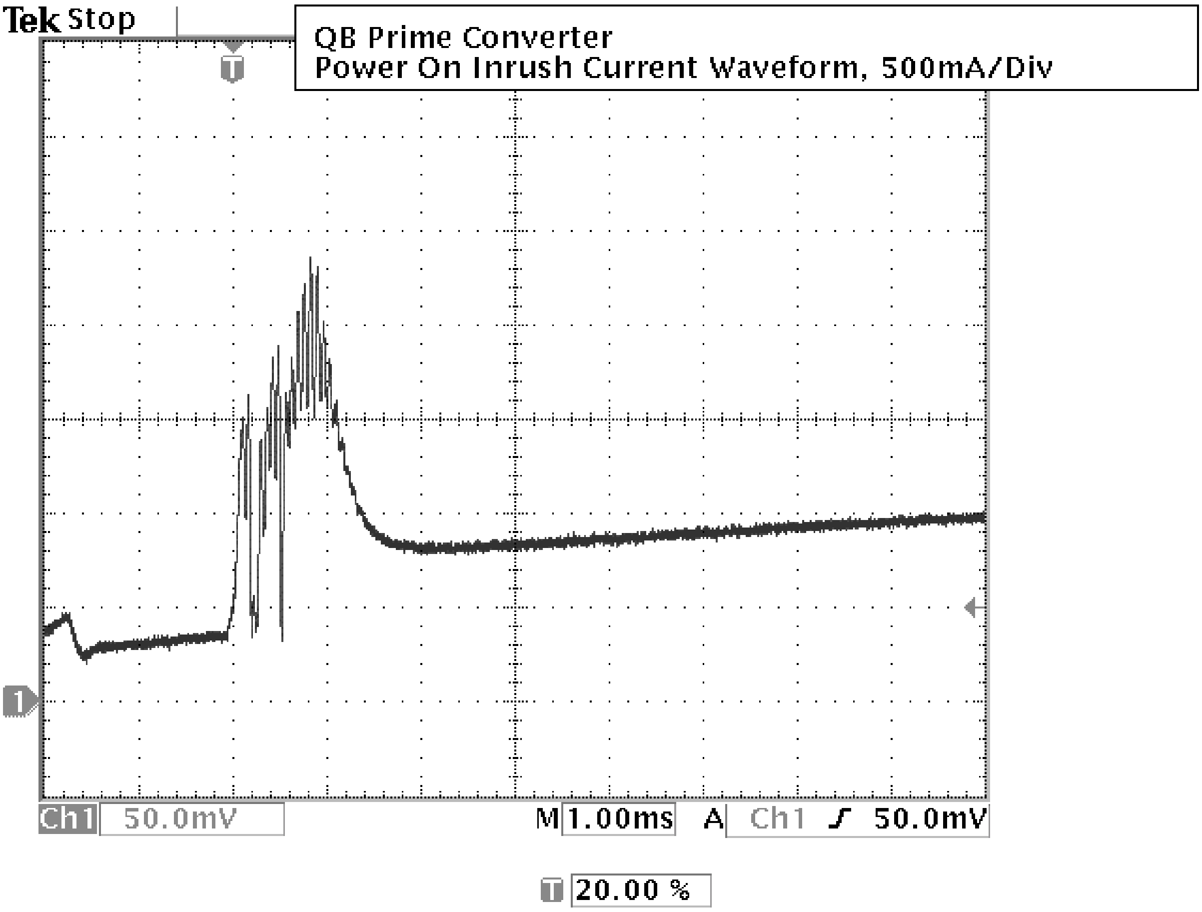
10.27 Waveform SPUBC15N.BMP



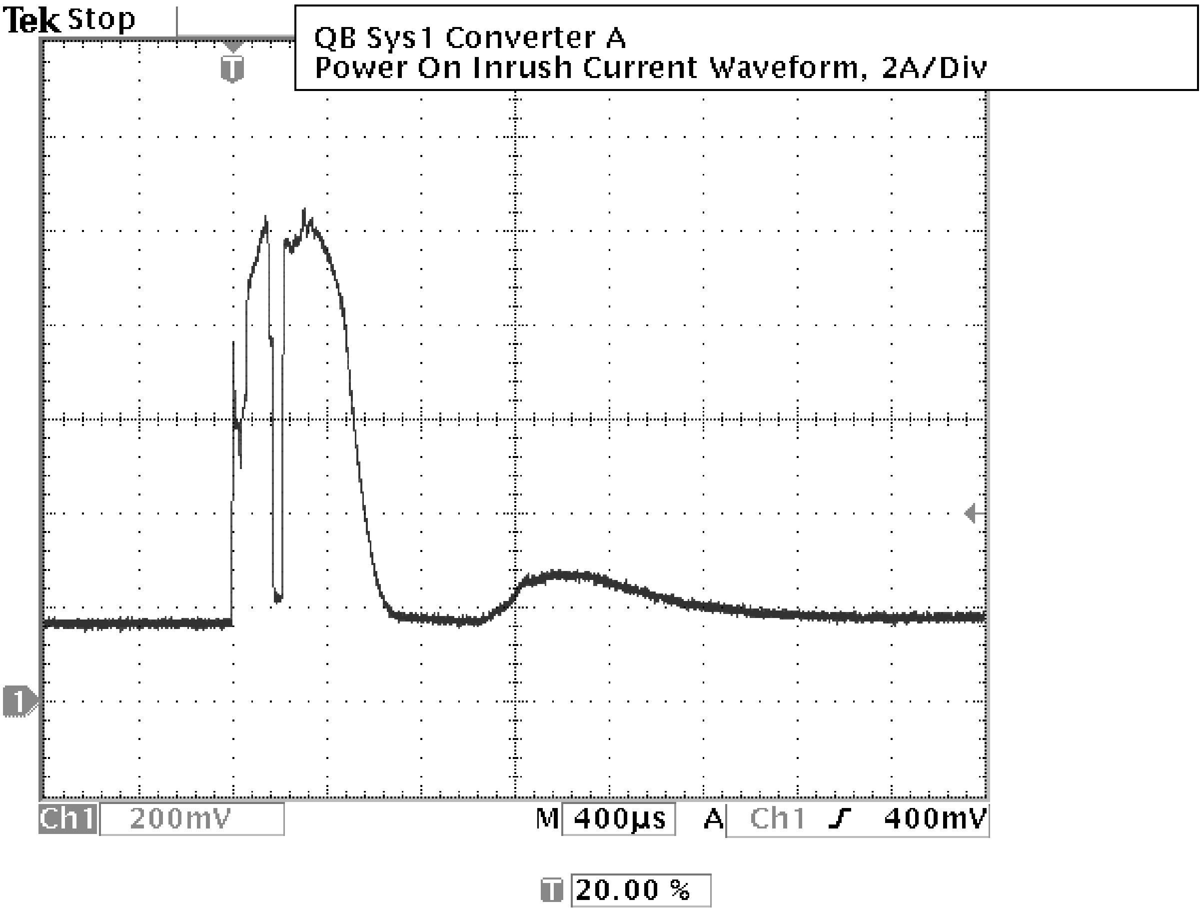
10.28 Waveform SPUBC5.BMP



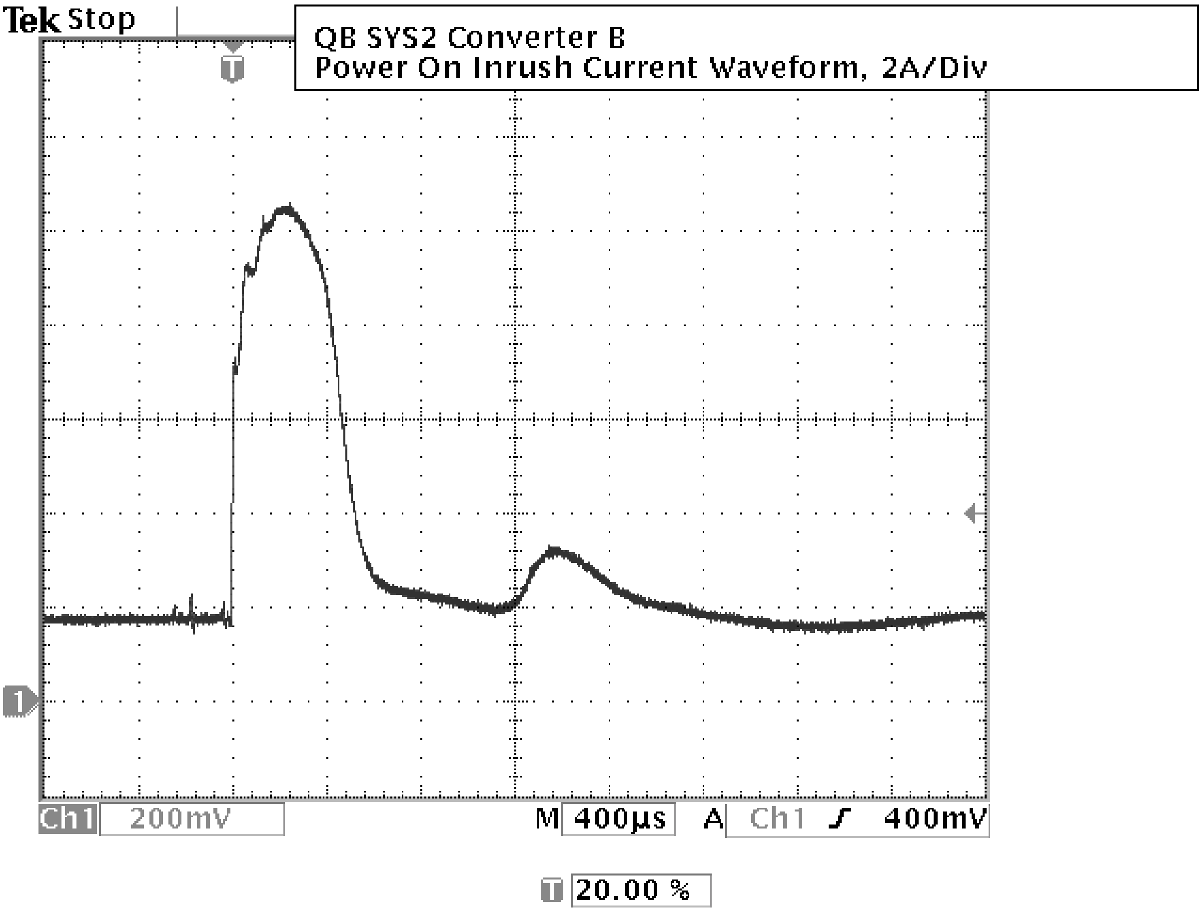
10.29 Waveform INRUSHBP.BMP



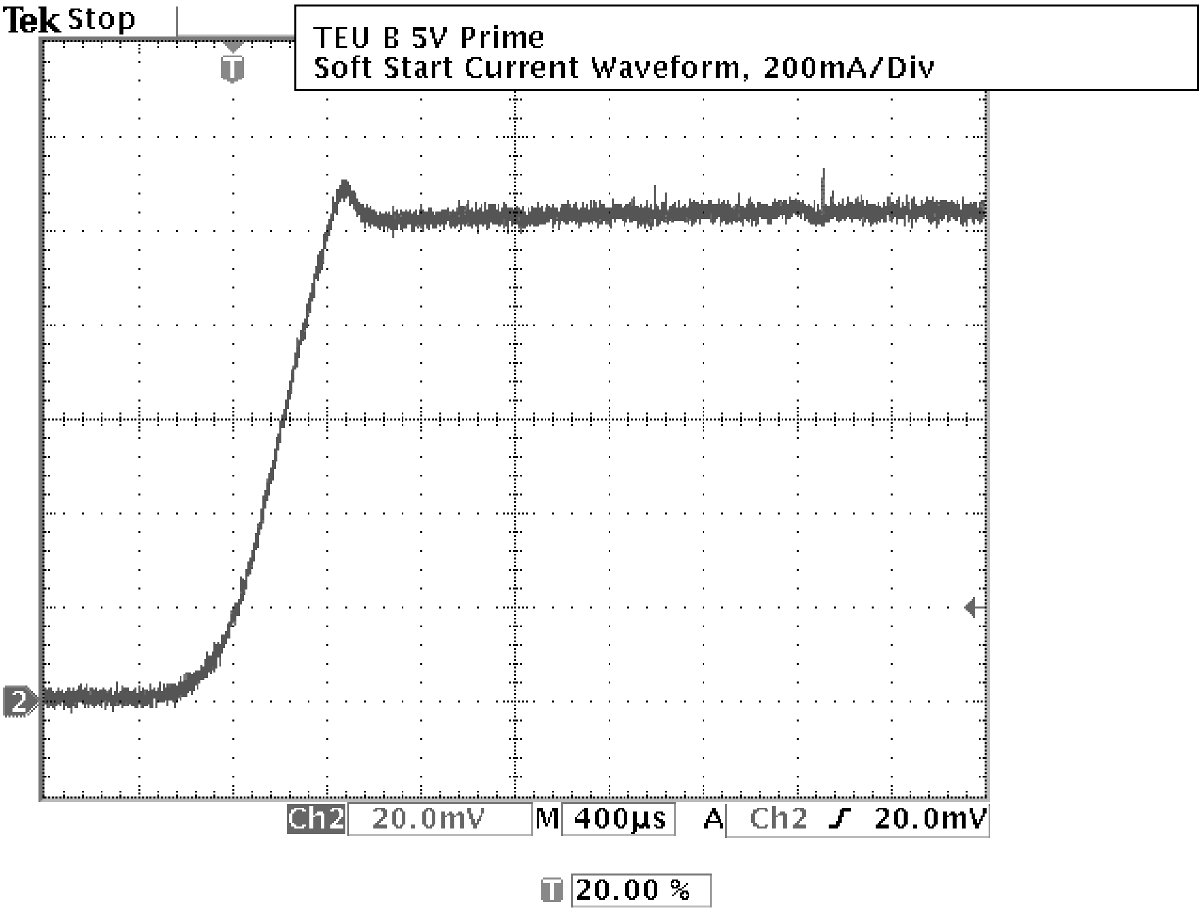
10.30 Waveform SYS1AQB.BMP



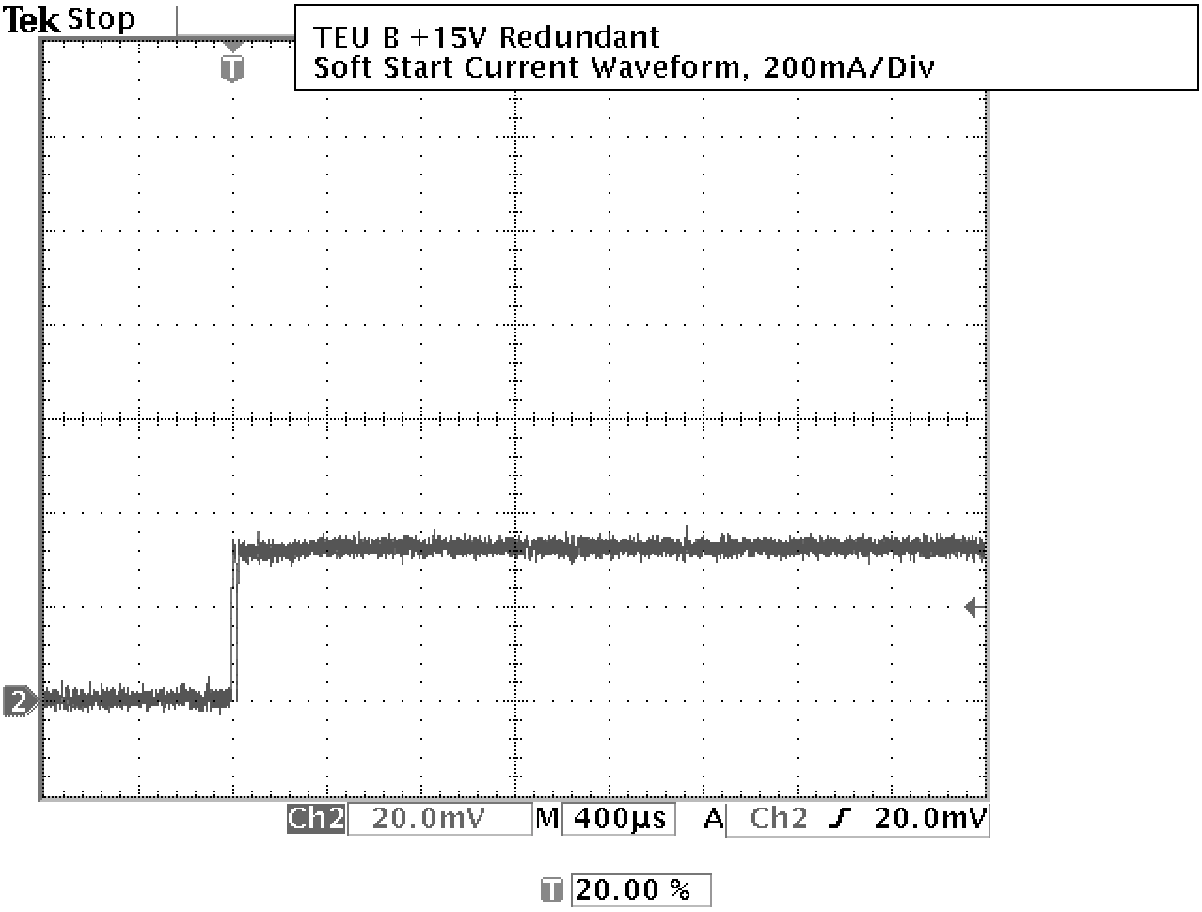
10.31 Waveform SYS2BQB.BMP



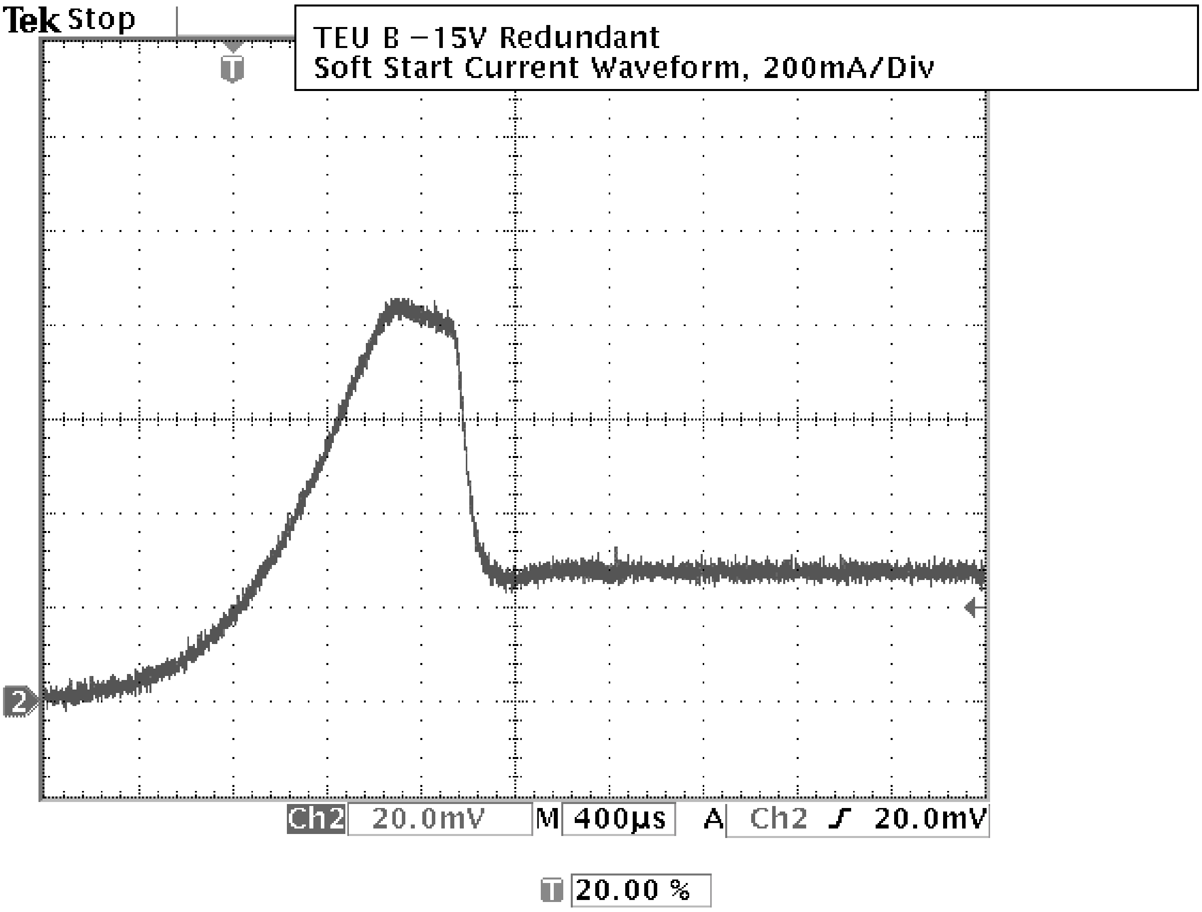
10.32 Waveform TEUBC2.BMP



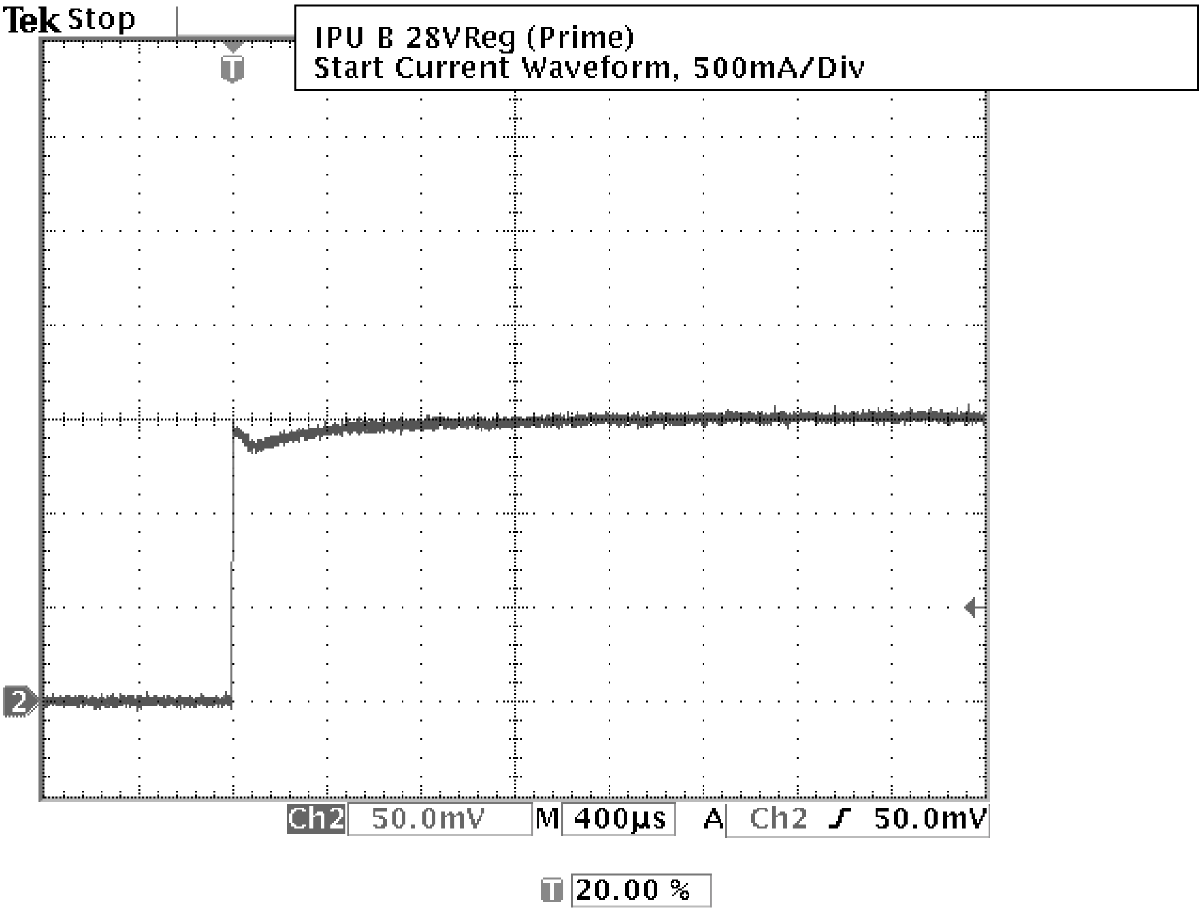
10.33 Waveform TEUBC3.BMP



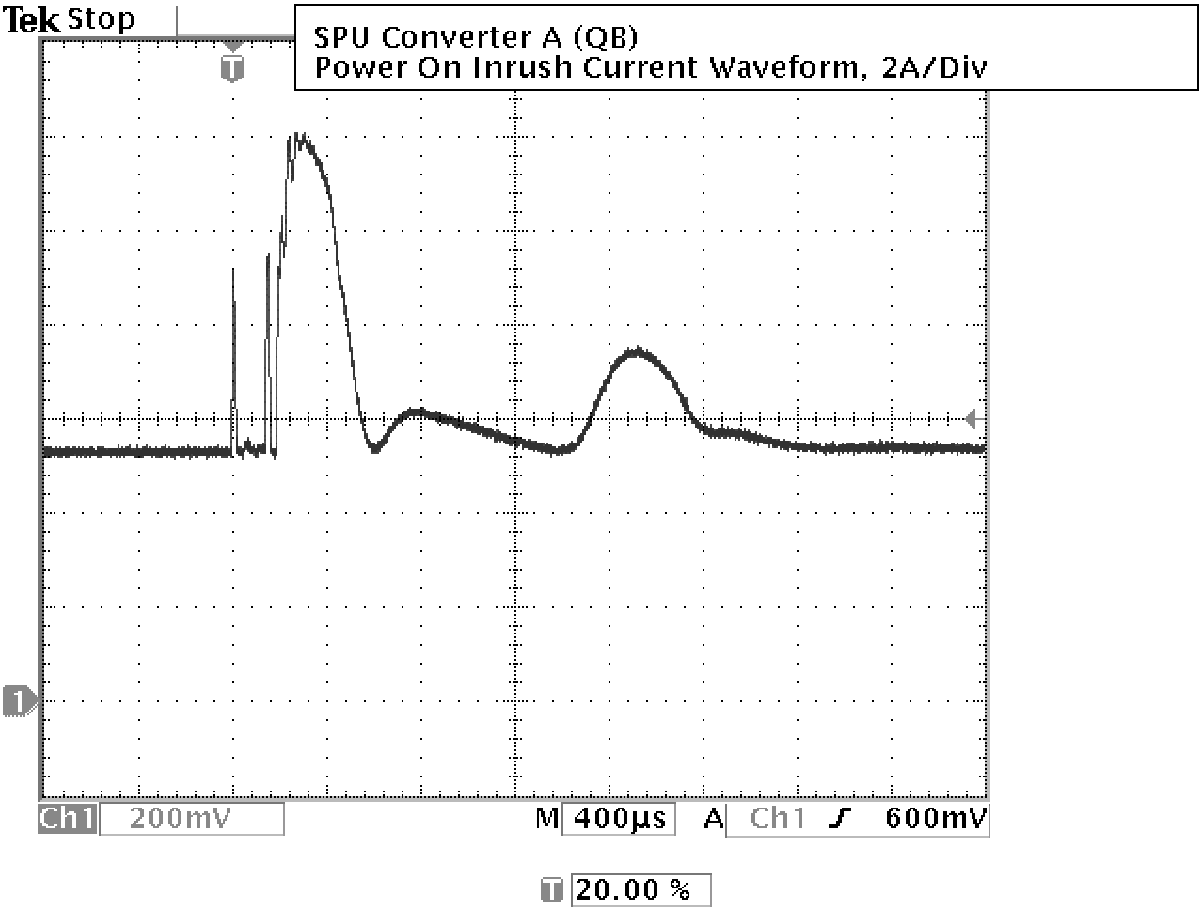
10.34 Waveform TEUBC4.BMP



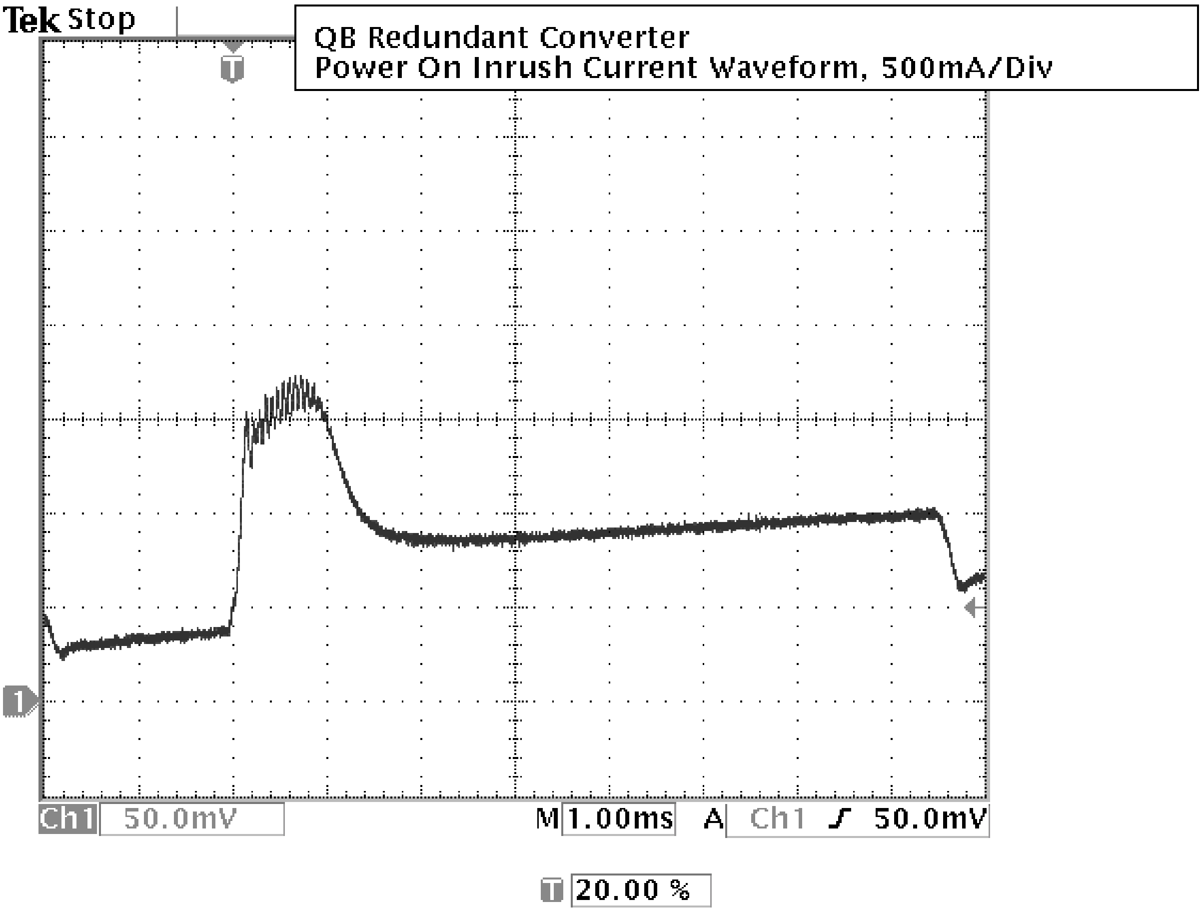
10.35 Waveform IPUB1.BMP



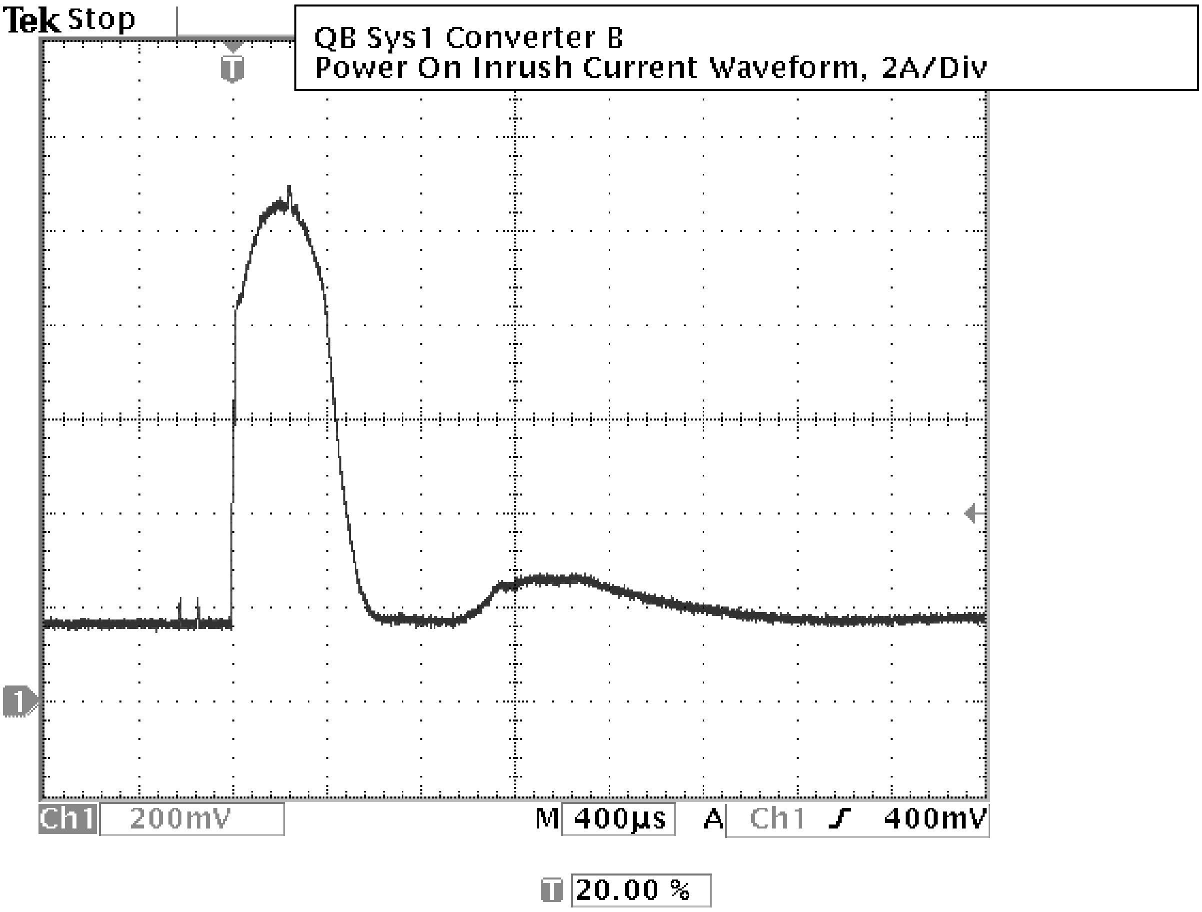
10.36 Waveform SPUAQB.BMP



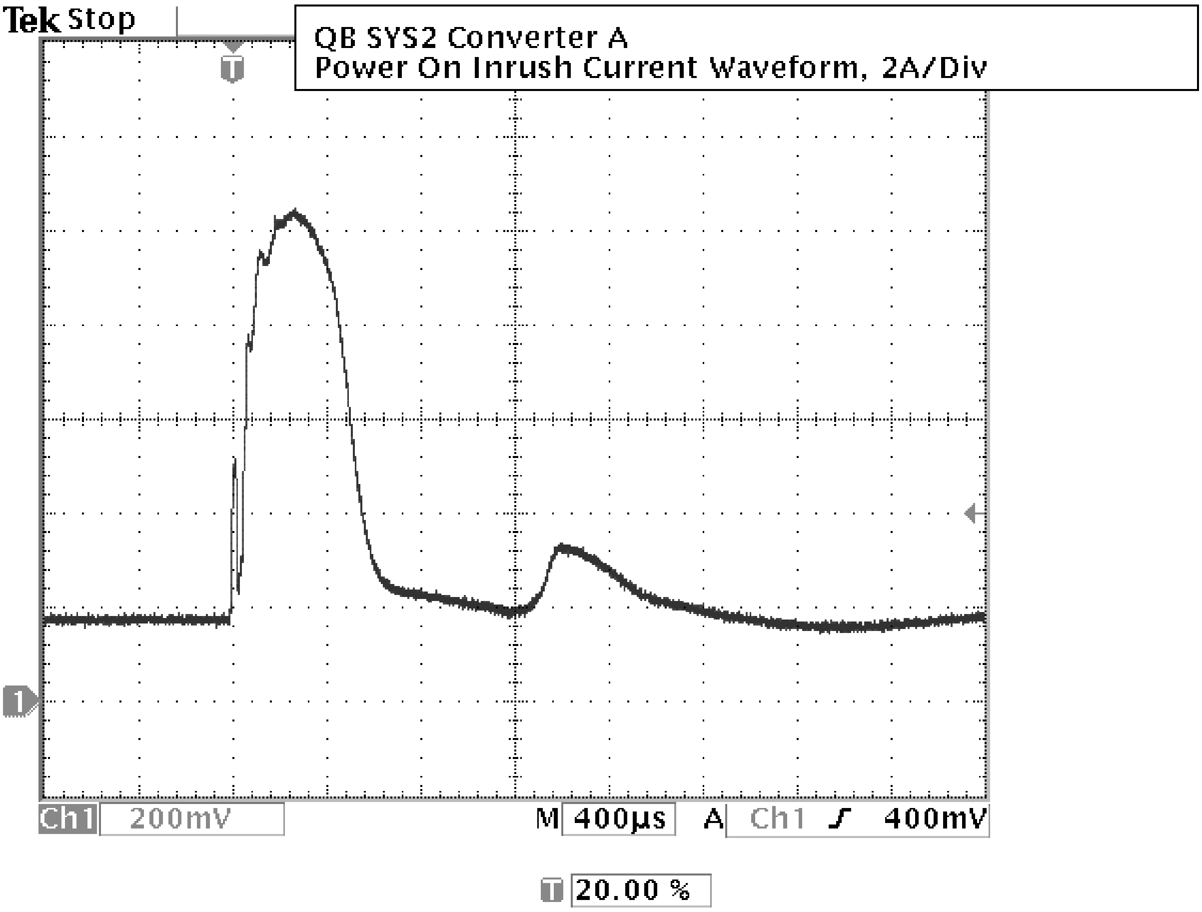
10.37 Waveform INRUSHBR.BMP



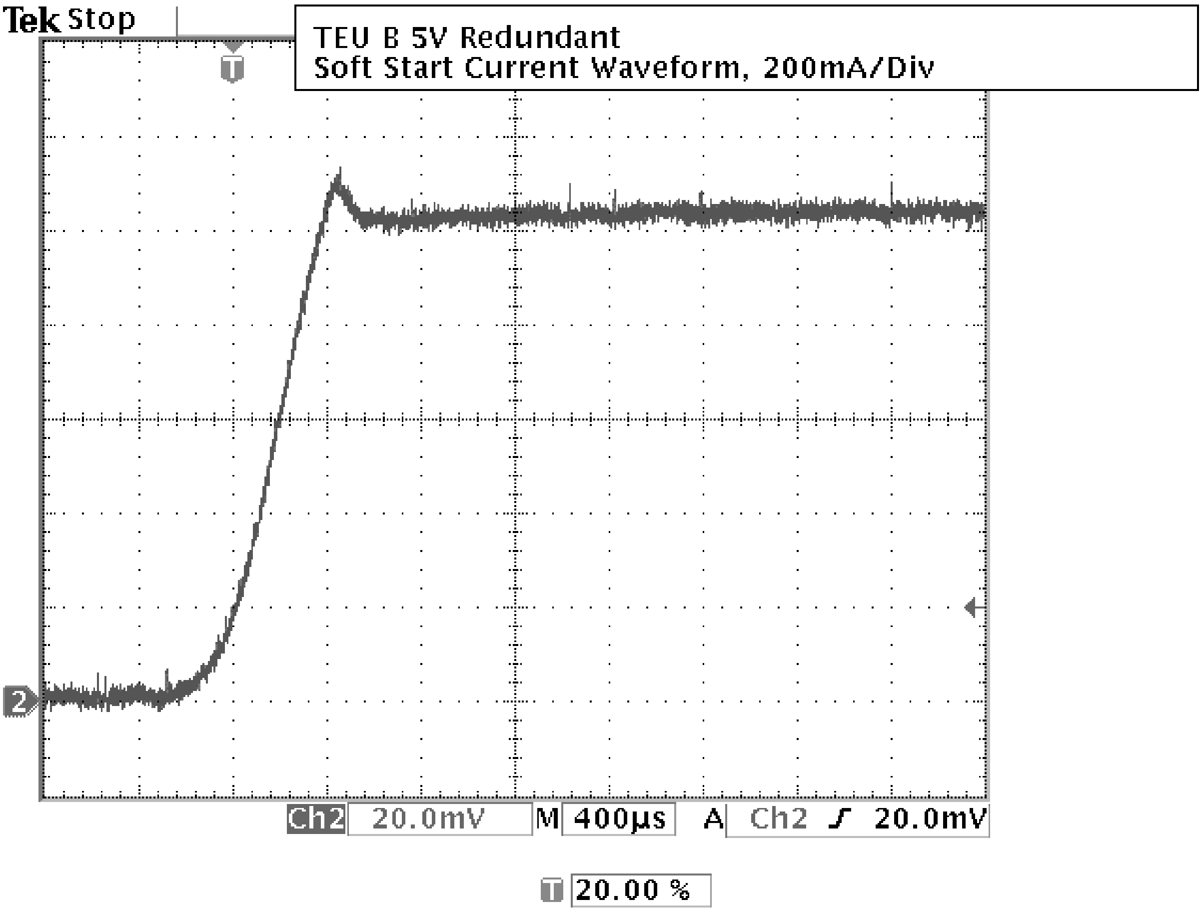
10.38 Waveform SYS1BQB.BMP



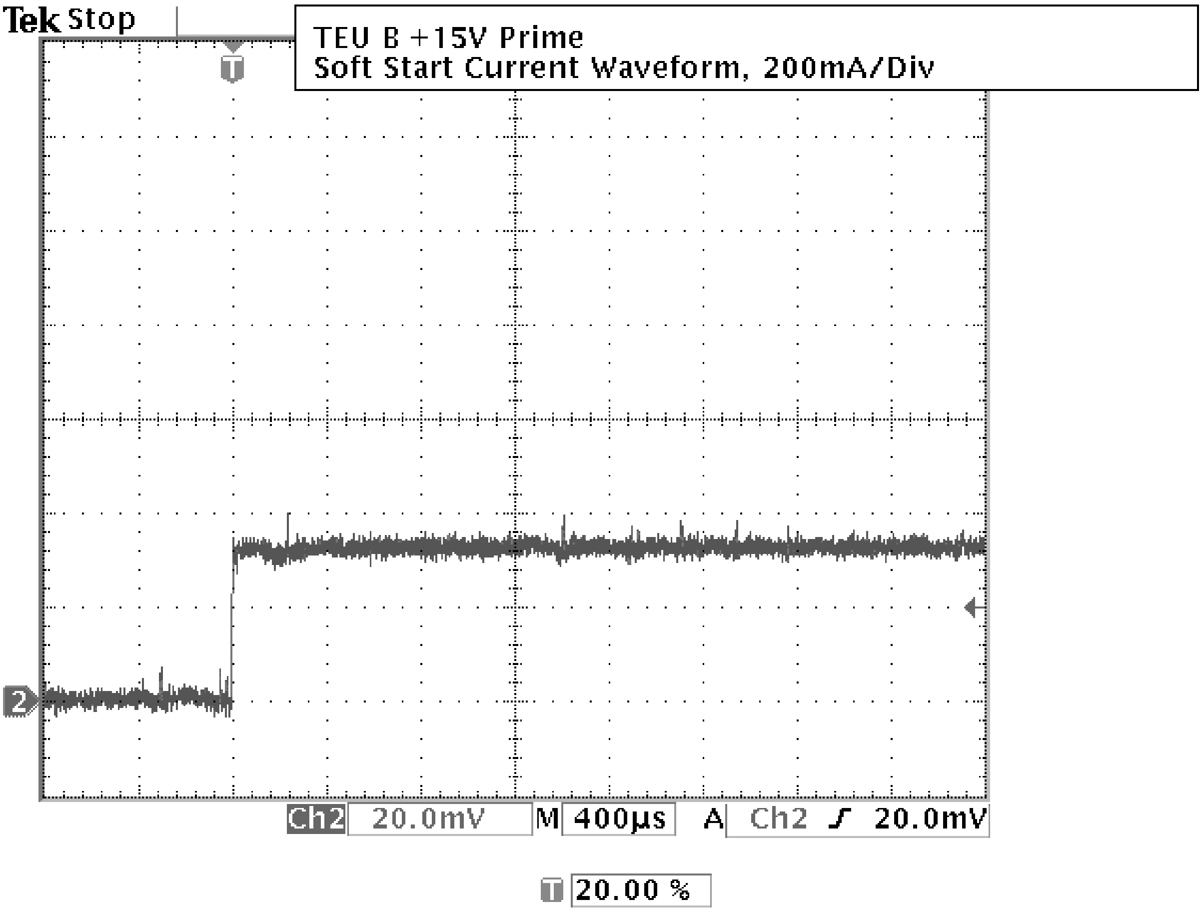
10.39 Waveform SYS2AQB.BMP



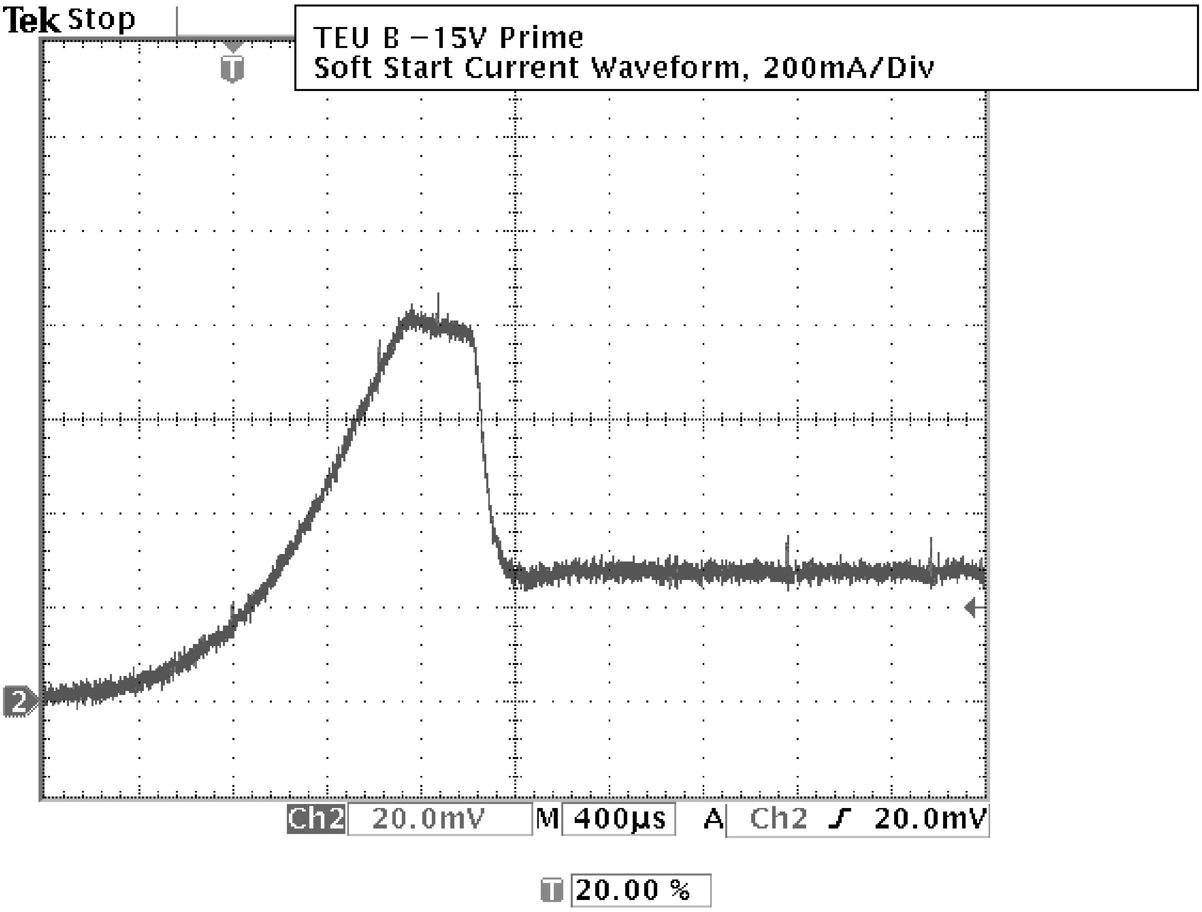
10.40 Waveform TEUBC6.BMP



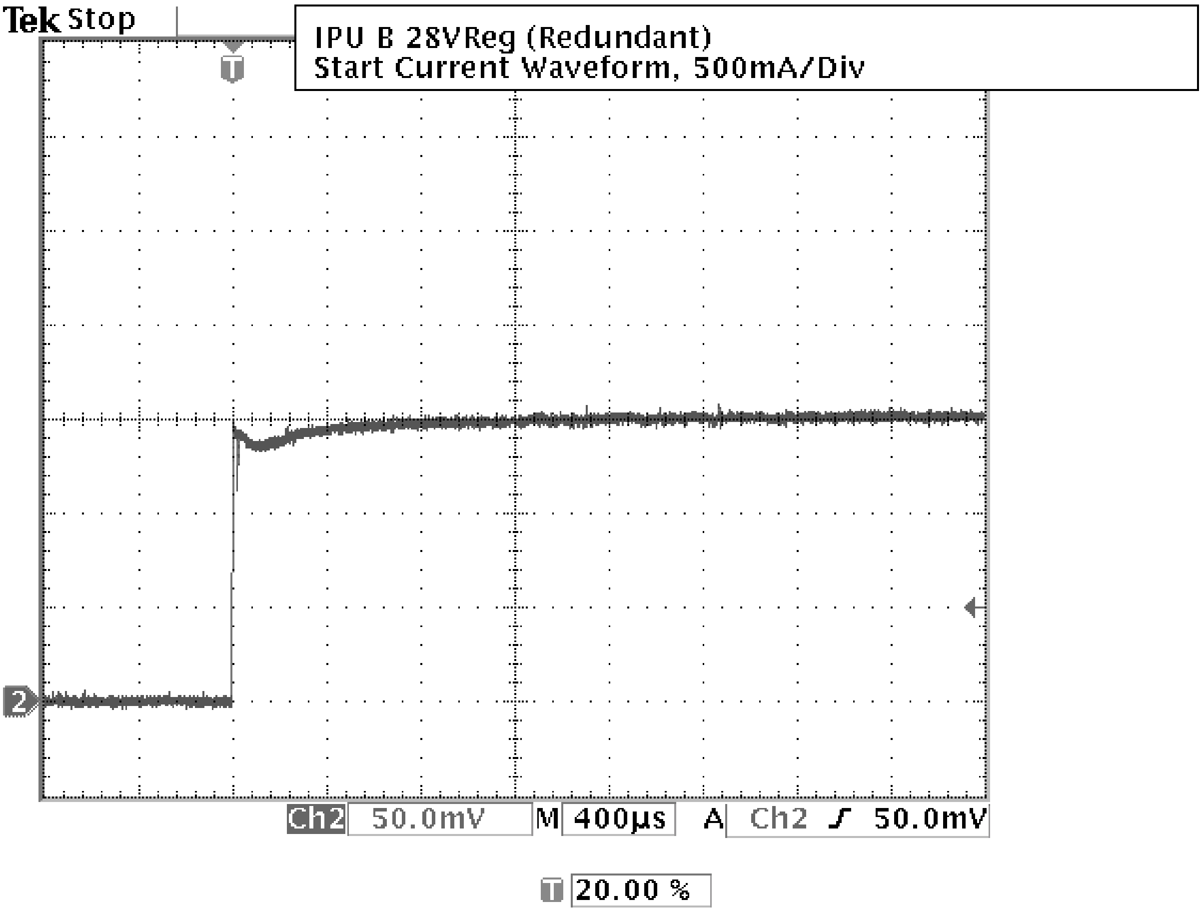
10.41 Waveform TEUBC7.BMP



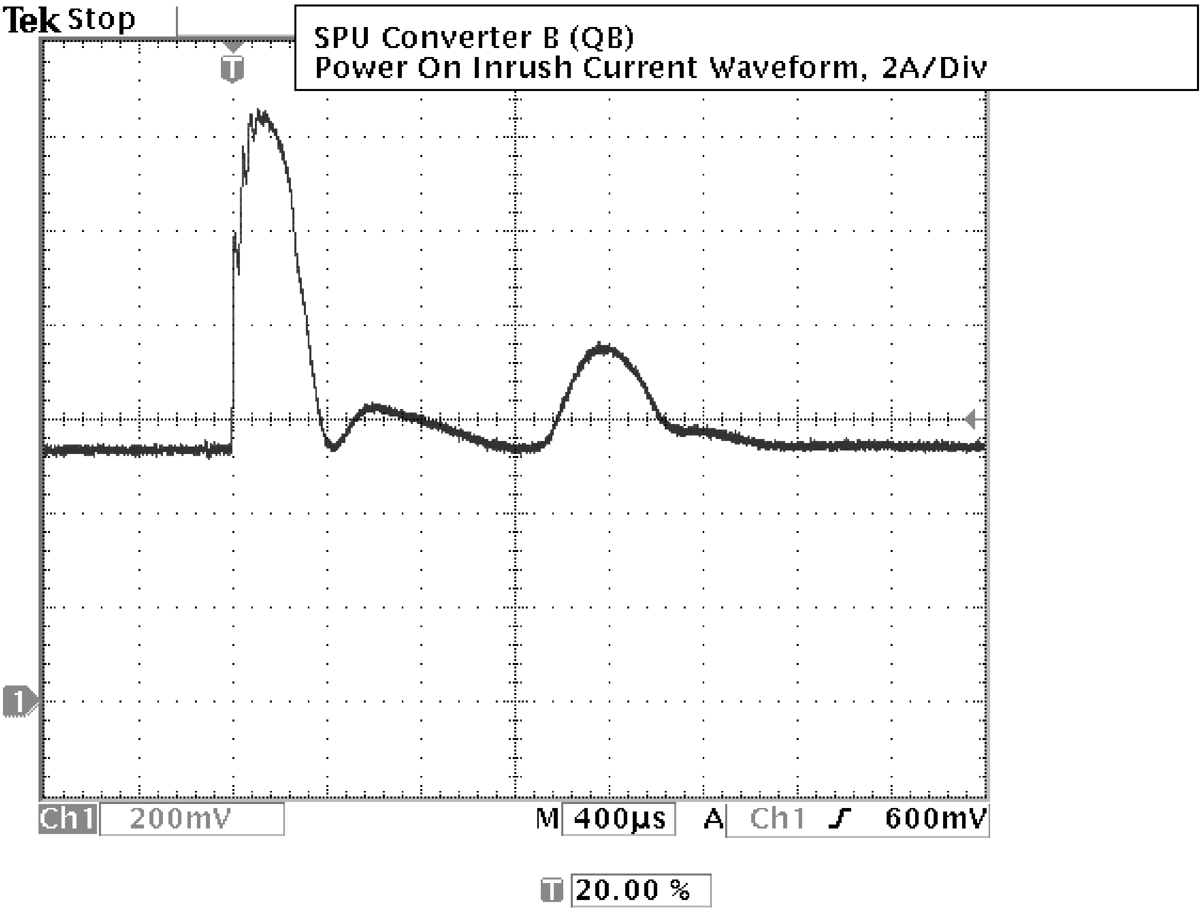
10.42 Waveform TEUBC8.BMP



10.43 Waveform IPUB2.BMP



10.44 Waveform SPUBQB.BMP



HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: A. Pearce Date: 15-04-2001

Subject / Title: Limited Performance Test Procedure

Contents / Description / Summary:

Key Words: PCU Performance Test

Purpose (20 characters maximum):

Approved By:

Date (yy–mm–dd):

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

		Name	Signature	Date
Prepared by		**Alan B. Pearce**		9/12/99
Checked by	-	-		
Issued	Issue A	Alan B. Pearce		28/6/2000
Updated	Issue B	Alan B. Pearce		4/8/2000
Updated	Issue C	Alan B. Pearce		5/8/2000
Updated	Issue D	Alan B. Pearce		7/8/2000
Revised	Issue E	Alan B. Pearce		7/8/2000
Updated	Issue F	Alan B. Pearce		8/8/2000
Updated	Issue G	Alan B. Pearce		9/8/2000
Updated	Issue H	Alan B. Pearce		15/11/2000
Updated	Issue J	Alan B. Pearce		06/04/2001
Updated	Issue J-2	Alan B. Pearce		08/04/2001
Updated	Issue J-3	Alan B. Pearce		14-04-2001
Updated	Issue J-4	Alan B. Pearce		15-04-2001

Issue A – Initial release.

Issue B – Corrections to incorrect Mnemonics. Add captions for plots, not all had them. Change parameters for reading currents so oscilloscope triggers properly. Added more oscilloscope initialisation instructions. Change table field widths to better suit entries. Added internal supply change over check to verify operation under TVAC temperature extremes on both Quiet Bus supplies. Add NA and NB off instructions to PSM-02 macros. Reversed order of PSM-01 and PSM-02 macros to better observe actions on the load box. Corrected SPU temperature measurements (SPU A –15 being measured twice instead of A and B each once). Added instructions to establish A/D offset using unused AMUX instructions. Added test for 28QC_PWR Low Volts signal at end of first test block.

Issue C – Change Inrush Current measurement settings to get waveforms on oscilloscope screen. Add current monitoring in every test block where a load gets switched on (was done only at initial switch on, and under full load).

Issue D – remove instruction to switch on IPU Unregulated Quiet Bus load. Causes problems with power supplies as other loads are at peak values for tests, instead of average values.

Issue E – Cut down versions derived from TP-RAL-173 – D to have QA/NA test and QB/NB test versions for TVAC tests. Required to reduce testing time. No alteration to this document except revision level, to match that applied to trimmed versions. QA/NA version has been named TP-RAL-1731-E, and QB/NB version has been named TP-RAL-1732-E.

Issue F – Modifications to all – Change supply voltage at end of test to nominal (29V). Modification to TP-RAL-1732-E. Add SPU Inrush tests as otherwise only done when QA side tested. Add test for QC Low signal. Other minor changes to take account of test being split off.

Issue G – TP-RAL-1731-F remove instructions at end of test which turn off the PCU. All versions, change type of last test table from Manual to Mixed to make power supply instructions work correctly.

Issue H - Change test voltage range from 27-31 volts to 26-32 volts. Also change to use current probe with DC response.

Issue J – Make changes to suit TEK 3034 Oscilloscope, change document formatting to enable import of screen images from oscilloscope without images being clipped. Add tests for soft starts on outputs. Corrected some errors in digital telemetry registers checked. Added more instructions to change load box cables. Changes done to full version of test only.

Issue J2 - Split for "Half Procedure" versions and tidy up some minor errors.

Issue J3 – add instructions for DC coupling and full bandwidth on scope setup. Fixed problem with TEU A prime only 28V being tested (table error). Also added more voltage and trigger set points for oscilloscope.

Issue J4 Change timebase selection for initial power up waveform to 1000uS from 400uS to capture full waveform.

Document copy 038

1 INTRODUCTION

This document designed to be used as the source of commands for the automated testing of the HIRDLS PCU, using the Rutherford Appleton developed IPU Emulator that is based around a PC. The command sequences used in this document are taken from TC-RAL-119 Draft A4 dated 2000-01-03.

The IPU Emulator software reads this document, and produces a serialised copy, with the test results inserted into the table fields where appropriate. A separate serialised copy is produced each time this test document is run.

All tests specified within this document are designed to run with minimal operator intervention at the start of the test run, and to confirm as fully as possible that the PCU meets operational requirements using internal telemetry, without external operator measurements. A separate document is available giving a full Comprehensive Performance Test where operator action is required to probe external test points to confirm that the PCU meets all operational requirements.

The format of the document is designed to enable the document with test results to be supplied as a completed test procedure document in the ADP package. To understand the format of the instruction tables refer to the Procedure Driver Instructions (TP-RAL-xxx).

2 REFERENCE AND APPLICABLE DOCUMENTS

SP-HIR-36	Power Subsystem Specification Document
SP-HIR-13	Instrument Technical Specification
SP-HIR-103	Command and Telemetry Handbook (C&TH) (July 99 draft)
TC-RAL-119	Test Plan
TP-RAL-207	Procedure Driver Instructions (for PCU/IPU Emulator)
071-0381-01	Tektronix TDS3000 series Programmer Manual (with 071-0378-01 Advanced Trigger module supplement and 071-0378-01 FFT Module supplement)

3 TEST FOREWORD.

Instruction formats.

Each instruction line in the tables has a prefix for automated testing. If no prefix exists in a line, then the automatic procedure assumes a manual operation and prompts the operator. Further detail on table format can be found in the Procedure Driver Instructions. Prefixes used are as follows

DIR: Direct command used to send commands to the HIRDLS discrete commands, and to control certain operations within the emulator.

PORTA: Send this command through the “A” IPU port.

PORTB: send this command through the ”B” IPU port.

QA: Operation command for the QA power supply.

QB: Operation command for the QB power supply.

NA: Operation command for the NA power supply.

NB: Operation command for the NB power supply.

SCOPE: send this command to the Oscilloscope – these take the form of the Tektronix command language used by the TDS3000 series oscilloscopes. The exception is the command to down load the screen to a file. The GSE program converts a command of the format "HARDCOPY FILENAME.BMP" to "HARDCOPY START" to send to the oscilloscope and transfers the resulting screen image into the file FILENAME.BMP on the GSE.

4 EQUIPMENT REQUIRED

Power supplies, 4 required, Thandar TSX3510 or similar IEEE 488 interface.
Oscilloscope, Tektronix TDS 3034 or similar, IEEE 488 Interface.
HIRDLS EGSE PC with emulation program and interface cards.
HIRDLS Dummy Load Box.
Appropriate connection cables for bench or TVAC testing as required.
Current Probe, Tektronix model 134 or similar.

5 CONNECTION DIAGRAM

To be supplied.

6 TEST PROCEDURE

Enter initial parameters indicating conditions at start of this test. As this test makes no provision for stopping to change the dummy load between outputs, the connection being used should be noted in the second item here, when instructed to do so by the emulator software.

STEP 1	Mixed		
Enter reason for test (Eg TVAC test 1).	TVAC LPT8		22-Apr-01 04:54:12
Connect IPU load box cable to Side A at load box.	ok		22-Apr-01 04:54:12
Connect TEU load box cable to Side A at load box.	ok		22-Apr-01 04:54:12
Connect SPU load box cable to Side A at load box.	ok		22-Apr-01 04:54:12
Verify all load switches on the load box are in the 'V' position	ok		22-Apr-01 04:54:12
Verify connection of power supplies and turn on mains power	ok		22-Apr-01 04:54:12
Verify Oscilloscope is powered on and IEEE cable connected.	ok		22-Apr-01 04:54:12
Fit current probe to QA supply lead	ok		22-Apr-01 04:54:12
Connect current probe to Oscilloscope channel 1	ok		22-Apr-01 04:54:12
Set current probe power switch to 100mA/V.	ok		22-Apr-01 04:54:12
Connect second current probe to Oscilloscope Ch2.	ok		22-Apr-01 04:54:12
Set second current probe power switch to 100mA/V.	ok		22-Apr-01 04:54:12

6.1 Oscilloscope set up.

STEP 2	Mixed		
SCOPE: CLEARMENU	SCOPE:CLEARMENU done.		22-Apr-01 04:54:28
SCOPE:DISP:GRAT FULL	SCOPE:DISP:GRAT FULL done.		22-Apr-01 04:54:28
SCOPE:DISP:FORMAT YT	SCOPE:DISP:FORMAT YT done.		22-Apr-01 04:54:28
SCOPE:HARDCOPY:FORMAT BMP	SCOPE:HARDCOPY:FORMAT BMP done.		22-Apr-01 04:54:28
SCOPE:HARDCOPY:PORT GPIB	SCOPE:HARDCOPY:PORT GPIB done.		22-Apr-01 04:54:28
SCOPE:HARDC:LAYOUT PORTR	SCOPE:HARDC:LAYOUT PORTR done.		22-Apr-01 04:54:28
SCOPE:MESSAGE:STATE ON	SCOPE:MESSAGE:STATE ON done.		22-Apr-01 04:54:28
SCOPE:MESSAGE:BOX 155,0,635,45	SCOPE:MESSAGE:BOX 155,0,635,45 done.		22-Apr-01 04:54:28
SCOPE:Select:REF1 OFF	SCOPE:SELECT:REF1 OFF done.		22-Apr-01 04:54:28
SCOPE:Select:REF2 OFF	SCOPE:SELECT:REF2 OFF done.		22-Apr-01 04:54:28
SCOPE:Select:REF3 OFF	SCOPE:SELECT:REF3 OFF done.		22-Apr-01 04:54:28
SCOPE:Select:REF4 OFF	SCOPE:SELECT:REF4 OFF done.		22-Apr-01 04:54:28
SCOPE:Select: MATH OFF	SCOPE:SELECT: MATH OFF done.		22-Apr-01 04:54:28
SCOPE:Select:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		22-Apr-01 04:54:29
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		22-Apr-01 04:54:29
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH3 OFF done.		22-Apr-01 04:54:29
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH4 OFF done.		22-Apr-01 04:54:29
SCOPE:CH1:Coupling DC	SCOPE:CH1:COUPLING DC done.		22-Apr-01 04:54:29
SCOPE:CH2:Coupling DC	SCOPE:CH2:COUPLING DC done.		22-Apr-01 04:54:29
SCOPE:CH3:Coupling DC	SCOPE:CH3:COUPLING DC done.		22-Apr-01 04:54:29

SCOPE:CH4:Coupling DC	SCOPE:CH4:COUPLING DC done.		22-Apr-01 04:54:29
SCOPE:CH1:Bandwidth Full	SCOPE:CH1:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE:CH2:Bandwidth Full	SCOPE:CH2:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE:CH3:Bandwidth Full	SCOPE:CH3:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE:CH4:Bandwidth Full	SCOPE:CH4:BANDWIDTH Full done.		22-Apr-01 04:54:29
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		22-Apr-01 04:54:29
SCOPE: CH2:POS -3	SCOPE:CH2:POS -3 done.		22-Apr-01 04:54:29

STEP 3	Mixed		
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:MODE AUTO	SCOPE:TRIG:A:MO DE AUTO done.		22-Apr-01 04:54:50
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:54:50
Verify Zero offset of current probe on CH1 (Trace in line with left hand arrow).	ok		22-Apr-01 04:54:50
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 04:54:50
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 04:54:50
Verify Zero offset of current probe on CH2 (Trace in line with left hand arrow).	ok		22-Apr-01 04:54:50
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 04:54:50
SCOPE:HOR:DELAY:STATE OFF	SCOPE:HOR:DELA Y:STATE OFF done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:MODE NORMAL	SCOPE:TRIG:A:MO DE NORMAL done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:EDGE:SLOPE RISE	SCOPE:TRIG:A:ED GE:SLOPE RISE done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:EDGE:COUP DC	SCOPE:TRIG:A:ED GE:COUP DC done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:LEVEL 0.5E-1	SCOPE:TRIG:A:LEV EL 0.5E-1 done.		22-Apr-01 04:54:50
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOL D:TIM 2.0E-2 done.		22-Apr-01 04:54:51
SCOPE:ACQ:STOPAFTER SEQ	SCOPE:ACQ:STOPA FTER SEQ done.		22-Apr-01 04:54:51
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:P OS 20 done.		22-Apr-01 04:54:51
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 04:54:51
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 04:54:51
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 04:54:51

6.2 Initial Power On conditions

Do initial operations to set the PCU to be powered from QA. The PCU is to be left powered up in the last test mode during TVAC testing (except where the test specifically requires it to be powered off), while the temperature is changed between test temperatures. The NB is left powered off during initial procedures.

STEP 4	Mixed		
QA: OFF	QA: OFF Done		22-Apr-01 04:55:36
QB: OFF	QB: OFF Done		22-Apr-01 04:55:36
NA: OFF	NA: OFF Done		22-Apr-01 04:55:36
NB: OFF	NB: OFF Done		22-Apr-01 04:55:36
QA: I=10	QA: I=10 Done		22-Apr-01 04:55:36
QB: I=10	QB: I=10 Done		22-Apr-01 04:55:36
NA: I=10	NA: I=10 Done		22-Apr-01 04:55:36
NB: I=10	NB: I=10 Done		22-Apr-01 04:55:36
QA: OV=35.0v	QA: OV=35.0v Done		22-Apr-01 04:55:36
QB: OV=35.0v	QB: OV=35.0v Done		22-Apr-01 04:55:36
NA: OV=35.0v	NA: OV=35.0v Done		22-Apr-01 04:55:36
NB: OV=35.0v	NB: OV=35.0v Done		22-Apr-01 04:55:36
QA: V=29v	QA: V=29v Done		22-Apr-01 04:55:36
QB: V=29v	QB: V=29v Done		22-Apr-01 04:55:36
NA: V=29v	NA: V=29v Done		22-Apr-01 04:55:36
NB: V=29v	NB: V=29v Done		22-Apr-01 04:55:37
QA: ON	QA: ON Done		22-Apr-01 04:55:37
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 04:55:37
QA: OFF	QA: OFF Done		22-Apr-01 04:55:37
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:55:37
SCOPE:MESS:SHOW 'QA Prime Converter Power On \nInrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QA Prime Converter Power On \nInrush Current Waveform, 500mA/Div' done.		22-Apr-01 04:55:37
QA: ON	QA: ON Done		22-Apr-01 04:55:37
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 04:55:37
SCOPE: HARDCOPY INRUSHAP.BMP	INRUSHAP.BMP written to Appendix.		22-Apr-01 04:55:37
QA: IO?	Current 0.14A		22-Apr-01 04:55:37

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.06A, Channel B = 0.07A		22-Apr-01 04:55:37
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 04:55:37

6.3 Set PCU start mode conditions.
This table issues commands as defined by PSM-01 and PSM-02 macros in C&TH Table 2.9.4.4-1.

This table is PSM-02 macro.

STEP 5	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 04:56:34
PORTA: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 04:56:34
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 04:56:34
PORTA: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 04:56:34
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 04:56:34
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 04:56:34
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 04:56:34
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 04:56:34
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 04:56:34
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 04:56:35
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 04:56:35
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 04:56:35
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 04:56:35
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 04:56:35
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 04:56:35
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 04:56:35
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 04:56:35
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 04:56:35
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 04:56:35
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 04:56:35
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 04:56:35
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 04:56:35
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 04:56:35
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 04:56:35
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 04:56:35
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 04:56:35
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 04:56:35
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 04:56:35
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 04:56:35
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 04:56:35
PORTA: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 04:56:35
PORTA: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 04:56:35
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 04:56:35
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 04:56:35

This table is PSM-01 Macro.

STEP 6	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 04:56:46
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 04:56:46
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 04:56:46
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 04:56:46
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 04:56:46
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 04:56:46

6.4 Telemetry verification after PSM-01 and PSM-02 macros.

STEP 7	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 04:57:12
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 04:57:12
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.63V, Channel B = -14.63V		22-Apr-01 04:57:12
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 04:57:12
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.34V		22-Apr-01 04:57:12
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 04:57:12

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 04:57:12
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 04:57:12
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 04:57:13
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 04:57:13
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		22-Apr-01 04:57:13

6.5 QC power on with Prime relay
Carries out PSM-58 macro, and then relevant telemetry.

STEP 8	Mixed		
PORTA: QA (PR) ON	IFC Echo = F00A		22-Apr-01 04:57:31
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 04:57:31
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 04:57:31
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 04:57:31
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 04:57:31
QA: IO?	Current 0.29A		22-Apr-01 04:57:31
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.21A, Channel B = 0.21A		22-Apr-01 04:57:31

6.6 Turn on System Converters – prime set.
Turn on Prime set of converters using PSM-13 and PSM-15. Outputs need to be selected using prime relay set. Telemetry checks done between and after macros.

STEP 9	Mixed		
NA: ON	NA: ON Done		22-Apr-01 04:58:57
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 04:58:58
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 04:58:58
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 04:58:58
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:58:58
SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 04:58:58
PORTA: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		22-Apr-01 04:58:58
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		22-Apr-01 04:58:58
SCOPE: HARDCOPY SYS1AQA.BMP	SYS1AQA.BMP written to Appendix.		22-Apr-01 04:58:58
PORTA: PSSV09;+5Volt DC-DC Converter SYS A	IFC Echo = 0008, Telemetry Channel A =5.34V, Channel B = 5.34V		22-Apr-01 04:58:58
PORTA: PSSV01;28Volt DC-DC Converter Sys A	IFC Echo = 000B, Telemetry Channel A =29.87V, Channel B = 29.87V		22-Apr-01 04:58:58
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.28A, Channel B = 0.28A		22-Apr-01 04:58:58
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 04:58:58
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 04:58:58
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 04:58:58

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 04:58:59
SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 04:58:59
PORTA: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		22-Apr-01 04:58:59
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 5009		22-Apr-01 04:58:59
SCOPE: HARDCOPY SYS2AQA.BMP	SYS2AQA.BMP written to Appendix.		22-Apr-01 04:58:59
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =0.35A, Channel B = 0.36A		22-Apr-01 04:58:59
PORTA: PSSV11;+15Volt DC-DC Converter SYS A	IFC Echo = 0009, Telemetry Channel A =15.14V, Channel B = 15.14V		22-Apr-01 04:58:59
PORTA: PSSV13;-15Volt DC-DC Converter SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.25V		22-Apr-01 04:58:59
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 04:58:59
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 04:58:59
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 04:58:59

6.7 TEU A Prime relays – 28V and 5V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through prime relays. This carries out PSM-18, PSM42, and PSM-45 macros with telemetry checks between macros.

STEP 10	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:00:39
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:00:39
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:00:39
PORTA: A_TEU_+28QC (PR) ON	IFC Echo = F014		22-Apr-01 05:00:39
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0006		22-Apr-01 05:00:39
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.0A, Channel B = 1.0A		22-Apr-01 05:00:39
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:00:39
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:00:39
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:00:39
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:00:39
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:00:39
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:00:39
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:00:39
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:00:40
SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:00:40
PORTA: A_TEU_+5 (PR) ON	IFC Echo = F00C		22-Apr-01 05:00:40
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500F		22-Apr-01 05:00:40
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:00:40
SCOPE:HARDCOPY TEUAC2.BMP	TEUAC2.BMP written to Appendix.		22-Apr-01 05:00:40
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.3V, Channel B = 5.3V		22-Apr-01 05:00:40

PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.27A, Channel B = 1.27A		22-Apr-01 05:00:40
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:00:40
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:00:40
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:00:40
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:00:40
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:00:40
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:00:40

6.8 TEU A – Prime relays – +/-15V

STEP 11	Mixed		
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:02:32
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:02:32
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:02:32
SCOPE:MESS:SHOW 'TEU A +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:02:32
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		22-Apr-01 05:02:32
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:02:32
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:02:32
SCOPE:HARDCOPY TEUAC3.BMP	TEUAC3.BMP written to Appendix.		22-Apr-01 05:02:32
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:02:32
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:02:32
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 05:02:32
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:02:32
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:02:32
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:02:33
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:02:33
SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:02:33
PORTA: A_TEU_+/-15 (PR) ON	IFC Echo = F00D		22-Apr-01 05:02:33
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:02:33
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:02:33

SCOPE:HARDCOPY TEUAC4.BMP	TEUAC4.BMP written to Appendix.		22-Apr-01 05:02:33
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:02:33
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 05:02:33
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.66A, Channel B = 1.66A		22-Apr-01 05:02:33
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:02:33

6.9 Turn on EEA

Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply EEA through prime relays. This carries out PSM-54 macro, with telemetry checks between 5V and 15V operations

STEP 12	Mixed		
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:05:42
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:05:42
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:05:42
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:05:42
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:05:42
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:05:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:05:42
SCOPE:MESS:SHOW 'EEA 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:05:42
PORTA: EEA_+5 (PR) ON	IFC Echo = F008		22-Apr-01 05:05:42
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		22-Apr-01 05:05:42
SCOPE:HARDCOPY EEA5VPR.BMP	EEA5VPR.BMP written to Appendix.		22-Apr-01 05:05:42
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.76A, Channel B = 1.76A		22-Apr-01 05:05:42
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:05:42
Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:05:42
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:05:43
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:05:43
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:05:43
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:05:43

SCOPE:MESS:SHOW 'EEA +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:05:43
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		22-Apr-01 05:05:43
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:05:43
SCOPE:HARDCOPY EEA15PPV.BMP	EEA15PPV.BMP written to Appendix.		22-Apr-01 05:05:43
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:05:43
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:05:43
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:05:43
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:05:43
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:05:43
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:05:43
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:05:43
SCOPE:MESS:SHOW 'EEA -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:05:44
PORTA: EEA_+/-15 (PR) ON	IFC Echo = F009		22-Apr-01 05:05:44
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:05:44
SCOPE:HARDCOPY EEA15NPV.BMP	EEA15NPV.BMP written to Appendix.		22-Apr-01 05:05:44
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =1.85A, Channel B = 1.85A		22-Apr-01 05:05:44
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 05:05:44
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:05:44

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.24V		22-Apr-01 05:05:44
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:05:44

6.10 Turn on IPU 28 volt regulated supply
Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through prime relays. This carries out PSM-24 macro.

STEP 13	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:06:49
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:06:49
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:06:49
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:06:49
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:06:49
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:06:49
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:06:49
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:06:49
SCOPE:MESS:SHOW 'IPU A 28VReg (Prime) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU A 28VReg (Prime) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 05:06:49
PORTA: A_IPU_+28REG (PR) ON	IFC Echo = F002		22-Apr-01 05:06:49
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 500F		22-Apr-01 05:06:50
SCOPE:HARDCOPY IPUA1.BMP	IPUA1.BMP written to Appendix.		22-Apr-01 05:06:50
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.77V, Channel B = 29.79V		22-Apr-01 05:06:50
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.71A, Channel B = 3.71A		22-Apr-01 05:06:50
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 05:06:50

6.11 Turn on SPU A Supplies.
Turns on SPU supplies in order specified in C&TH Vol1 Part 2 section 5.5.5 to power SPU side A. This carries out PSM-10 and PSM-38 macros.

STEP 14	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:09:23
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:09:23
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:09:23
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:09:23
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:09:23
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 05:09:23
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:09:23
SCOPE:MESS:SHOW 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter A (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:09:23
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		22-Apr-01 05:09:23
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =3.8A, Channel B = 3.8A		22-Apr-01 05:09:24
SCOPE: HARDCOPY SPUAQA.BMP	SPUAQA.BMP written to Appendix.		22-Apr-01 05:09:24
PORTA:PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:09:24
PORTA: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:09:24
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:09:24
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 05:09:24
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 05:09:24
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:ED GE:SOURCE CH2 done.		22-Apr-01 05:09:24

SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:09:24
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:09:24
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:09:24
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:09:24
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:09:24
SCOPE:MESS:SHOW 'SPU A +15V \nSoft Start Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'SPU A +15V \nSoft Start Current Waveform, 500mA/Div' done.		22-Apr-01 05:09:24
PORTA: SPU_+/-15A ON	IFC Echo = F019		22-Apr-01 05:09:24
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C0F		22-Apr-01 05:09:25
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:09:25
SCOPE: HARDCOPY SPUAC15P.BMP	SPUAC15P.BMP written to Appendix.		22-Apr-01 05:09:25
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:09:25
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:09:25
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:09:25
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:09:25
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:09:25
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:09:25
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:09:25
SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU A -15V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:09:25
PORTA: SPU_+/-15A ON	IFC Echo = F019		22-Apr-01 05:09:25
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C0F		22-Apr-01 05:09:25

PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:09:25
SCOPE: HARDCOPY SPUAC15N.BMP	SPUAC15N.BMP written to Appendix.		22-Apr-01 05:09:25
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =4.92A, Channel B = 4.92A		22-Apr-01 05:09:25

6.12 SPU A 5V Output.

STEP 15	Mixed		
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:10:38
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:10:38
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:10:39
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:10:39
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:10:39
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:10:39
SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU A 5V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:10:39
PORTA: SPU_+5A ON	IFC Echo = F018		22-Apr-01 05:10:39
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.12A, Channel B = 5.12A		22-Apr-01 05:10:39
SCOPE: HARDCOPY SPUAC5P.BMP	SPUAC5P.BMP written to Appendix.		22-Apr-01 05:10:39
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:10:39
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5009		22-Apr-01 05:10:39
PORTA:PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:10:39
PORTA:PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:10:39
PORTA:PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:10:39
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:10:39

6.13 Turn on GEU Supplies.
Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power GEU from prime side. This carries out PSM-33 and PSM-30 macros.

STEP 16	Mixed		
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:11:05
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 05:11:05
PORTA: GEU_+5 (PR) ON	IFC Echo = F004		22-Apr-01 05:11:05
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 500F		22-Apr-01 05:11:05
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.29A, Channel B = 5.29A		22-Apr-01 05:11:05
PORTA: GEU_+/-15 (PR) ON	IFC Echo = F005		22-Apr-01 05:11:05
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:11:05
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =5.96A, Channel B = 5.96A		22-Apr-01 05:11:05
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.32V, Channel B = 5.29V		22-Apr-01 05:11:05
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.13V		22-Apr-01 05:11:06
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:11:06
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:11:06
PORTA: GEU_+28QC (PR) ON	IFC Echo = F016		22-Apr-01 05:11:06
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:11:06
PORTA: QA Primary Current	IFC Echo = 0006, Telemetry Channel A =6.79A, Channel B = 6.79A		22-Apr-01 05:11:06

6.14 Turn on Noisy Bus
Turn on the Noisy Bus Output from the NA supply through the Prime Relay. This uses PSM-04 macro.

STEP 17	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:11:14
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:11:14
PORTA: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:11:14
PORTA: NA (PR) ON	IFC Echo = F01C		22-Apr-01 05:11:14
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:11:14

6.15 Do complete telemetry check of PCU.
Now all outputs are on, do Digital Telemetry first.

STEP 18	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:11:28
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:11:28
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:11:28
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:11:28
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:11:28

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 19	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 05:11:57
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:11:57
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:11:57
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.57V, Channel B = -14.58V		22-Apr-01 05:11:57
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:11:57
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 05:11:58
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.04A, Channel B = 8.04A		22-Apr-01 05:11:58
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		22-Apr-01 05:11:58
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.23V, Channel B = 5.23V		22-Apr-01 05:11:58
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:11:58

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.23V		22-Apr-01 05:11:58
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.77V, Channel B = 29.79V		22-Apr-01 05:11:58
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:11:58
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:11:58
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:11:58
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		22-Apr-01 05:11:58

Analogue Telemetry block 2.

STEP 20	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:12:24
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.12V, Channel B = 15.11V		22-Apr-01 05:12:24
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:12:24
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:12:24
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:12:24
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:12:24
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-30.5C, Channel B = -30.8C		22-Apr-01 05:12:24
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:12:24
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-29.6C, Channel B = -29.3C		22-Apr-01 05:12:24
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 05:12:24

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:12:25
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:12:25
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-34.9C, Channel B = -35.2C		22-Apr-01 05:12:25
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-35.5C, Channel B = -35.5C		22-Apr-01 05:12:25

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 21	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-28.7C, Channel B = -28.5C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-27.6C, Channel B = -27.9C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-26.1C, Channel B = -25.8C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-32.8C, Channel B = -32.6C		22-Apr-01 05:12:52
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-33.1C, Channel B = -33.1C		22-Apr-01 05:12:53
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-32.0C, Channel B = -32.3C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:12:53

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-10.6C, Channel B = -10.3C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-33.4C, Channel B = -33.1C		22-Apr-01 05:12:53
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 05:12:53

6.16 Do High Voltage Input Limit Test
Adjust the QA and NA supplies to upper operating voltage limit, and complete telemetry test. This table has input voltage change and digital telemetry.

STEP 22	Mixed		
QA: V=32.0V	QA: V=32.0V Done		22-Apr-01 05:13:08
NA: V=32.0V	NA: V=32.0V Done		22-Apr-01 05:13:08
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:13:08
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:13:08
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:13:08
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:13:09
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:13:09

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 23	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:13:36
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:13:36
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.59V, Channel B = -14.59V		22-Apr-01 05:13:36
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:13:36
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.34V		22-Apr-01 05:13:36
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.85A, Channel B = 7.86A		22-Apr-01 05:13:36
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.04A		22-Apr-01 05:13:36
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:13:36
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:13:36
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 05:13:37

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.79V, Channel B = 29.77V		22-Apr-01 05:13:37
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:13:37
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:13:37
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:13:37
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.14V		22-Apr-01 05:13:37

Analogue Telemetry block 2.

STEP 24	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:14:02
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.12V		22-Apr-01 05:14:02
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.2V		22-Apr-01 05:14:03
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:14:03
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 05:14:03
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-30.8C, Channel B = -31.1C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-28.5C, Channel B = -28.5C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:14:03

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-34.9C, Channel B = -34.9C		22-Apr-01 05:14:03
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 05:14:03

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V Regulator temperature.

STEP 25	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 05:14:29
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 05:14:29
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.3C, Channel B = -29.3C		22-Apr-01 05:14:29
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-25.2C, Channel B = -25.2C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-32.0C, Channel B = -31.7C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-29.9C, Channel B = -30.2C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-33.1C, Channel B = -32.8C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:14:30

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-9.1C, Channel B = -9.4C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-33.1C, Channel B = -33.1C		22-Apr-01 05:14:30
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-32.6C, Channel B = -32.8C		22-Apr-01 05:14:30

6.17 Do Low Operating Voltage Limit Test.
Adjust the QA and NA supplies to lower operating limit, and complete telemetry test.
This table has input voltage change and digital telemetry.

STEP 26	Mixed		
QA: V=26.0V	QA: V=26.0V Done		22-Apr-01 05:14:45
NA: V=26.0V	NA: V=26.0V Done		22-Apr-01 05:14:45
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E0F		22-Apr-01 05:14:45
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 507F		22-Apr-01 05:14:45
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:14:45
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0066		22-Apr-01 05:14:46
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0009		22-Apr-01 05:14:46
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:14:46
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6006		22-Apr-01 05:14:46
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:14:46

Analogue telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 27	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.08V		22-Apr-01 05:15:13
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:15:13
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.62V, Channel B = -14.62V		22-Apr-01 05:15:13
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:15:13
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:15:13
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.37A, Channel B = 8.38A		22-Apr-01 05:15:13
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		22-Apr-01 05:15:14
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:15:14
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:15:14
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 05:15:14

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.81V, Channel B = 29.79V		22-Apr-01 05:15:14
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:15:14
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:15:14
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:15:14
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.12V		22-Apr-01 05:15:14

Analogue Telemetry block 2.

STEP 28	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.58V, Channel B = 5.59V		22-Apr-01 05:15:40
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.11V		22-Apr-01 05:15:40
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:15:40
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:15:40
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:15:40
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-30.8C, Channel B = -30.5C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-28.2C, Channel B = -28.2C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:15:40

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-34.3C, Channel B = -34.3C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-34.9C, Channel B = -34.6C		22-Apr-01 05:15:40
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-35.5C, Channel B = -35.2C		22-Apr-01 05:15:40

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 29	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-27.6C, Channel B = -27.6C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-26.7C, Channel B = -26.7C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-31.7C, Channel B = -32.0C		22-Apr-01 05:16:06
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-31.4C, Channel B = -31.4C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-29.3C, Channel B = -29.6C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-26.4C, Channel B = -26.4C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 05:16:07

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-9.1C, Channel B = -8.8C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 05:16:07
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-32.3C, Channel B = -32.6C		22-Apr-01 05:16:07

6.18 Turn off all relays.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.
This table is PSM-02 macro.

STEP 30	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:17:06
PORTB: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:17:06
PORTB: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:17:06
PORTB: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 05:17:06
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:17:06
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 05:17:06
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 05:17:06
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:17:06
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:17:06
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 05:17:06
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:17:06
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:17:06
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:17:06
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 05:17:06
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:17:06
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:17:06
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:17:06
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:17:06
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:17:06
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:17:06
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:17:07
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:17:07
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:17:07
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:17:07
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:17:07
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:17:07
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:17:07
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:17:07
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:17:07
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:17:07
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:17:07
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:17:07
PORTB: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:17:07
PORTB: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:17:07

This table is PSM-01 Macro.

STEP 31	Mixed		
PORTB: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:17:17
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 05:17:17
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 05:17:17
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:17:17
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 05:17:17
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 05:17:17

6.19 Quiet Bus C Low Voltage Detect signal

Very the operation of the +28QC_PWR Low Volts signal. Bit 15 of PSS_STATUS_06 should go high when the voltage drops below 20 volts.

STEP 32	Mixed		
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:24
QA: V=19.8V	QA: V=19.8V Done		22-Apr-01 05:17:24
NA: OFF	NA: OFF Done		22-Apr-01 05:17:24
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:24
QA: V=29V	QA: V=29V Done		22-Apr-01 05:17:24
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:25

6.20 Status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QA (important for TVAC check at temperature extremes).

STEP 33	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:17:58
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.0V, Channel B = 14.0V		22-Apr-01 05:17:58
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.68V, Channel B = -14.68V		22-Apr-01 05:17:58
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:17:58
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:17:58
PORTB: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:17:58
PORTB: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =-34.3C, Channel B = -34.3C		22-Apr-01 05:17:58
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:17:59
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:17:59
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:17:59

PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:17:59
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005D		22-Apr-01 05:17:59
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		22-Apr-01 05:17:59
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:17:59
DIR: (IPU A) HIR_PSS_DISCRETE(1)	(IPU A) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 05:17:59
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:17:59
DIR: (IPU A) HIR_PSS_DISCRETE(2)	(IPU A) HIR_PSS_DISCRETE(2) Enabled		22-Apr-01 05:18:00
QA: OFF	QA: OFF Done		22-Apr-01 05:18:00

7 POWER ON PCU USING QA AND NA, ACTIVATE REDUNDANT RELAY SETS.
Enters with redundant internal supply already selected at end of previous table.

STEP 34	Mixed		
QA: V=29.0v	QA: V=29.0v Done		22-Apr-01 05:18:46
QB: V=29.0v	QB: V=29.0v Done		22-Apr-01 05:18:46
NA: V=29.0v	NA: V=29.0v Done		22-Apr-01 05:18:46
NB: V=29.0v	NB: V=29.0v Done		22-Apr-01 05:18:46
SCOPE:Select:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:18:46
SCOPE:Select:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:18:46
SCOPE:Select:CH3 OFF	SCOPE:SELECT:CH 3 OFF done.		22-Apr-01 05:18:46
SCOPE:Select:CH4 OFF	SCOPE:SELECT:CH 4 OFF done.		22-Apr-01 05:18:46
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 05:18:46
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:18:46
SCOPE:TRIG:A:EDGE:SLOPE RISE	SCOPE:TRIG:A:ED GE:SLOPE RISE done.		22-Apr-01 05:18:46
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEV EL 0.05 done.		22-Apr-01 05:18:47
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:P OS 20 done.		22-Apr-01 05:18:47
SCOPE:TRIG:A:HOLD:TIM 2.0E-2	SCOPE:TRIG:A:HOL D:TIM 2.0E-2 done.		22-Apr-01 05:18:47
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 05:18:47
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		22-Apr-01 05:18:47
SCOPE: CH2:POS -3	SCOPE:CH2:POS -3 done.		22-Apr-01 05:18:47
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:18:47
SCOPE:MESS:SHOW 'QA Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHO W 'QA Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		22-Apr-01 05:18:47
QA: ON	QA: ON Done		22-Apr-01 05:18:47

PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:18:47
SCOPE: HARDCOPY INRUSHAR.BMP	INRUSHAR.BMP written to Appendix.		22-Apr-01 05:18:47
QA: IO?	Current 1.42A		22-Apr-01 05:18:47
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.34A, Channel B = 1.34A		22-Apr-01 05:18:47
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 05:18:47

7.1 Power On telemetry verification.

STEP 35	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:19:14
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.03V, Channel B = 14.03V		22-Apr-01 05:19:14
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.94V, Channel B = -14.93V		22-Apr-01 05:19:14
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:19:15
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 05:19:15
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 05:19:15
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 05:19:15
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:19:15
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:19:15
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 05:19:16

PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 001C		22-Apr-01 05:19:16

7.2 Turn on QC, with redundant relay

STEP 36	Mixed		
PORTA: QA (RR) ON	IFC Echo = D00A		22-Apr-01 05:19:31
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:19:32
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:19:32
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:19:32
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:19:32

7.3 Power on System Converters, - Redundant set.
Power on using PSM-14 and PSM-16. Outputs need to be selected using redundant relay set. Telemetry checks done between and after macros.

STEP 37	Mixed		
NA: ON	NA: ON Done		22-Apr-01 05:21:00
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 05:21:00
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:21:00
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:21:00
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:21:00
SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:21:00
PORTA: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		22-Apr-01 05:21:00
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		22-Apr-01 05:21:00
SCOPE: HARDCOPY SYS1BQA.BMP	SYS1BQA.BMP written to Appendix.		22-Apr-01 05:21:00
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.35V		22-Apr-01 05:21:01
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.85V, Channel B = 29.85V		22-Apr-01 05:21:01
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.56A, Channel B = 1.56A		22-Apr-01 05:21:01
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:21:01
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:21:01
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:21:01

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:21:01
SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QA SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:21:01
PORTA: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		22-Apr-01 05:21:01
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A012		22-Apr-01 05:21:01
SCOPE: HARDCOPY SYS2BQA.BMP	SYS2BQA.BMP written to Appendix.		22-Apr-01 05:21:01
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =1.64A, Channel B = 1.64A		22-Apr-01 05:21:01
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.16V, Channel B = 15.16V		22-Apr-01 05:21:01
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:21:02
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH1 OFF done.		22-Apr-01 05:21:02
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH2 ON done.		22-Apr-01 05:21:02
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 05:21:02

7.4 TEU A – Redundant Output relays – 28V and 5V.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1 to supply TEU A through redundant relays. This carries out PSM-19, PSM43, and PSM-46 macros with telemetry checks between macros.

STEP 38	Mixed		
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:22:51
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:22:51
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:22:51
PORTA: A_TEU_+28QC (RR) ON	IFC Echo = D014		22-Apr-01 05:22:51
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0005		22-Apr-01 05:22:51
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.27A, Channel B = 2.27A		22-Apr-01 05:22:51
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:22:51
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:22:51
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:22:51
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:22:51
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:22:51
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:22:51
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:22:51
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:22:51
SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:22:51
PORTA: A_TEU_+5 (RR) ON	IFC Echo = D00C		22-Apr-01 05:22:52
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A017		22-Apr-01 05:22:52
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:22:52
SCOPE:HARDCOPY TEUAC6.BMP	TEUAC6.BMP written to Appendix.		22-Apr-01 05:22:52

PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.3V, Channel B = 5.3V		22-Apr-01 05:22:52
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.55A, Channel B = 2.54A		22-Apr-01 05:22:52
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:22:52
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:22:52
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:22:52
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:22:52

7.5 TEU A Redundant relays - +/-15V.

STEP 39	Mixed		
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:24:54
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:24:54
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:24:54
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:24:54
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:24:54
SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:24:54
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		22-Apr-01 05:24:54
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:24:54
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:24:54
SCOPE:HARDCOPY TEUAC7.BMP	TEUAC7.BMP written to Appendix.		22-Apr-01 05:24:54
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:24:54
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:24:55
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 05:24:55
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:24:55
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:24:55
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:24:55
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:24:55

SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU A -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:24:55
PORTA: A_TEU_+/-15 (RR) ON	IFC Echo = D00D		22-Apr-01 05:24:55
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:24:55
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:24:55
SCOPE:HARDCOPY TEUAC8.BMP	TEUAC8.BMP written to Appendix.		22-Apr-01 05:24:55
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =2.94A, Channel B = 2.94A		22-Apr-01 05:24:55
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.15V, Channel B = 15.14V		22-Apr-01 05:24:55
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:24:56
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:24:56

7.6 EEA – Redundant Relays.

Turns on supplies in order specified in C&TH Vol1 part 2 section 5.5.1 to supply EEA through redundant relays. This carries out PSM-57 macro with interspersed telemetry checks.

STEP 40	Mixed		
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 05:28:01
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:28:01
Fit a current monitor loop to the EEA 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:28:01
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:28:02
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:28:02
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:28:02
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:28:02
SCOPE:MESS:SHOW 'EEA 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:28:02
PORTA: EEA_+5 (RR) ON	IFC Echo = D008		22-Apr-01 05:28:02
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		22-Apr-01 05:28:02
SCOPE:HARDCOPY EEA5VR.BMP	EEA5VR.BMP written to Appendix.		22-Apr-01 05:28:02
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.04A, Channel B = 3.04A		22-Apr-01 05:28:02
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:28:02
Fit a current monitor loop to the EEA +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:28:02
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:28:02
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:28:02
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:28:02

SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:28:03
SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:28:03
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		22-Apr-01 05:28:03
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:28:03
SCOPE:HARDCOPY EEA15PRV.BMP	EEA15PRV.BMP written to Appendix.		22-Apr-01 05:28:03
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:28:03
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:28:03
Fit a current monitor loop to the EEA -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:28:03
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:28:03
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:28:03
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:28:03
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:28:03
SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'EEA -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:28:03
PORTA: EEA_+/-15 (RR) ON	IFC Echo = D009		22-Apr-01 05:28:03
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:28:03
SCOPE:HARDCOPY EEA15NRV.BMP	EEA15NRV.BMP written to Appendix.		22-Apr-01 05:28:03
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =3.12A, Channel B = 3.12A		22-Apr-01 05:28:04
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 05:28:04

PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.14V, Channel B = 15.15V		22-Apr-01 05:28:04
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.22V		22-Apr-01 05:28:04
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:28:04

7.7 IPU 28 Volt Regulated supply – Redundant relay.
Turns on supply in order specified in C&TH Vol1 Part 2 section 5.5.2 to supply IPU A side regulated 28 volts through redundant relays. This carries out PSM-25 macro.

STEP 41	Mixed		
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:29:21
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:29:21
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:29:21
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:29:22
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:29:22
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:29:22
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:29:22
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:29:22
SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU 28VReg (Redundant) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 05:29:22
PORTA: A_IPU_+28REG (RR) ON	IFC Echo = D002		22-Apr-01 05:29:22
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:29:22
SCOPE:HARDCOPY IPUA2.BMP	IPUA2.BMP written to Appendix.		22-Apr-01 05:29:22
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 05:29:22
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =4.98A, Channel B = 4.98A		22-Apr-01 05:29:22
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 05:29:22

7.8 Power On SPU B Supplies
Turn on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side B using PSM-12 and PSM-40 macros.

STEP 42	Mixed		
Change SPU load box cable to Side B at load box.	ok		22-Apr-01 05:33:39
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 05:33:39
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:33:39
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:33:40
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:33:40
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:33:40
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 05:33:40
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:40
SCOPE:MESS:SHOW 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QA) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:33:40
PORTA: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		22-Apr-01 05:33:40
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry A012		22-Apr-01 05:33:40
SCOPE: HARDCOPY SPUBQA.BMP	SPUBQA.BMP written to Appendix.		22-Apr-01 05:33:40
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =5.08A, Channel B = 5.07A		22-Apr-01 05:33:40
PORTA: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 05:33:40
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:33:40
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 05:33:40
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 05:33:40

SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 05:33:41
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:33:41
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:33:41
Fit a current monitor loop to the SPU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:33:41
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:33:41
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:41
SCOPE:MESS:SHOW 'SPU Converter B +15V \nSoft Start Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B +15V \nSoft Start Current Waveform, 500mA/Div' done.		22-Apr-01 05:33:41
PORTA: SPU_+/-15B ON	IFC Echo = D019		22-Apr-01 05:33:41
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:33:41
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		22-Apr-01 05:33:41
SCOPE: HARDCOPY SPUBC15P.BMP	SPUBC15P.BMP written to Appendix.		22-Apr-01 05:33:41
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:33:41
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:33:41
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:33:41
On Load Box select "V" position of SPU +15V load switch and remove loop.	ok		22-Apr-01 05:33:41
Fit a current monitor loop to the SPU -15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:33:41
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:33:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:42
SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B -15V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:33:42

PORTA: SPU_+/-15B ON	IFC Echo = D019		22-Apr-01 05:33:42
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:33:42
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC12		22-Apr-01 05:33:42
SCOPE: HARDCOPY SPUBC15N.BMP	SPUBC15N.BMP written to Appendix.		22-Apr-01 05:33:42
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.18A, Channel B = 6.18A		22-Apr-01 05:33:42
On Load Box select "V" position of SPU -15V load switch and remove loop.	ok		22-Apr-01 05:33:42
Fit a current monitor loop to the SPU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:33:42
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:33:42
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:33:42
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:33:42
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:33:42
SCOPE:MESS:SHOW 'SPU Converter B 5V \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'SPU Converter B 5V \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:33:42
PORTA: SPU_+5B ON	IFC Echo = D018		22-Apr-01 05:33:43
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:33:43
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE12		22-Apr-01 05:33:43
SCOPE: HARDCOPY SPUBC5.BMP	SPUBC5.BMP written to Appendix.		22-Apr-01 05:33:43
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.38A, Channel B = 6.38A		22-Apr-01 05:33:43
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 05:33:43

PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 05:33:43
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:33:43
On Load Box select "V" position of SPU 5V load switch and remove loop.	ok		22-Apr-01 05:33:43

7.9 Turn on GEU Supplies.
Turns on GEU supplies in order specified in C&TH Vol1 Part 2 section 5.5.5 to power GEU from prime side.

STEP 43	Mixed		
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 05:34:10
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:34:10
PORTA: GEU_+5 (RR) ON	IFC Echo = D004		22-Apr-01 05:34:10
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE17		22-Apr-01 05:34:10
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =6.56A, Channel B = 6.57A		22-Apr-01 05:34:10
PORTA: GEU_+/-15 (RR) ON	IFC Echo = D005		22-Apr-01 05:34:10
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 05:34:10
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.23A, Channel B = 7.23A		22-Apr-01 05:34:10
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:34:10
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:34:11
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.22V		22-Apr-01 05:34:11
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 05:34:11
PORTA: GEU_+28QC (RR) ON	IFC Echo = D016		22-Apr-01 05:34:11
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		22-Apr-01 05:34:11
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.04A, Channel B = 8.04A		22-Apr-01 05:34:11

7.10 Turn on Noisy Bus – Redundant relay
Turn on the Noisy Bus Output from the NA supply through the Redundant Relay.

STEP 44	Mixed		
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:34:20
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:34:20
PORTA: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:34:20
PORTA: NA (RR) ON	IFC Echo = D01C		22-Apr-01 05:34:20
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:34:20

7.11 Do complete telemetry check of PCU now all outputs are on.

STEP 45	Mixed		
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:34:34
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:34:34
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 05:34:34
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:34:34
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:34:34
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:34:34
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		22-Apr-01 05:34:34
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:34:34

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 46	Mixed		
PORTA: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 05:35:04
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:35:04
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.02V		22-Apr-01 05:35:04
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.05V, Channel B = -15.04V		22-Apr-01 05:35:04
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.34V, Channel B = 0.33V		22-Apr-01 05:35:04
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.07V		22-Apr-01 05:35:05
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.05A, Channel B = 8.05A		22-Apr-01 05:35:05
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.03A, Channel B = -0.03A		22-Apr-01 05:35:05
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:35:05
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:35:05

PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:35:05
PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:35:05
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:35:05
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:35:05
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.21V, Channel B = -15.22V		22-Apr-01 05:35:05
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 05:35:05

Analogue Telemetry block 2.

STEP 47	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:35:32
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:35:32
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:35:32
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 05:35:32
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 05:35:32
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-34.9C, Channel B = -34.9C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-37.0C, Channel B = -36.7C		22-Apr-01 05:35:32

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:35:32
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-31.4C, Channel B = -31.4C		22-Apr-01 05:35:32

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 48	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-29.3C, Channel B = -29.3C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.8C, Channel B = -25.8C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-27.3C, Channel B = -27.0C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-25.5C, Channel B = -25.5C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.3C, Channel B = -24.3C		22-Apr-01 05:36:01
PORTA: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-31.1C, Channel B = -30.8C		22-Apr-01 05:36:01
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.0C, Channel B = -27.3C		22-Apr-01 05:36:01

PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-10.9C, Channel B = -10.9C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:36:02
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-30.5C, Channel B = -29.9C		22-Apr-01 05:36:02

7.12 Do High Voltage Input Limit Test
Adjust the QA and NA supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 49	Mixed		
QA:V= 32.0V	QA:V= 32.0V Done		22-Apr-01 05:36:17
NA:V= 32.0V	NA:V= 32.0V Done		22-Apr-01 05:36:17
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry A017		22-Apr-01 05:36:17
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A07F		22-Apr-01 05:36:17
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 05:36:17
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:36:18
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0012		22-Apr-01 05:36:18
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:36:18
PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5005		22-Apr-01 05:36:18
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:36:18

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 50	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:36:46
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.02V		22-Apr-01 05:36:46
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.04V, Channel B = -15.04V		22-Apr-01 05:36:46
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:36:46
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:36:46
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =7.86A, Channel B = 7.86A		22-Apr-01 05:36:46
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.03A		22-Apr-01 05:36:46
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:36:46
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.08V		22-Apr-01 05:36:47
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:36:47

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:36:47
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:36:47
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.11V, Channel B = 15.13V		22-Apr-01 05:36:47
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.23V		22-Apr-01 05:36:47
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.75V, Channel B = 29.77V		22-Apr-01 05:36:47

Analogue Telemetry block 2.

STEP 51	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.02V		22-Apr-01 05:37:13
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:37:13
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.1V		22-Apr-01 05:37:13
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.54V, Channel B = 5.55V		22-Apr-01 05:37:13
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 05:37:13
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-34.3C, Channel B = -34.6C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-35.2C, Channel B = -34.9C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-34.9C, Channel B = -34.6C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-37.0C, Channel B = -37.0C		22-Apr-01 05:37:14

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-28.5C, Channel B = -28.5C		22-Apr-01 05:37:14
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-30.8C, Channel B = -30.2C		22-Apr-01 05:37:14

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 52	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -30.2C		22-Apr-01 05:37:40
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.3C, Channel B = -29.3C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.2C, Channel B = -25.2C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.7C, Channel B = -27.0C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.1C, Channel B = -23.8C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-26.4C, Channel B = -26.1C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 05:37:41

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-29.0C, Channel B = -29.3C		22-Apr-01 05:37:41
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-10.0C, Channel B = -10.0C		22-Apr-01 05:37:42
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-31.7C, Channel B = -32.0C		22-Apr-01 05:37:42
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:37:42

7.13 Do Low Operating Voltage Limit Test.
Adjust the QA and NA supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 53	Mixed		
QA: V=26.0V	QA: V=26.0V Done		22-Apr-01 05:37:57
NA: V=26.0V	NA: V=26.0V Done		22-Apr-01 05:37:57
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:57
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0065		22-Apr-01 05:37:58

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 54	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:38:26
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.01V, Channel B = 14.02V		22-Apr-01 05:38:26
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.1V, Channel B = -15.1V		22-Apr-01 05:38:26
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:38:26
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.06V		22-Apr-01 05:38:26
PORTA: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =8.37A, Channel B = 8.38A		22-Apr-01 05:38:26
PORTA: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =-0.04A, Channel B = -0.04A		22-Apr-01 05:38:27
PORTA: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:38:27
PORTA: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:38:27
PORTA: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:38:27

PORTA: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:38:27
PORTA: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:38:27
PORTA: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.11V, Channel B = 15.13V		22-Apr-01 05:38:27
PORTA: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.23V		22-Apr-01 05:38:27
PORTA: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 05:38:27

Analogue Telemetry block 2.

STEP 55	Mixed		
PORTA: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:38:53
PORTA: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 05:38:53
PORTA: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 05:38:54
PORTA: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 05:38:54
PORTA: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 05:38:54
PORTA: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-34.6C, Channel B = -34.3C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-34.9C, Channel B = -34.6C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-36.7C, Channel B = -37.0C		22-Apr-01 05:38:54

PORTA: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-30.5C, Channel B = -30.5C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-28.2C, Channel B = -28.2C		22-Apr-01 05:38:54
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 05:38:54

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 56	Mixed		
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.6C, Channel B = -29.3C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.5C, Channel B = -28.5C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.5C, Channel B = -29.0C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.2C, Channel B = -25.2C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.7C, Channel B = -26.7C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.6C, Channel B = -24.9C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-23.5C, Channel B = -23.8C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 05:39:21
PORTA: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-25.8C, Channel B = -26.1C		22-Apr-01 05:39:22

PORTA: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:39:22
PORTA: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-9.7C, Channel B = -9.4C		22-Apr-01 05:39:22
PORTA: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-31.7C, Channel B = -31.4C		22-Apr-01 05:39:22
PORTA: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:39:22

7.14 Turn off all relays.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTB to verify alternate channel communication.
This table is PSM-02 macro.

STEP 57	Mixed		
PORTB: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:40:23
PORTB: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:40:23
PORTB: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 05:40:23
PORTB: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 05:40:23
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:40:23
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 05:40:23
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 05:40:23
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:40:23
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:40:23
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 05:40:23
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 05:40:23
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:40:23
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:40:23
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 05:40:23
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:40:23
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:40:23
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:40:23
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:40:23
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:40:23
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:40:23
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 05:40:23
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:40:23
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:40:23
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:40:23
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 05:40:23
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:40:23
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:40:23
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:40:23
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 05:40:23
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:40:24
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:40:24
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:40:24
PORTB: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 05:40:24
PORTB: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:40:24

This table is PSM-01 Macro.

STEP 58	Mixed		
PORTB:SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:40:34
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 05:40:34
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 05:40:34
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:40:35
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 05:40:35
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 05:40:35

7.15 Do status check and turn off QC bus relay.

STEP 59	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:41:03
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.03V		22-Apr-01 05:41:03
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.23V, Channel B = -15.24V		22-Apr-01 05:41:03
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 05:41:04
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 05:41:04
PORTB: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =-34.6C, Channel B = -34.6C		22-Apr-01 05:41:04

PORTB: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 05:41:04
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0060		22-Apr-01 05:41:04
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:41:04
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:41:05
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 005E		22-Apr-01 05:41:05
NA: OFF	NA: OFF Done		22-Apr-01 05:41:05
QA: OFF	QA: OFF Done		22-Apr-01 05:41:05

8 DO ALL TESTS WITH QB AND NB, SYS1 PRIMARY AND SYS2 REDUNDANT SUPPLIES.

Enters with Primary Internal Supply connected to QB from previous test block.

STEP 60	Mixed		
Move scope CH1 current probe to QB Supply lead	ok		22-Apr-01 05:43:26
Change IPU load box cable to Side B at load box.	ok		22-Apr-01 05:43:26
QA: V=29.0v	QA: V=29.0v Done		22-Apr-01 05:43:26
QB: V=29.0v	QB: V=29.0v Done		22-Apr-01 05:43:26
NA: V=29.0v	NA: V=29.0v Done		22-Apr-01 05:43:26
NB: V=29.0v	NB: V=29.0v Done		22-Apr-01 05:43:26
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 05:43:26
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:POS 20 done.		22-Apr-01 05:43:26
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 05:43:26
SCOPE: CH1:POS –3	SCOPE:CH1:POS –3 done.		22-Apr-01 05:43:26
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		22-Apr-01 05:43:26
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		22-Apr-01 05:43:26
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:43:27
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		22-Apr-01 05:43:27
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:43:27
SCOPE:MESS:SHOW 'QB Prime Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Prime Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		22-Apr-01 05:43:27
QB: ON	QB: ON Done		22-Apr-01 05:43:27
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:43:27
SCOPE: HARDCOPY INRUSHBP.BMP	INRUSHBP.BMP written to Appendix.		22-Apr-01 05:43:27
QB: IO?	Current 0.15A		22-Apr-01 05:43:27

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =0.09A, Channel B = 0.09A		22-Apr-01 05:43:27
SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 05:43:27

8.1 Power On telemetry verification.

STEP 61	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:43:55
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.0V, Channel B = 14.0V		22-Apr-01 05:43:55
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.63V, Channel B = -14.63V		22-Apr-01 05:43:55
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:43:55
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:43:55
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-33.1C, Channel B = -33.4C		22-Apr-01 05:43:56
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-33.7C, Channel B = -33.4C		22-Apr-01 05:43:56
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 05:43:56
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:43:56
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 05:43:57

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		22-Apr-01 05:43:57

8.2 QC Power On with QB Prime relay.
Carries out PSM-60 macro, and then relevant telemetry.

STEP 62	Mixed		
PORTB: QB (PR) ON	IFC Echo = F00B		22-Apr-01 05:44:13
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 05:44:14
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 05:44:14
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 05:44:14
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 05:44:14
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 05:44:15
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 05:44:15
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 05:44:15
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 05:44:15

8.3 System Converters, Prime SYS1 and Redundant SYS2.
Power on SYS1A and SYS2B converters using PSM-13 and PSM-16. Outputs need to be selected using prime relay set for 5V and 28V, and redundant relay set for +/-15V. Telemetry checks done between and after macros.

STEP 63	Mixed		
NB: ON	NB: ON Done		22-Apr-01 05:45:44
PORTB: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 05:45:44
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:45:44
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:45:44
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:45:44
SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:45:44
PORTB: SYS1;28Volt, +5Volt (Con. A) ON	IFC Echo = B001		22-Apr-01 05:45:44
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5009		22-Apr-01 05:45:44
SCOPE: HARDCOPY SYS1AQB.BMP	SYS1AQB.BMP written to Appendix.		22-Apr-01 05:45:45
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =0.3A, Channel B = 0.3A		22-Apr-01 05:45:45
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.34V, Channel B = 5.34V		22-Apr-01 05:45:45
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.89V, Channel B = 29.87V		22-Apr-01 05:45:45
PORTB: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 05:45:45
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:45:45
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 05:45:45

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:45:45
SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:45:45
PORTB: SYS2;+15Volt, -15Volt (Con. B) ON	IFC Echo = 9002		22-Apr-01 05:45:45
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:45:45
SCOPE: HARDCOPY SYS2BQB.BMP	SYS2BQB.BMP written to Appendix.		22-Apr-01 05:45:45
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =0.38A, Channel B = 0.38A		22-Apr-01 05:45:45
PORTB: PSSV12;+15Volt DC-DC Converter SYS B	IFC Echo = 000D, Telemetry Channel A =15.16V, Channel B = 15.16V		22-Apr-01 05:45:45
PORTB: PSSV14;-15Volt DC-DC Converter SYS B	IFC Echo = 000E, Telemetry Channel A =-15.24V, Channel B = -15.23V		22-Apr-01 05:45:46
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 05:45:46
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 05:45:46
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 05:45:47

8.4 TEU B – Prime relays – 28V and 5V.

Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-21, PSM48, and PSM-52 macros with telemetry checks between macros.

STEP 64	Mixed		
Change TEU load box cable to Side B at load box.	ok		22-Apr-01 05:47:51
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 05:47:51
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 05:47:51
PORTB: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 05:47:51
PORTB: B_TEU_+28QC (PR) ON	IFC Echo = F015		22-Apr-01 05:47:51
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0030		22-Apr-01 05:47:51
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.03A, Channel B = 1.03A		22-Apr-01 05:47:51
PORTB: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 05:47:51
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:47:51
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:47:51
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:47:51
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:47:51
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:47:51
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:47:52
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:47:52
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:47:52
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:47:52
SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B 5V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:47:52
PORTB: B_TEU_+5 (PR) ON	IFC Echo = F010		22-Apr-01 05:47:52
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:47:52
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 0017		22-Apr-01 05:47:52
SCOPE:HARDCOPY TEUBC2.BMP	TEUBC2.BMP written to Appendix.		22-Apr-01 05:47:52

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.29A, Channel B = 1.28A		22-Apr-01 05:47:53
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.31V, Channel B = 5.31V		22-Apr-01 05:47:53
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 05:47:53
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 05:47:53
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 05:47:53
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:47:53

8.5 TEU B Redundant Relays - +/-15V.

STEP 65	Mixed		
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:49:59
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:49:59
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 05:49:59
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 05:49:59
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:49:59
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:49:59
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:49:59
SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B +15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:49:59
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		22-Apr-01 05:49:59
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:50:00
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:50:00
SCOPE:HARDCOPY TEUBC3.BMP	TEUBC3.BMP written to Appendix.		22-Apr-01 05:50:00
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 05:50:00
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:50:00
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 05:50:00
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 05:50:00
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 05:50:00
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 05:50:00
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:50:00

SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B -15V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 05:50:00
PORTB: B_TEU_+/-15 (RR) ON	IFC Echo = D011		22-Apr-01 05:50:00
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:50:00
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:50:01
SCOPE:HARDCOPY TEUBC4.BMP	TEUBC4.BMP written to Appendix.		22-Apr-01 05:50:01
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.68A, Channel B = 1.69A		22-Apr-01 05:50:01
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.14V, Channel B = 15.15V		22-Apr-01 05:50:01
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:50:01
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 05:50:01

8.6 Turn on EEA.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1.
Primary and Redundant measurements already made. No A or B selection.

STEP 66	Mixed		
PORTB: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 05:50:20
PORTB: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 05:50:20
PORTB: EEA_+5 (PR) ON	IFC Echo = F008		22-Apr-01 05:50:20
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 0017		22-Apr-01 05:50:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.79A, Channel B = 1.79A		22-Apr-01 05:50:20
PORTB: EEA_+/-15 (RR) ON	IFC Echo = D009		22-Apr-01 05:50:20
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:50:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.87A, Channel B = 1.86A		22-Apr-01 05:50:20
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 05:50:20
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.15V, Channel B = 15.15V		22-Apr-01 05:50:20
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.23V		22-Apr-01 05:50:21

8.7 Turn on IPU Regulated 28 Volt Supply

Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B Regulated 28 volts through prime relays. This carries out PSM-27 macro.

STEP 67	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 05:51:58
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 05:51:58
PORTB: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 05:51:58
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 05:51:58
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 05:51:58
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 05:51:58
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 05:51:58
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:51:58
SCOPE:MESS:SHOW 'IPU B 28VReg (Prime) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU B 28VReg (Prime) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 05:51:58
PORTB: B_IPU_+28REG (PR) ON	IFC Echo = F003		22-Apr-01 05:51:58
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5039		22-Apr-01 05:51:59
SCOPE:HARDCOPY IPUB1.BMP	IPUB1.BMP written to Appendix.		22-Apr-01 05:51:59
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.73V, Channel B = 29.73V		22-Apr-01 05:51:59
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.72A, Channel B = 3.72A		22-Apr-01 05:51:59
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 05:51:59

8.8 Power on SPU A Supplies from QB.
Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5 to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-10 and PSM-38 macros.

STEP 68	Mixed		
Change SPU load box cable to Side A at load box.	ok		22-Apr-01 05:56:51
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 05:56:51
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 05:56:51
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 05:56:51
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 05:56:51
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 05:56:51
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 05:56:51
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 05:56:51
SCOPE:MESS:SHOW 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter A (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 05:56:51
PORTA: SPU +5Volt, +/-15Volt (Con. A) ON	IFC Echo = B005		22-Apr-01 05:56:52
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		22-Apr-01 05:56:52
SCOPE: HARDCOPY SPUAQB.BMP	SPUAQB.BMP written to Appendix.		22-Apr-01 05:56:52
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.82A, Channel B = 3.82A		22-Apr-01 05:56:52
PORTB: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 05:56:52
PORTB: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 05:56:52
PORTB: SPU_+/-15A ON	IFC Echo = F019		22-Apr-01 05:56:52
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5C39		22-Apr-01 05:56:52

PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		22-Apr-01 05:56:52
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =4.92A, Channel B = 4.92A		22-Apr-01 05:56:52
PORTB: SPU_+5A ON	IFC Echo = F018		22-Apr-01 05:56:52
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 05:56:52
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5011		22-Apr-01 05:56:53
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.12A, Channel B = 5.12A		22-Apr-01 05:56:53
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:56:53
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:56:53
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:56:53

8.9 GEU Supplies – Prime and Redundant relays.
Turns on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5.
This carries out PSM-34 and PSM-30 macros.

STEP 69	Mixed		
PORTB: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 05:57:19
PORTB: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 05:57:19
PORTB: GEU_+5 (PR) ON	IFC Echo = F004		22-Apr-01 05:57:19
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 5017		22-Apr-01 05:57:19
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.3A, Channel B = 5.29A		22-Apr-01 05:57:19
PORTB: GEU_+/-15 (RR) ON	IFC Echo = D005		22-Apr-01 05:57:19
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:57:19
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.96A, Channel B = 5.96A		22-Apr-01 05:57:19
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.25V, Channel B = 5.26V		22-Apr-01 05:57:19
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:57:20
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.21V		22-Apr-01 05:57:20
PORTB: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 05:57:20
PORTB: GEU_+28QC (PR) ON	IFC Echo = F016		22-Apr-01 05:57:20
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 05:57:20
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.78A, Channel B = 6.78A		22-Apr-01 05:57:20

8.10 Turn on Noisy Bus.
Turn on the Noisy Bus Output from the NB supply through the Prime Relay.

STEP 70	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 05:57:29
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 05:57:29
PORTB: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 05:57:29
PORTB: NB (PR) ON	IFC Echo = F01D		22-Apr-01 05:57:29
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 05:57:29

8.11 Do complete telemetry check of PCU.

STEP 71	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 05:57:43
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:57:43
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:57:43
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 05:57:43
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:57:43
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:57:43
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 05:57:43
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 05:57:43

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 72	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 05:58:12
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:58:12
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 14.0V		22-Apr-01 05:58:12
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.56V, Channel B = -14.56V		22-Apr-01 05:58:12
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:58:12
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 05:58:12
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 05:58:12
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.03A, Channel B = 8.03A		22-Apr-01 05:58:12
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.27V, Channel B = 5.27V		22-Apr-01 05:58:12
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 05:58:12

PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:58:13
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.75V, Channel B = 29.75V		22-Apr-01 05:58:13
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:58:13
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:58:13
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.22V		22-Apr-01 05:58:13
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		22-Apr-01 05:58:13

Analogue Telemetry block 2.

STEP 73	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.59V		22-Apr-01 05:58:38
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.11V		22-Apr-01 05:58:38
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 05:58:38
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 05:58:38
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:58:39
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-33.1C, Channel B = -33.1C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-33.7C, Channel B = -33.7C		22-Apr-01 05:58:39

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 05:58:39
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-36.1C, Channel B = -36.1C		22-Apr-01 05:58:39

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 74	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-29.0C, Channel B = -28.7C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-22.6C, Channel B = -22.9C		22-Apr-01 05:59:06
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.4C, Channel B = -26.7C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-25.5C, Channel B = -25.2C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:59:07
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-32.8C, Channel B = -32.6C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 05:59:07

PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 05:59:07
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 05:59:08
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 05:59:08
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-14.1C, Channel B = -13.8C		22-Apr-01 05:59:08
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 05:59:08

8.12 Do High Voltage Input Limit Test
Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 75	Mixed		
QB: V=32.0V	QB: V=32.0V Done		22-Apr-01 05:59:22
NB: V=32.0V	NB: V=32.0V Done		22-Apr-01 05:59:22
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 05:59:22
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 05:59:22
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 05:59:23
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 05:59:23
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 05:59:23
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 05:59:23
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 05:59:23
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 05:59:23

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 76	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 05:59:50
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.99V, Channel B = 13.99V		22-Apr-01 05:59:50
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.58V, Channel B = -14.58V		22-Apr-01 05:59:50
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 05:59:50
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 05:59:50
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 05:59:50
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.85A, Channel B = 7.85A		22-Apr-01 05:59:50
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 05:59:50
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:59:50
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 05:59:50

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.73V, Channel B = 29.75V		22-Apr-01 05:59:50
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 05:59:50
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 05:59:50
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.23V, Channel B = -15.22V		22-Apr-01 05:59:50
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.14V, Channel B = -0.12V		22-Apr-01 05:59:51

Analogue Telemetry block 2.

STEP 77	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.58V, Channel B = 5.59V		22-Apr-01 06:00:16
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.12V		22-Apr-01 06:00:16
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 06:00:16
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.03V		22-Apr-01 06:00:16
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:00:16
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-32.3C, Channel B = -32.6C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-32.6C, Channel B = -32.6C		22-Apr-01 06:00:16

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-35.2C, Channel B = -35.5C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:00:16
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-36.4C, Channel B = -36.4C		22-Apr-01 06:00:17

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 78	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-29.0C, Channel B = -29.0C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-22.3C, Channel B = -22.3C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-26.1C, Channel B = -25.8C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.9C, Channel B = -24.9C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.6C, Channel B = -27.6C		22-Apr-01 06:00:42
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-28.2C, Channel B = -28.5C		22-Apr-01 06:00:43

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 06:00:43
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 06:00:43
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-13.2C, Channel B = -13.2C		22-Apr-01 06:00:43
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:00:44

8.13 Do Low Operating Voltage Limit Test.
Adjust the QB and NB supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 79	Mixed		
QB: V=26.0V	QB: V=26.0V Done		22-Apr-01 06:00:59
NB: V=26.0V	NB: V=26.0V Done		22-Apr-01 06:00:59
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 5E39		22-Apr-01 06:00:59
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry A011		22-Apr-01 06:00:59
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 507F		22-Apr-01 06:00:59
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0047		22-Apr-01 06:00:59
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:00:59
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:00:59
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 6030		22-Apr-01 06:00:59
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 06:00:59

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 80	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:01:26
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =13.98V, Channel B = 13.99V		22-Apr-01 06:01:26
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.61V, Channel B = -14.61V		22-Apr-01 06:01:26
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 06:01:26
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 06:01:26
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:01:26
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.35A, Channel B = 8.35A		22-Apr-01 06:01:26
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:01:26
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =-0.06V, Channel B = -0.08V		22-Apr-01 06:01:26
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-0.08V, Channel B = -0.06V		22-Apr-01 06:01:27

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =29.75V, Channel B = 29.75V		22-Apr-01 06:01:27
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 06:01:27
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 06:01:27
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-15.22V, Channel B = -15.23V		22-Apr-01 06:01:27
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =-0.12V, Channel B = -0.12V		22-Apr-01 06:01:27

Analogue Telemetry block 2.

STEP 81	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =5.59V, Channel B = 5.58V		22-Apr-01 06:01:52
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =15.11V, Channel B = 15.11V		22-Apr-01 06:01:52
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 06:01:52
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =-0.02V, Channel B = -0.03V		22-Apr-01 06:01:52
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:01:52
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:01:52
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-32.0C, Channel B = -31.7C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:01:53

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-35.5C, Channel B = -35.8C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-35.2C, Channel B = -35.2C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:01:53
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-36.7C, Channel B = -36.7C		22-Apr-01 06:01:53

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 82	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-24.3C, Channel B = -24.3C		22-Apr-01 06:02:18
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-28.7C, Channel B = -28.5C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-22.0C, Channel B = -22.0C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-25.8C, Channel B = -25.8C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-29.3C, Channel B = -29.6C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-26.4C, Channel B = -26.7C		22-Apr-01 06:02:19
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 06:02:19

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:02:20
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:02:20
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-12.3C, Channel B = -12.3C		22-Apr-01 06:02:20
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 06:02:20

8.14 Turn of all relays ready to activate alternate relay set.
Relays are turned off by using PSM-01 and PSM-02 macros. All communication is done through PORTA to verify alternate channel communication.
This is PSM-02

STEP 83	Mixed		
PORTA: SPU_+/-15B OFF	IFC Echo = C019		22-Apr-01 06:03:18
PORTA: SPU_+5B OFF	IFC Echo = C018		22-Apr-01 06:03:18
PORTA: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 06:03:18
PORTA: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 06:03:18
PORTA: GEU_+28QC (RR) OFF	IFC Echo = C016		22-Apr-01 06:03:18
PORTA: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 06:03:18
PORTA: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 06:03:18
PORTA: GEU_+5 (RR) OFF	IFC Echo = C004		22-Apr-01 06:03:18
PORTA: GEU_+/-15 (PR) OFF	IFC Echo = E005		22-Apr-01 06:03:18
PORTA: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 06:03:18
PORTA: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 06:03:18
PORTA: EEA_+5 (RR) OFF	IFC Echo = C008		22-Apr-01 06:03:18
PORTA: EEA_+/-15 (PR) OFF	IFC Echo = E009		22-Apr-01 06:03:18
PORTA: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 06:03:18
PORTA: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 06:03:18
PORTA: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 06:03:18
PORTA: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 06:03:18
PORTA: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 06:03:18
PORTA: B_TEU_+5 (RR) OFF	IFC Echo = C010		22-Apr-01 06:03:18
PORTA: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 06:03:18
PORTA: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 06:03:18
PORTA: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 06:03:18
PORTA: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 06:03:18
PORTA: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 06:03:18
PORTA: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 06:03:18
PORTA: B_TEU_+28QC (RR) OFF	IFC Echo = C015		22-Apr-01 06:03:18
PORTA: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 06:03:18
PORTA: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 06:03:19
PORTA: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 06:03:19
PORTA: B_IPU_+28REG (RR) OFF	IFC Echo = C003		22-Apr-01 06:03:19
PORTA: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 06:03:19
PORTA: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 06:03:19
PORTA: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 06:03:19
PORTA: NB (RR) OFF	IFC Echo = C01D		22-Apr-01 06:03:19

This is PSM-01

STEP 84	Mixed		
PORTA: SPU +5Volt, +/-15Volt (Con. B) OFF	IFC Echo = 8005		22-Apr-01 06:03:29
PORTA: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 06:03:29
PORTA: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 06:03:29
PORTA: SYS2;+15Volt, -15Volt (Con. A) OFF	IFC Echo = A002		22-Apr-01 06:03:29
PORTA: SYS1;28Volt, +5Volt (Con. B) OFF	IFC Echo = 8001		22-Apr-01 06:03:29
PORTA: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 06:03:29

8.15 Do status check and turn off QC bus relay.
Also check we can change direct command relay back and forth on QB (important for TVAC check at temperature extremes).

STEP 85	Mixed		
PORTA: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:04:02
PORTA: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.0V, Channel B = 14.0V		22-Apr-01 06:04:03
PORTA: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.63V, Channel B = -14.62V		22-Apr-01 06:04:03
PORTA: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 06:04:03
PORTA: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 06:04:03
PORTA: Temperature;+/-15Volt DC-DC Converter PCU A	IFC Echo = 1008, Telemetry Channel A =-31.7C, Channel B = -31.7C		22-Apr-01 06:04:03
PORTA: Temperature;+/-15Volt DC-DC Converter PCU B	IFC Echo = 100C, Telemetry Channel A =-35.8C, Channel B = -35.5C		22-Apr-01 06:04:03
PORTA: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 06:04:03
PORTA: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 06:04:03
PORTA: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 06:04:03

PORTA: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 06:04:04
PORTA: PSS_STATUS_07	IFC Echo = 4007, Telemetry 006B		22-Apr-01 06:04:04
NB: OFF	NB: OFF Done		22-Apr-01 06:04:04
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 06:04:04
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:04:04
DIR: (IPU B) HIR_PSS_DISCRETE(2)	(IPU B) HIR_PSS_DISCRETE(2) Enabled		22-Apr-01 06:04:04
PORTA: PSS_STATUS_02	IFC Echo = 4002, Telemetry 101B		22-Apr-01 06:04:04
DIR: (IPU B) HIR_PSS_DISCRETE(1)	(IPU B) HIR_PSS_DISCRETE(1) Enabled		22-Apr-01 06:04:04
QB: OFF	QB: OFF Done		22-Apr-01 06:04:04

9 POWER ON PCU USING QB AND NB, SYS1 REDUNDANT AND SYS2 PRIMARY.
Enters with Redundant Internal Supply connected to QB from previous test block.

STEP 86	Mixed		
QA: V=29.0v	QA: V=29.0v Done		22-Apr-01 06:04:46
QB: V=29.0v	QB: V=29.0v Done		22-Apr-01 06:04:46
NA: V=29.0v	NA: V=29.0v Done		22-Apr-01 06:04:46
NB: V=29.0v	NB: V=29.0v Done		22-Apr-01 06:04:46
SCOPE:HOR:MAIN:SCALE 1000E-6	SCOPE:HOR:MAIN: SCALE 1000E-6 done.		22-Apr-01 06:04:46
SCOPE:HOR:TRIG:POS 20	SCOPE:HOR:TRIG:POS 20 done.		22-Apr-01 06:04:46
SCOPE: CH1:VOLT 0.05	SCOPE:CH1:VOLT 0.05 done.		22-Apr-01 06:04:46
SCOPE: CH1:POS -3	SCOPE:CH1:POS -3 done.		22-Apr-01 06:04:47
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH1 ON done.		22-Apr-01 06:04:47
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH2 OFF done.		22-Apr-01 06:04:47
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 06:04:47
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:EDGE:SOURCE CH1 done.		22-Apr-01 06:04:47
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:04:47
SCOPE:MESS:SHOW 'QB Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'QB Redundant Converter \nPower On Inrush Current Waveform, 500mA/Div' done.		22-Apr-01 06:04:48
QB: ON	QB: ON Done		22-Apr-01 06:04:48
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:04:48
SCOPE: HARDCOPY INRUSHBR.BMP	INRUSHBR.BMP written to Appendix.		22-Apr-01 06:04:48
QB: IO?	Current 1.42A		22-Apr-01 06:04:48
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.37A, Channel B = 1.36A		22-Apr-01 06:04:48

SCOPE:HOR:MAIN:SCALE 400E-6	SCOPE:HOR:MAIN: SCALE 400E-6 done.		22-Apr-01 06:04:48

9.1 Power On telemetry verification.

STEP 87	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:05:14
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.03V, Channel B = 14.03V		22-Apr-01 06:05:15
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.93V, Channel B = -14.92V		22-Apr-01 06:05:15
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 06:05:15
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.07V, Channel B = 5.07V		22-Apr-01 06:05:15
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-33.1C, Channel B = -32.8C		22-Apr-01 06:05:15
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-34.0C, Channel B = -34.0C		22-Apr-01 06:05:16
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 06:05:16
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 06:05:16
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry B01B		22-Apr-01 06:05:16

PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0023		22-Apr-01 06:05:17

9.2 QC Power On with QB Redundant relay.
Carries out PSM-61 macro, and then relevant telemetry.

STEP 88	Mixed		
PORTB: QB (RR) ON	IFC Echo = D00B		22-Apr-01 06:05:33
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry 001B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 001B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry 201B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0003		22-Apr-01 06:05:34
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 001B		22-Apr-01 06:05:34
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 001B		22-Apr-01 06:05:35
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0000		22-Apr-01 06:05:35
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:05:35
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:05:35
SCOPE: CH2:VOLT 0.2	SCOPE:CH2:VOLT 0.2 done.		22-Apr-01 06:05:35

9.3 Turn on System Converters - Redundant SYS1 and Prime SYS2.
Power on SYS1B and SYS2A converters using PSM-14 and PSM-15. Outputs need to be selected using redundant relay set for 5V and 28V, and prime relay set for +/-15V. Telemetry checks done between and after macros.

STEP 89	Mixed		
NB: ON	NB: ON Done		22-Apr-01 06:07:01
PORTB: SYS1;28Volt, +5Volt (Con. A) OFF	IFC Echo = A001		22-Apr-01 06:07:01
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:07:01
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 06:07:02
SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:07:02
SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB Sys1 Converter B \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 06:07:02
PORTB: SYS1;28Volt, +5Volt (Con. B) ON	IFC Echo = 9001		22-Apr-01 06:07:02
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A012		22-Apr-01 06:07:02
SCOPE: HARDCOPY SYS1BQB.BMP	SYS1BQB.BMP written to Appendix.		22-Apr-01 06:07:02
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.58A, Channel B = 1.58A		22-Apr-01 06:07:02
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.35V, Channel B = 5.35V		22-Apr-01 06:07:02
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.83V, Channel B = 29.87V		22-Apr-01 06:07:02
PORTB: SYS2;+15Volt, -15Volt (Con. B) OFF	IFC Echo = 8002		22-Apr-01 06:07:02
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:07:02
SCOPE:TRIG:A:LEVEL 0.4	SCOPE:TRIG:A:LEVEL 0.4 done.		22-Apr-01 06:07:02

SCOPE: ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:07:02
SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHOW 'QB SYS2 Converter A \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 06:07:03
PORTB: SYS2;+15Volt, -15Volt (Con. A) ON	IFC Echo = B002		22-Apr-01 06:07:03
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:07:03
SCOPE: HARDCOPY SYS2AQB.BMP	SYS2AQB.BMP written to Appendix.		22-Apr-01 06:07:03
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =1.66A, Channel B = 1.66A		22-Apr-01 06:07:03
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.15V, Channel B = 15.16V		22-Apr-01 06:07:03
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.26V, Channel B = -15.26V		22-Apr-01 06:07:03
SCOPE:SELECT:CH1 OFF	SCOPE:SELECT:CH 1 OFF done.		22-Apr-01 06:07:03
SCOPE:SELECT:CH2 ON	SCOPE:SELECT:CH 2 ON done.		22-Apr-01 06:07:04
SCOPE:TRIG:A:EDGE:SOURCE CH2	SCOPE:TRIG:A:EDGE:SOURCE CH2 done.		22-Apr-01 06:07:04

9.4 TEU B – Redundant relays – 28V and 5V.
Turns on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1. This carries out PSM-22, PSM49, and PSM-51 macros with telemetry checks between macros.

STEP 90	Mixed		
PORTB: A_TEU_+28QC (PR) OFF	IFC Echo = E014		22-Apr-01 06:09:14
PORTB: A_TEU_+28QC (RR) OFF	IFC Echo = C014		22-Apr-01 06:09:14
PORTB: B_TEU_+28QC (PR) OFF	IFC Echo = E015		22-Apr-01 06:09:14
PORTB: B_TEU_+28QC (RR) ON	IFC Echo = D015		22-Apr-01 06:09:14
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 0028		22-Apr-01 06:09:14
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.29A, Channel B = 2.29A		22-Apr-01 06:09:14
PORTB: B_TEU_+5 (PR) OFF	IFC Echo = E010		22-Apr-01 06:09:14
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 06:09:14
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 06:09:14
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 06:09:14
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 06:09:14
Fit a current monitor loop to the TEU 5V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 06:09:14
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 06:09:14
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 06:09:15
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 06:09:15
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:09:15
SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B 5V Redundant \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 06:09:15
PORTB: B_TEU_+5 (RR) ON	IFC Echo = D010		22-Apr-01 06:09:15
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:09:15
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 000F		22-Apr-01 06:09:15
SCOPE:HARDCOPY TEUBC6.BMP	TEUBC6.BMP written to Appendix.		22-Apr-01 06:09:16

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.56A, Channel B = 2.56A		22-Apr-01 06:09:16
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.31V, Channel B = 5.31V		22-Apr-01 06:09:16
PORTB: B_TEU_+/-15 (RR) OFF	IFC Echo = C011		22-Apr-01 06:09:16
PORTB: A_TEU_+/-15 (PR) OFF	IFC Echo = E00D		22-Apr-01 06:09:16
PORTB: A_TEU_+/-15 (RR) OFF	IFC Echo = C00D		22-Apr-01 06:09:16
PORTB: A_TEU_+5 (RR) OFF	IFC Echo = C00C		22-Apr-01 06:09:16
PORTB: A_TEU_+5 (PR) OFF	IFC Echo = E00C		22-Apr-01 06:09:16

9.5 TEU B – Prime relays – +/-15V.

STEP 91	Mixed		
Set the switch on the 5V monitor to "V" and remove the current loop.	ok		22-Apr-01 06:11:23
Fit a current monitor loop to the TEU +15V monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 06:11:23
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 06:11:23
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 06:11:23
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 06:11:23
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:11:23
SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B +15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 06:11:23
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		22-Apr-01 06:11:24
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:11:24
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:11:24
SCOPE:HARDCOPY TEUBC7.BMP	TEUBC7.BMP written to Appendix.		22-Apr-01 06:11:24
PORTB: B_TEU_+/-15 (PR) OFF	IFC Echo = E011		22-Apr-01 06:11:24
Set the switch on the +15V monitor to "V" and remove the current loop.	ok		22-Apr-01 06:11:24
Fit a current monitor loop to the TEU -15V monitor on the Load Box and set the switch to "I"	ok		22-Apr-01 06:11:24
Fit the 2nd current probe to the current monitor loop with + mark to WHITE socket.	ok		22-Apr-01 06:11:24
SCOPE: CH2:VOLT 0.02	SCOPE:CH2:VOLT 0.02 done.		22-Apr-01 06:11:24
SCOPE:TRIG:A:LEVEL 0.02	SCOPE:TRIG:A:LEVEL 0.02 done.		22-Apr-01 06:11:24
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:11:24

SCOPE:MESS:SHOW 'TEU B -15V Prime \nSoft Start Current Waveform, 200mA/Div'	SCOPE:MESS:SHOW 'TEU B -15V Prime \nSoft Start Current Waveform, 200mA/Div' done.		22-Apr-01 06:11:24
PORTB: B_TEU_+/-15 (PR) ON	IFC Echo = F011		22-Apr-01 06:11:24
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:11:24
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:11:24
SCOPE:HARDCOPY TEUBC8.BMP	TEUBC8.BMP written to Appendix.		22-Apr-01 06:11:24
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =2.95A, Channel B = 2.95A		22-Apr-01 06:11:25
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.14V, Channel B = 15.15V		22-Apr-01 06:11:25
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.26V		22-Apr-01 06:11:25
Set the switch on the -15V monitor to "V" and remove the current loop.	ok		22-Apr-01 06:11:25

9.6 Power on EEA.
Turn on supplies in order specified in C&TH Vol 1 Part 2 section 5.5.1
Primary and Redundant measurements already made. No A or B selection.

STEP 92	Mixed		
PORTB: EEA_+5 (PR) OFF	IFC Echo = E008		22-Apr-01 06:11:44
PORTB: EEA_+/-15 (RR) OFF	IFC Echo = C009		22-Apr-01 06:11:44
PORTB: EEA_+5 (RR) ON	IFC Echo = D008		22-Apr-01 06:11:44
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 000F		22-Apr-01 06:11:44
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.05A, Channel B = 3.05A		22-Apr-01 06:11:44
PORTB: EEA_+/-15 (PR) ON	IFC Echo = F009		22-Apr-01 06:11:45
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:11:45
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =3.14A, Channel B = 3.14A		22-Apr-01 06:11:45
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.29V, Channel B = 5.29V		22-Apr-01 06:11:45
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.14V, Channel B = 15.14V		22-Apr-01 06:11:45
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.25V		22-Apr-01 06:11:46

9.7 Turn on IPU regulated 28 Volt Supply.
Turns on supply in order specified in C&TH Vol 1 Part 2 section 5.5.2 to supply IPU B side regulated 28 Volts through redundant relays.

STEP 93	Mixed		
PORTB: A_IPU_+28REG (PR) OFF	IFC Echo = E002		22-Apr-01 06:12:54
PORTB: A_IPU_+28REG (RR) OFF	IFC Echo = C002		22-Apr-01 06:12:54
PORTB: B_IPU_+28REG (PR) OFF	IFC Echo = E003		22-Apr-01 06:12:54
SCOPE: CH2:VOLT 0.05	SCOPE:CH2:VOLT 0.05 done.		22-Apr-01 06:12:54
SCOPE:TRIG:A:LEVEL 0.05	SCOPE:TRIG:A:LEVEL 0.05 done.		22-Apr-01 06:12:54
Fit a current monitor loop to the IPU 28VReg monitor on the Load Box and set the switch to "I".	ok		22-Apr-01 06:12:55
Fit the 2nd current probe to the current monitor loop with + mark to red socket.	ok		22-Apr-01 06:12:55
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:12:55
SCOPE:MESS:SHOW 'IPU B 28VReg (Redundant) \nStart Current Waveform, 500mA/Div'	SCOPE:MESS:SHOW 'IPU B 28VReg (Redundant) \nStart Current Waveform, 500mA/Div' done.		22-Apr-01 06:12:55
PORTB: B_IPU_+28REG (RR) ON	IFC Echo = D003		22-Apr-01 06:12:55
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:12:55
SCOPE:HARDCOPY IPUB2.BMP	IPUB2.BMP written to Appendix.		22-Apr-01 06:12:56
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =4.99A, Channel B = 4.99A		22-Apr-01 06:12:56
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.79V, Channel B = 29.79V		22-Apr-01 06:12:56
Set the switch on the 28VReg monitor to "V" and remove the current loop.	ok		22-Apr-01 06:12:56

9.8 Power on SPU B supplies from QB.
Turns on SPU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5. to power SPU side A. Only Converter Power On Inrush currents checked as SPU soft starts checked on QA operations. This carries out PSM-12 and PSM-40 macros.

STEP 94	Mixed		
Change SPU load box cable to Side B at load box.	ok		22-Apr-01 06:14:41
PORTB: SPU +5Volt, +/-15Volt (Con. A) OFF	IFC Echo = A005		22-Apr-01 06:14:41
SCOPE:SELECT:CH2 OFF	SCOPE:SELECT:CH 2 OFF done.		22-Apr-01 06:14:41
SCOPE:SELECT:CH1 ON	SCOPE:SELECT:CH 1 ON done.		22-Apr-01 06:14:41
SCOPE:TRIG:A:EDGE:SOURCE CH1	SCOPE:TRIG:A:ED GE:SOURCE CH1 done.		22-Apr-01 06:14:41
SCOPE: CH1:VOLT 0.2	SCOPE:CH1:VOLT 0.2 done.		22-Apr-01 06:14:41
SCOPE:TRIG:A:LEVEL 0.6	SCOPE:TRIG:A:LEV EL 0.6 done.		22-Apr-01 06:14:41
SCOPE:ACQ:STATE RUN	SCOPE:ACQ:STATE RUN done.		22-Apr-01 06:14:41
SCOPE:MESS:SHOW 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div'	SCOPE:MESS:SHO W 'SPU Converter B (QB) \nPower On Inrush Current Waveform, 2A/Div' done.		22-Apr-01 06:14:41
PORTB: SPU +5Volt, +/-15Volt (Con. B) ON	IFC Echo = 9005		22-Apr-01 06:14:41
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry A00A		22-Apr-01 06:14:42
SCOPE: HARDCOPY SPUBQB.BMP	SPUBQB.BMP written to Appendix.		22-Apr-01 06:14:42
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =5.09A, Channel B = 5.09A		22-Apr-01 06:14:42
PORTB: SPU_+5A OFF	IFC Echo = E018		22-Apr-01 06:14:42
PORTB: SPU_+/-15A OFF	IFC Echo = E019		22-Apr-01 06:14:42
PORTB: SPU_+/-15B ON	IFC Echo = D019		22-Apr-01 06:14:42
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:14:42
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AC0A		22-Apr-01 06:14:42

PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.19A, Channel B = 6.19A		22-Apr-01 06:14:42
PORTB: SPU_+5B ON	IFC Echo = D018		22-Apr-01 06:14:42
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:14:42
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0A		22-Apr-01 06:14:42
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.39A, Channel B = 6.39A		22-Apr-01 06:14:42
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 06:14:42
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 06:14:42
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.19V		22-Apr-01 06:14:43

9.9 Turn on GEU supplies.
Turn on GEU supplies in order specified in C&TH Vol 1 Part 2 section 5.5.5.

STEP 95	Mixed		
PORTB: GEU_+5 (PR) OFF	IFC Echo = E004		22-Apr-01 06:15:07
PORTB: GEU_+/-15 (RR) OFF	IFC Echo = C005		22-Apr-01 06:15:07
PORTB: GEU_+5 (RR) ON	IFC Echo = D004		22-Apr-01 06:15:07
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE0F		22-Apr-01 06:15:07
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =6.57A, Channel B = 6.57A		22-Apr-01 06:15:07
PORTB: GEU_+/-15 (PR) ON	IFC Echo = F005		22-Apr-01 06:15:07
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.23A, Channel B = 7.23A		22-Apr-01 06:15:07
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:15:07
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:15:07
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.13V, Channel B = 15.13V		22-Apr-01 06:15:08
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 06:15:08
PORTB: GEU_+28QC (PR) OFF	IFC Echo = E016		22-Apr-01 06:15:08
PORTB: GEU_+28QC (RR) ON	IFC Echo = D016		22-Apr-01 06:15:08
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:15:08

9.10 Turn on Noisy Bus.
Turn on the Noisy Bus Output from the NB supply through the Redundant Relay.

STEP 96	Mixed		
PORTB: NA (PR) OFF	IFC Echo = E01C		22-Apr-01 06:15:17
PORTB: NA (RR) OFF	IFC Echo = C01C		22-Apr-01 06:15:17
PORTB: NB (PR) OFF	IFC Echo = E01D		22-Apr-01 06:15:17
PORTB: NB (RR) ON	IFC Echo = D01D		22-Apr-01 06:15:17
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:15:17

9.11 Do complete telemetry check of PCU now all outputs are on.

STEP 97	Mixed		
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:15:31
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:15:31
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:15:31
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:15:31
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:15:31
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:15:31
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:15:31
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:15:31

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 98	Mixed		
PORTB: HKA SELECT 0	IFC Echo = 0000, Telemetry Channel A =-0.02, Channel B = -0.02		22-Apr-01 06:16:00
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.08V		22-Apr-01 06:16:00
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.02V, Channel B = 14.02V		22-Apr-01 06:16:00
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-14.99V, Channel B = -14.99V		22-Apr-01 06:16:00
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.34V, Channel B = 0.34V		22-Apr-01 06:16:00
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.07V		22-Apr-01 06:16:00
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:16:00
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.04A, Channel B = 8.05A		22-Apr-01 06:16:00
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 06:16:00
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 06:16:00

PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.24V		22-Apr-01 06:16:01
PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.12V, Channel B = -0.14V		22-Apr-01 06:16:01
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:16:01
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 06:16:01
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.06V, Channel B = -0.06V		22-Apr-01 06:16:01
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.79V, Channel B = 29.79V		22-Apr-01 06:16:01

Analogue Telemetry block 2.

STEP 99	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 06:16:26
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:16:26
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.09V, Channel B = -0.09V		22-Apr-01 06:16:26
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 06:16:26
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.12V		22-Apr-01 06:16:26
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.19V, Channel B = -15.19V		22-Apr-01 06:16:26
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-35.5C, Channel B = -35.8C		22-Apr-01 06:16:26
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-36.1C, Channel B = -36.1C		22-Apr-01 06:16:26
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-35.8C, Channel B = -36.1C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-37.8C, Channel B = -37.8C		22-Apr-01 06:16:27

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-31.4C, Channel B = -31.4C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-32.8C, Channel B = -32.8C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-31.7C, Channel B = -31.4C		22-Apr-01 06:16:27
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-33.4C, Channel B = -33.4C		22-Apr-01 06:16:27

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 100	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-24.6C, Channel B = -24.6C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.7C, Channel B = -28.5C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-25.2C, Channel B = -25.5C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:16:54
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.3C, Channel B = -24.6C		22-Apr-01 06:16:55
PORTB: HKA SELECT 40	IFC Echo = 2008, Telemetry Channel A =-32.8C, Channel B = -32.6C		22-Apr-01 06:16:55
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.9C, Channel B = -28.2C		22-Apr-01 06:16:55

PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-28.7C, Channel B = -28.7C		22-Apr-01 06:16:55
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 06:16:56
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:16:56
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 06:16:56
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-15.6C, Channel B = -15.6C		22-Apr-01 06:16:56

9.12 Do High Voltage Input Limit Test
Adjust the QB and NB supplies to upper operating voltage limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 101	Mixed		
QB: V=32.0V	QB: V=32.0V Done		22-Apr-01 06:17:11
NB: V=32.0V	NB: V=32.0V Done		22-Apr-01 06:17:11
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:17:11
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:17:11
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:17:11
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:17:11
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:17:11
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:17:11
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:17:11
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:17:11

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 102	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:17:38
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.01V, Channel B = 14.01V		22-Apr-01 06:17:38
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.08V, Channel B = -15.08V		22-Apr-01 06:17:38
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.33V		22-Apr-01 06:17:38
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 06:17:38
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:17:38
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =7.86A, Channel B = 7.86A		22-Apr-01 06:17:38
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 06:17:38
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 06:17:38
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.24V, Channel B = -15.25V		22-Apr-01 06:17:38

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		22-Apr-01 06:17:39
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:17:39
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.06V		22-Apr-01 06:17:39
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.06V		22-Apr-01 06:17:39
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.77V, Channel B = 29.77V		22-Apr-01 06:17:39

Analogue Telemetry block 2.

STEP 103	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.02V, Channel B = -0.02V		22-Apr-01 06:18:04
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:18:04
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:18:04
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.54V, Channel B = 5.55V		22-Apr-01 06:18:04
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 06:18:04
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-36.1C, Channel B = -36.4C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-36.1C, Channel B = -35.8C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-38.1C, Channel B = -38.1C		22-Apr-01 06:18:04

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-31.1C, Channel B = -31.1C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:18:04
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-30.5C, Channel B = -30.2C		22-Apr-01 06:18:05
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-32.3C, Channel B = -32.0C		22-Apr-01 06:18:05

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 104	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-24.1C, Channel B = -24.1C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-26.7C, Channel B = -27.0C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.2C, Channel B = -28.5C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-24.9C, Channel B = -24.6C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-24.1C, Channel B = -23.8C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-27.0C, Channel B = -27.0C		22-Apr-01 06:18:30
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-27.9C, Channel B = -27.9C		22-Apr-01 06:18:30

PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.3C, Channel B = -32.3C		22-Apr-01 06:18:31
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-30.2C, Channel B = -30.2C		22-Apr-01 06:18:31
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:18:32
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-14.7C, Channel B = -14.7C		22-Apr-01 06:18:32

9.13 Low Operating Voltage Limit Test.
Adjust the QB and NB supplies to lower operating limit, and do complete telemetry test. This table has voltage change and digital telemetry.

STEP 105	Mixed		
QB: V=26.0V	QB: V=26.0V Done		22-Apr-01 06:18:46
NB: V=26.0V	NB: V=26.0V Done		22-Apr-01 06:18:46
PORTB: PSS_STATUS_00	IFC Echo = 4000, Telemetry A03A		22-Apr-01 06:18:46
PORTB: PSS_STATUS_01	IFC Echo = 4001, Telemetry 500A		22-Apr-01 06:18:46
PORTB: PSS_STATUS_02	IFC Echo = 4002, Telemetry AE7F		22-Apr-01 06:18:46
PORTB: PSS_STATUS_03	IFC Echo = 4003, Telemetry 0027		22-Apr-01 06:18:46
PORTB: PSS_STATUS_04	IFC Echo = 4004, Telemetry 007F		22-Apr-01 06:18:47
PORTB: PSS_STATUS_05	IFC Echo = 4005, Telemetry 007F		22-Apr-01 06:18:47
PORTB: PSS_STATUS_06	IFC Echo = 4006, Telemetry 5028		22-Apr-01 06:18:47
PORTB: PSS_STATUS_07	IFC Echo = 4007, Telemetry 0073		22-Apr-01 06:18:47

Analogue Telemetry block 1.
HKA select 0 is unused AMUX port used to establish A/D converter zero offset.

STEP 106	Mixed		
PORTB: PSSV15;+5VOLT PCU INTERNAL POWER RAIL, +5C	IFC Echo = 0001, Telemetry Channel A =5.09V, Channel B = 5.09V		22-Apr-01 06:19:14
PORTB: PSSV16;+15VOLT PCU INTERNAL POWER RAIL, +15C	IFC Echo = 0002, Telemetry Channel A =14.01V, Channel B = 14.02V		22-Apr-01 06:19:14
PORTB: PSSV17;-15VOLT PCU INTERNAL POWER RAIL, -15C	IFC Echo = 0003, Telemetry Channel A =-15.13V, Channel B = -15.13V		22-Apr-01 06:19:14
PORTB: PSSV18;+5VOLT PCU INTERNAL POWER RAIL, +5A	IFC Echo = 0004, Telemetry Channel A =0.33V, Channel B = 0.34V		22-Apr-01 06:19:14
PORTB: PSSV19;+5Volt PCU Internal Power Rail, +5B	IFC Echo = 0005, Telemetry Channel A =5.06V, Channel B = 5.06V		22-Apr-01 06:19:14
PORTB: QA PRIMARY CURRENT	IFC Echo = 0006, Telemetry Channel A =-0.05A, Channel B = -0.05A		22-Apr-01 06:19:14
PORTB: QB PRIMARY CURRENT	IFC Echo = 0007, Telemetry Channel A =8.37A, Channel B = 8.37A		22-Apr-01 06:19:14
PORTB: PSSV09;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 0008, Telemetry Channel A =-0.03V, Channel B = -0.03V		22-Apr-01 06:19:14
PORTB: PSSV11;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 0009, Telemetry Channel A =15.12V, Channel B = 15.12V		22-Apr-01 06:19:14
PORTB: PSSV13;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 000A, Telemetry Channel A =-15.25V, Channel B = -15.24V		22-Apr-01 06:19:14

PORTB: PSSV01;28VOLT DC-DC CONVERTER Sys A	IFC Echo = 000B, Telemetry Channel A =-0.14V, Channel B = -0.14V		22-Apr-01 06:19:14
PORTB: PSSV10;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 000C, Telemetry Channel A =5.26V, Channel B = 5.26V		22-Apr-01 06:19:14
PORTB: PSSV12;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000D, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 06:19:14
PORTB: PSSV14;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 000E, Telemetry Channel A =-0.08V, Channel B = -0.08V		22-Apr-01 06:19:14
PORTB: PSSV02;28VOLT DC-DC CONVERTER Sys B	IFC Echo = 000F, Telemetry Channel A =29.79V, Channel B = 29.79V		22-Apr-01 06:19:15

Analogue Telemetry block 2.

STEP 107	Mixed		
PORTB: PSSV03;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1001, Telemetry Channel A =-0.03V, Channel B = -0.02V		22-Apr-01 06:19:40
PORTB: PSSV05;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1002, Telemetry Channel A =-0.1V, Channel B = -0.09V		22-Apr-01 06:19:40
PORTB: PSSV07;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 1003, Telemetry Channel A =-0.1V, Channel B = -0.1V		22-Apr-01 06:19:40
PORTB: PSSV04;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 1005, Telemetry Channel A =5.55V, Channel B = 5.55V		22-Apr-01 06:19:40
PORTB: PSSV06;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1006, Telemetry Channel A =15.1V, Channel B = 15.1V		22-Apr-01 06:19:40
PORTB: PSSV08;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 1007, Telemetry Channel A =-15.2V, Channel B = -15.2V		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU A	IFC Echo = 1008, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU A	IFC Echo = 1009, Telemetry Channel A =-35.8C, Channel B = -35.8C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100A, Telemetry Channel A =-35.8C, Channel B = -36.1C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU A	IFC Echo = 100B, Telemetry Channel A =-38.1C, Channel B = -37.8C		22-Apr-01 06:19:40

PORTB: TEMPERATURE;+/-15VOLT DC-DC CONVERTER PCU B	IFC Echo = 100C, Telemetry Channel A =-31.4C, Channel B = -31.1C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SPU B	IFC Echo = 100D, Telemetry Channel A =-32.3C, Channel B = -31.7C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100E, Telemetry Channel A =-29.6C, Channel B = -29.9C		22-Apr-01 06:19:40
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SPU B	IFC Echo = 100F, Telemetry Channel A =-32.0C, Channel B = -32.0C		22-Apr-01 06:19:40

Analogue Telemetry block 3.
HKA Select 40 is measuring the internal supply 5V regulator temperature.

STEP 108	Mixed		
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS A	IFC Echo = 2000, Telemetry Channel A =-29.9C, Channel B = -29.6C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2001, Telemetry Channel A =-24.1C, Channel B = -24.1C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS A	IFC Echo = 2002, Telemetry Channel A =-26.4C, Channel B = -26.7C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS A	IFC Echo = 2003, Telemetry Channel A =-28.2C, Channel B = -28.2C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;+5VOLT DC-DC CONVERTER SYS B	IFC Echo = 2004, Telemetry Channel A =-24.3C, Channel B = -24.6C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;+15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2005, Telemetry Channel A =-29.6C, Channel B = -29.6C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;-15VOLT DC-DC CONVERTER SYS B	IFC Echo = 2006, Telemetry Channel A =-27.0C, Channel B = -26.7C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;28VOLT DC-DC CONVERTER SYS B	IFC Echo = 2007, Telemetry Channel A =-23.8C, Channel B = -23.5C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;IN RUSH A & CURRENT QA SENSOR	IFC Echo = 200A, Telemetry Channel A =-25.5C, Channel B = -25.8C		22-Apr-01 06:20:06
PORTB: TEMPERATURE;IN RUSH B & CURRENT QB SENSOR	IFC Echo = 200B, Telemetry Channel A =-26.7C, Channel B = -26.4C		22-Apr-01 06:20:06

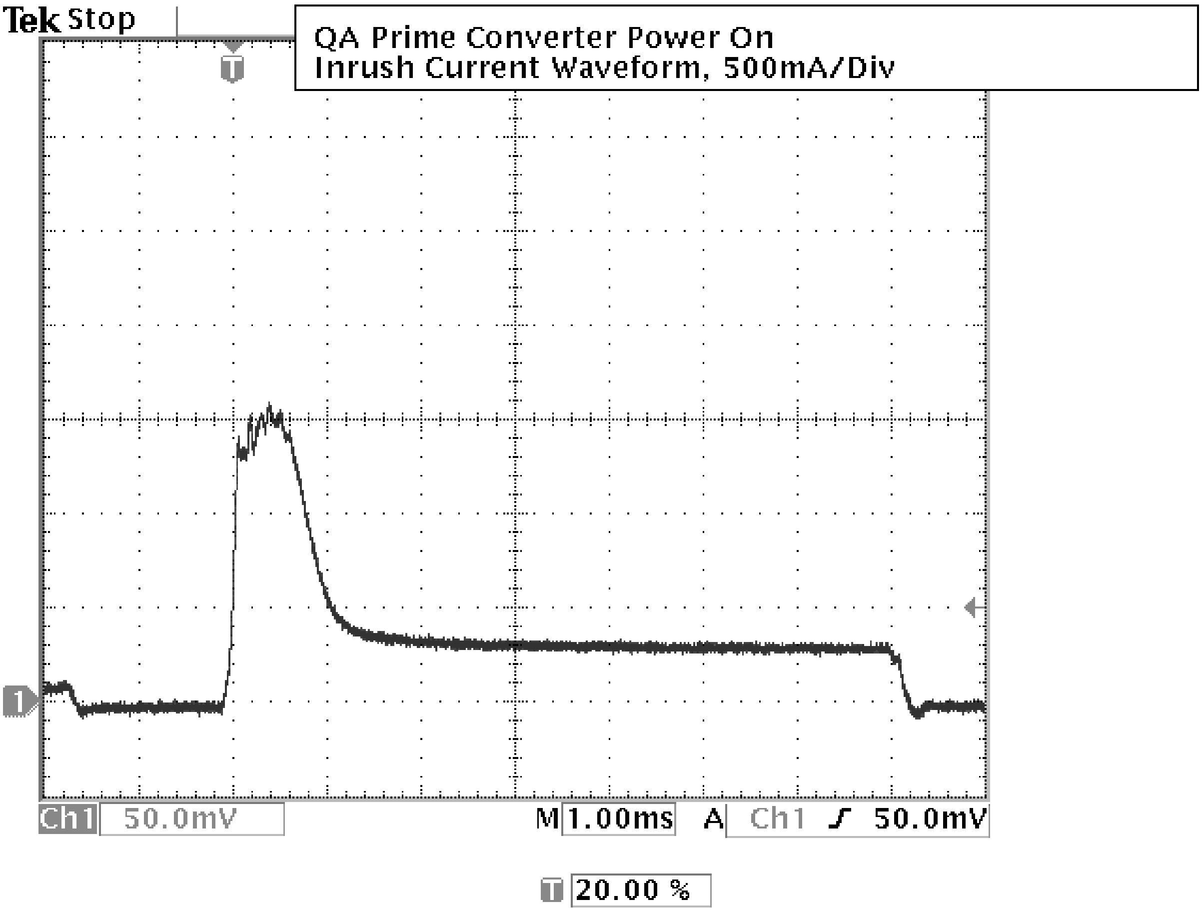
PORTB: TEMPERATURE;QA RELAY (PR)	IFC Echo = 200C, Telemetry Channel A =-32.0C, Channel B = -32.3C		22-Apr-01 06:20:07
PORTB: TEMPERATURE;QA RELAY (RR)	IFC Echo = 200D, Telemetry Channel A =-29.9C, Channel B = -29.9C		22-Apr-01 06:20:07
PORTB: TEMPERATURE;QB RELAY (PR)	IFC Echo = 200E, Telemetry Channel A =-27.3C, Channel B = -27.3C		22-Apr-01 06:20:08
PORTB: TEMPERATURE;QB RELAY (RR)	IFC Echo = 200F, Telemetry Channel A =-13.8C, Channel B = -13.8C		22-Apr-01 06:20:08

9.14 End Of Test. – Leave PCU Powered Up.

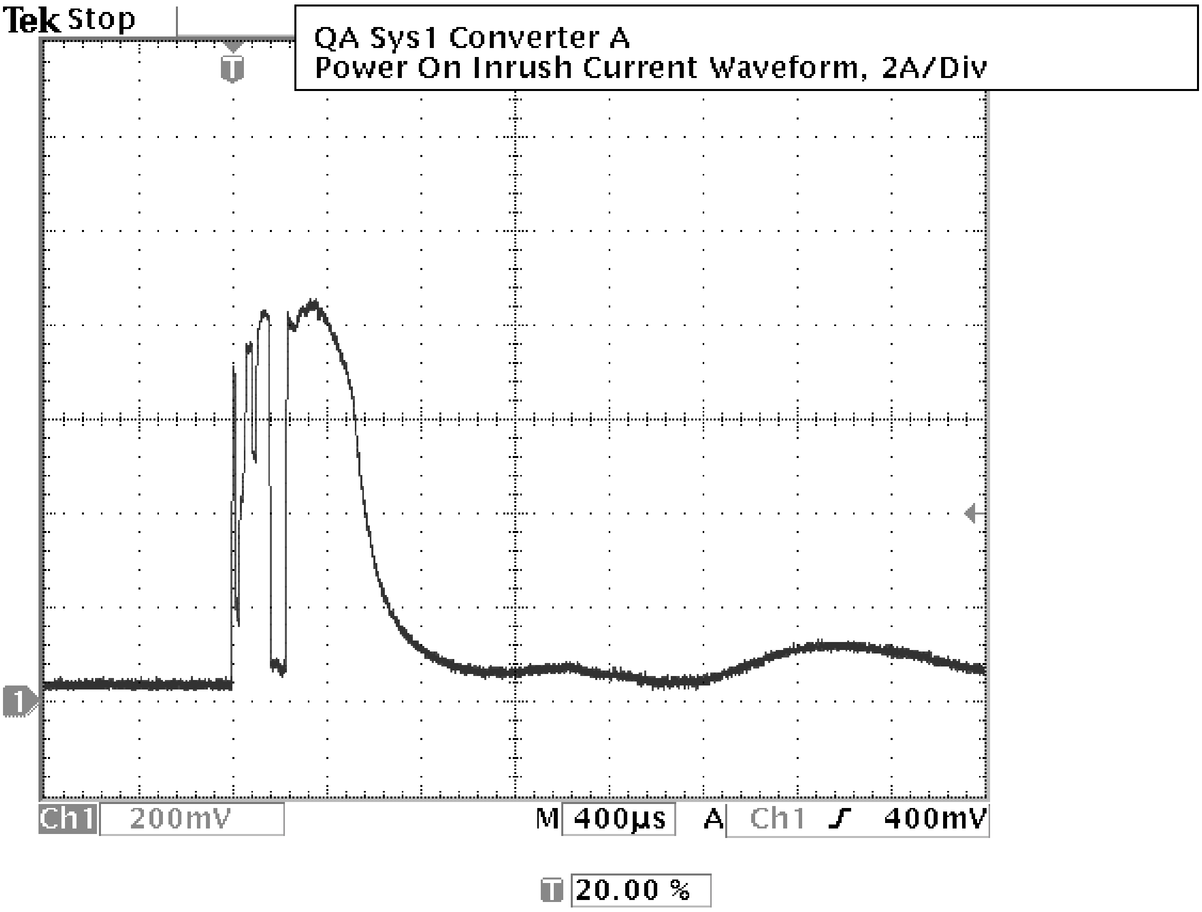
STEP 109	Mixed		
QB: V=29.0V	QB: V=29.0V Done		22-Apr-01 06:21:02
NB: V=29.0V	NB: V=29.0V Done		22-Apr-01 06:21:02
Turn off Current Probes	ok		22-Apr-01 06:21:02
Ensure all test certification is signed and annotated on diary cards.	ok		22-Apr-01 06:21:02
Ensure QA are notified of file name and test number for archiving.	ok		22-Apr-01 06:21:02
PCU left powered for TVAC test. Power down using Shutdown_PCU macro if required.	ok		22-Apr-01 06:21:02

10 APPENDIX

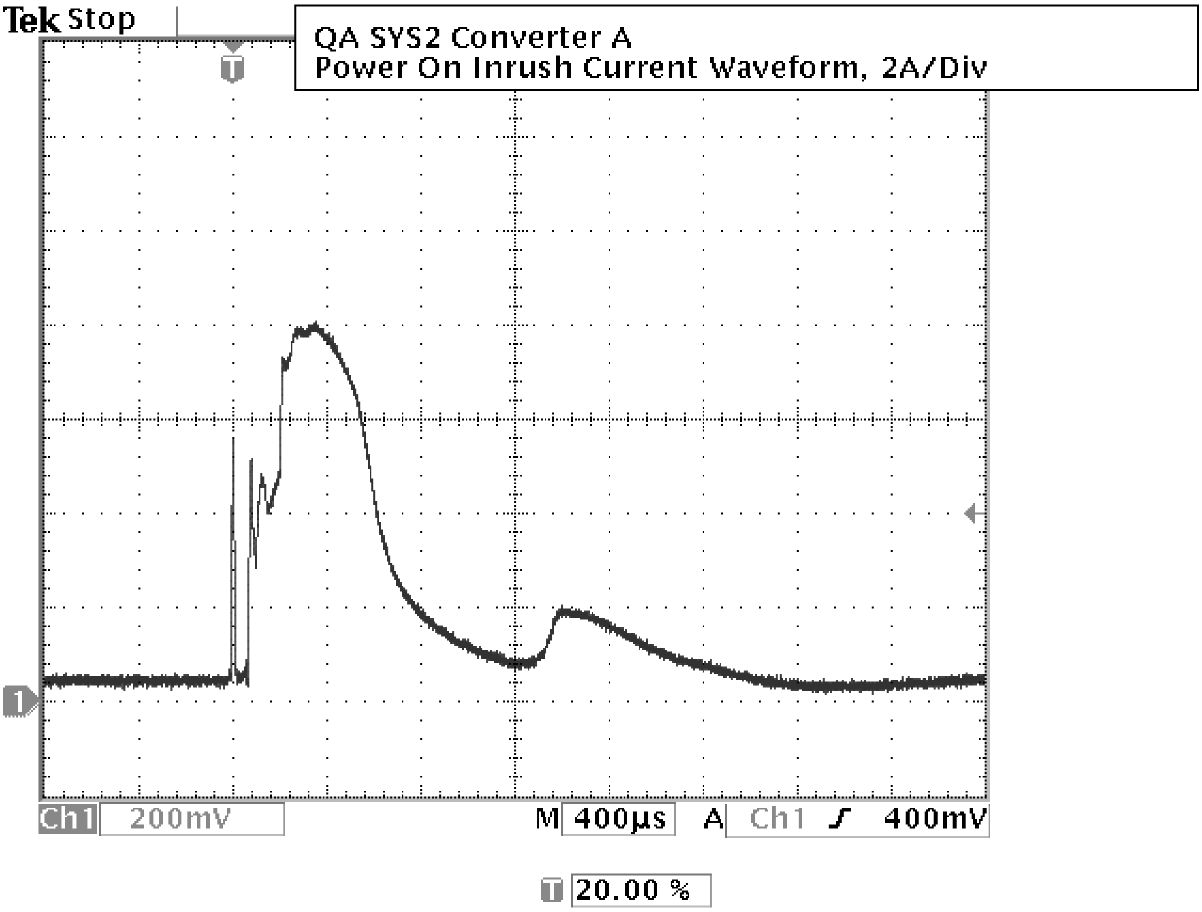
10.1 Waveform INRUSHAP.BMP



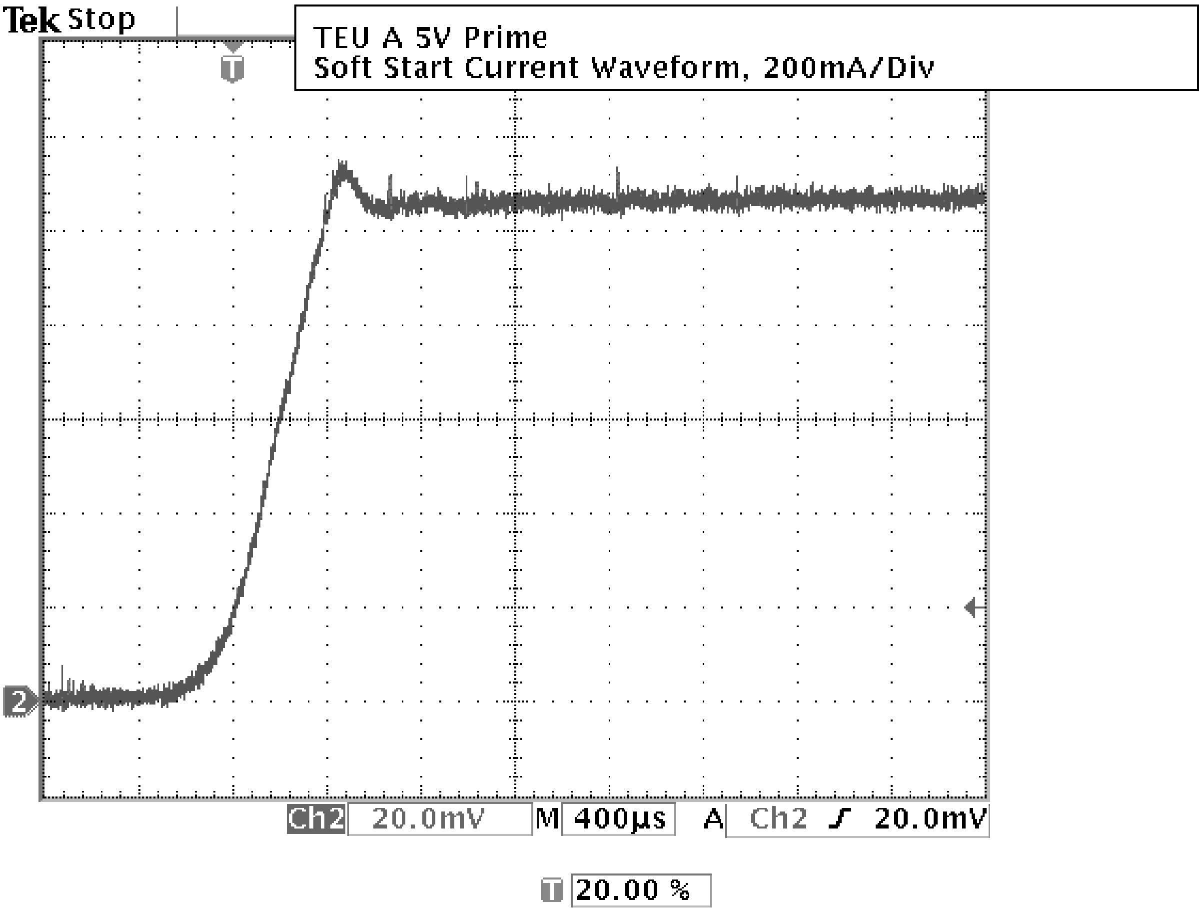
10.2 Waveform SYS1AQA.BMP



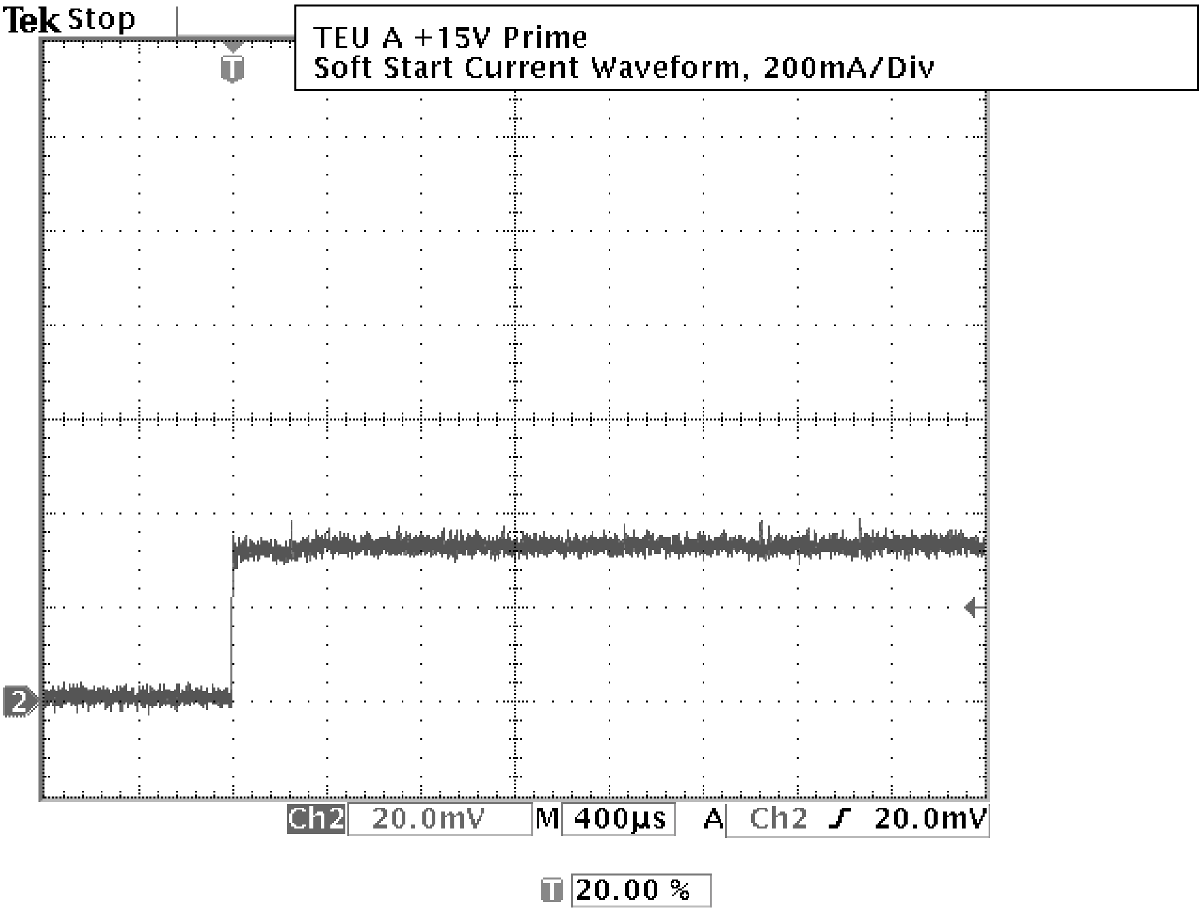
10.3 Waveform SYS2AQA.BMP



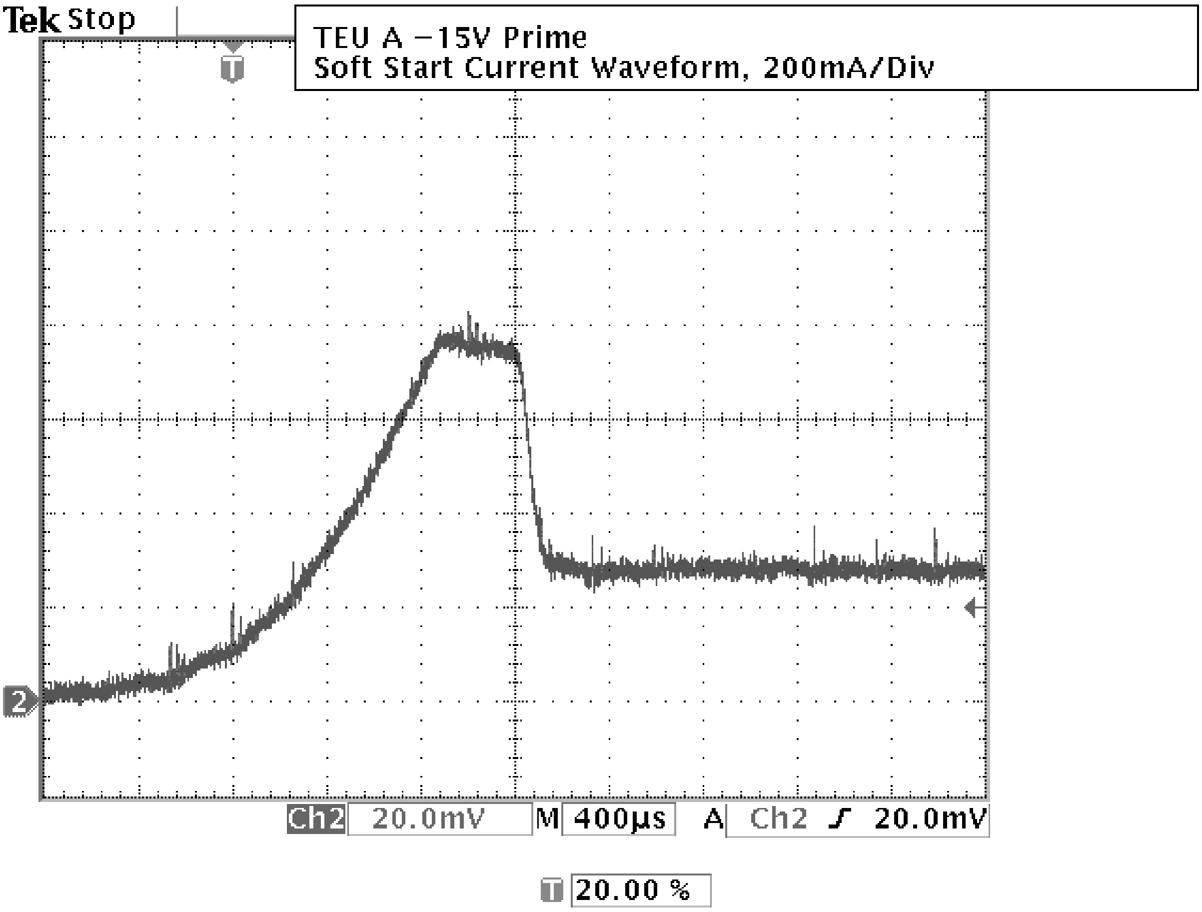
10.4 Waveform TEUAC2.BMP



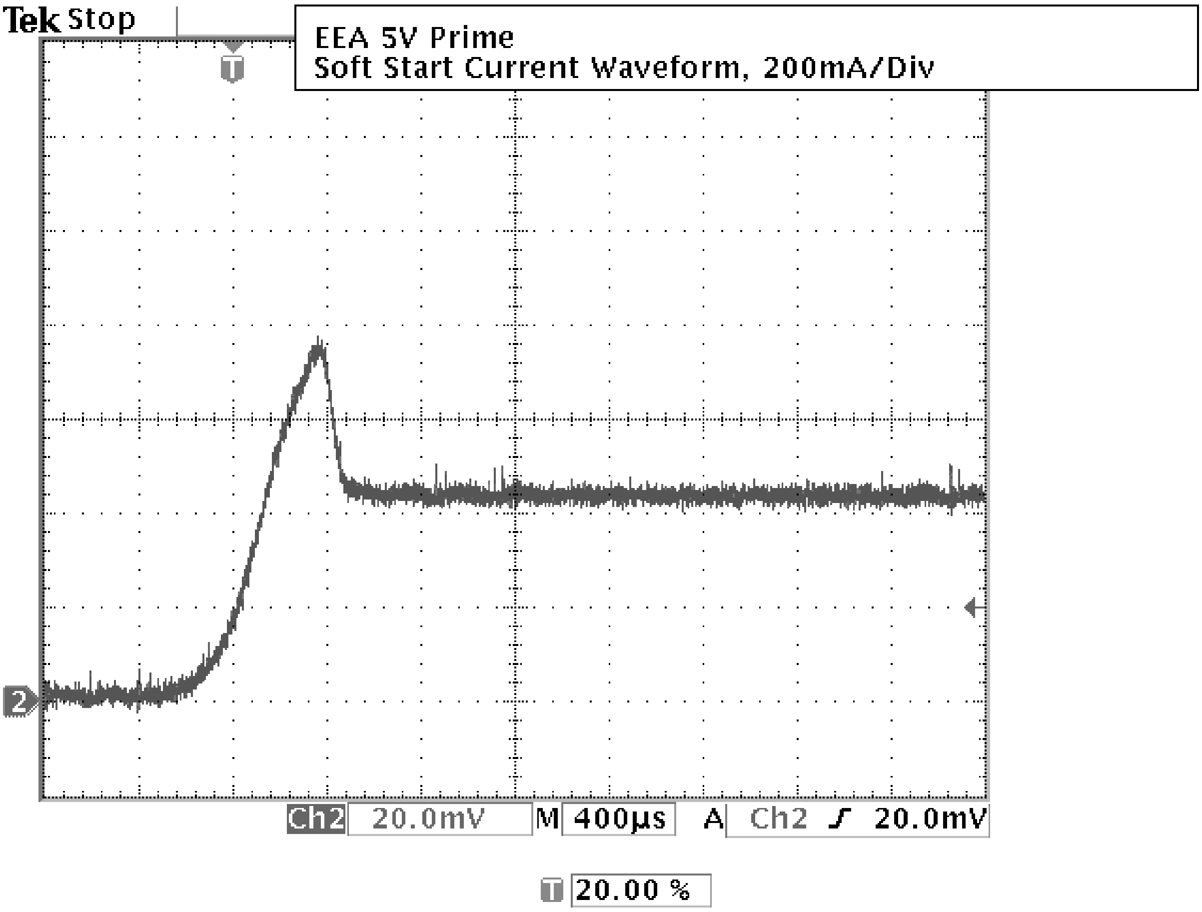
10.5 Waveform TEUAC3.BMP



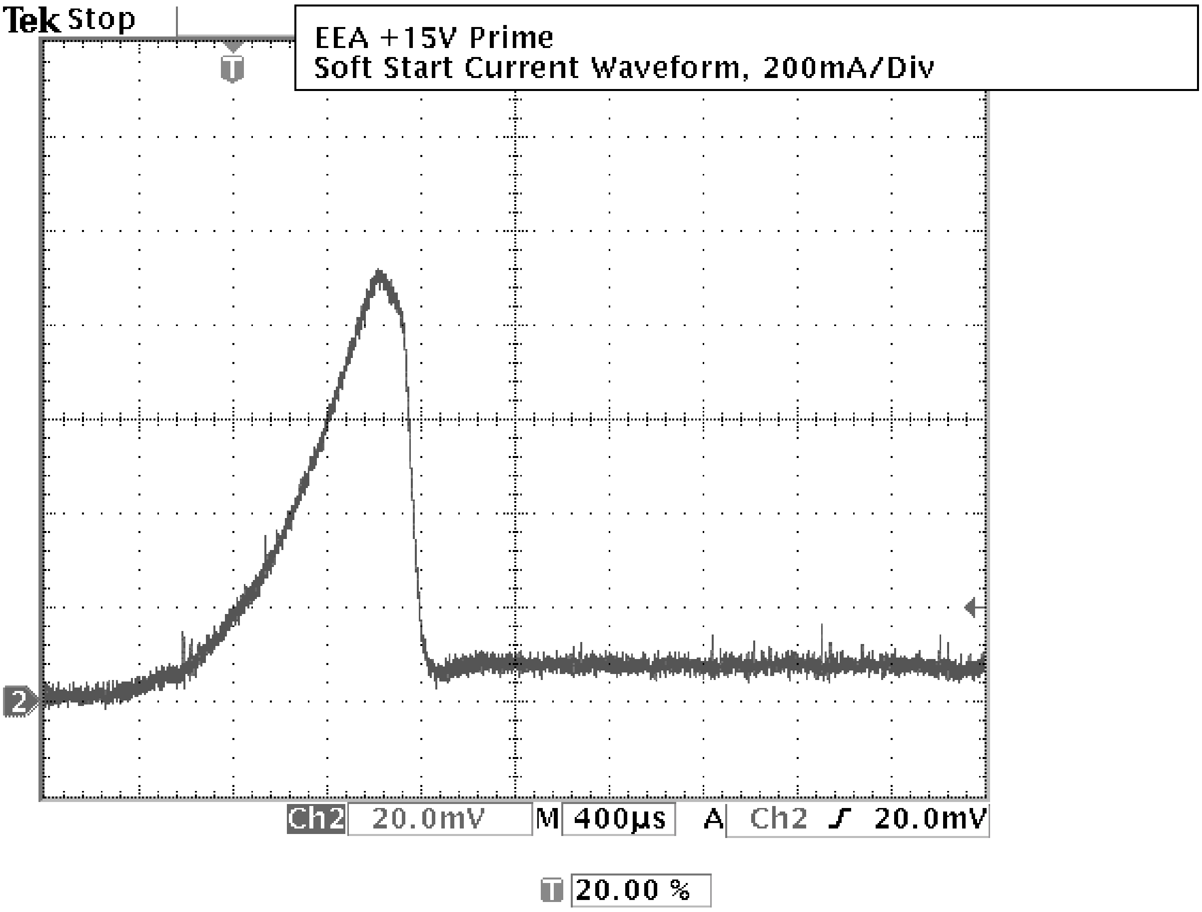
10.6 Waveform TEUAC4.BMP



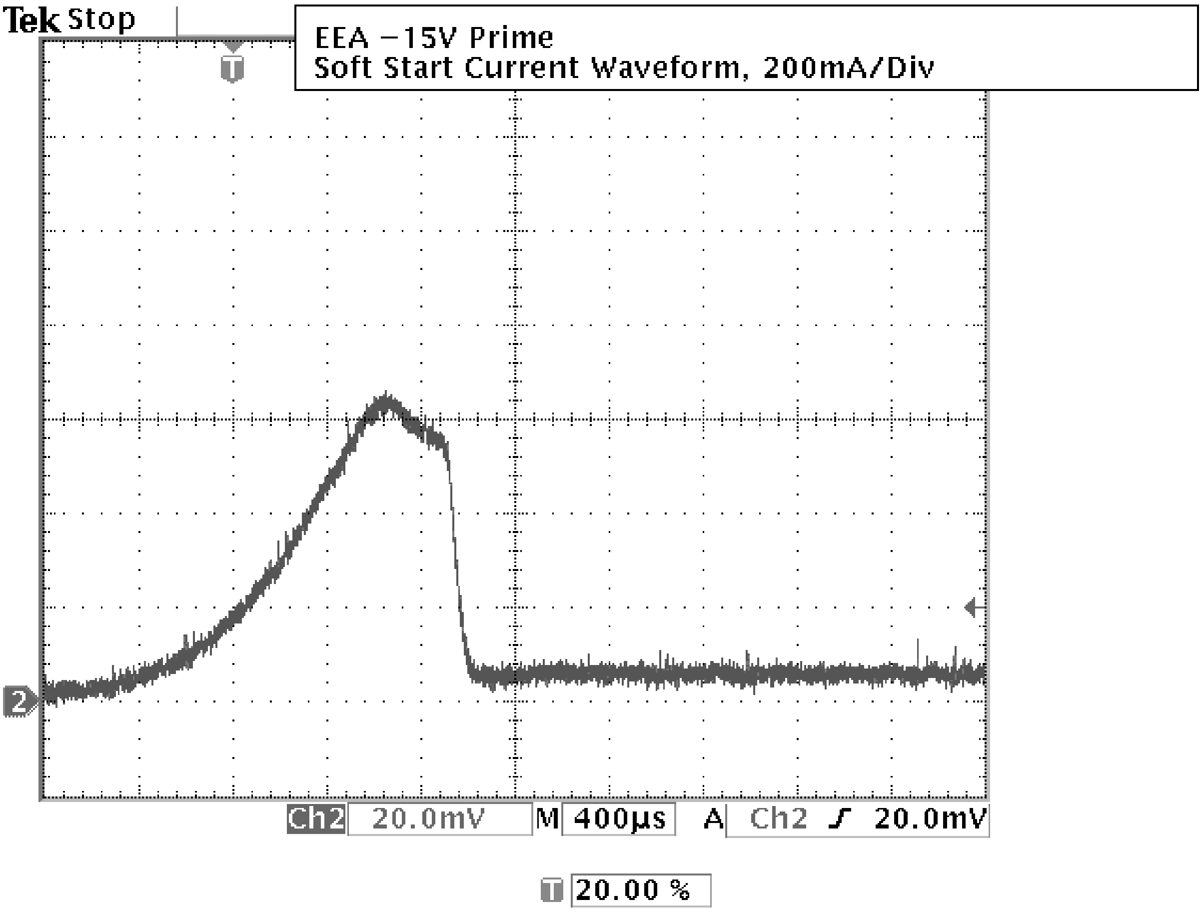
10.7 Waveform EEA5VPR.BMP



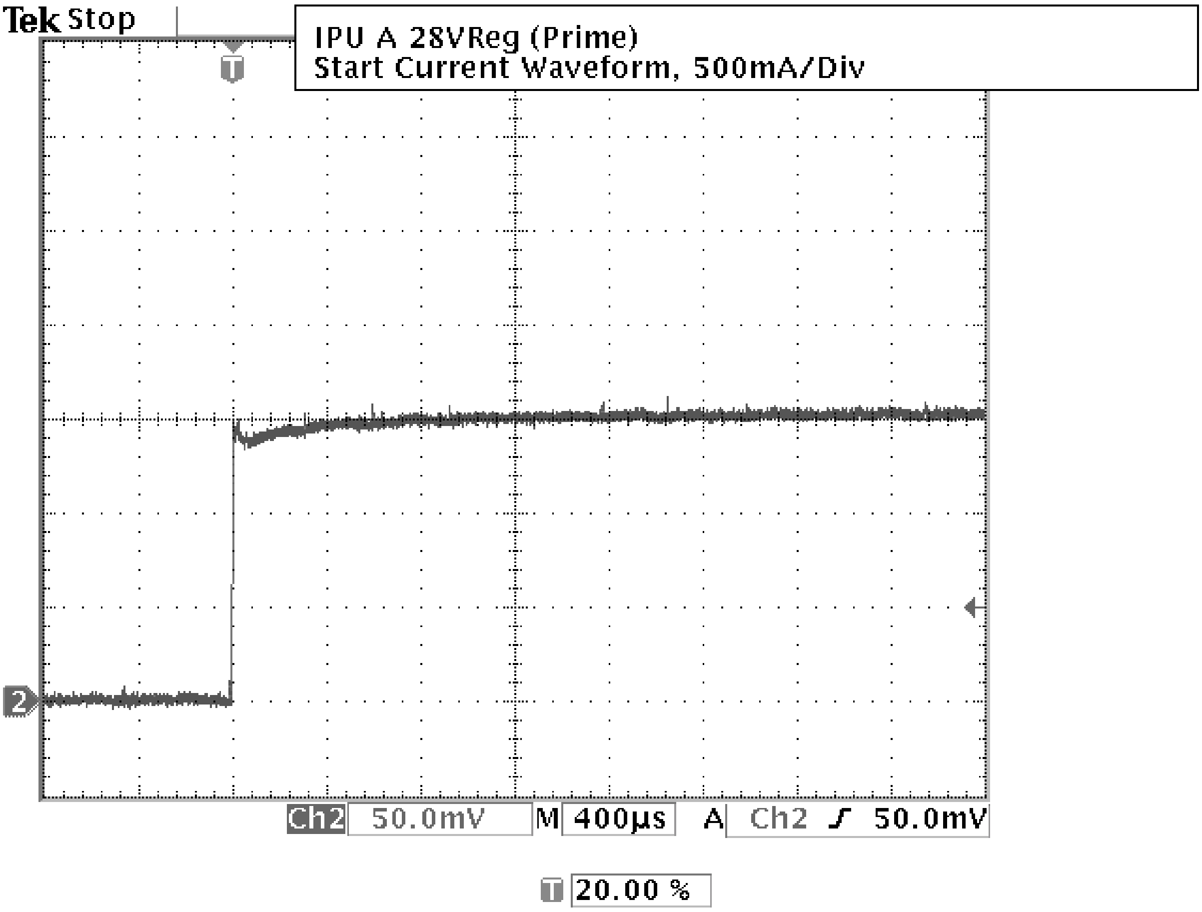
10.8 Waveform EEA15PPV.BMP



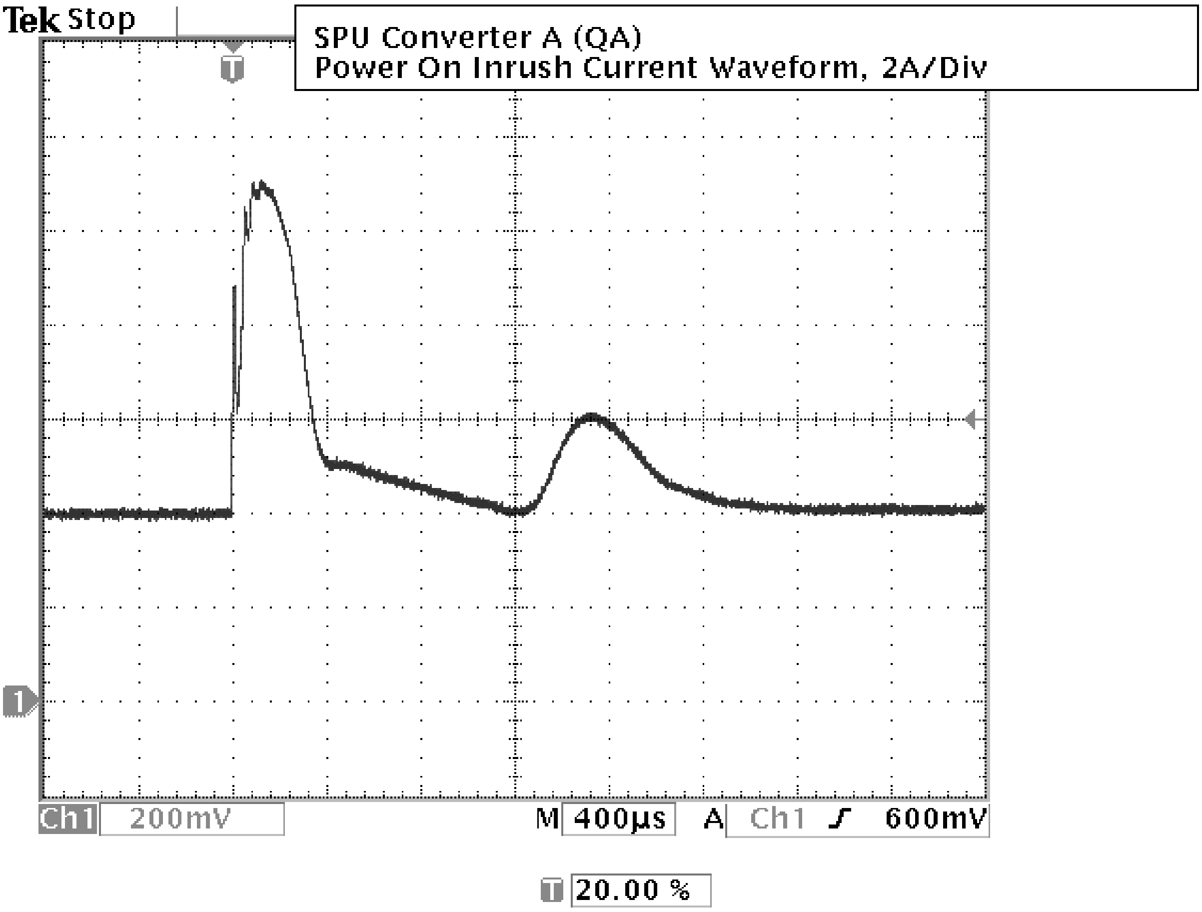
10.9 Waveform EEA15NPV.BMP



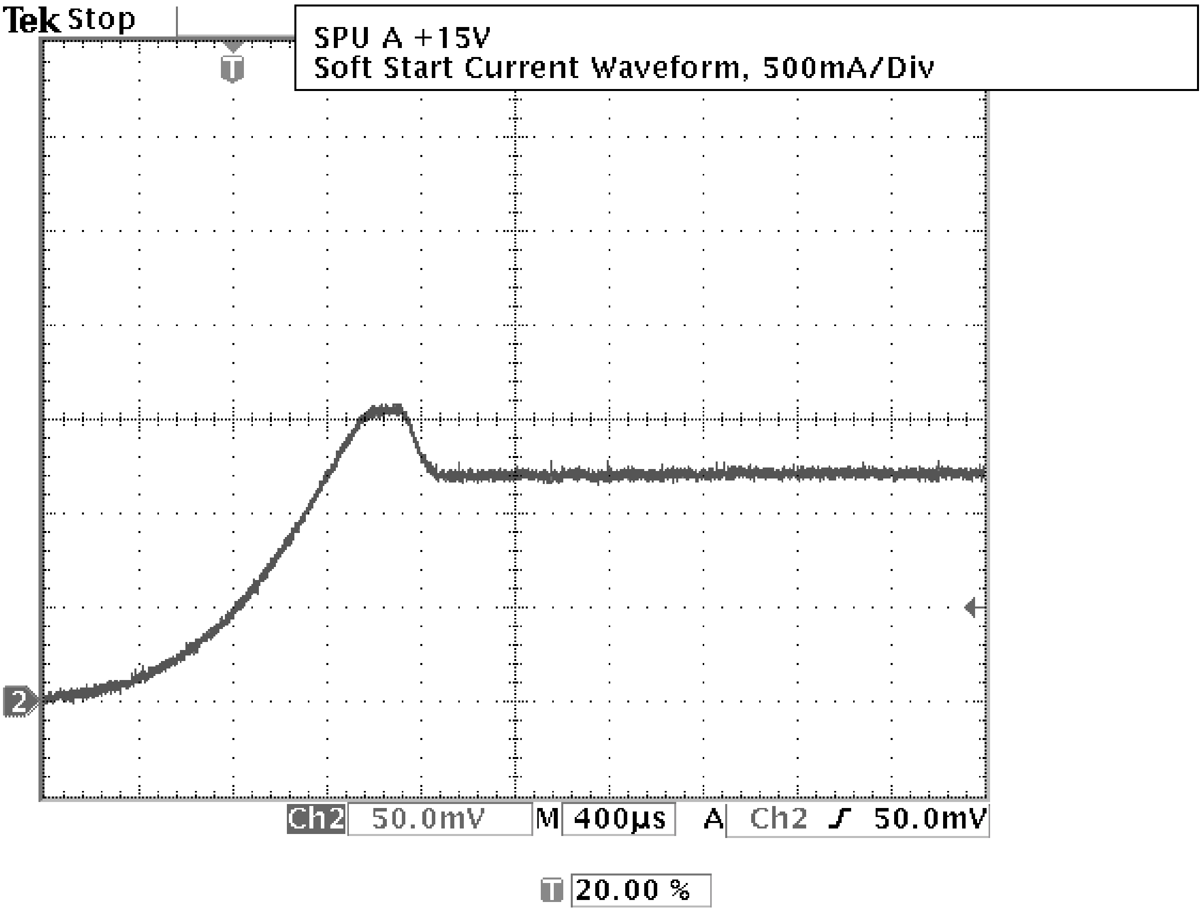
10.10 Waveform IPUA1.BMP



10.11 Waveform SPUAQA.BMP



10.12 Waveform SPUAC15P.BMP



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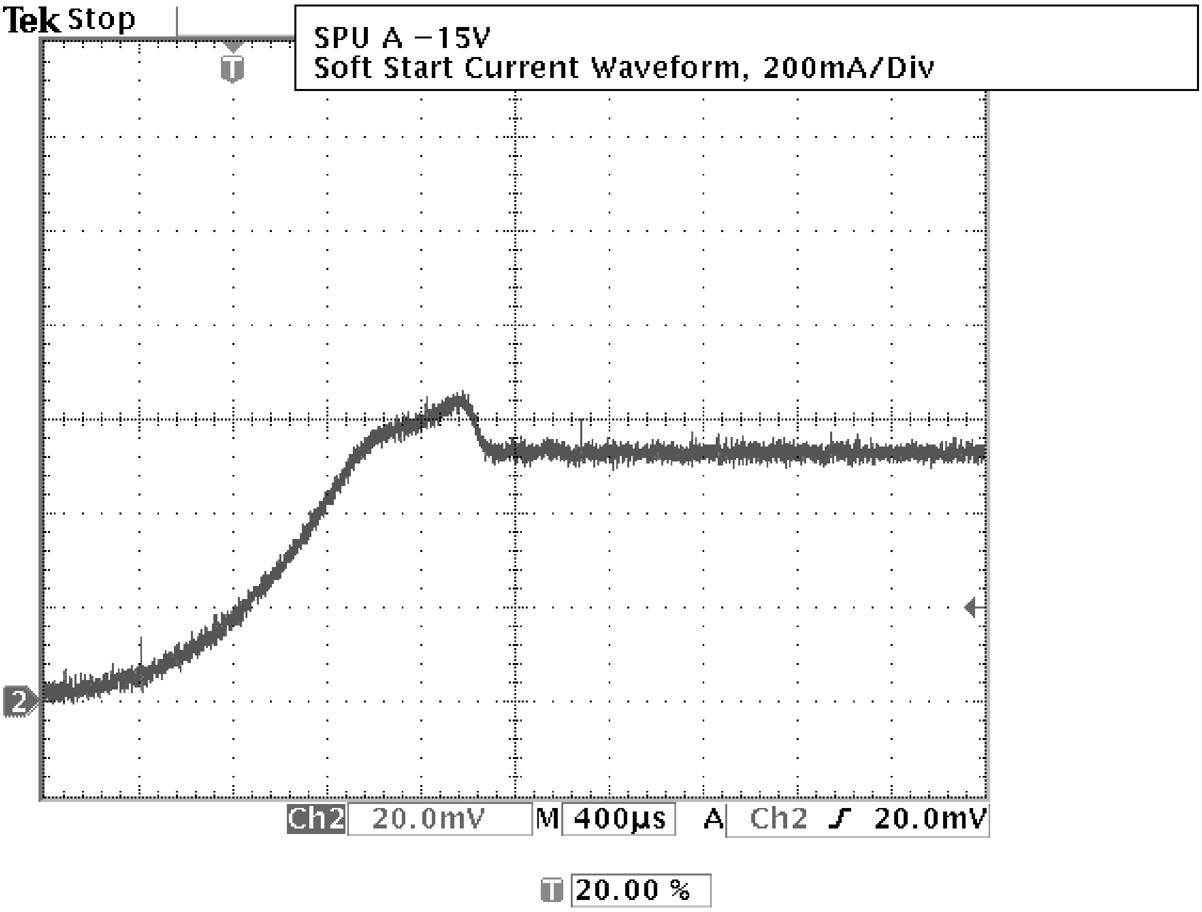

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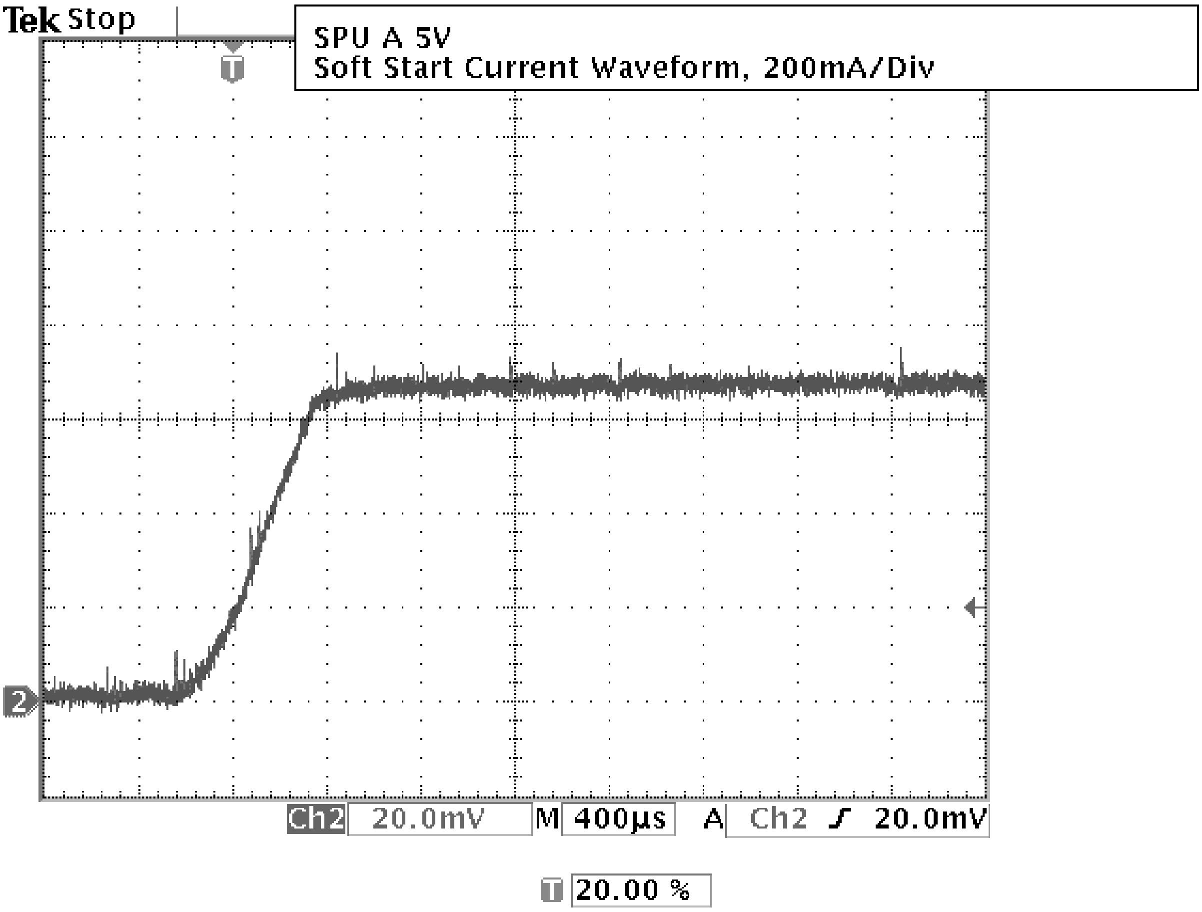

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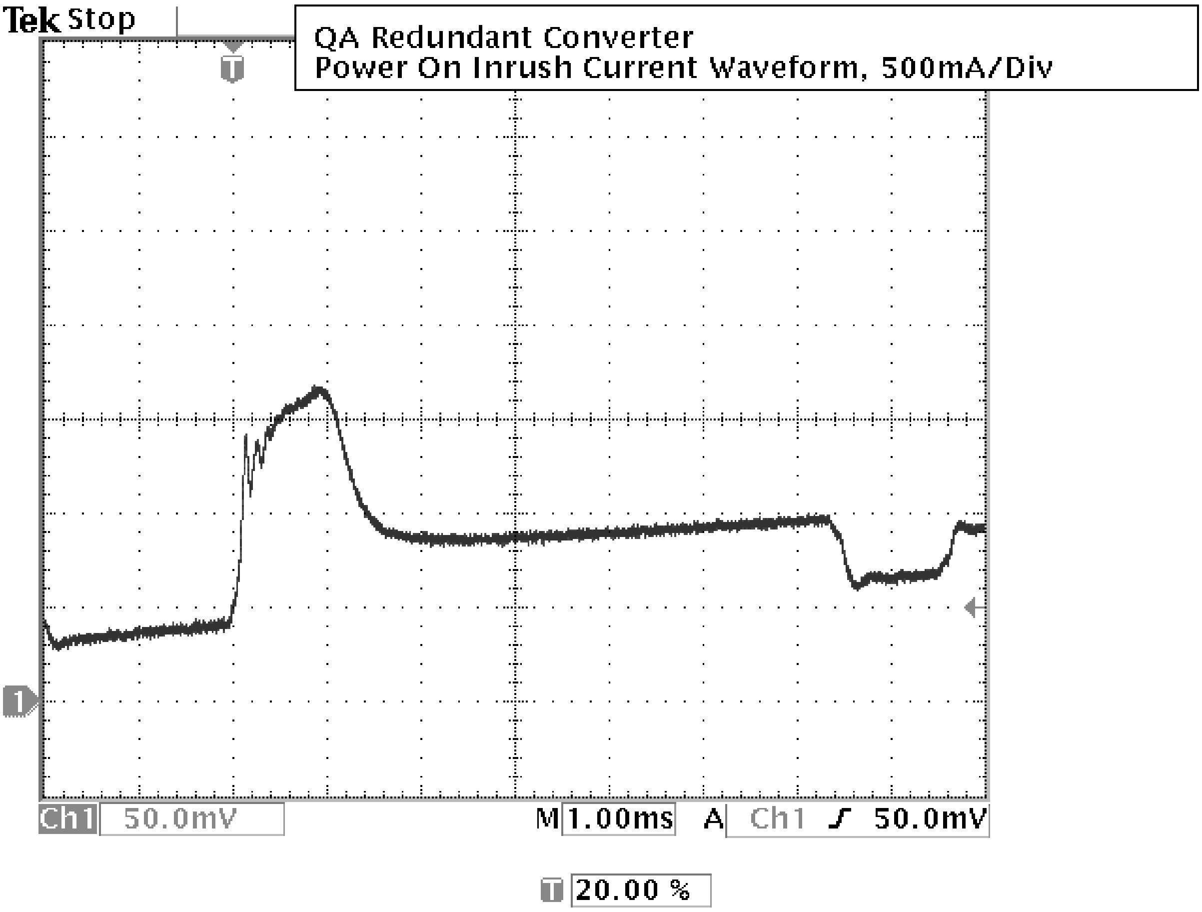

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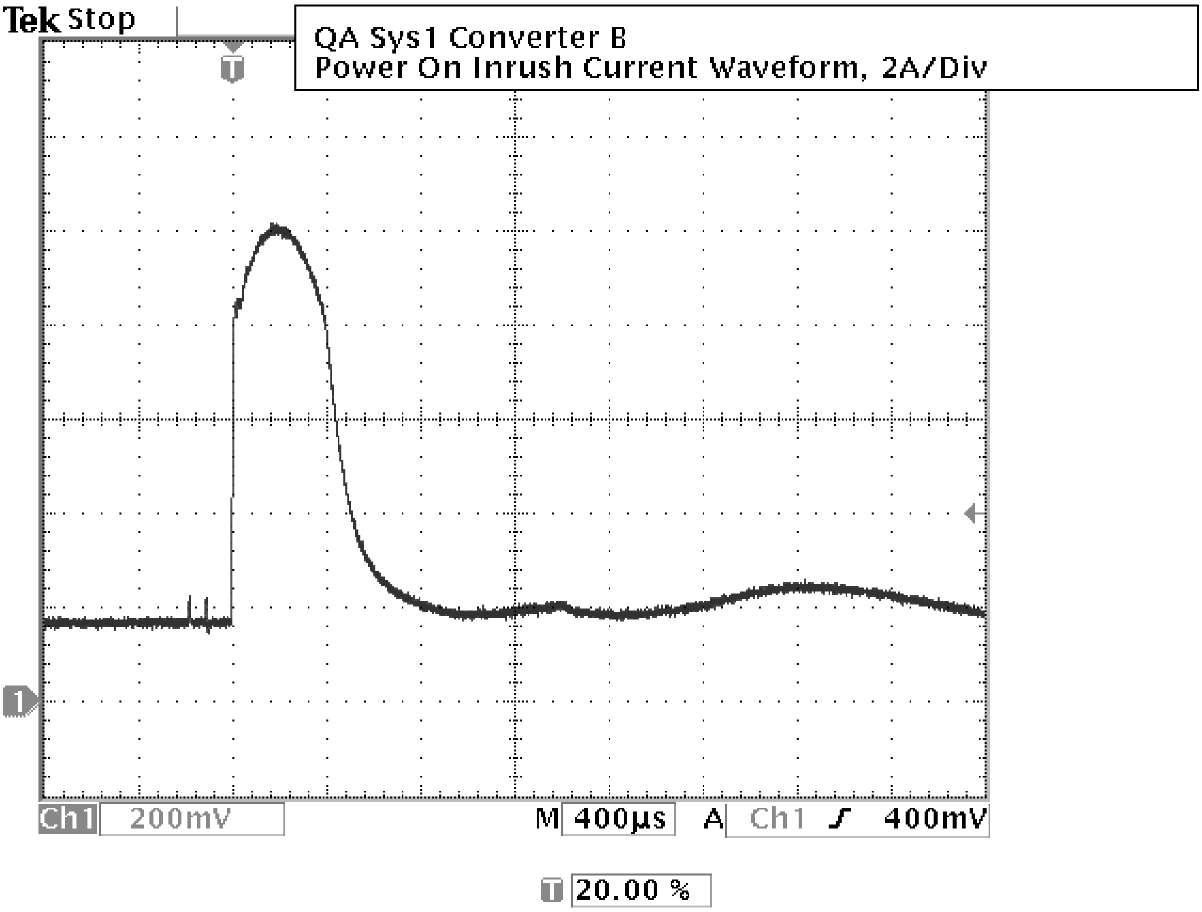

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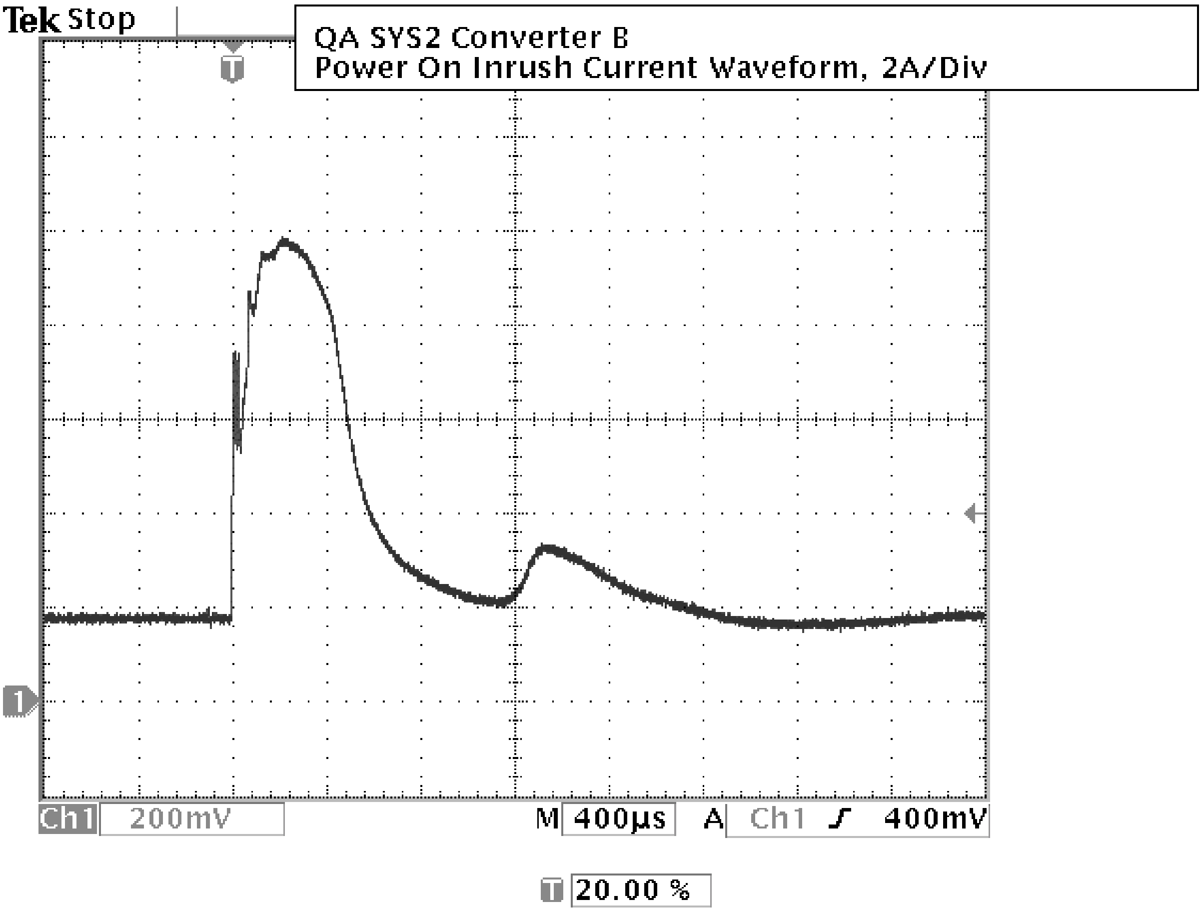
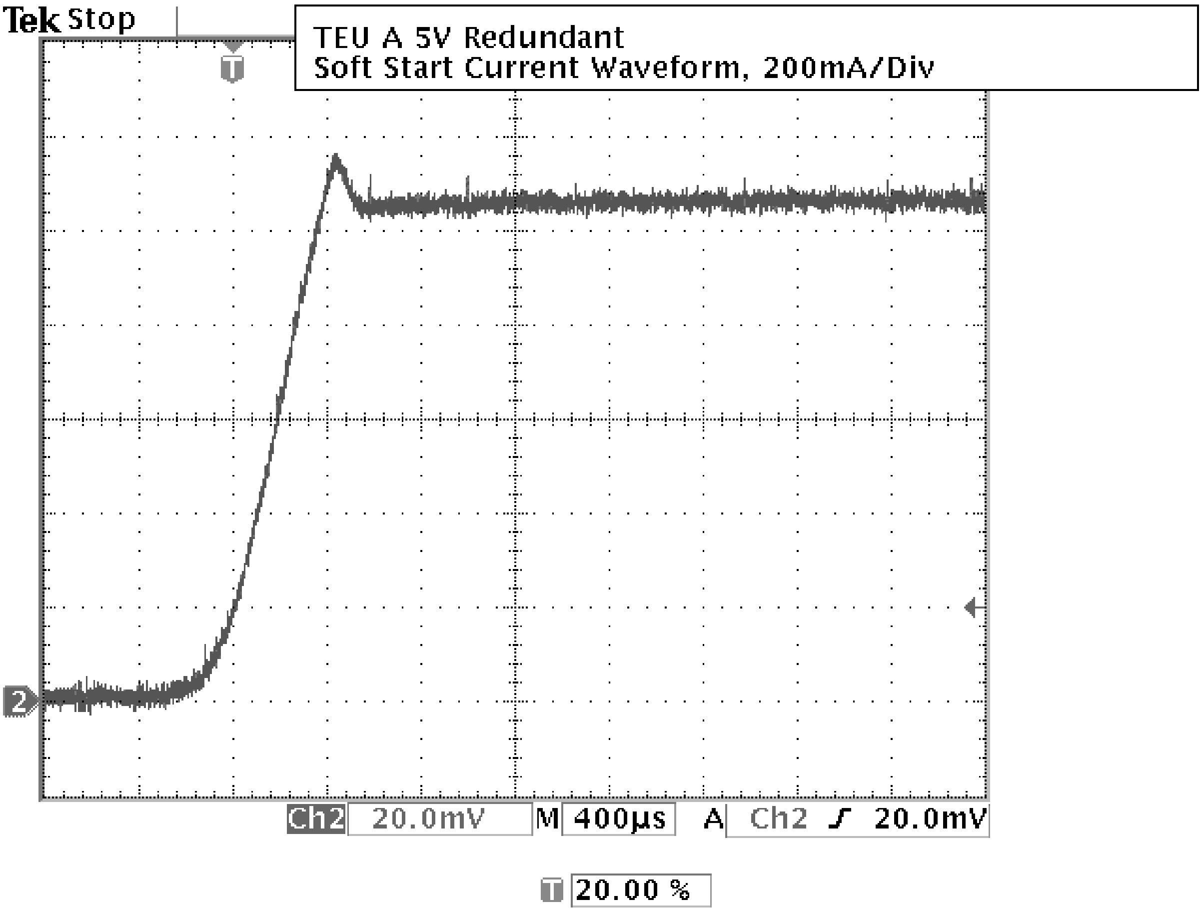


10.18 Waveform TEUAC6.BMP



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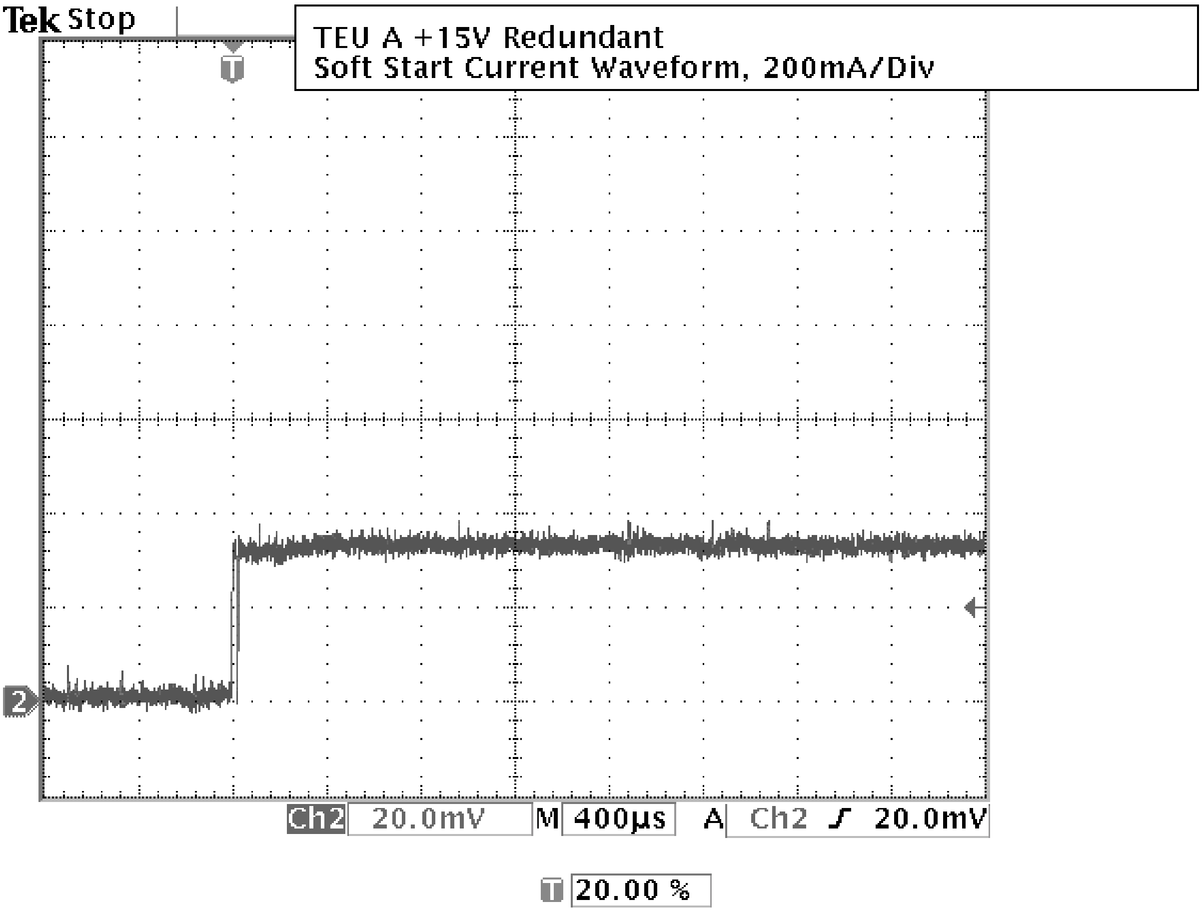

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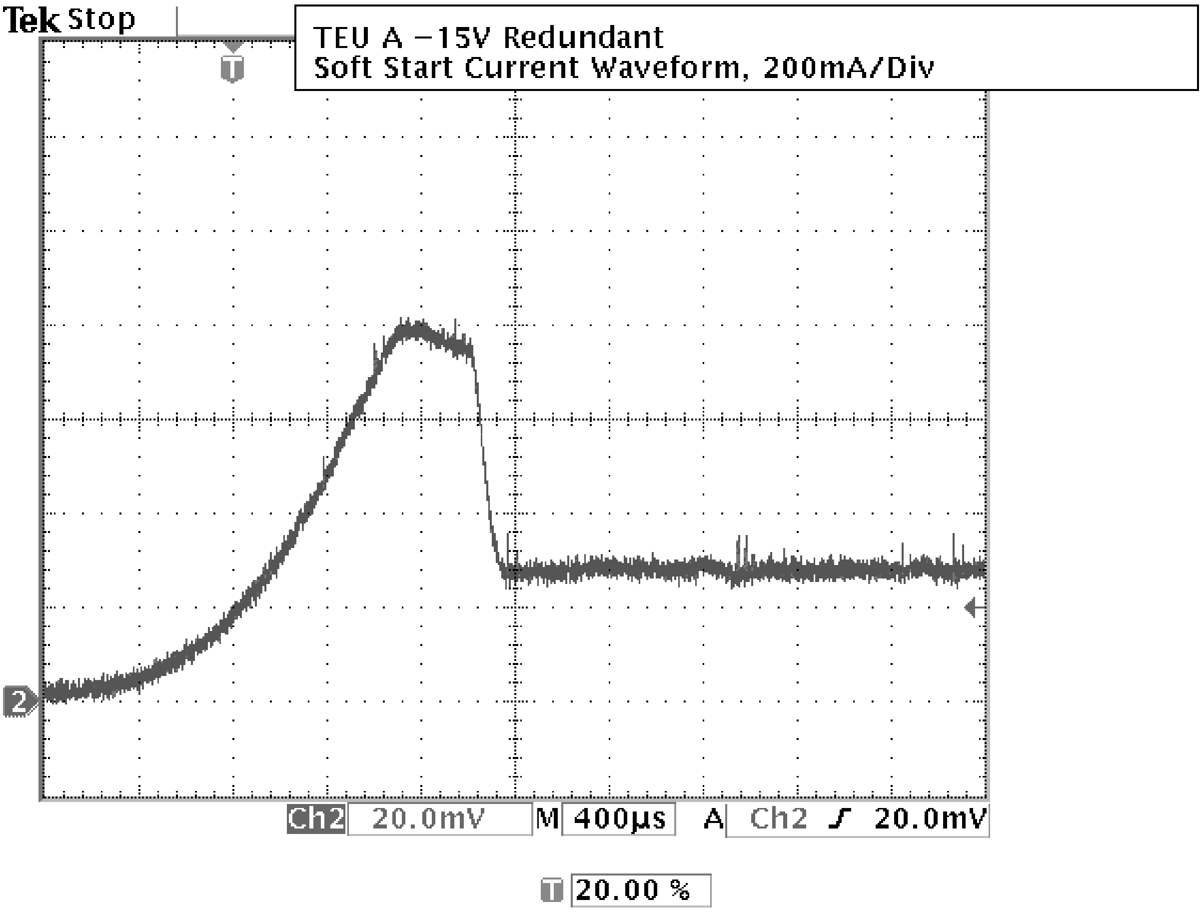

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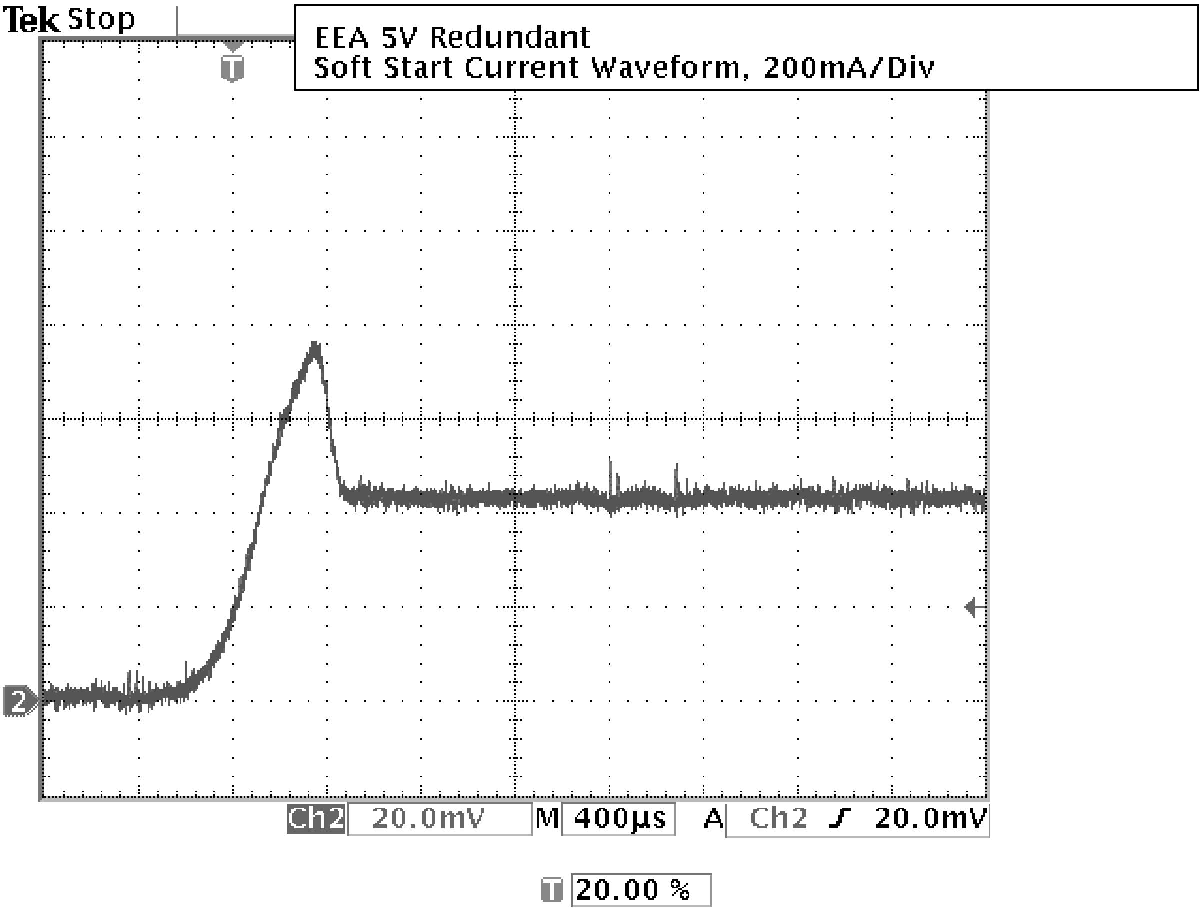

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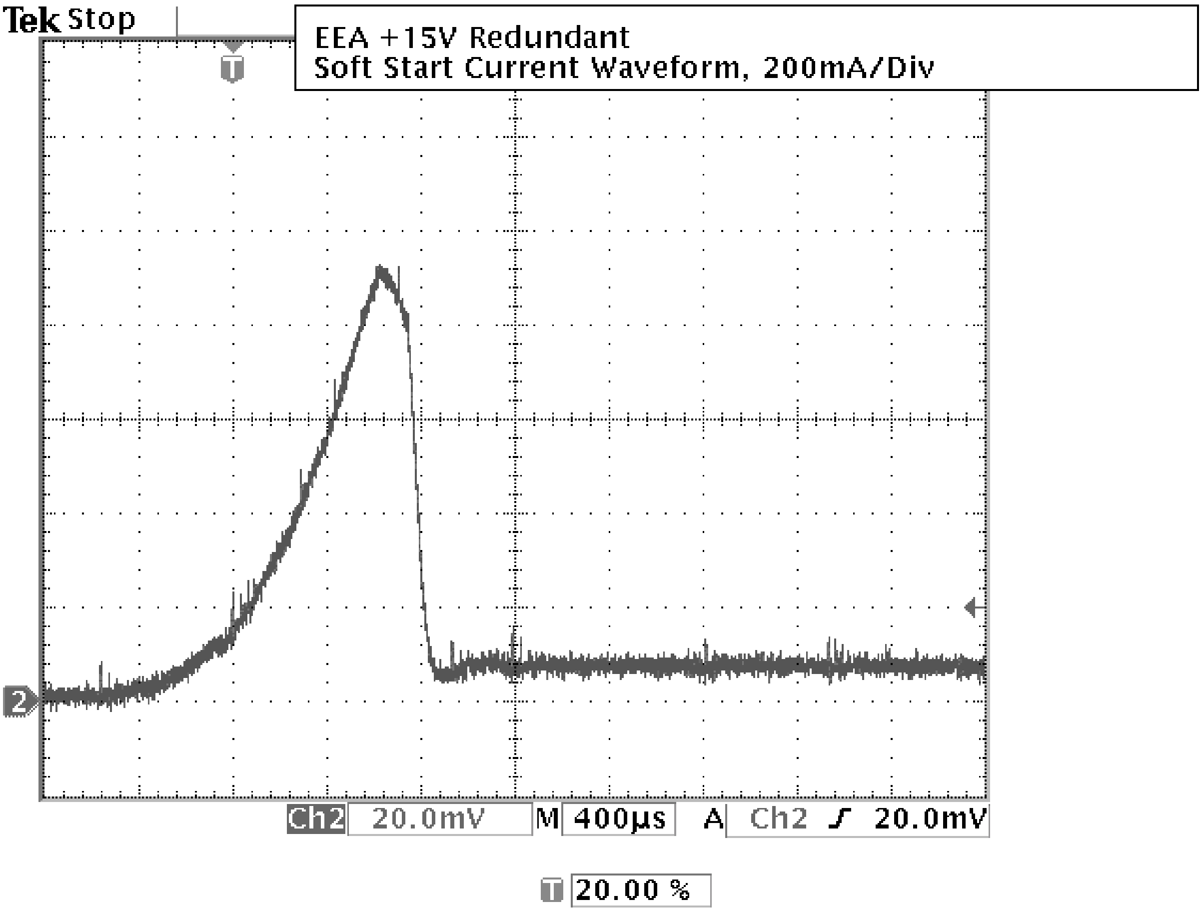

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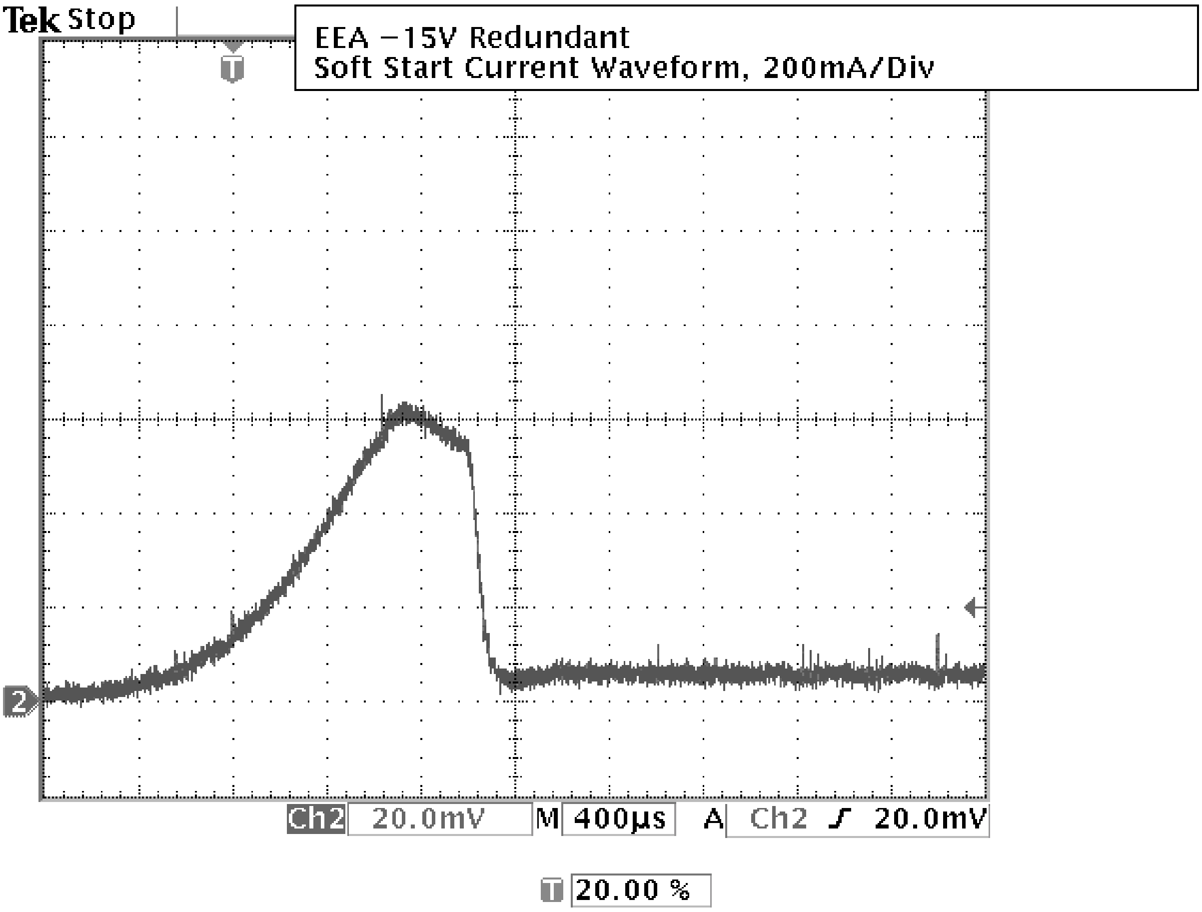

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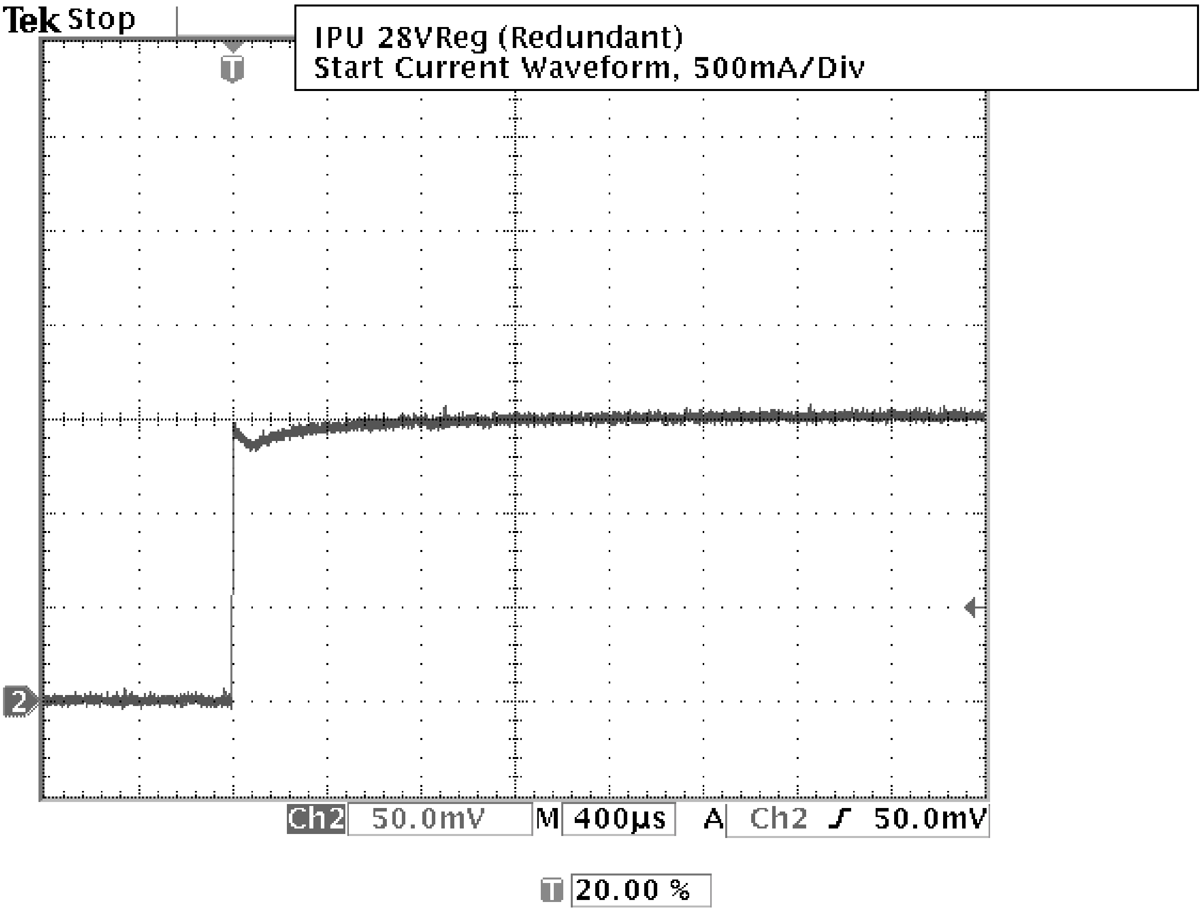

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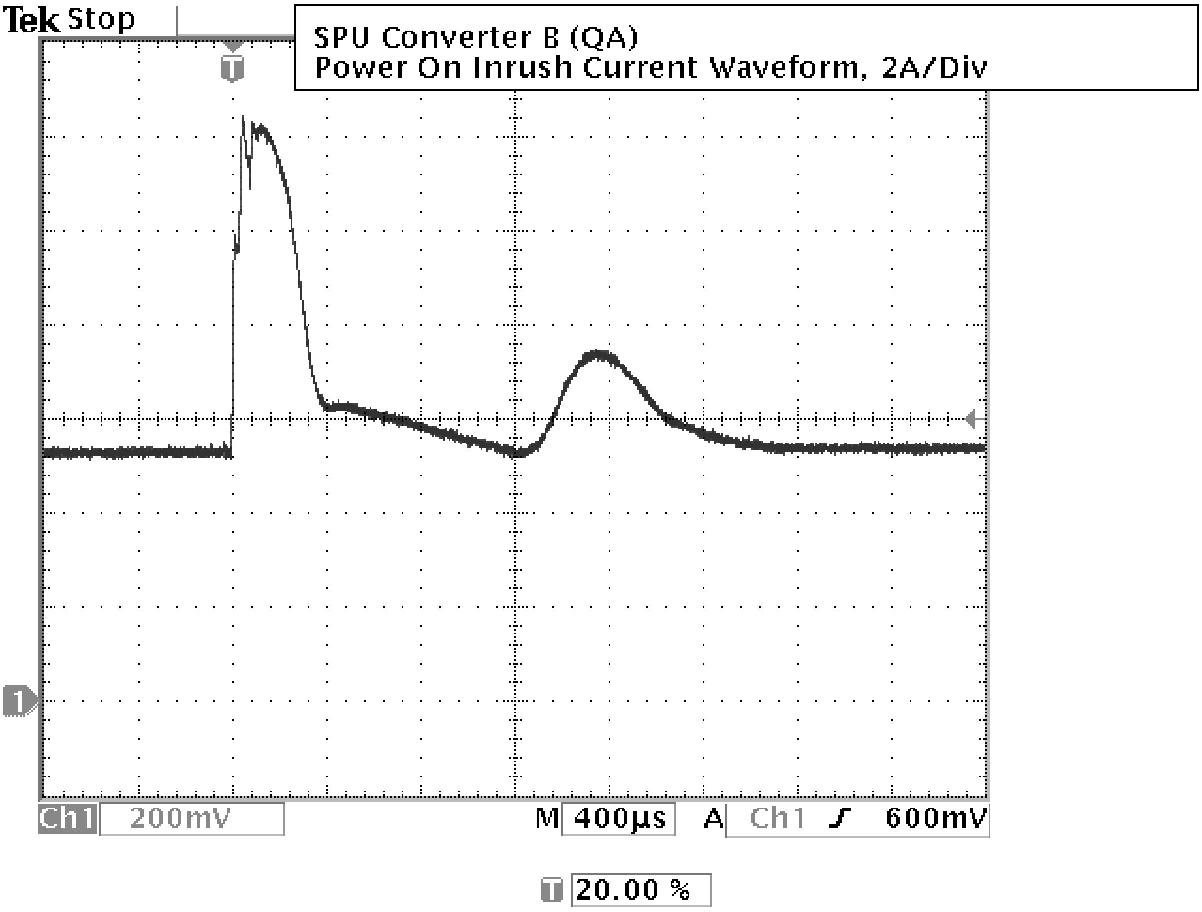

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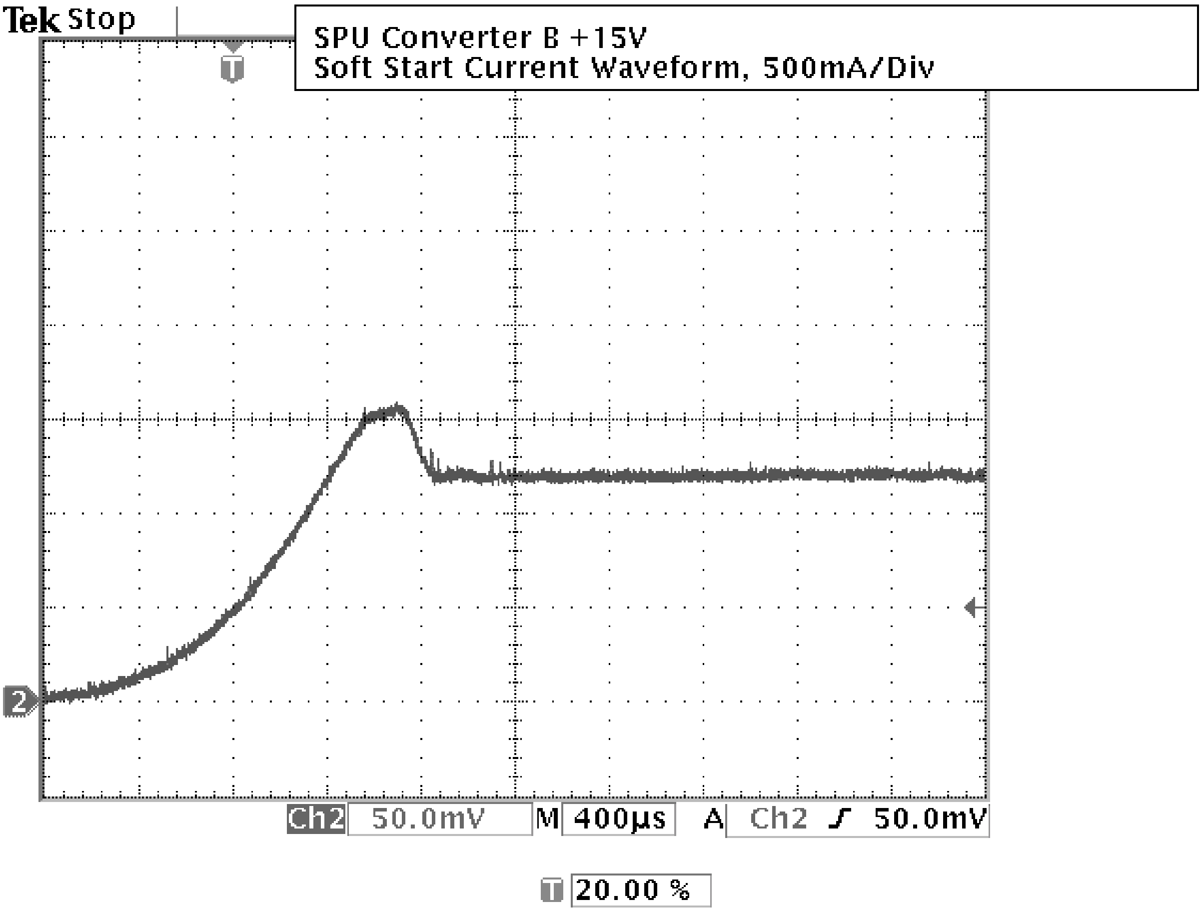

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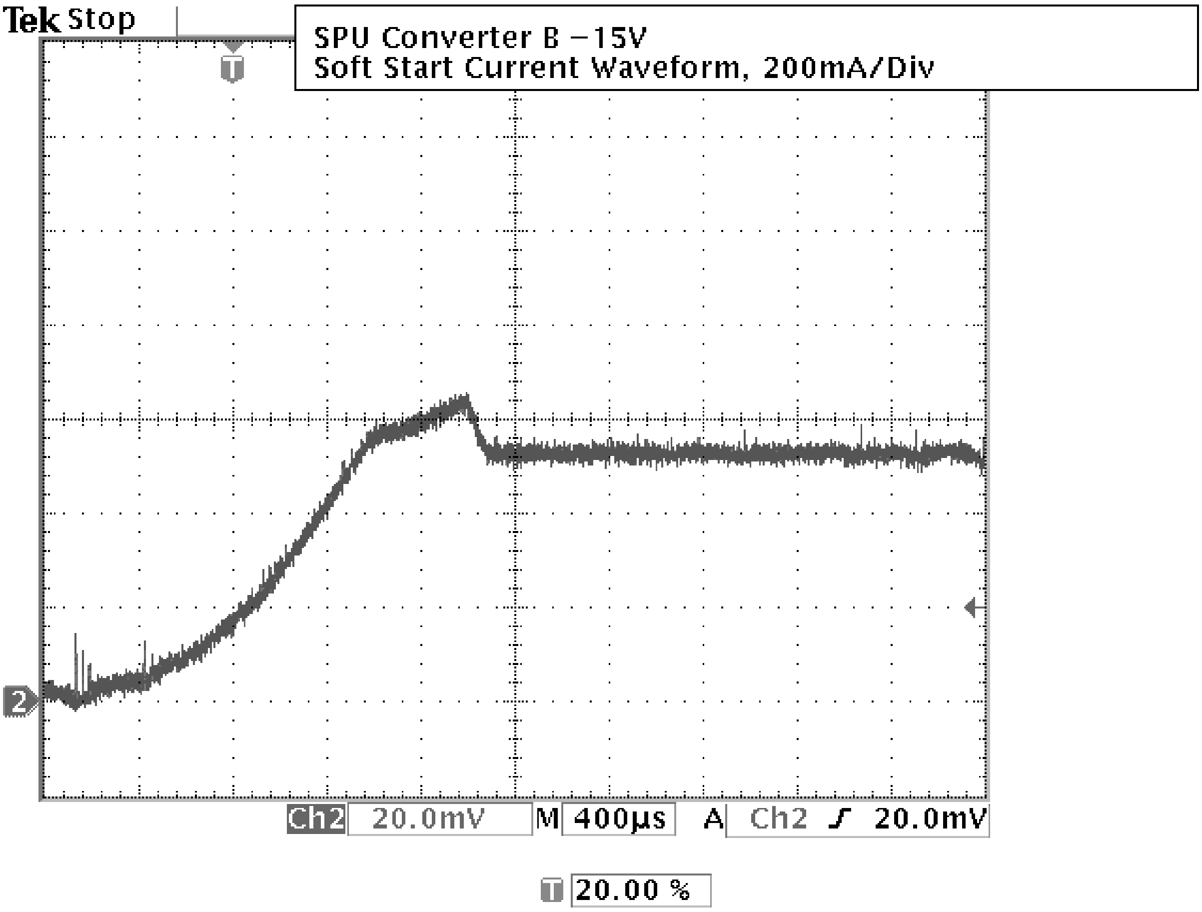

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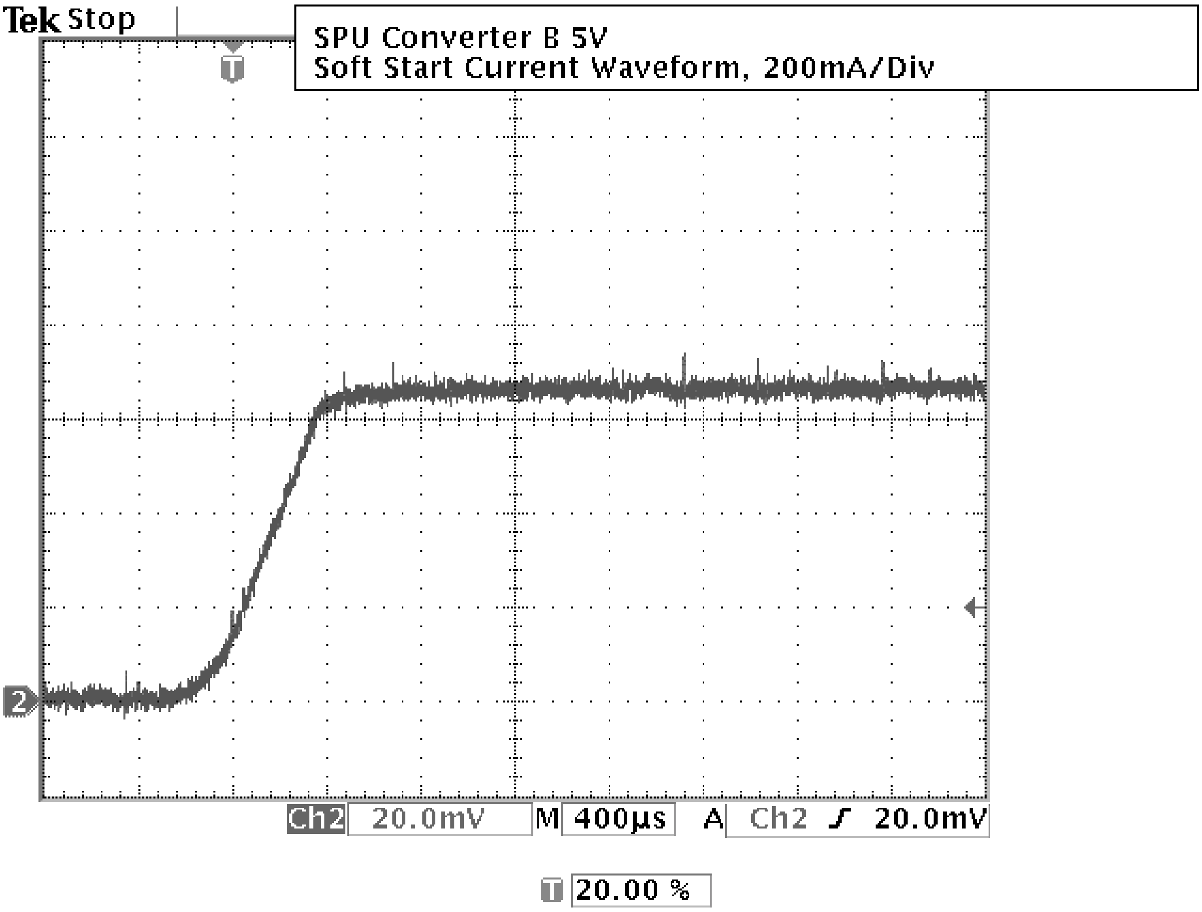
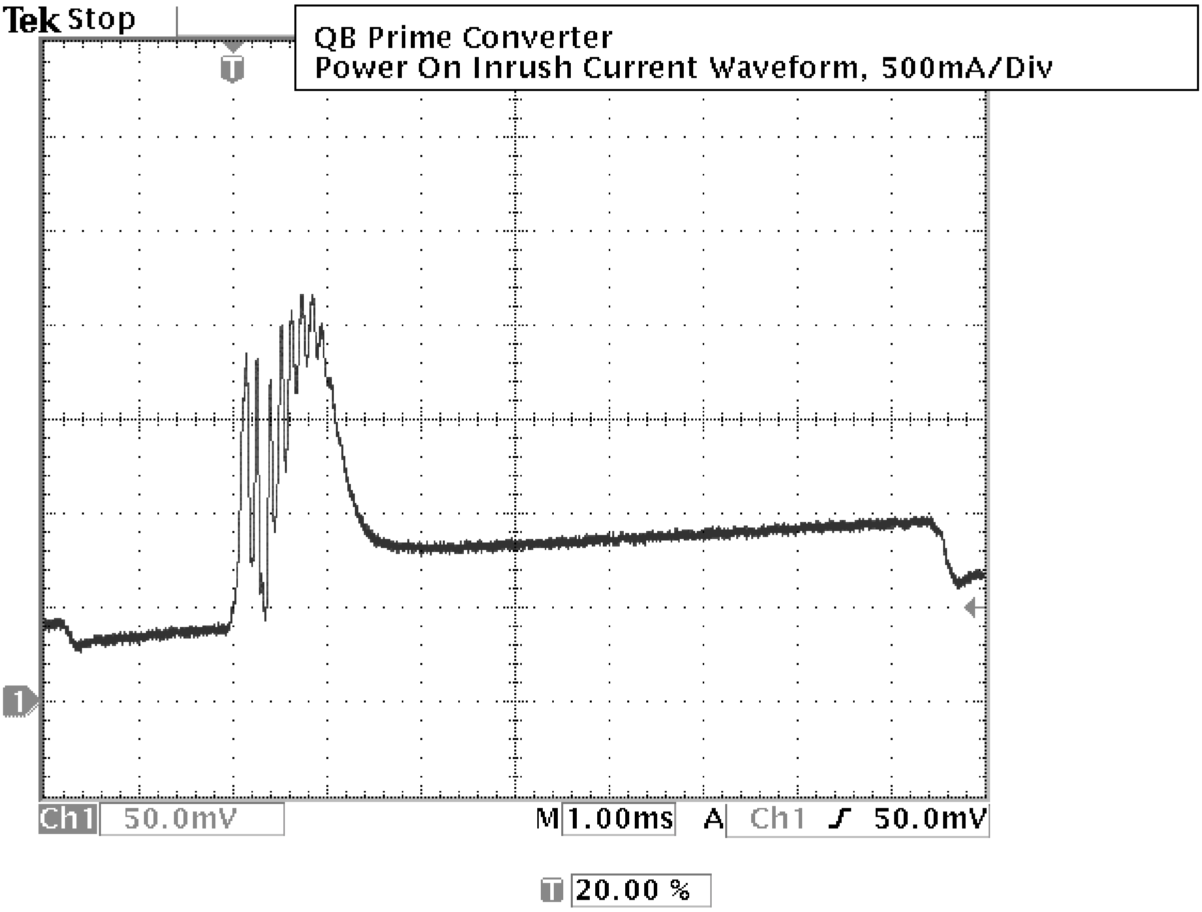


10.29 Waveform INRUSHBP.BMP



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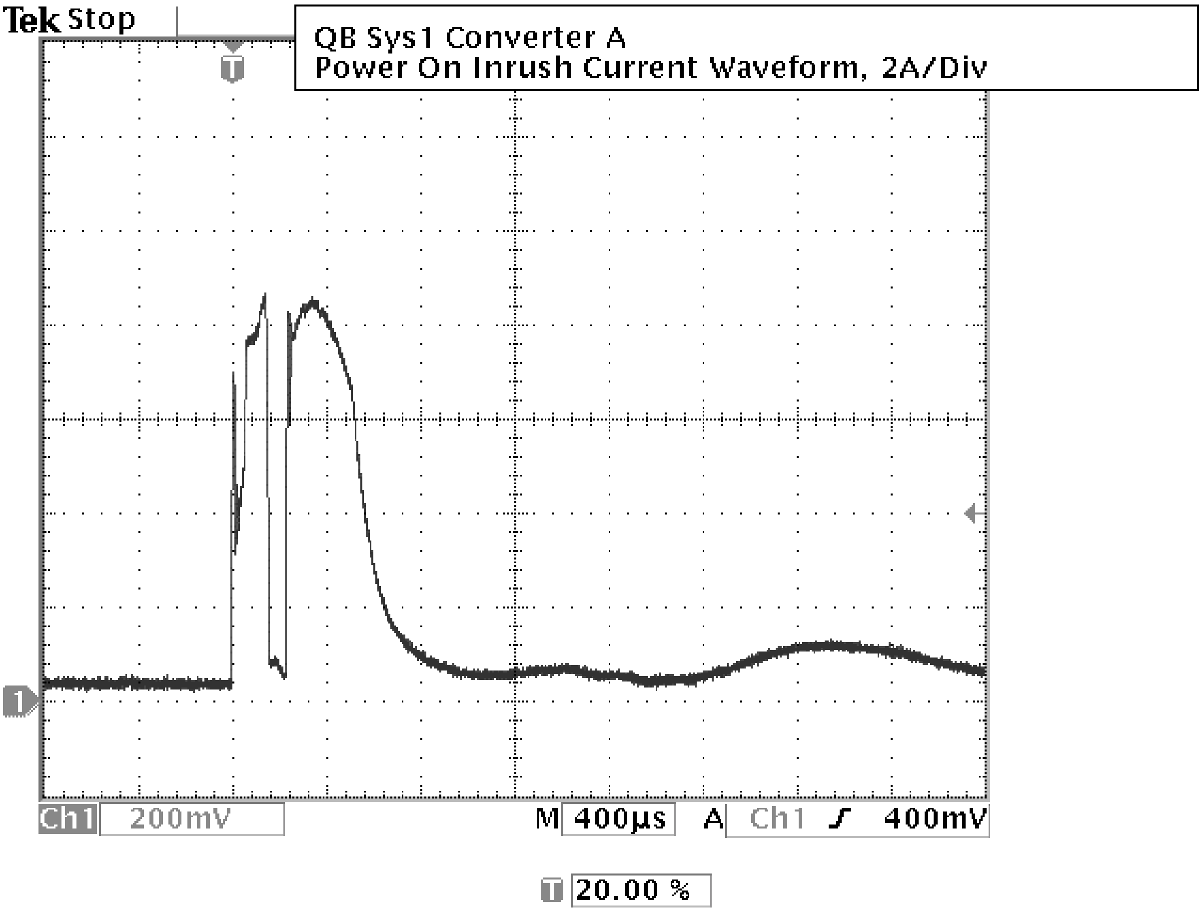
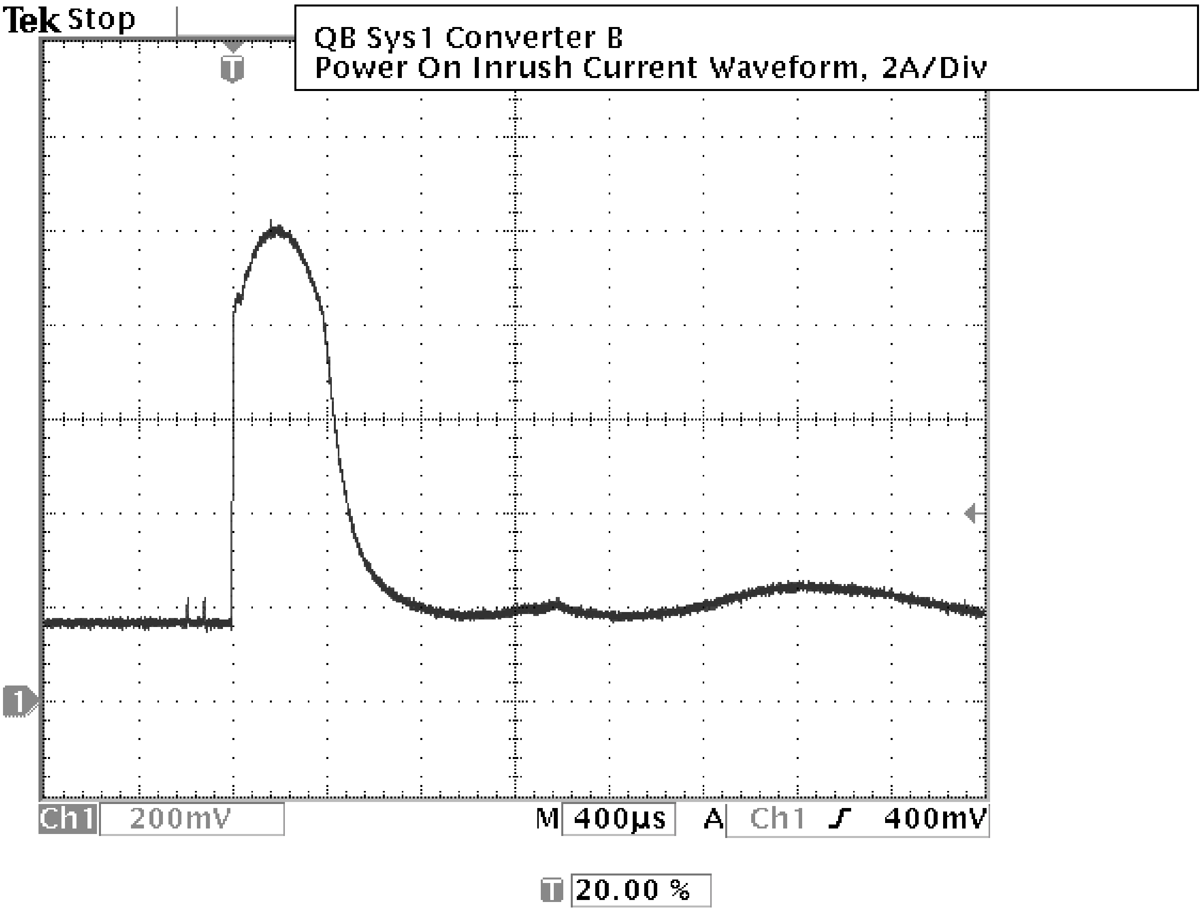
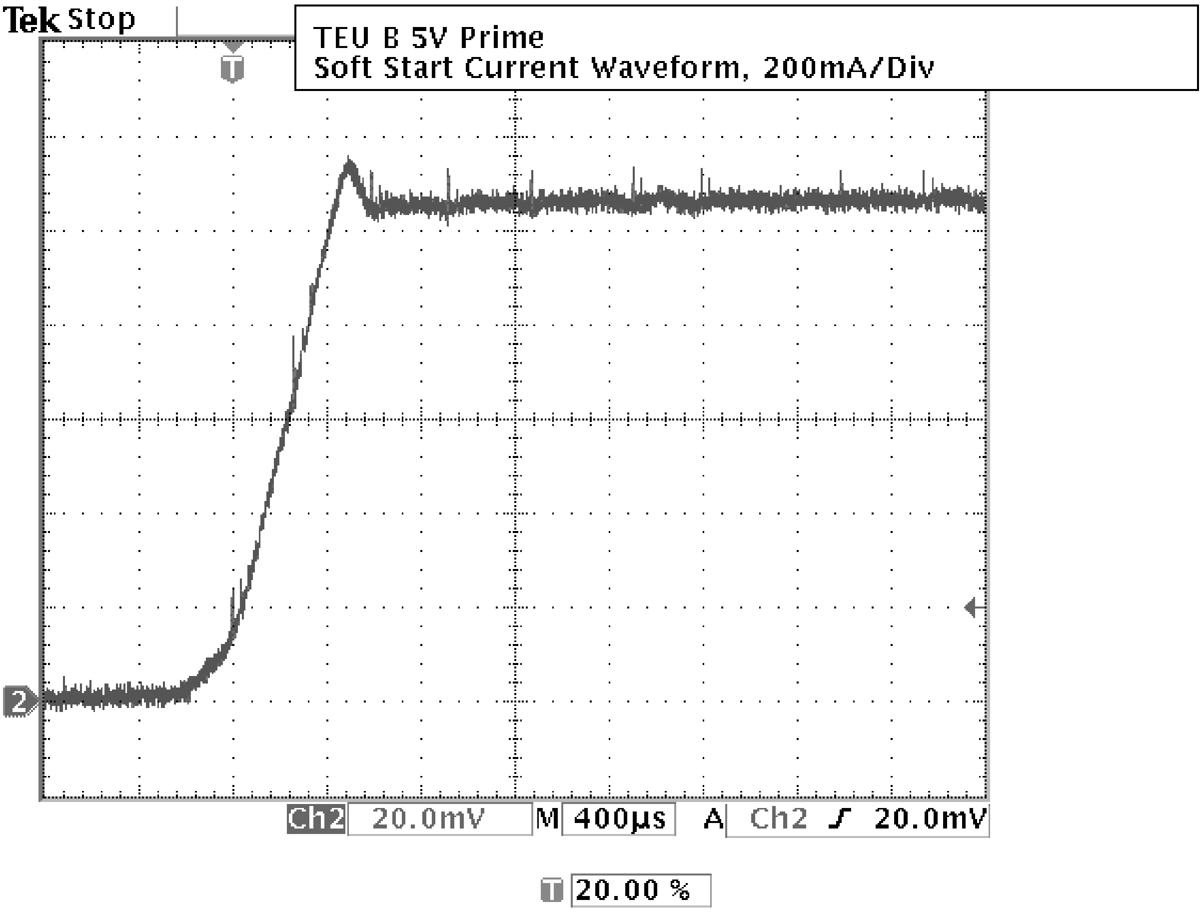


10.31 Waveform SYS2BQB.BMP



10.32 Waveform TEUBC2.BMP



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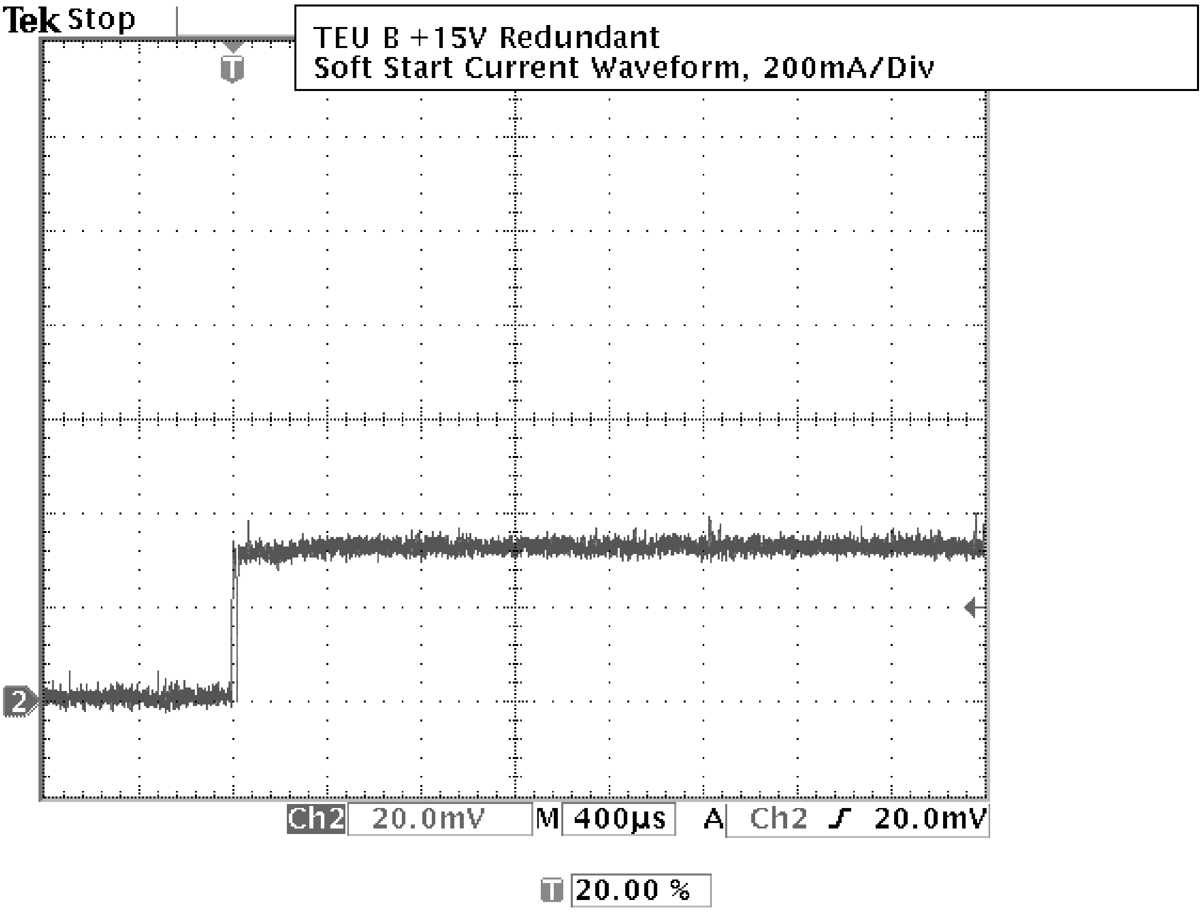

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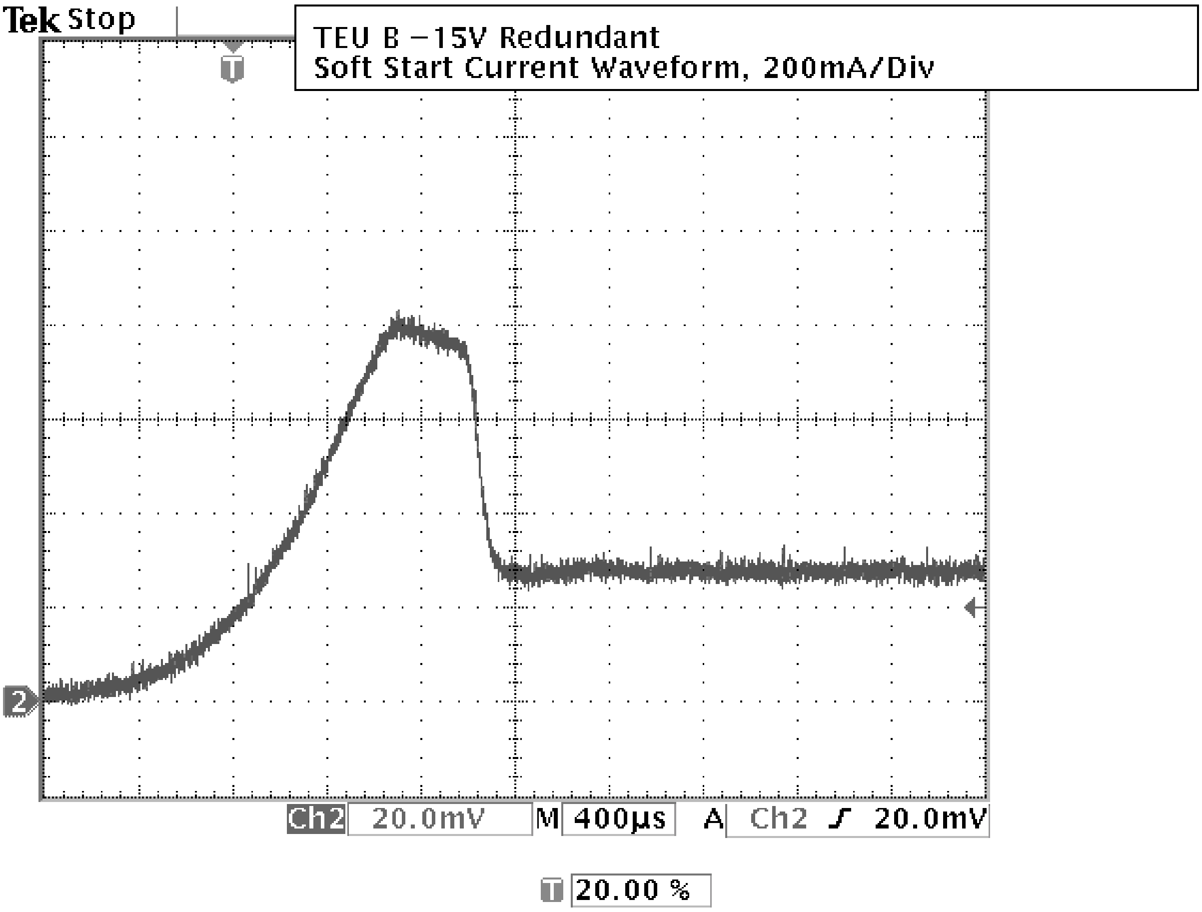

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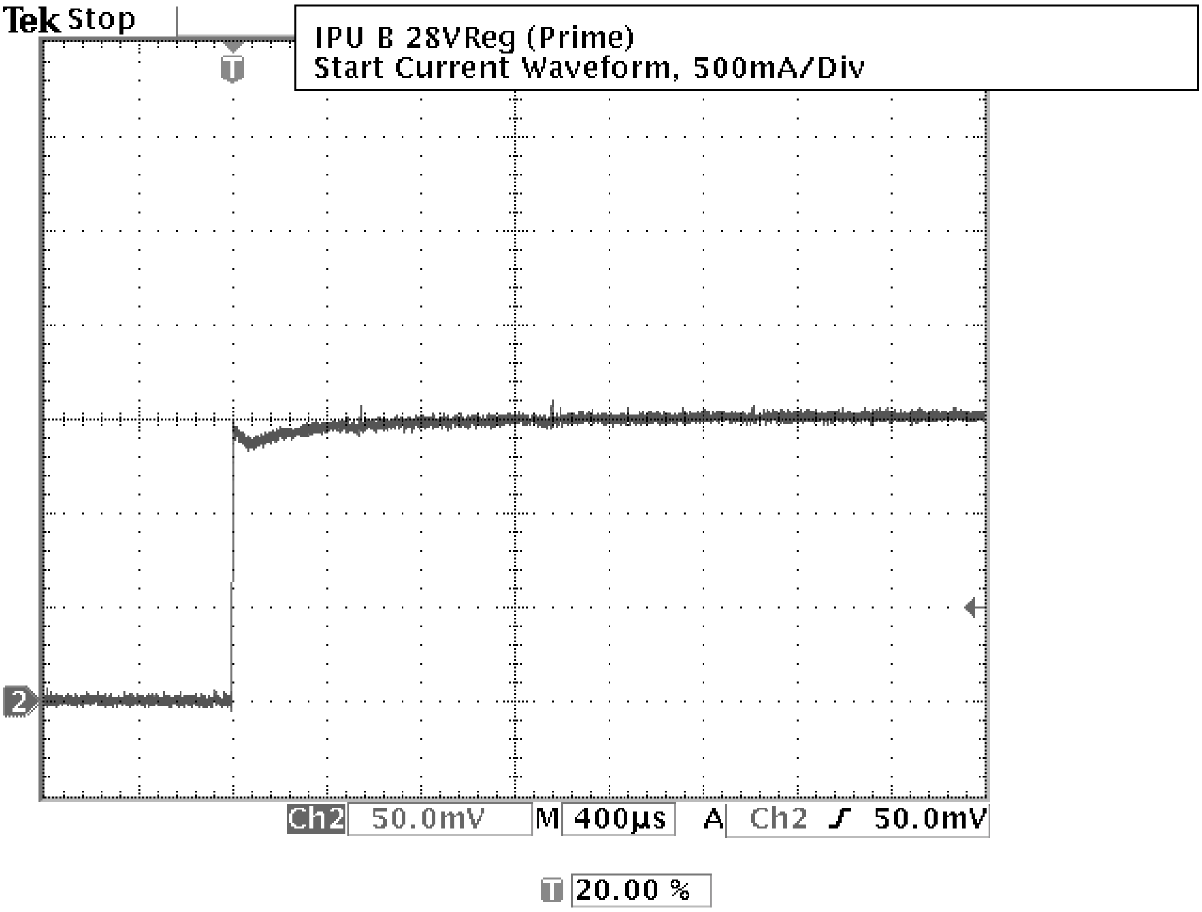

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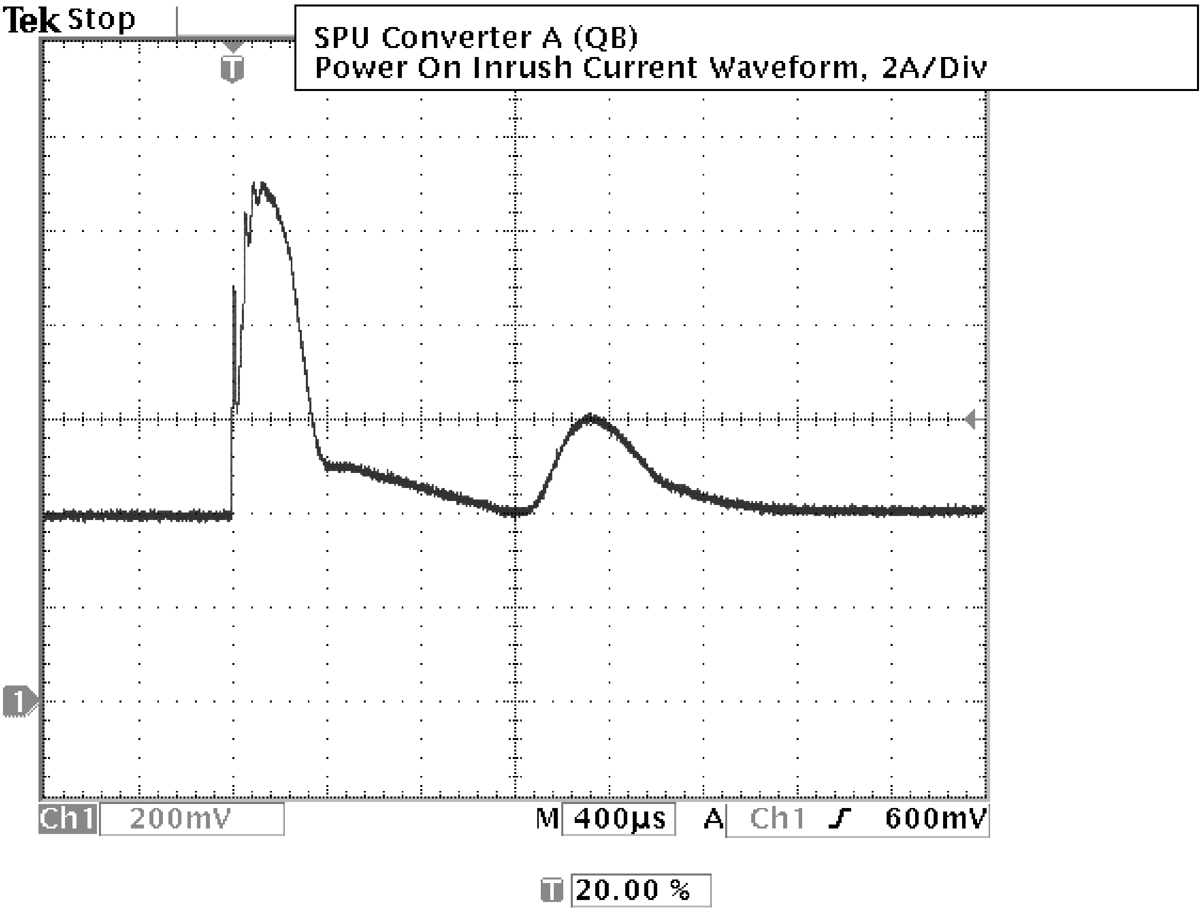

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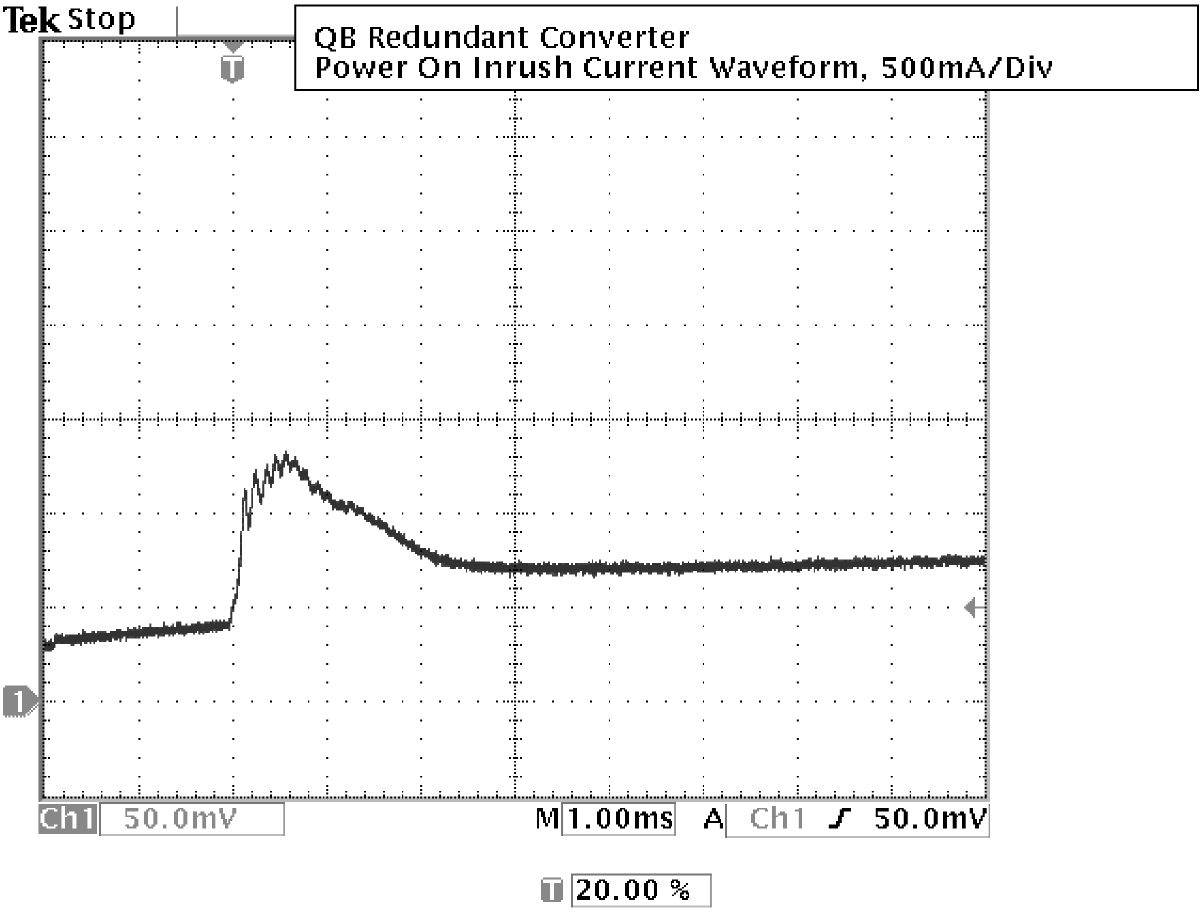

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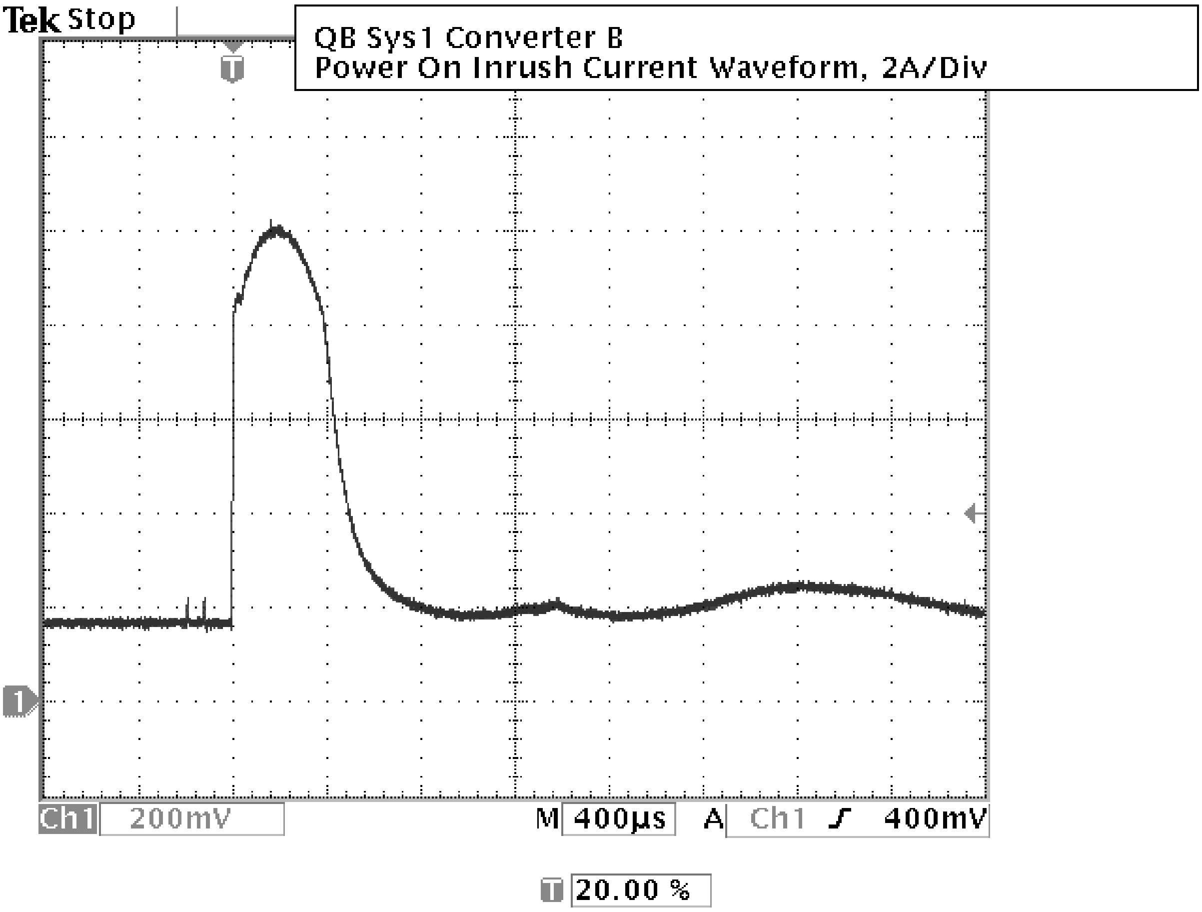

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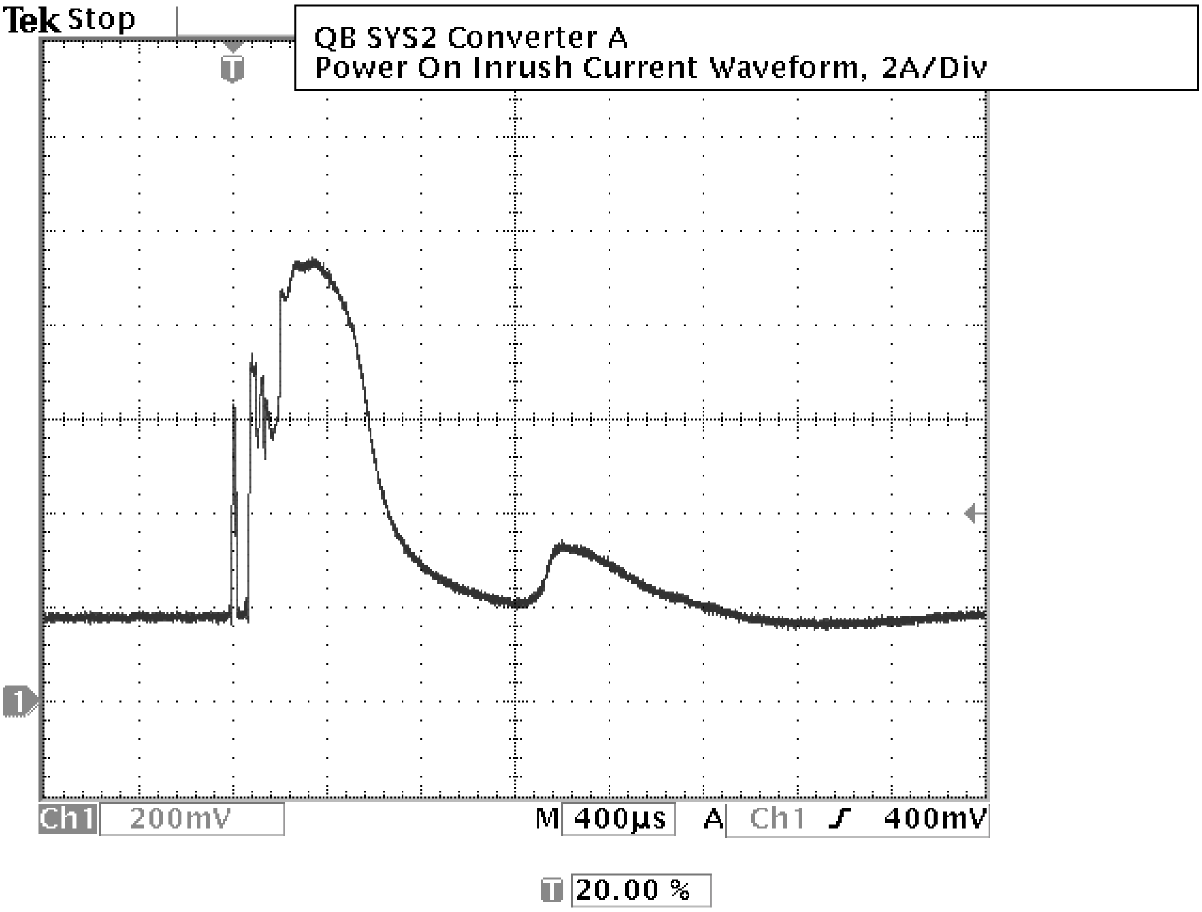

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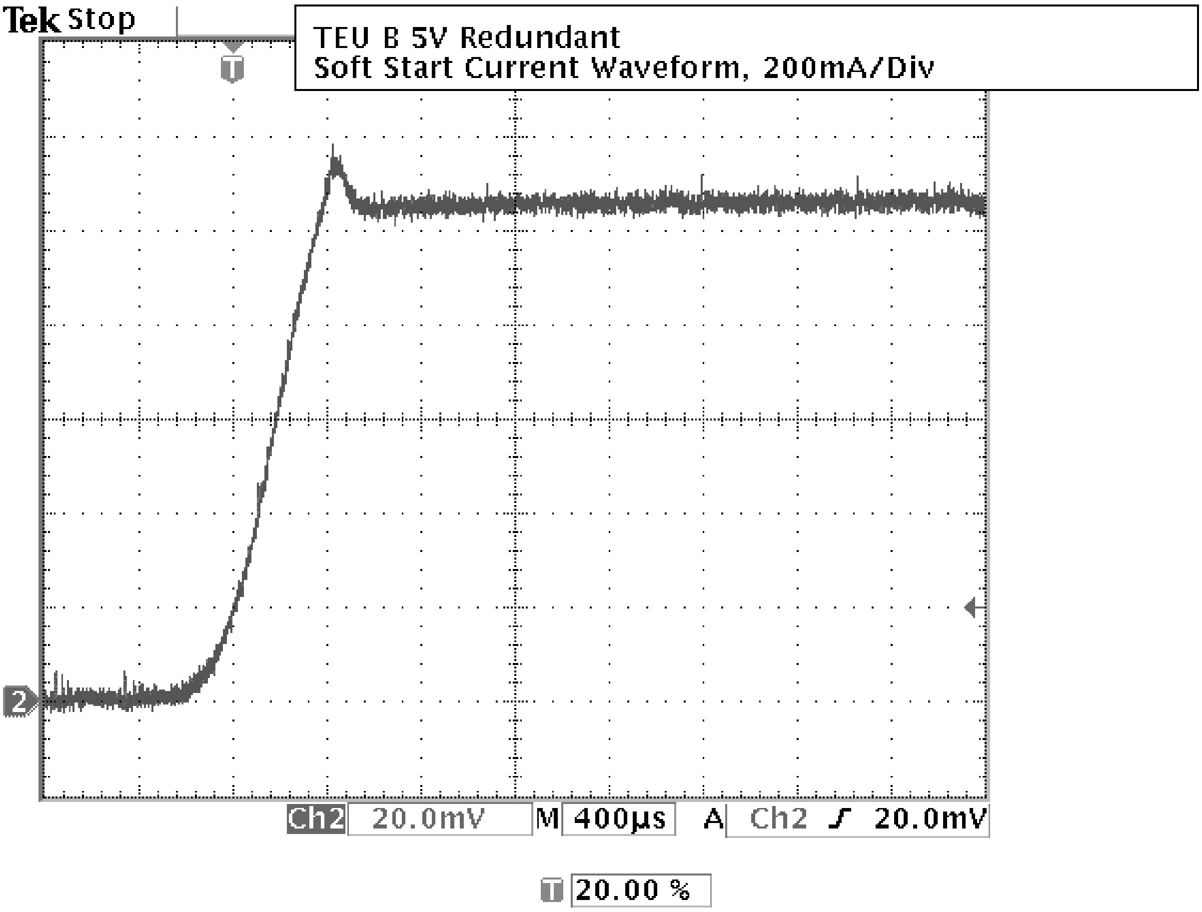

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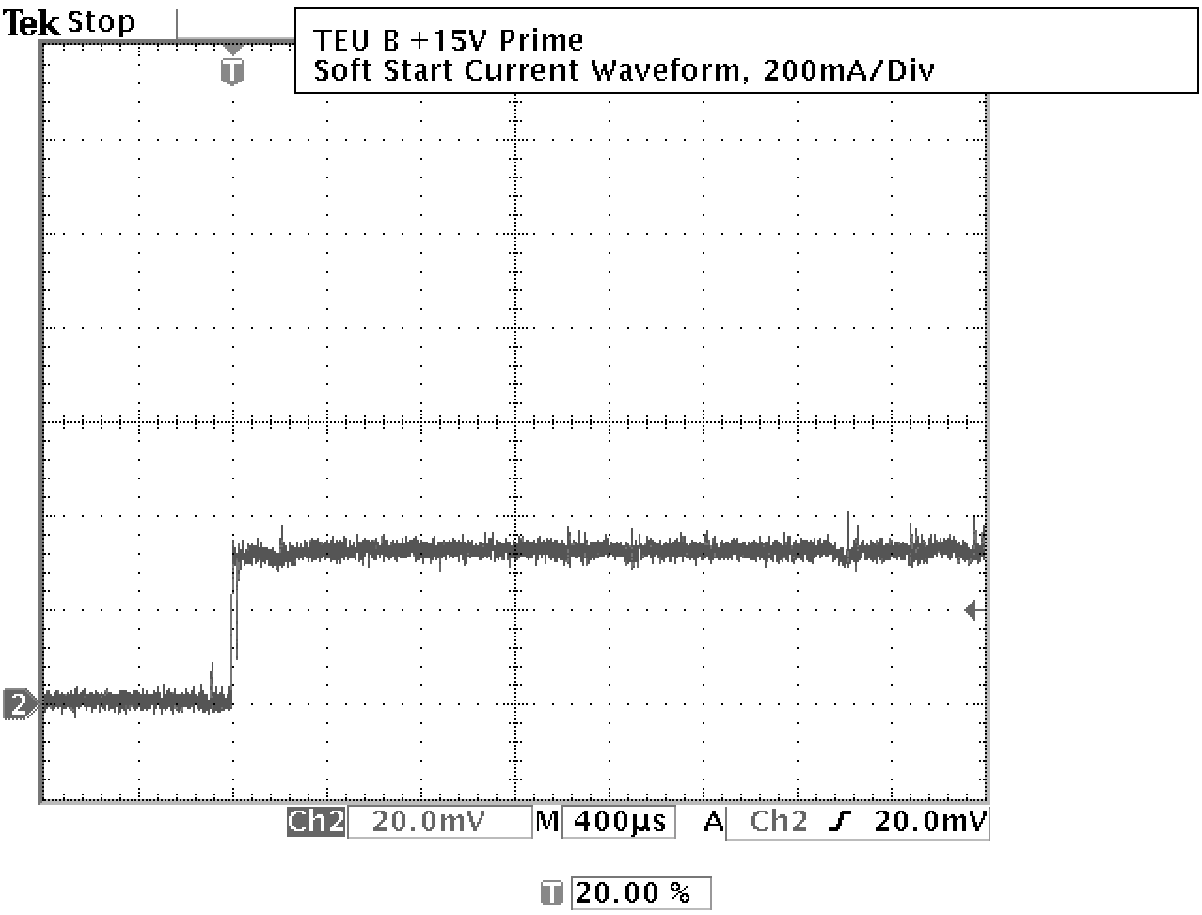

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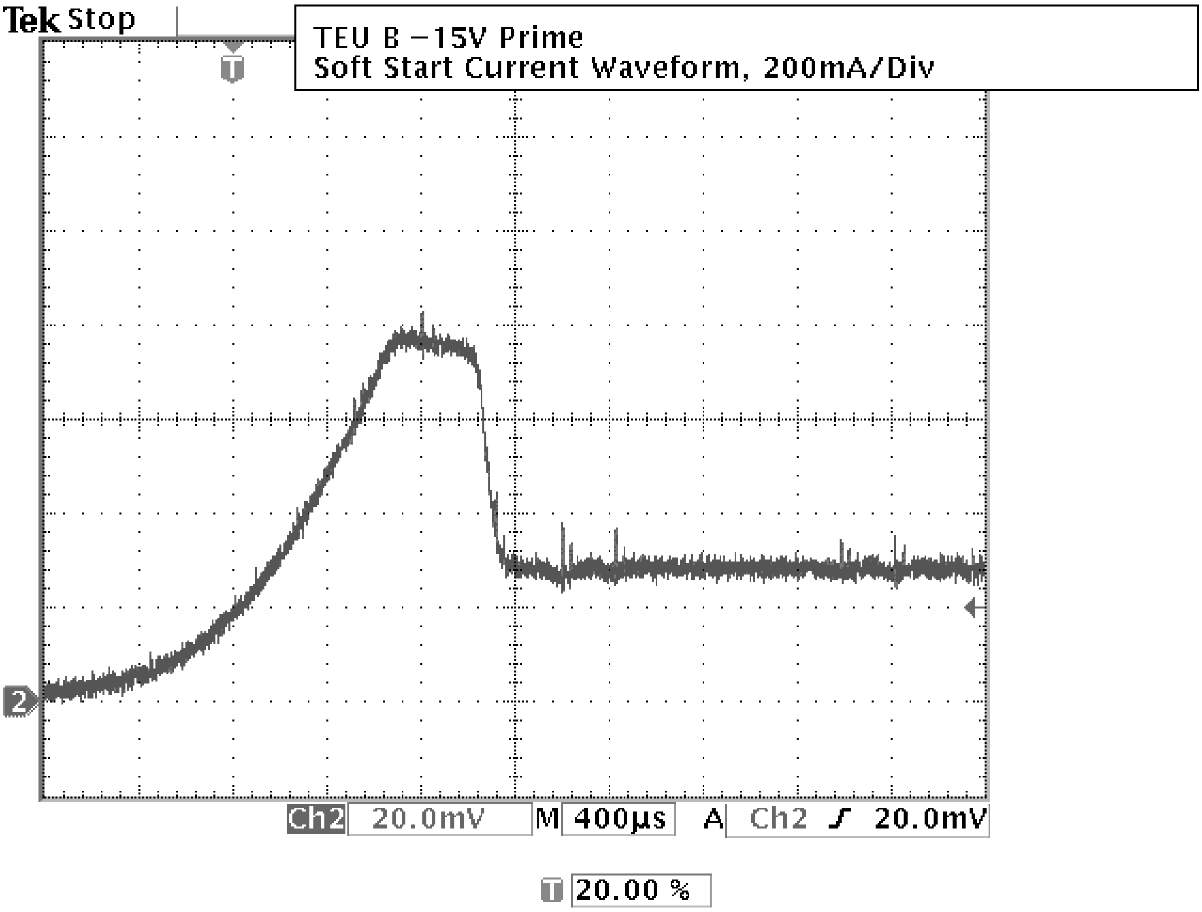

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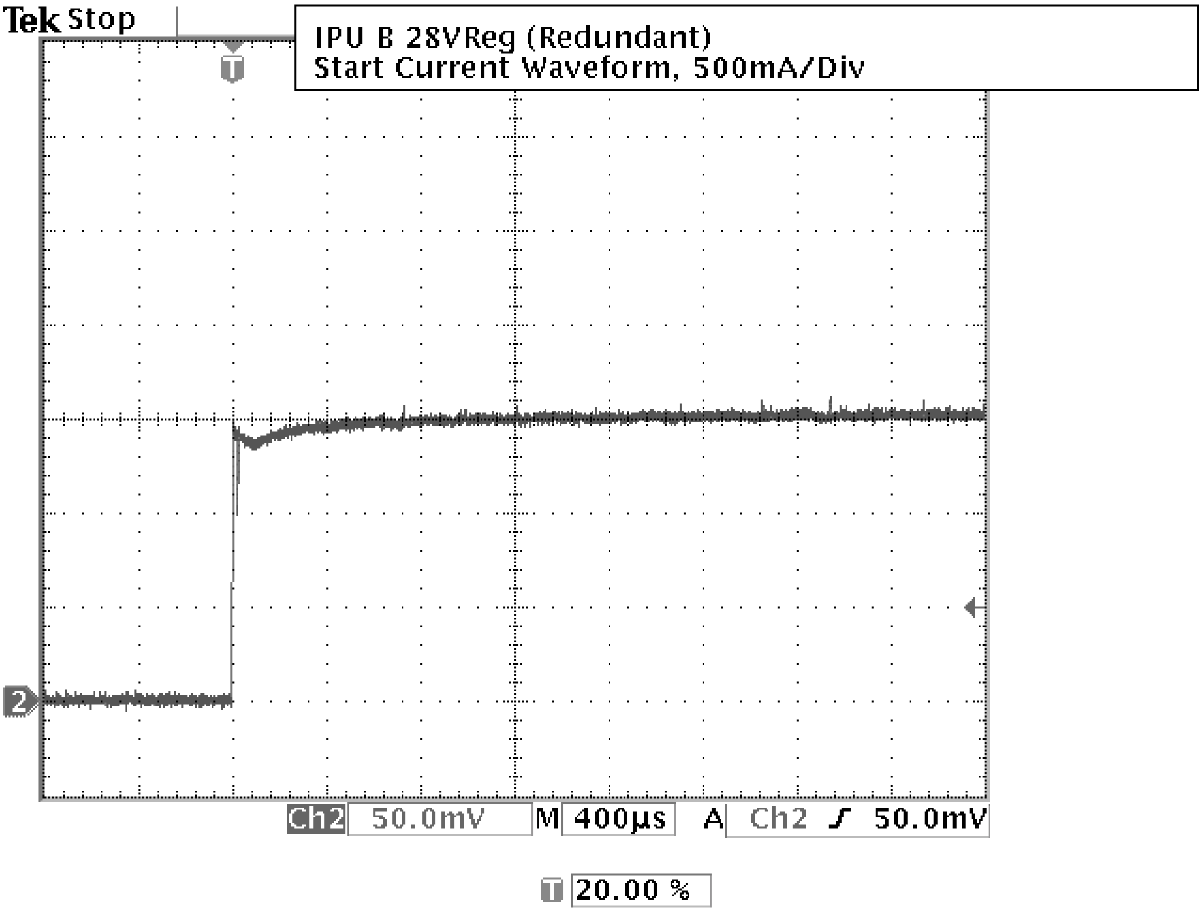
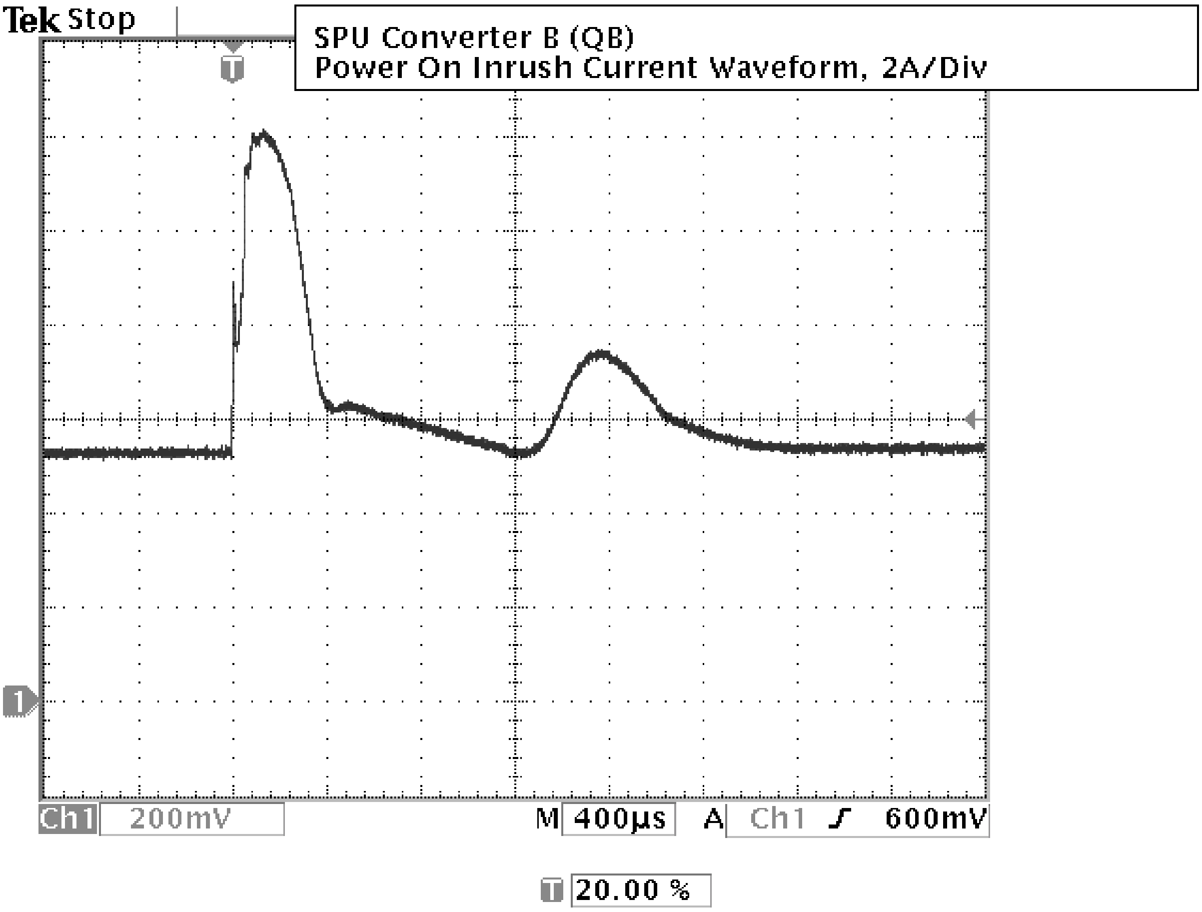


10.44 Waveform SPUBQB.BMP



HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: G Case **Date: 1st May 2001.**

Subject / Title: **HIRDLS PCU Vacuum Bake Test Report**

Contents / Description / Summary:

Test report from the PCU vacuum bake conducted at RAL.

Reference RAL AIV Facility Report No. AIV-2001-048-Bak.

Key Words: Vacuum Bake Test Report

Purpose (20 characters maximum): Reporting of test data

Approved By: S Jaroslawski

Date: 2001-05-01

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-05-01	-	-	First Issue

SST DEPARTMENT
AIV FACILITY

HIRLDS FM PCU

Vacuum Bake

REPORT No: AIV-2001-048-Bak

EAQA REGISTERED COMPANY ISO 9001 CERT NO.705
UKAS QUALITY MANAGEMENT

RUTHERFORD APPLETON LABORATORY
Chilton,
Didcot,
Oxfordshire
OX11 OQX
Tel: (01235) 821900 Ext: 5732

CONTENTS

1) Test Item Description

HIRDLS FM PCU

2) Test Specification

REQUIREMENT	TEMPERATURE
Vacuum bake	60°C
Tolerances	+3°C -0°C
Temperature Vs Time Plot	Annex B

REQUIREMENT	DURATION
Soak Time minimum	24 Hrs

REQUIREMENT	PRESSURE
Maximum Pressure	1.0E-4 mBar

3) Test Objectives

The objective of the test was to vacuum bake the HIRDLS FM PCU to remove the bulk of the volatile materials prior to the Outgassing measurements made at the end of the TVAC test. This was done with the PCU lid removed to increase the pumping rate.

4) Pre-Test Chamber Verification

A pretest was carried out to check that the vacuum showed no unusual Peaks.

5) Cleanliness

Test Type	Cleanliness	Status	Peaks	Figures
Pre Test Calibration	Satisfactory	Normal	18, 28 & 32	
Thermal Testing	Satisfactory	Normal	18, 28 & 32	Annex B

6) Test Item Mounting and Sensor Details

The PCU was placed on a shelf within the test chamber with the lid resting against the side. The temperature sensors were taped to the shelf.

7) Test Summary

Parameter	Date	Time	Temperature	Pressure
Pumpdown Initiated	11-04-2001	17:55		
Start Thermal Cycling	11-04-2001	22:35	23.7°C	4.1E-5
Finish Thermal Cycling	13-04-2001	21:30	60.0°C	1.4E-5
Letup Initiated	14-04-2001	07:20	32.1°C	2.6E-6

8) Conclusion

The thermal vacuum bakeout was successfully performed on the HIRDLS FM PCU

Reporting Officer

Facility Manager

Date

Date

Annex A – Equipment Used

EQUIPMENT USED

Equipment	Manufacturer	Type	Calibration Date	Certificate No	Comments
Mass Spectrometer 0-100 AMU	Spectra Metrics	Microvision Plus (MQH4)	19/10/2000	NA	Calibrated by Original Equipment Manufacturer
Vacuum gauges	Balzers	TPG300 Pirani/Penning	NA	NA	
Monitoring PRT's	TC LTD	PT100 Class A	12 Jan 2001	NA	In house Calibration
Temperature Controller	Eurotherm	PC 3000	12 Jan 2001	NA	In house Calibration
Thermal Sentry	Eurotherm	Eurotherm 92	12 Jan 2001	NA	In House Calibration
Data acquisition system	Measurement Systems	Datascan Modules	12 Jan 2001	NA	In house Calibration
Calibrator	Beamax	TC 303	30/05/2000	16394	Absolute Calibration Ltd

Annex B – Test Data

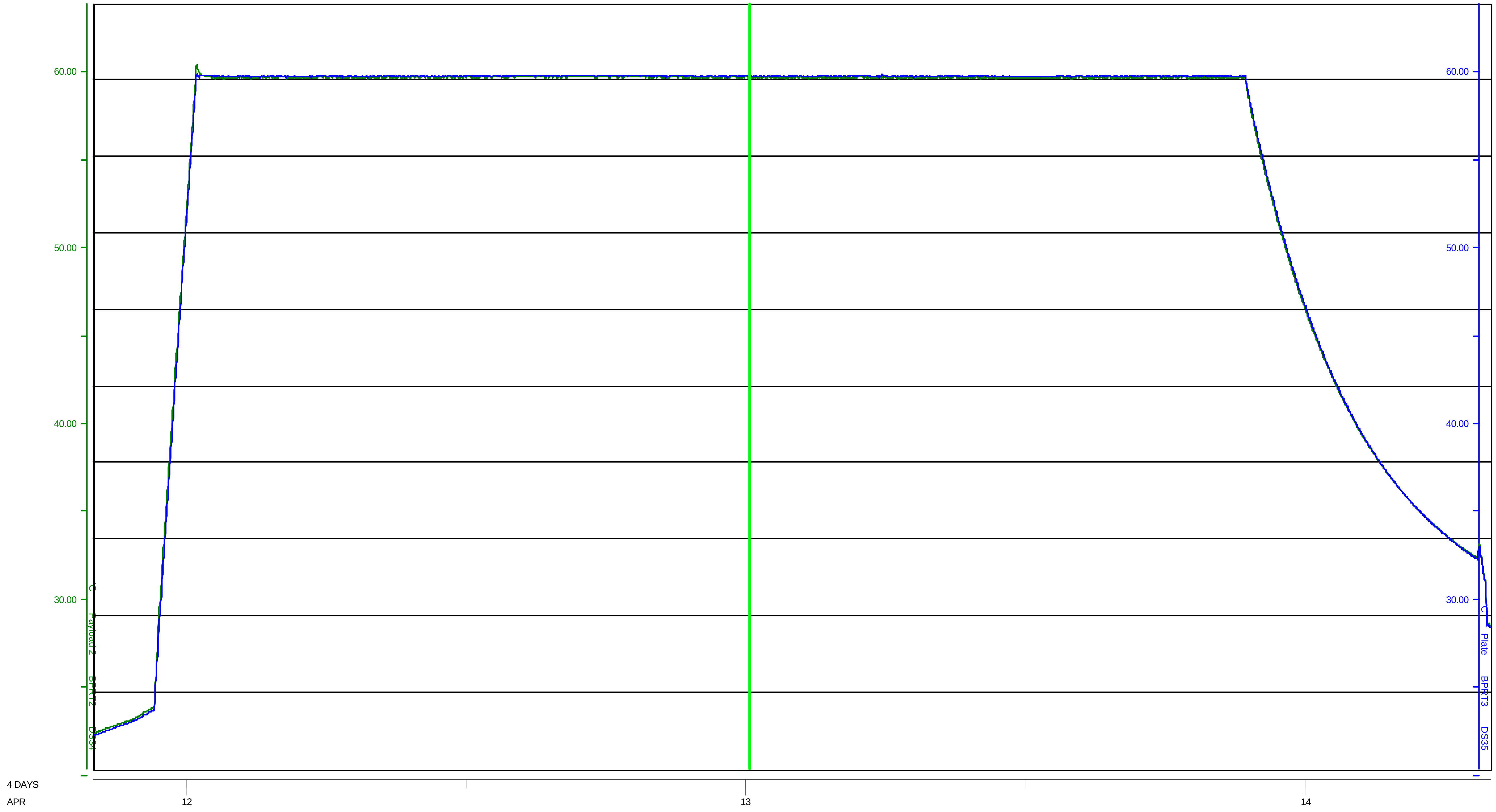
AIV-2001-048-BAK Thermal Trend

Logger Name : AIV-2001-048-BAK | File Name : 010411_200543.odl | Start Time : 04/11/01 08:05:43 PM | Stop Time : 04/14/01 07:55:43 AM

04/13/01 12:08:43 AM.004 / 04/13/01 12:10:43 AM.007

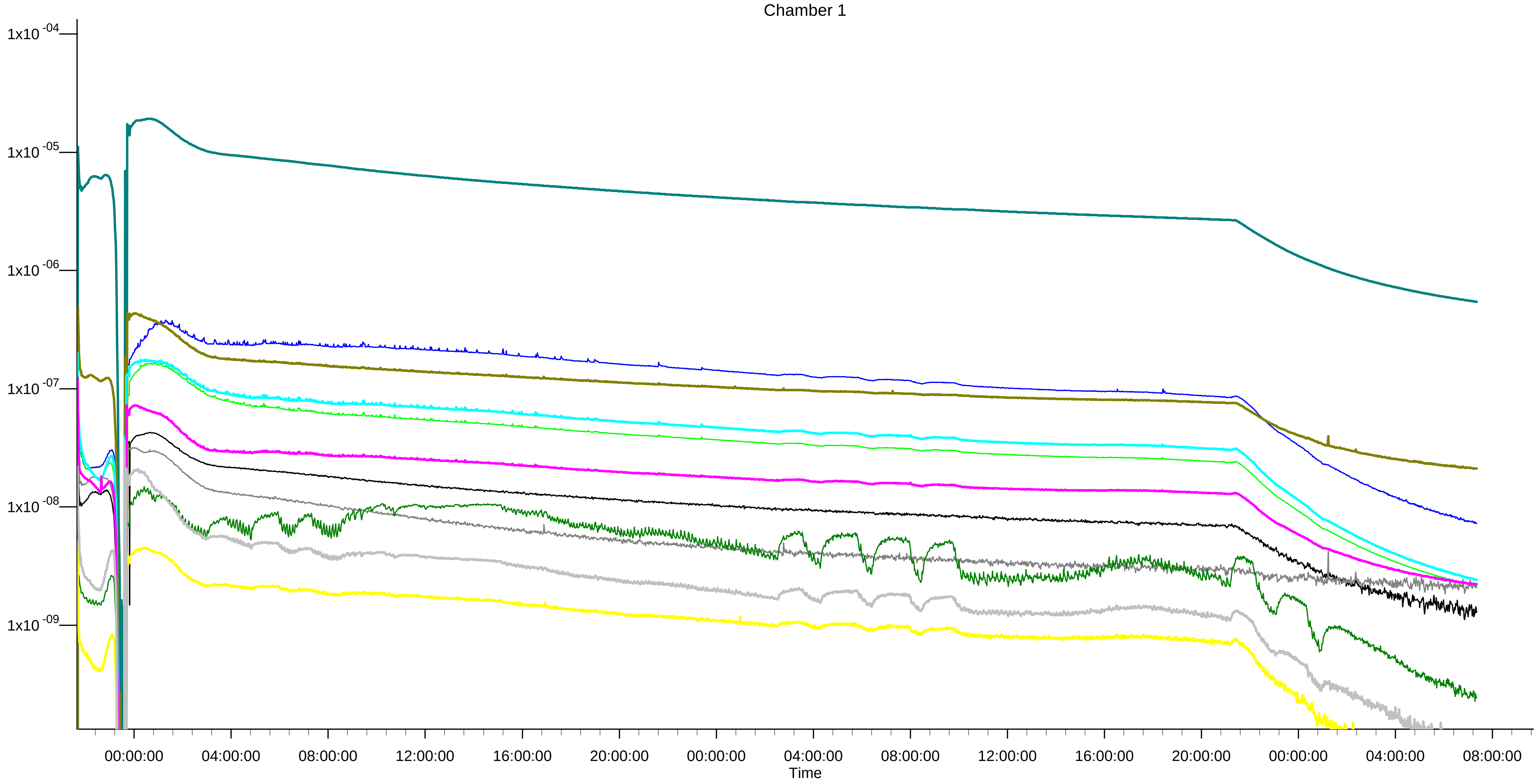
59.64 / 59.66

59.73 / 59.73



Color	Channel	Tag	Description	Units	Min / Max
	DS34	BPRT2	Payload 2	'C	0.00 / 100.00
	DS35	BPRT3	Plate	'C	0.00 / 100.00

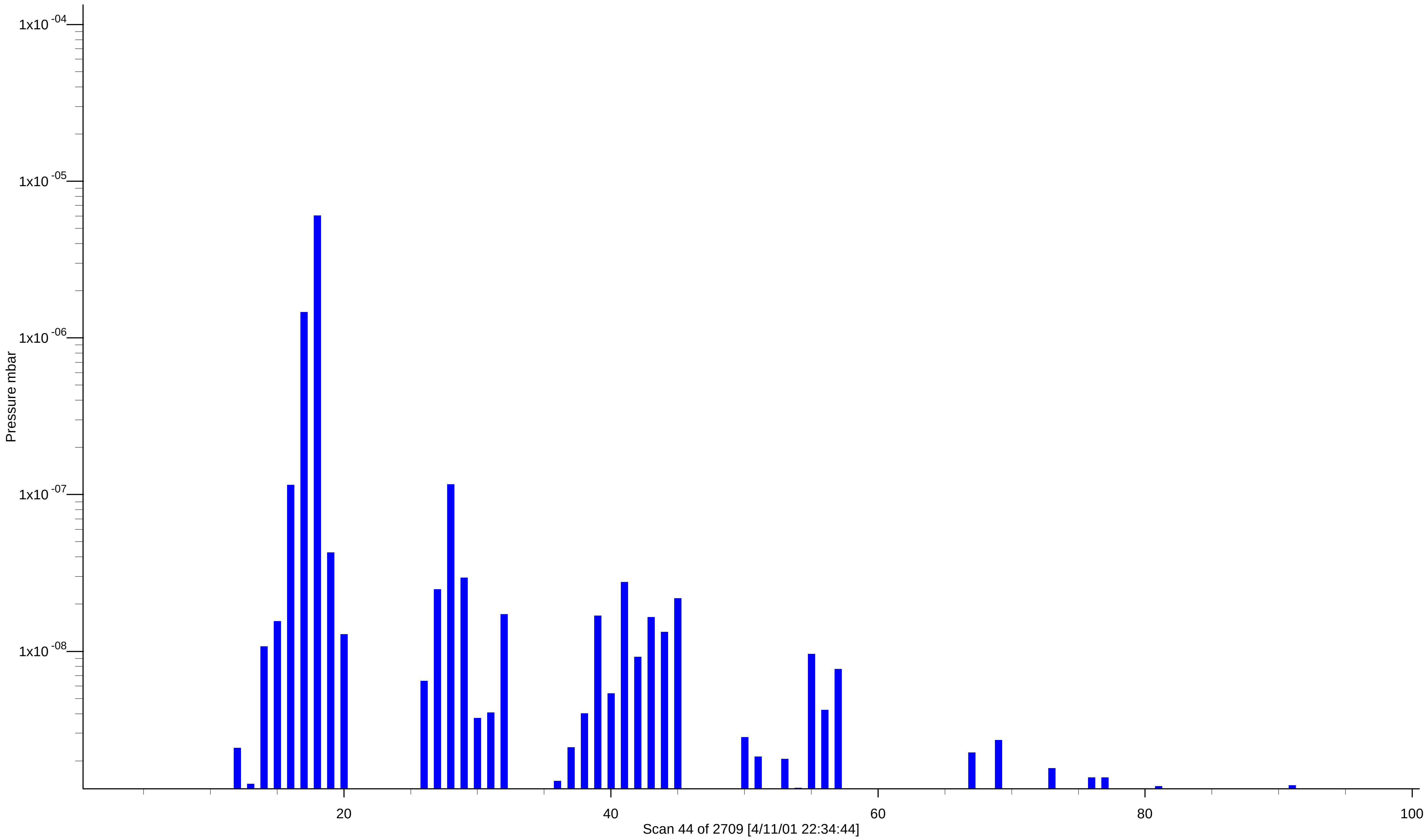
AIV-2001-048-BAK RGA Trend



20 - Neon : From -4.77e-011 To 1.29e-009
45 - IPA : From 6.36e-011 To 7.25e-009
18 - Water : From 1.11e-010 To 5.44e-007
28 - Nitrogen : From -6.36e-011 To 2.11e-008
32 - Oxygen : From 6.36e-011 To 2.08e-009
4 - Helium : From -5.48e-011 To -2.00e-011

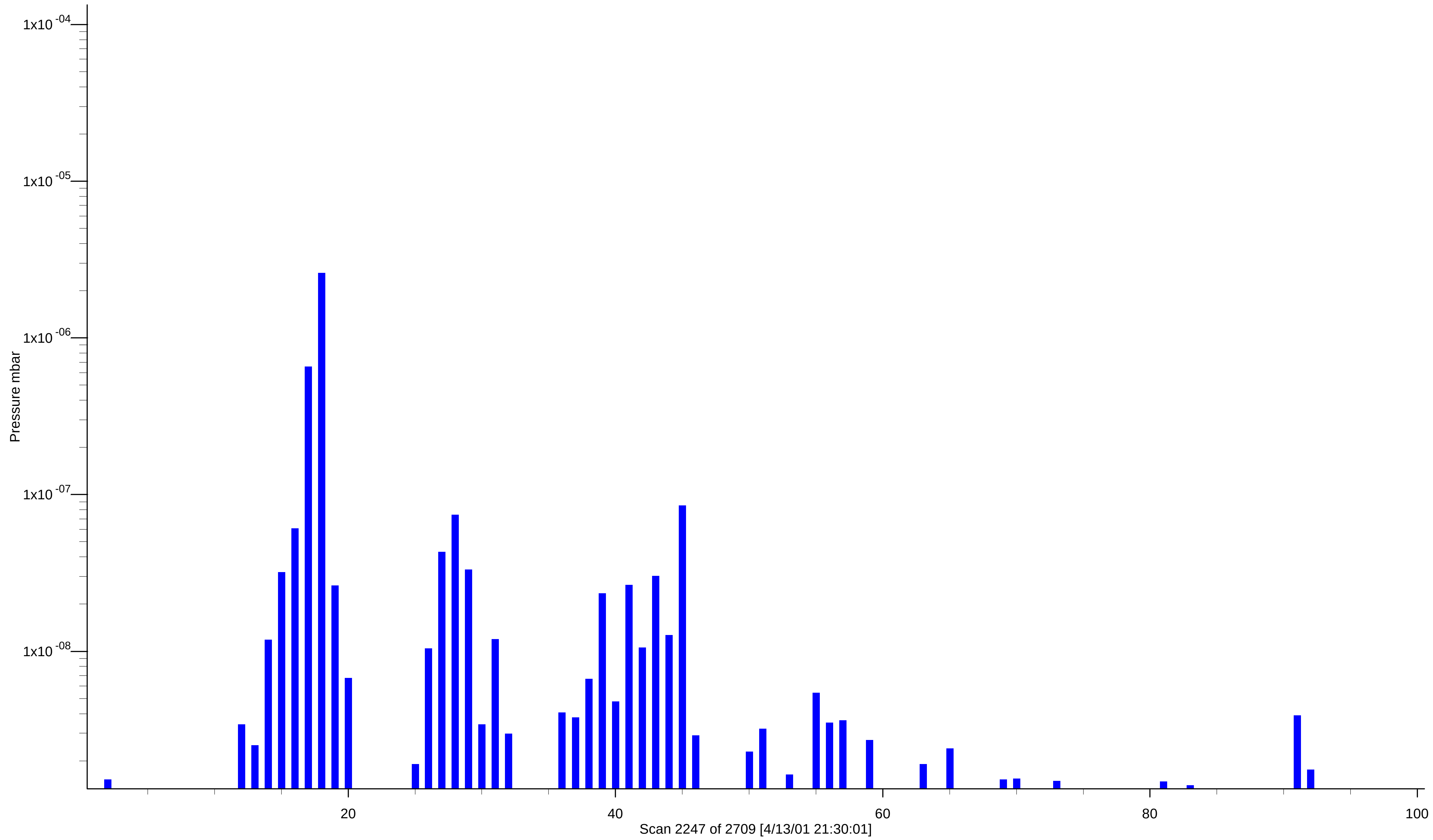
91 - Toluene : From 3.36e-009 To 2.42e-010
39 - Hydrocarbon : From 2.00e-007 To 2.13e-009
43 - Hydrocarbon : From 1.99e-007 To 2.42e-009
44 - Carbon dioxide : From 1.23e-007 To 2.23e-009
60 - Hydrocarbon : From 5.10e-009 To 3.40e-011
73 - Hydrocarbon : From 2.19e-008 To 7.47e-011

AIV-2001-048-BAK RGA Barchart before Heating



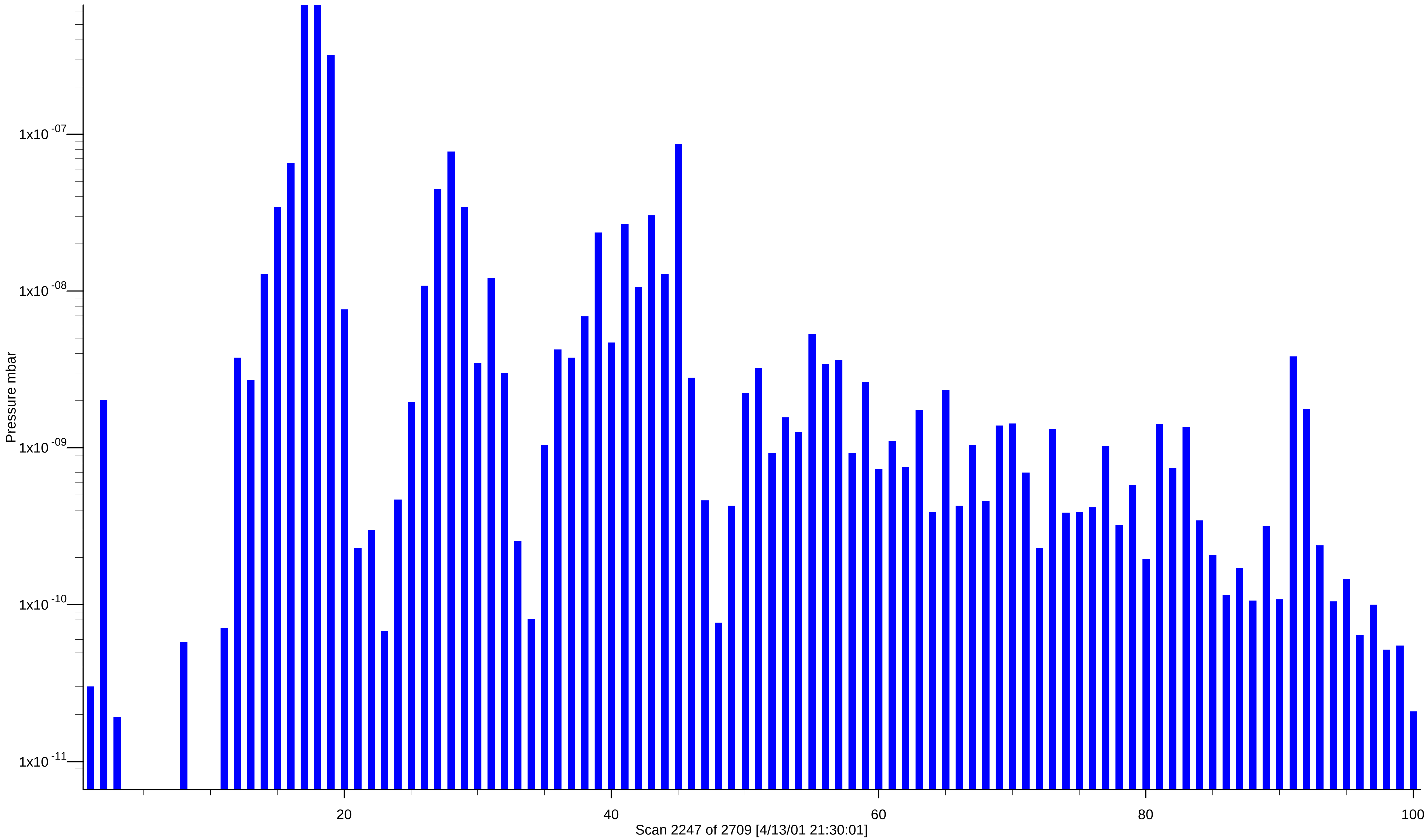
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

AIV-2001-048-BAK RGA Barchart at end of Bake (1)



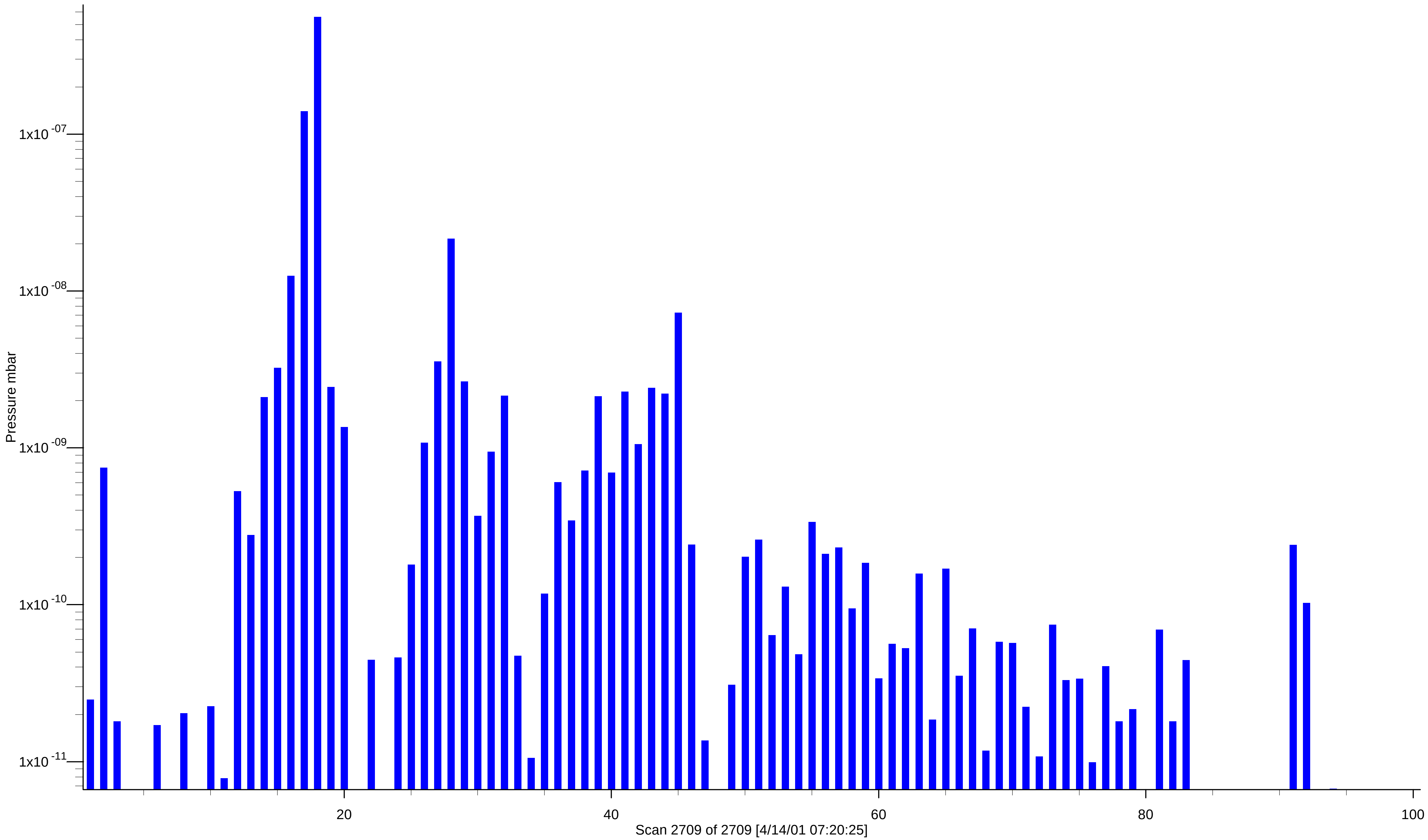
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

AIV-2001-048-BAK RGA Barchart at end of Bake (2)



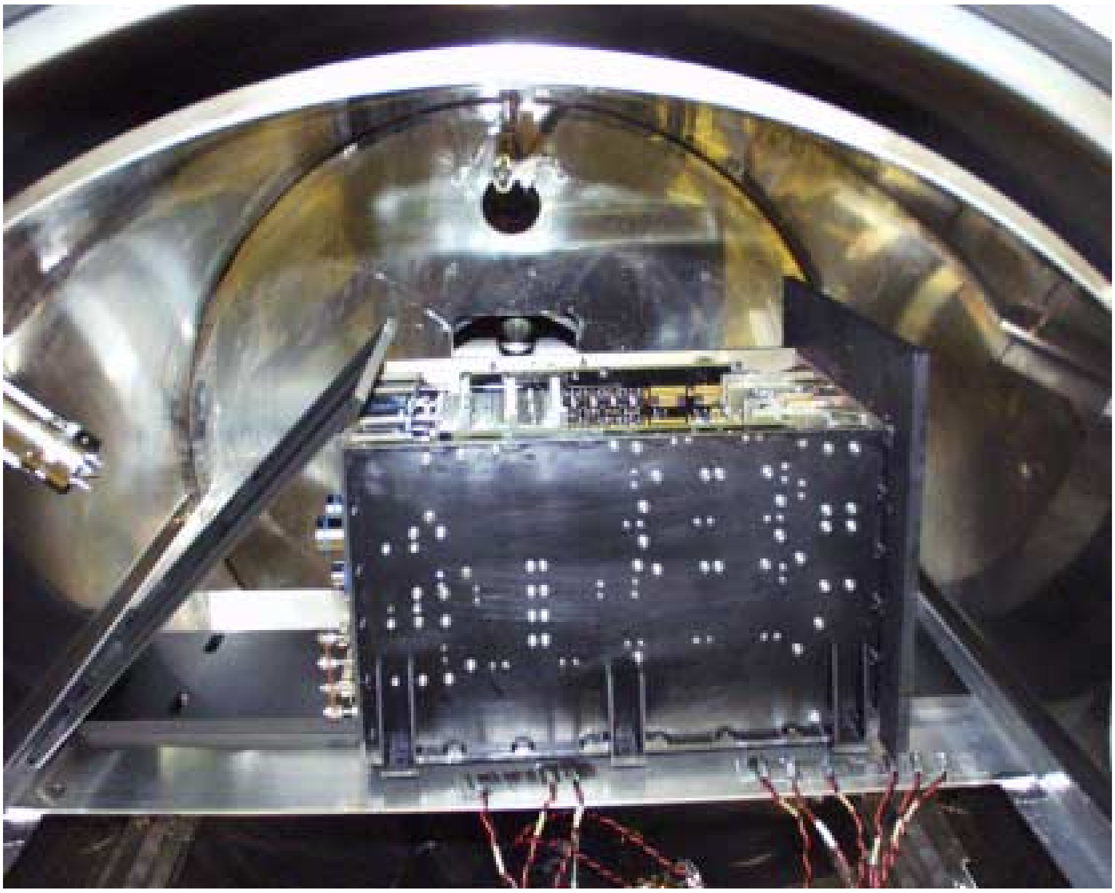
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

AIV-2001-048-BAK RGA Barchart at Letup



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM76-01099015

Annex C – Photograph.



HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: G Case **Date: 1st May 2001.**

Subject / Title:	**HIRDLS PCU Outgassing Test Report**

Contents / Description / Summary:

Test report from the Outgassing tests conducted at RAL.

Reference RAL AIV Facility Report No. AIV-2001-027b-Bak.

Key Words: Outgassing Test Report

Purpose (20 characters maximum): Reporting of test data

Approved By: S Jaroslawski

Date: 2001-05-01

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-05-01	-	-	First Issue

SST DEPARTMENT
AIV FACILITY

HIRDLS PFM PCU

Outgassing Verification
REPORT No: AIV-2001-027b-Bak

CONTENTS

1) Test Item Description

HIRDLS PFM PCU Serial Number #001

2) Test Specification

REQUIREMENT	TEMPERATURE
Vacuum bake	50°C
Maximum Rate of Change	20°C/Hr
Tolerances	+3°C -0°C
Temperature Vs Time Plot	Annex B

REQUIREMENT	RATE
TQCM Rate of Change at –20 °C	64Hz/Hr

REQUIREMENT	PRESSURE
Maximum Pressure	1.0E-5 mBar

3) Test Objectives

The objective of the test was to vacuum bake the PCU to obtain the outgassing rate.

4) Pre-Test and Post-Test Chamber Verification

The HIRDLS TVAC test was used for a chamber verification check. Only the removal of the radiator thermal plate had been performed. The chambe was also checked after the bake to obtain the Baseline for the chamber.

5) Cleanliness

Test Type	Cleanliness	Status	Peaks	Figures
Pre Test Calibration	Satisfactory	Normal	18, 28 & 32	
Thermal Testing	Satisfactory	Normal	18, 28 & 32	Annex B

6) Test Item Mounting and Sensor Details

The PCU was mounted on the lower thermal plate that was used in the TVAC tests. 3 sensors were attached. One each on the +X, -X and +Z faces.

7) Test Summary

With PCU in Chamber

Parameter	Date	Time	Temperature	Pressure
Pumpdown Initiated	26-04-2001	18:40		
Start Bake	26-04-2001	23:40	20.4°C	4.0E-5
Finish Bake	28-04-2001	16:20	50.0°C	3.8E-6
Letup Initiated (Hot)	28-04-2001	16:25	50.0°C	3.8E-6

Empty Chamber

Parameter	Date	Time	Temperature	Pressure
Pumpdown Initiated	28-04-2001	17:45		
Start Bake	28-04-2001	21:00	29.1°C	1.6E-5
Finish Bake	N/A			
Letup Initiated	N/A (Chamber left hot until next job)			

8) Conclusion

The Outgassing Verification data is presented in Annex B. The Rate reached with the PCU in the chamber (after about 40Hrs Hot) was 274Hz/Hr. The Baseline for the empty chamber (after about 48Hrs Hot) was 224Hz/Hr. This gives a rate of 50Hz/Hr from the PCU. This is within specification.

9) Chamber Details

The layout of the chamber is shown in Annex D. The pump is a Balzers TPH2200 Turbo Pump. The details (taken from the manual) are.

Pumping speed for	
Nitrogen	2200 l/s
Helium	3200 l/s
Hydrogen	2800 l/s
Flow Rate of fore pump	60 m^3/Hour
Compression ratio for	
Nitrogen	1x10^9
Helium	3.8x10^4
Hydrogen	1800

NOTE: Pumping speeds are reduced by about 15% by the inclusion of an slinter guard on the pump inlet.

Further details can be provided on request.

Reporting Officer **Facility Manager**

Date **Date**

Annex A – Equipment Used

EQUIPMENT USED

Equipment	Manufacturer	Type	Calibration Date	Certificate No	Comments
Mass Spectrometer 0-100 AMU	Spectra Metrics	Microvision Plus (MQH5)	15/08/2000	NA	Calibrated by Original Equipment Manufacturer
Vacuum gauges	Balzers	TPG300 Pirani/Penning	NA	NA	
Monitoring PRT's	TC LTD	PT100 Class A	12 Jan 2001	NA	In house Calibration
Temperature Controller	Eurotherm	PC 3000	12 Jan 2001	NA	In house Calibration
Thermal Sentry	Eurotherm	Eurotherm 92	12 Jan 2001	NA	In House Calibration
Data acquisition system	Measurement Systems	Datascan Modules	12 Jan 2001	NA	In house Calibration
Calibrator	Beamax	TC 303	30/05/2000	16394	Absolute Calibration Ltd
Frequency Meter	Fluke	Fluke 45 #7053006	18/05/2000	218974	ElectroServices
TQCM	Faraday Labs Inc.	Type 80-T TQCM #285 (15MHz)	New Dec 1999	NA	Faraday Labs Inc.

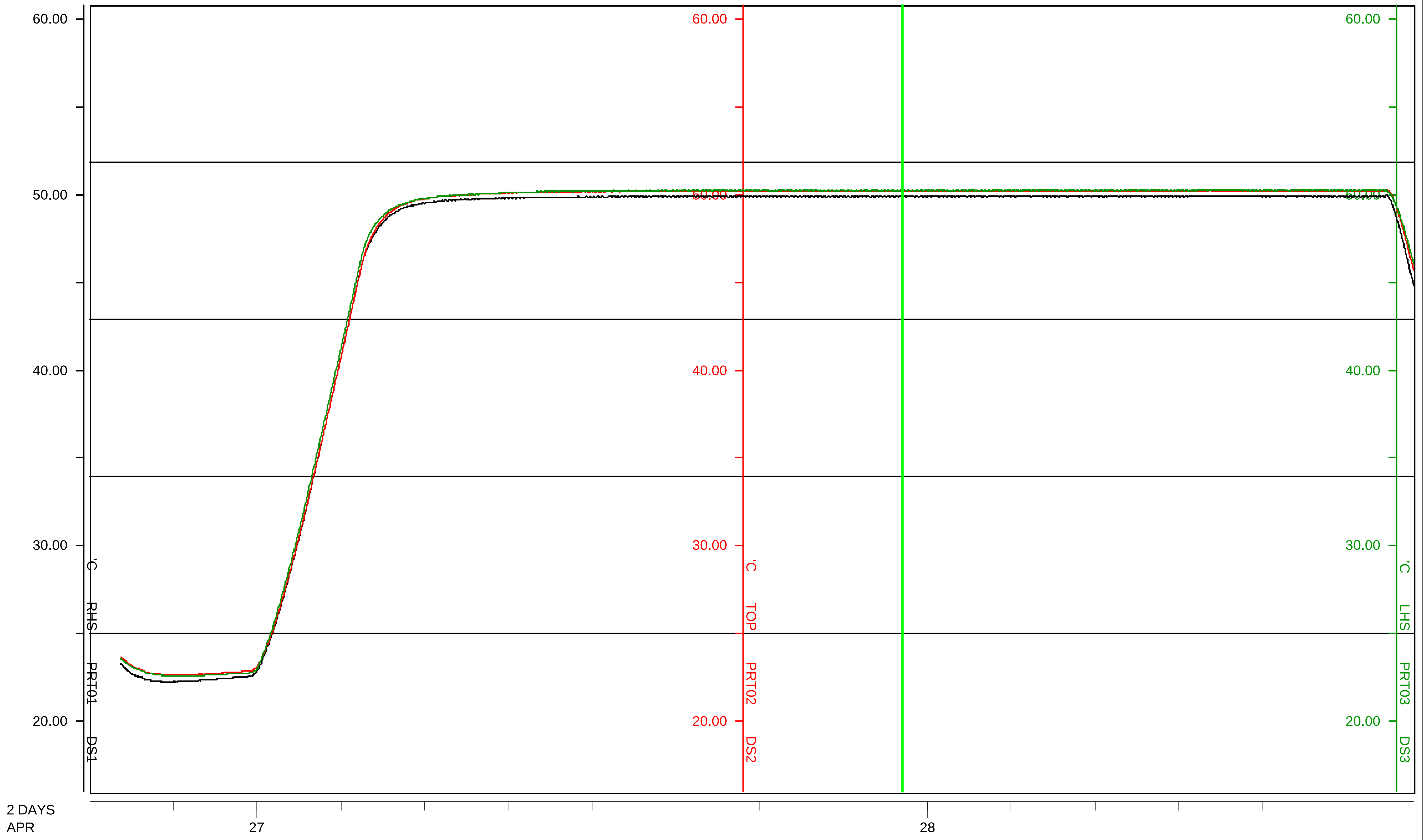
Annex B – Test Data

AIV-2001-027b-TVC PCU Outgassing Thermal Profile

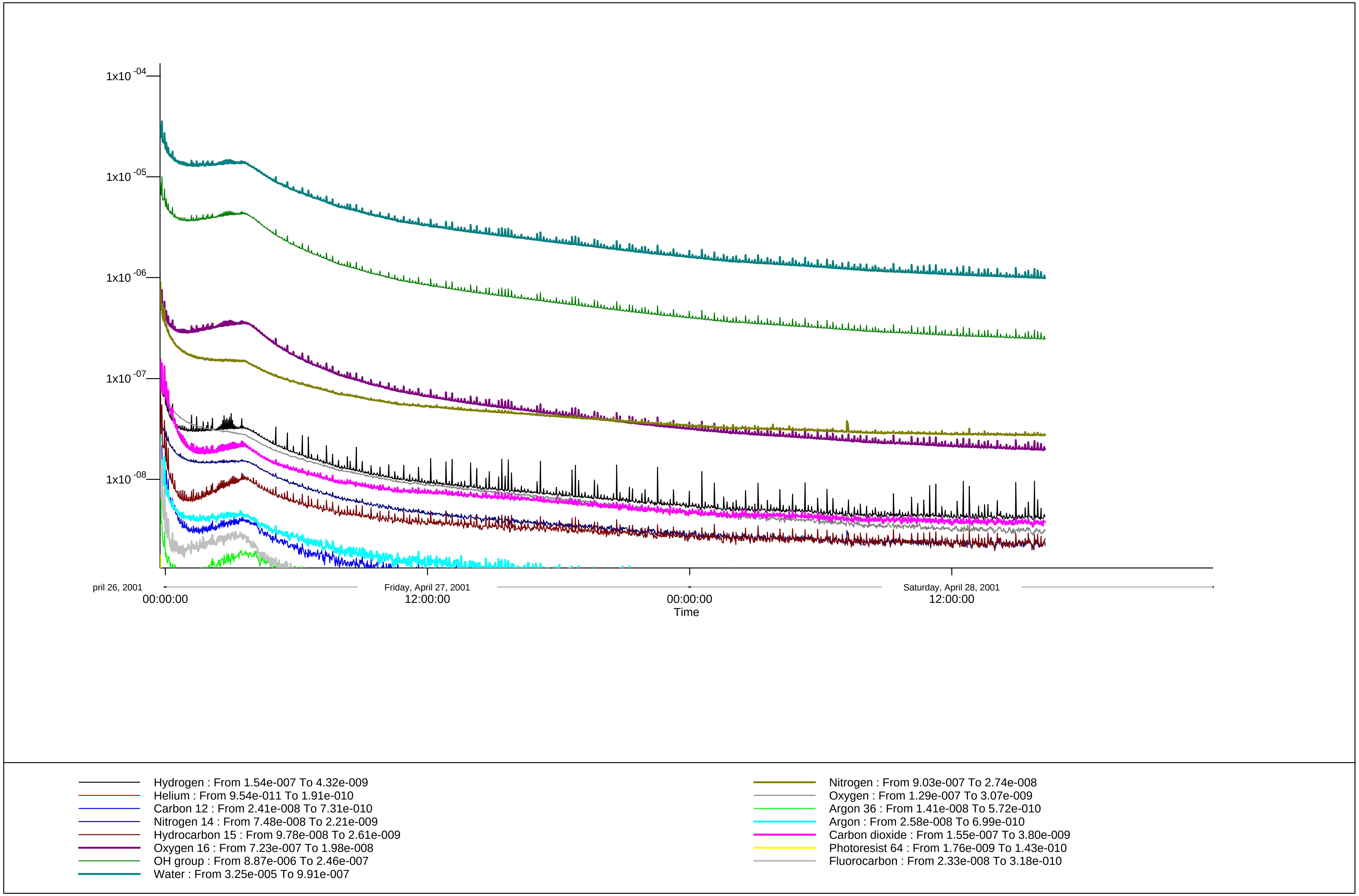
Logger Name : AIV-2001-027B-TVC	File Name : 010426_190815.odl	Start Time : 04/26/01 07:08:15 PM	Stop Time : 04/28/01 05:24:15 PM

04/27/01 11:06:15 PM.004 / 04/27/01 11:08:15 PM.007

49.89 / 49.90 'C | 50.20 / 50.22 'C | 50.23 / 50.24 'C

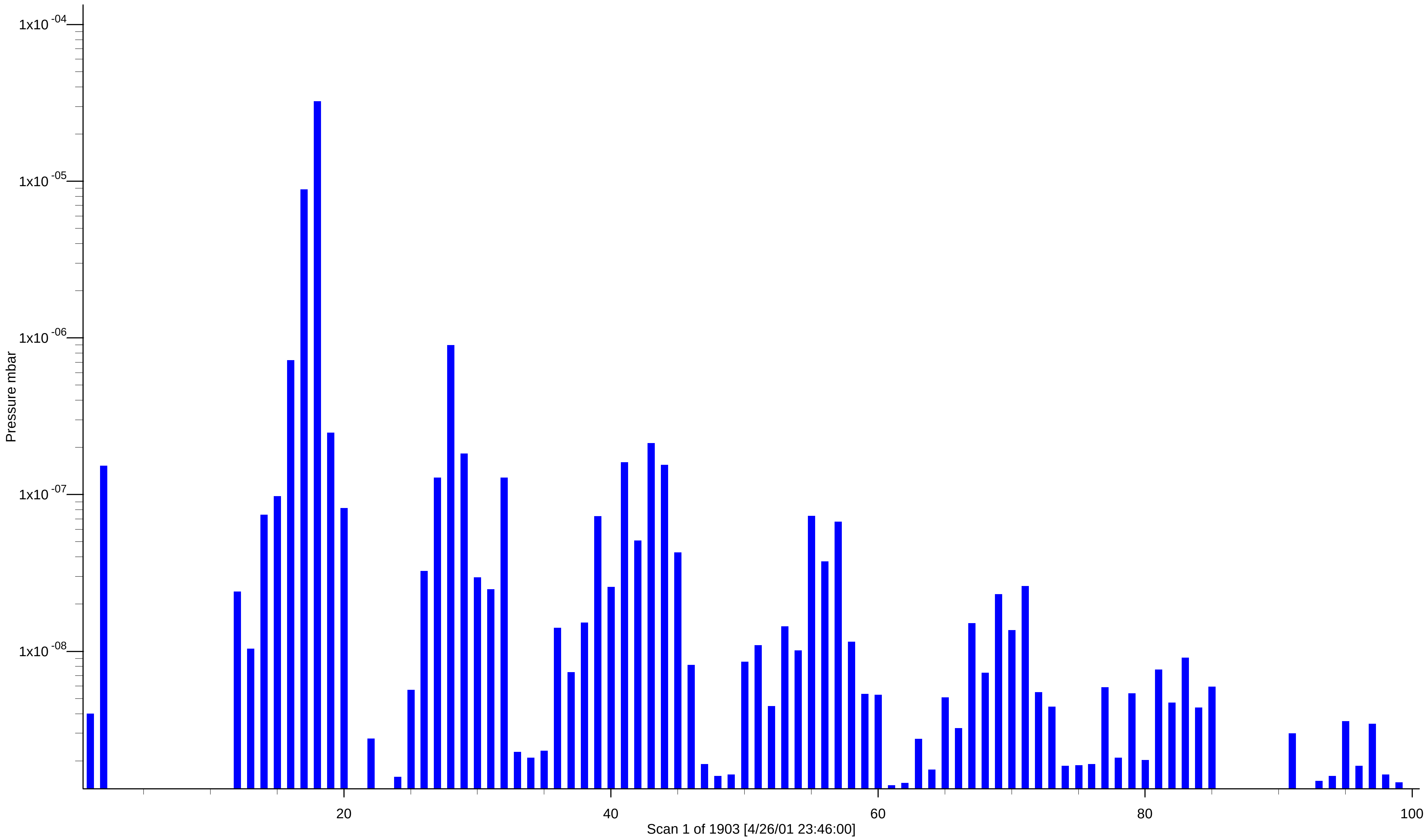


AIV-2001-027b-TVC PCU Outgassing RGA Mass Trend



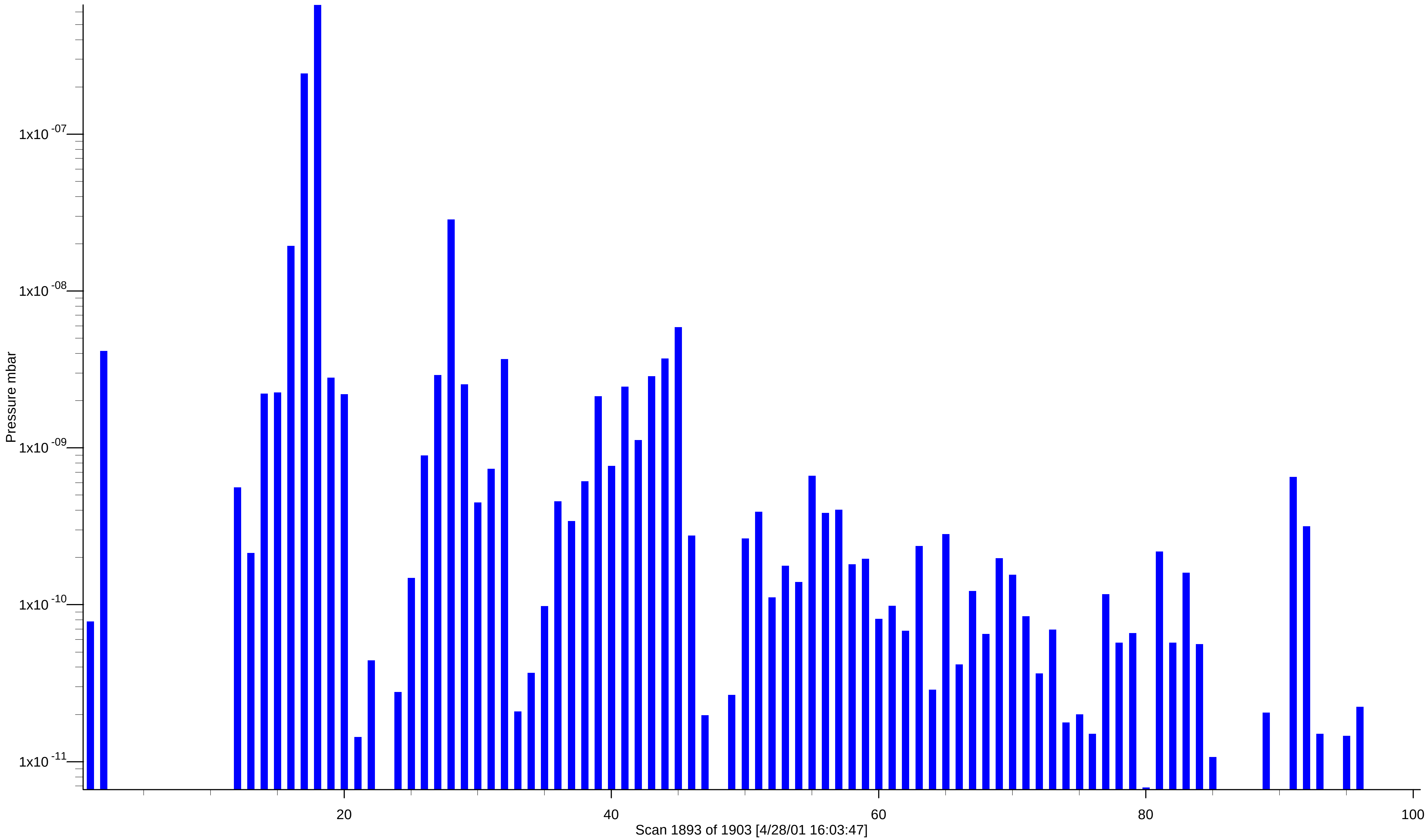
MKS Instruments, Spectra Products - Process Eye 2000

AIV-2001-027b-TVC PCU Outgassing Mass Barchart before heating



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

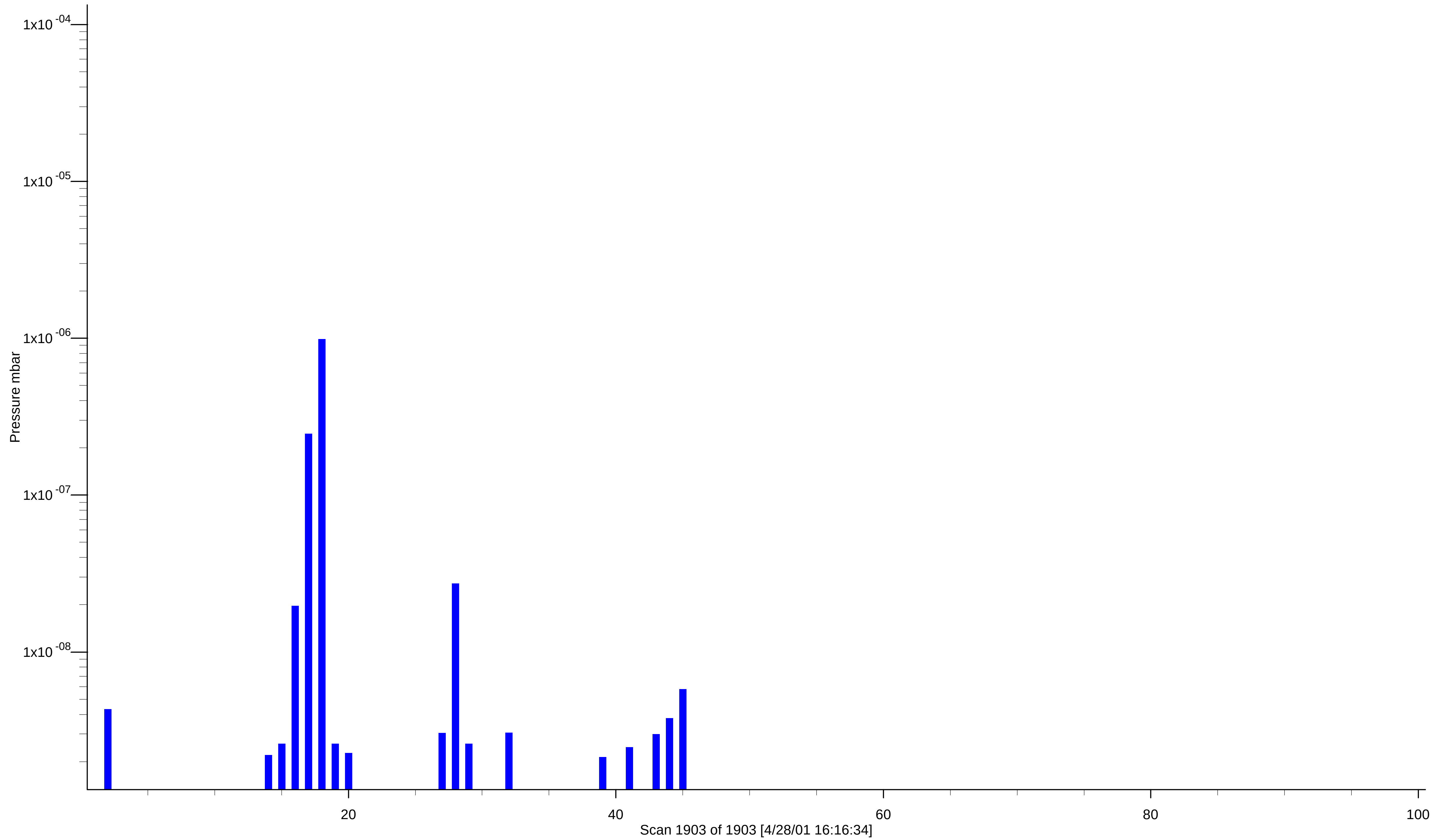
AIV-2001-027b-TVC PCU Outgassing Mass Barchart at Letup (50C)
10E-7 to 10E-11 Ranges



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

MKS Instruments, Spectra Products - Process Eye 2000

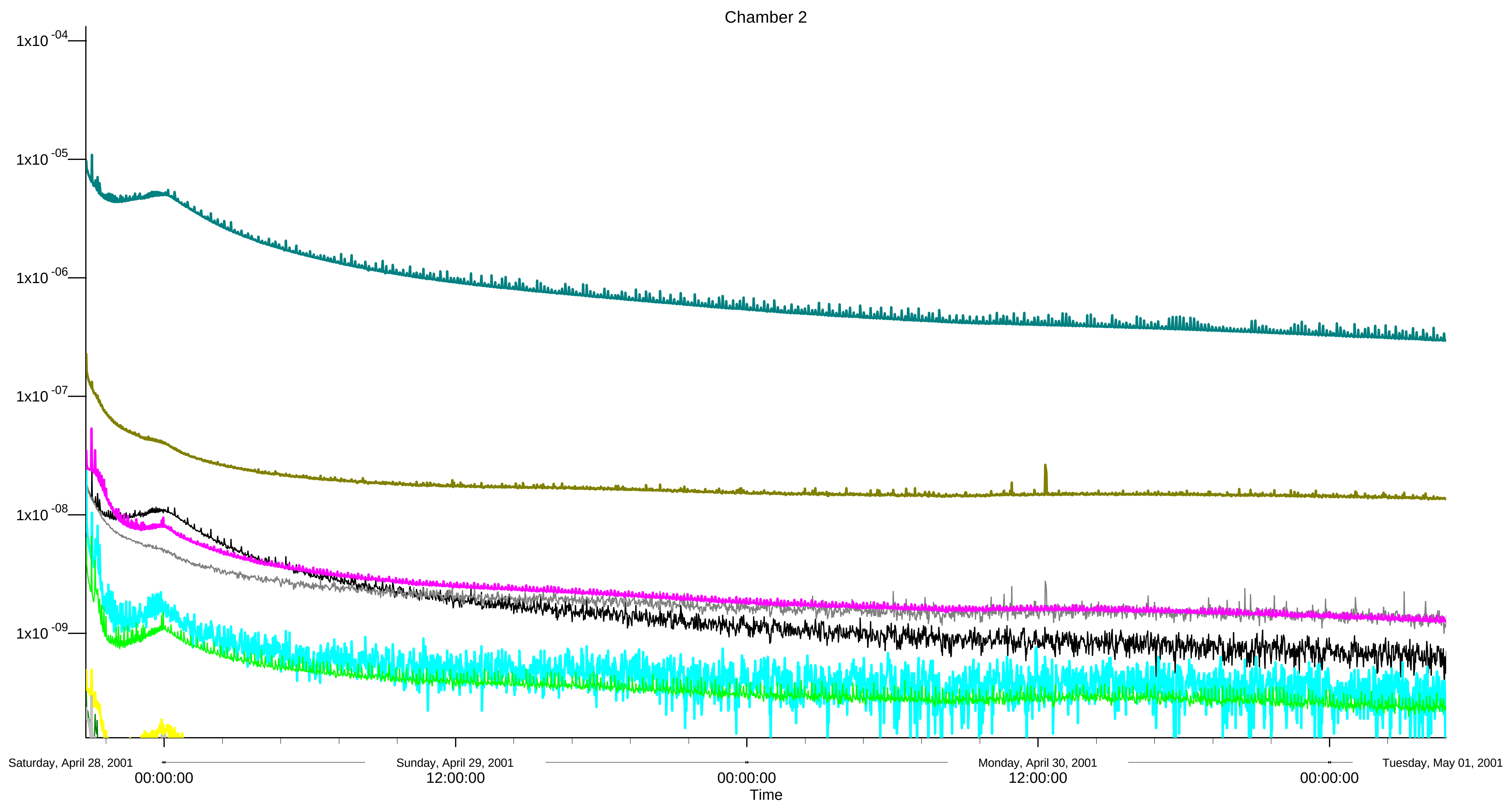
AIV-2001-027b-TVC PCU Outgassing Mass Barchart at Letup (50C)
10E-4 to 10E-9 Ranges



Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008

AIV-2001-027b-TVC Post-Test Thermal Profile

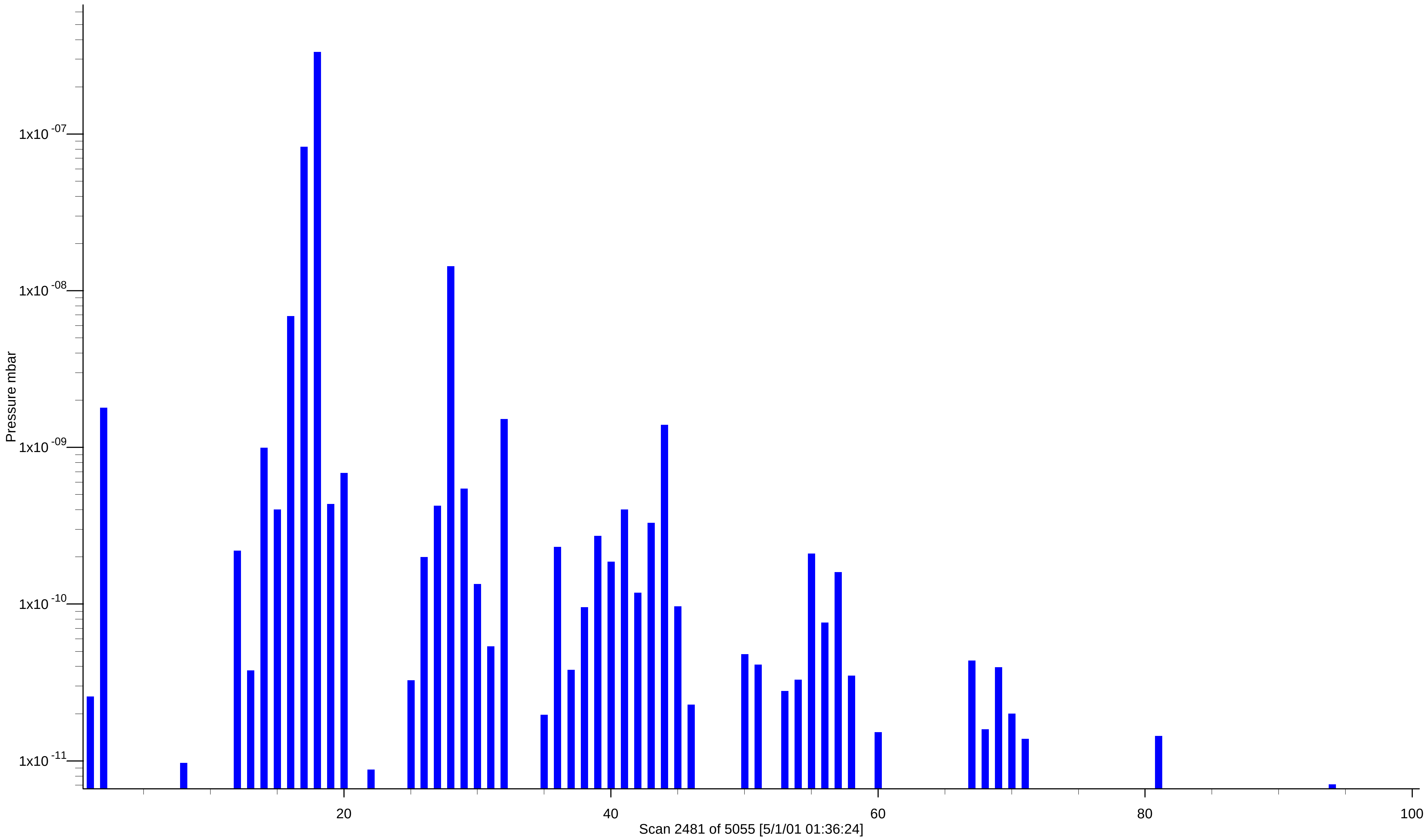
AIV-2001-027b-TVC Post-Test RGA Mass Trend



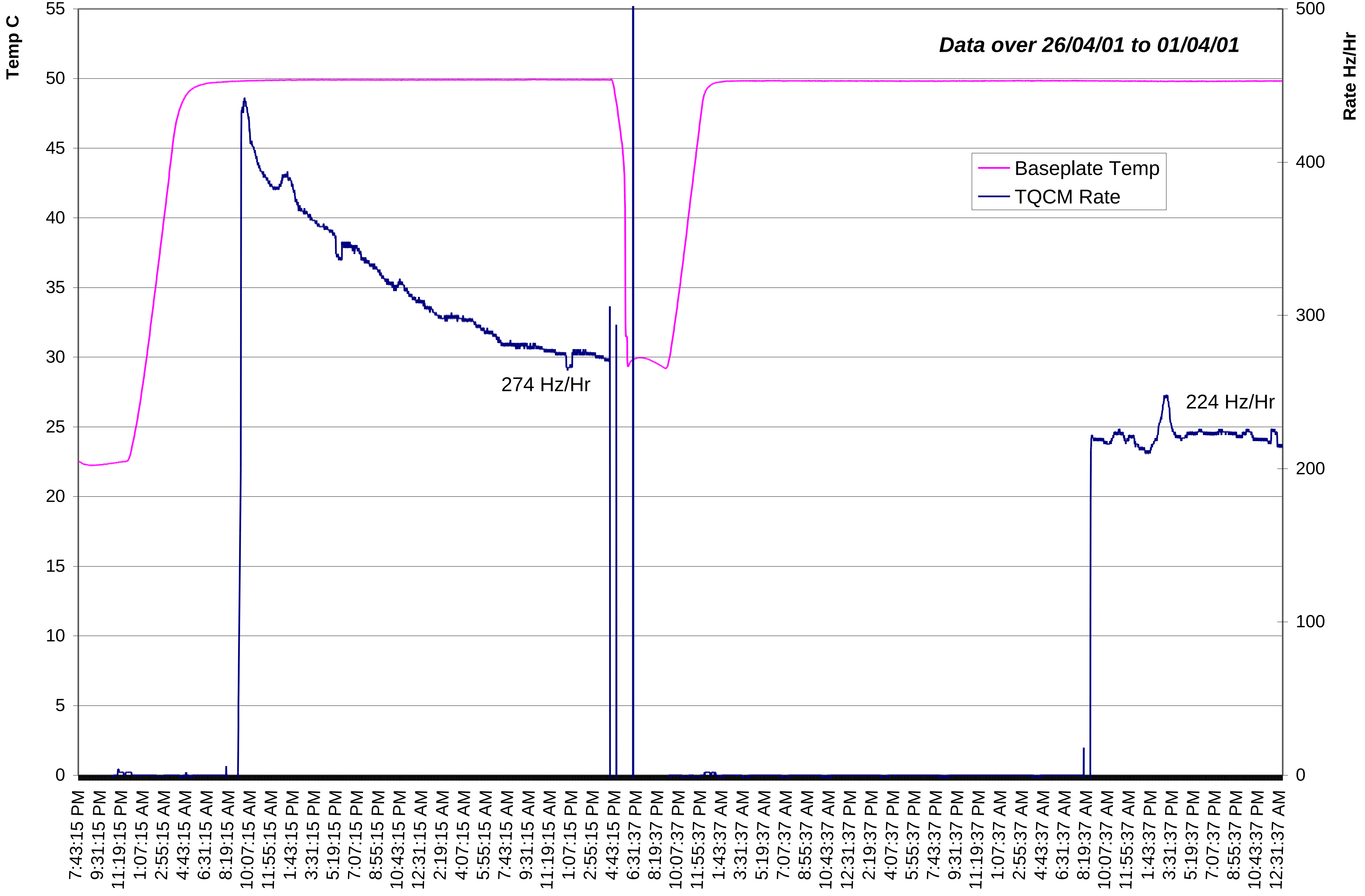
20 - Neon : From 2.19e-008 To 4.61e-010
18 - Water : From 9.72e-006 To 2.96e-007
28 - Nitrogen : From 2.29e-007 To 1.36e-008
32 - Oxygen : From 2.50e-008 To 1.14e-009
Hydrocarbon : From 2.34e-008 To 4.77e-011
4 - Helium : From 1.47e-011 To 3.18e-012
91 - Toluene : From 3.26e-010 To -2.46e-012
39 - Hydrocarbon : From 6.42e-009 To 2.42e-010
44 - Carbon dioxide : From 3.48e-008 To 1.27e-009
60 - Hydrocarbon : From 4.91e-010 To 9.38e-012
73 - Hydrocarbon : From 2.36e-010 To 8.90e-012

MKS Instruments, Spectra Products - Process Eye 2000

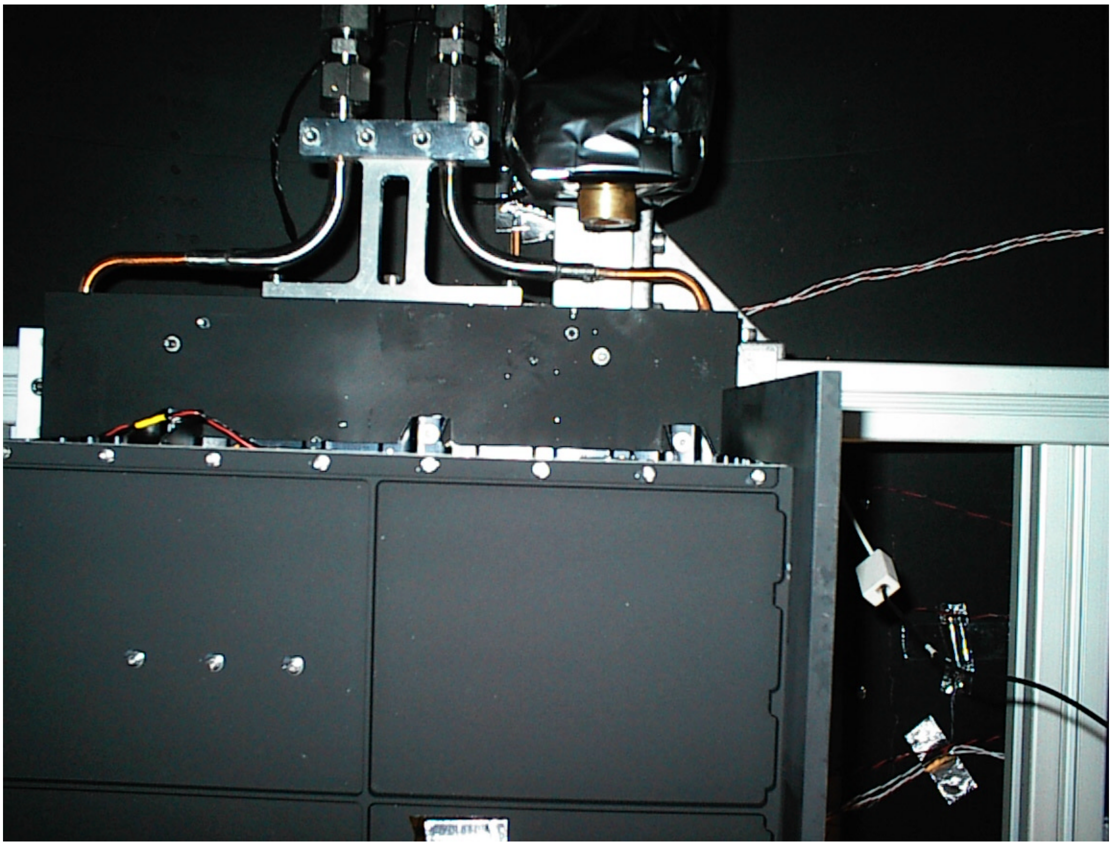
AIV-2001-027b-TVC Post-Test Mass Barchart at 50C
10E-7 to 10E-11 Ranges



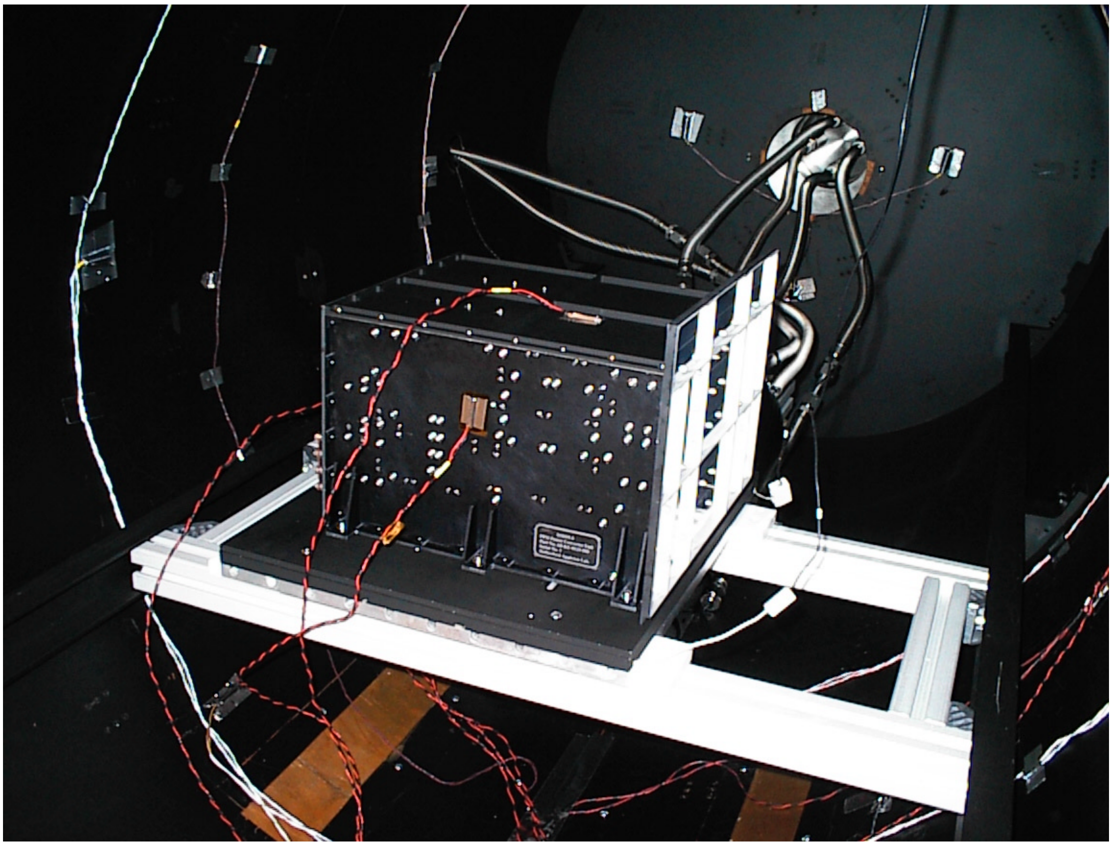
Ion source configuration: Standard Electron Energy
Detector: Faraday
Accuracy: 8
Instrument serial number: LM70-10899008


Data over 26/04/01 to 01/04/01
Temp C
Rate Hz/Hr
Baseplate Temp
TQCM Rate
274 Hz/Hr
224 Hz/Hr
55
50
45
40
35
30
25
20
15
10
5
0
500
400
300
200
100
0
7:43:15 PM
9:31:15 PM
11:19:15 PM
1:07:15 AM
2:55:15 AM
4:43:15 AM
6:31:15 AM
8:19:15 AM
10:07:15 AM
11:55:15 AM
1:43:15 PM
3:31:15 PM
5:19:15 PM
7:07:15 PM
8:55:15 PM
10:43:15 PM
12:31:15 AM
2:19:15 AM
4:07:15 AM
5:55:15 AM
7:43:15 AM
9:31:15 AM
11:19:15 AM
1:07:15 PM
2:55:15 PM
4:43:15 PM
6:31:37 PM
8:19:37 PM
10:07:37 PM
11:55:37 PM
1:43:37 AM
3:31:37 AM
5:19:37 AM
7:07:37 AM
8:55:37 AM
10:43:37 AM
12:31:37 PM
2:19:37 PM
4:07:37 PM
5:55:37 PM
7:43:37 PM
9:31:37 PM
11:19:37 PM
1:07:37 AM
2:55:37 AM
4:43:37 AM
6:31:37 AM
8:19:37 AM
10:07:37 AM
11:55:37 AM
1:43:37 PM
3:31:37 PM
5:19:37 PM
7:07:37 PM
8:55:37 PM
10:43:37 PM
12:31:37 AM

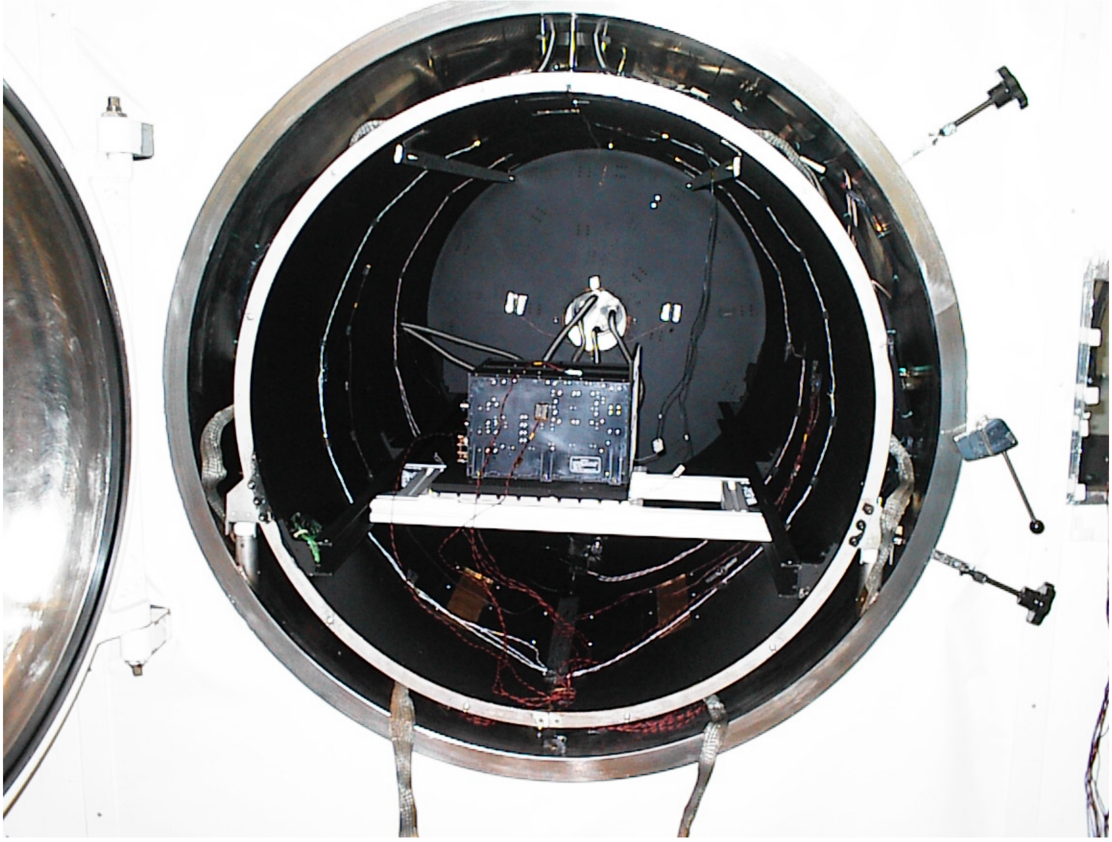
Annex C – Photographs.

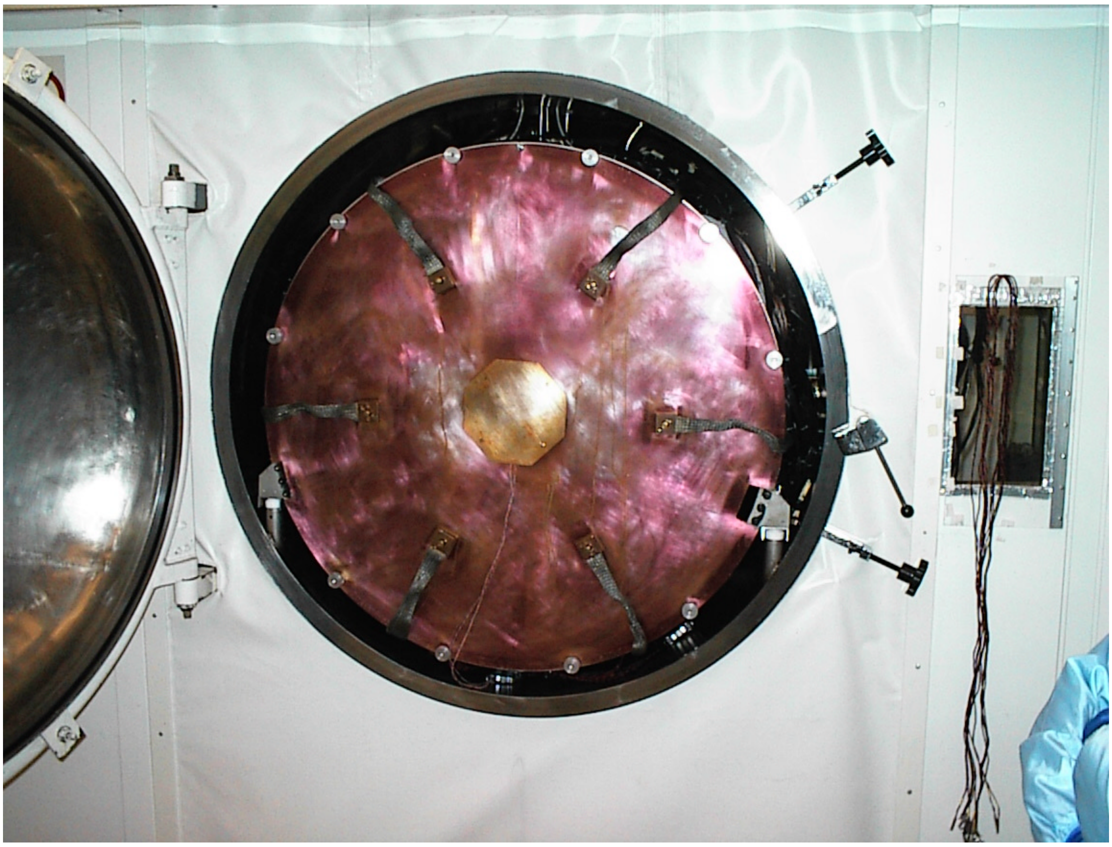


TQCM Position

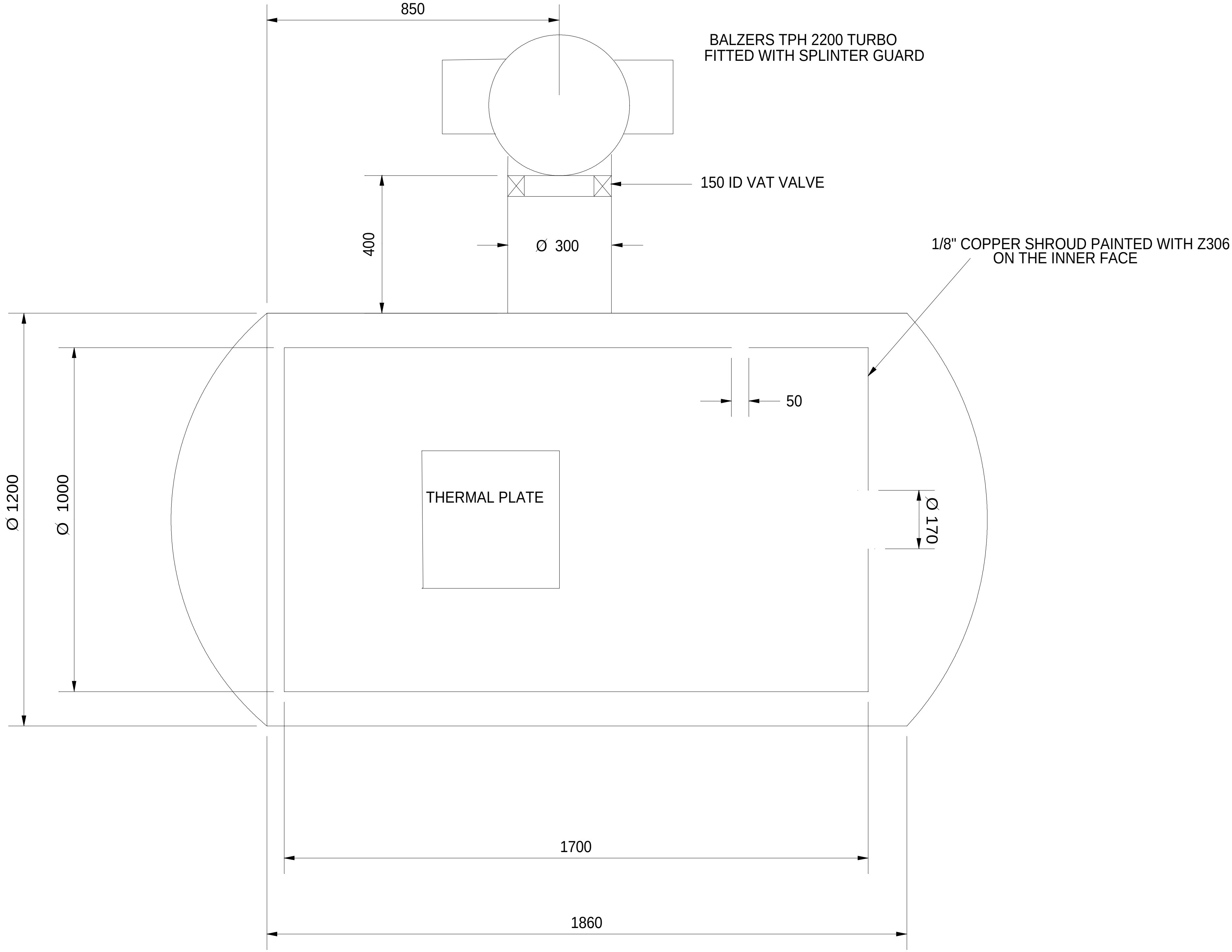


Sensor Positions


PCU Position within the Chamber


Chamber with end of shroud installed

Annex D – Chamber Layout Details


850
BALZERS TPH 2200 TURBO
FITTED WITH SPLINTER GUARD
150 ID VAT VALVE
400
Ø 300
1/8" COPPER SHROUD PAINTED WITH Z306
ON THE INNER FACE
50
Ø 1200
Ø 1000
THERMAL PLATE
Ø 170
1700
1860

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: D Rippington **Date: 1st May 2001.**

Subject / Title:	**HIRDLS PCU Vibration Test Report**

Contents / Description / Summary:

Test report from the PCU vibration tests conducted at RAL.

Reference RAL AIV Facility Report No. AIV-2001-.026

Key Words: Vibration Test Report

Purpose (20 characters maximum): Reporting of test data

Approved By: S Jaroslawski

Date: 2001-05-01

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-05-01	-	-	First Issue

SST DEPARTMENT

VIBRATION TEST FACILITY

REPORT REF: AIV-2001-026-VIB

HIRDLS : POWER CONVERTER UNIT

RUTHERFORD APPLETON LABORATORY
Vibration Facility
Chilton, Didcot,
Oxfordshire OX11 OQX

Tel: Abingdon (01235) 446617

CONTENTS

1) TEST ITEM DESCRIPTION

The test item consisted of the HIRDLS (High Resolution Dynamics Limb Sounder) ProtoFlight Model Reworked Power Converter Unit. It required testing in all three axes, X and Y-axes on the slip table and Z-axis on the head. A limited performance test (L.P.T.) would be carried out on the PCU at the end of testing in each axis.

2) TEST SPECIFICATION

The qualification specification levels were given in document ref. TP-RAL-201 Issue 3 dated 14/03/2001.It was also necessary to carry out further testing to the levels referred to in the Workmanship Vibration procedure ref. TP-RAL-217 dated 04/08/2000. A low level sine survey was to be followed by a sine dwell, random and a further low level sine for all axes. A triaxial accelerometer was to be used for monitoring.

SINE SURVEY TEST

One sweep @ 0.2g from 5 Hz to 2000 Hz at 2 octaves per minute.

SINE DWELL

Level:- 13g

Frequency:- 20 Hertz

Duration:- 0.5 sec (10 cycles)

RANDOM

Z AXIS

FREQUENCY (Hz)	TEST LEVEL (g^2 / Hz)
20	0.01
50	0.05
70 - 100	0.5
120 - 140	1.5
200 - 300	0.12
400 - 800	0.025
2000	0.01

Overall Test Level = 12.05 g rms. for 60 seconds

RANDOM

X AXIS

FREQUENCY (Hz)	TEST LEVEL (g^2 / Hz)
20	0.01
60 - 80	0.30
300 - 800	0.02
2000	0.01

Overall Test Level = 7.34 g rms. for 60 seconds

RANDOM

Y AXIS

FREQUENCY (Hz)	TEST LEVEL (g^2 / Hz)
20	0.01
50	0.02
70 - 80	0.5
180 - 500	0.05
2000	0.01

Overall Test Level = 8.52 g rms. for 60 seconds

RANDOM WORKMANSHIP LEVELS

Y AXIS

FREQUENCY (Hz)	TEST LEVEL (g^2 / Hz)
20	0.01
80	0.04
500	0.04
2000	0.01

Overall Test Level = 6.8 g rms. for 60 seconds

3) PRE-TEST ACCELEROMETER VERIFICATION

Control System:

The calibrated control accelerometer (Endevco Type 7254A-100 (99.78mV/g) Serial No. 11923), was fastened onto the head of the LDS 954 shaker.

At a Frequency of 44.226 Hz with a displacement of 0.1 inches peak to peak, thus acceleration of 10 g peak the response of the auxiliary accelerometers were recorded. Also a 10 – 2000 Hz Sine Sweep run at 0.5 g at 2 octaves per minute was carried out to check the response of the accelerometers. Plots of the above runs are available for inspection, although not included in this report.

Auxiliary Accelerometers: -

ENDEVCO TRIAXIAL 2258A-10 Serial No. 11286

SERIAL NUMBER	CALIBRATION mV/g	Date	SIGNAL CONDITIONER
11286 X	10.32	08/05/01	**DYTRAN**
11286 Y	10.27	08/05/01	MODEL E4121
11286 Z	10.35	08/05/01	SERIAL No. 225

Control Accelerometer : Endevco Type 7254A-100 (99.78 mV/g) Serial No. 11923
Next Calibration due**:** 8 May 2001

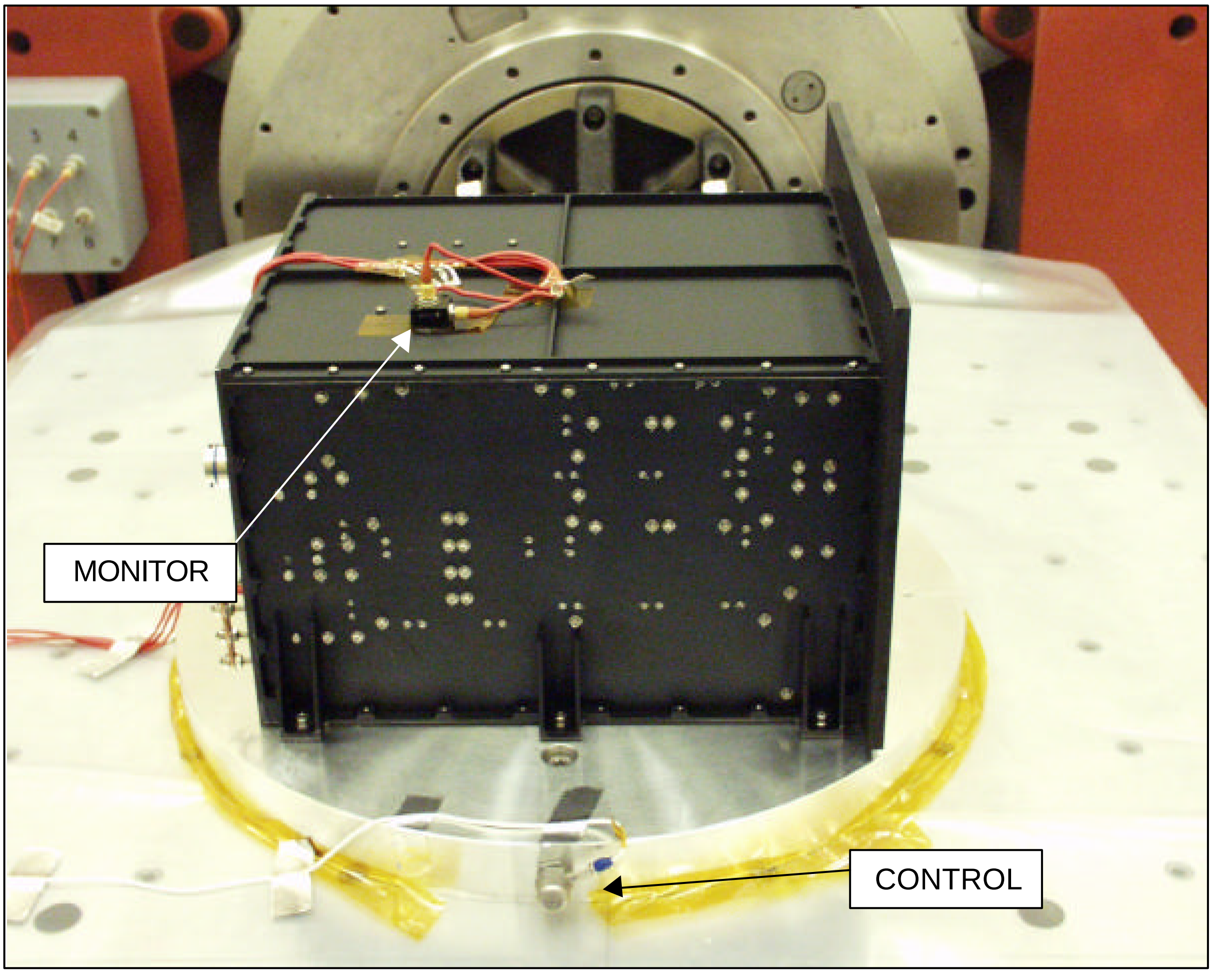
Signal Conditioner: Dytran model E4121 Serial No. 225
Next Calibration due**:** 18 July 2001

4) CLEANLINESS

The PCU was fully enclosed within suitable cleanroom material during transportation to the Vibration Test Facility. All personnel in the Vibration Test Hall wore clean room coats and hats whilst the PCU was unbagged.

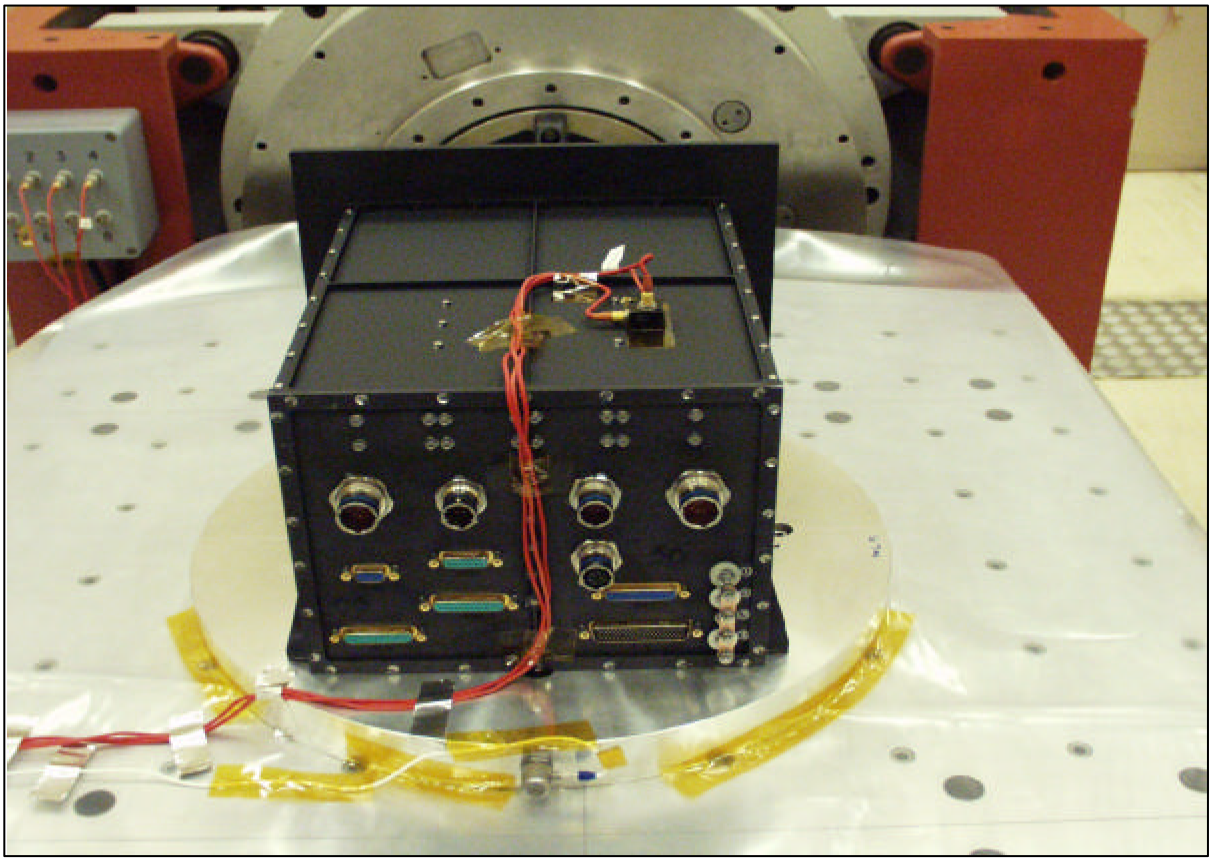
5) FIXTURE DETAILS

X AXIS TEST CONFIGURATION

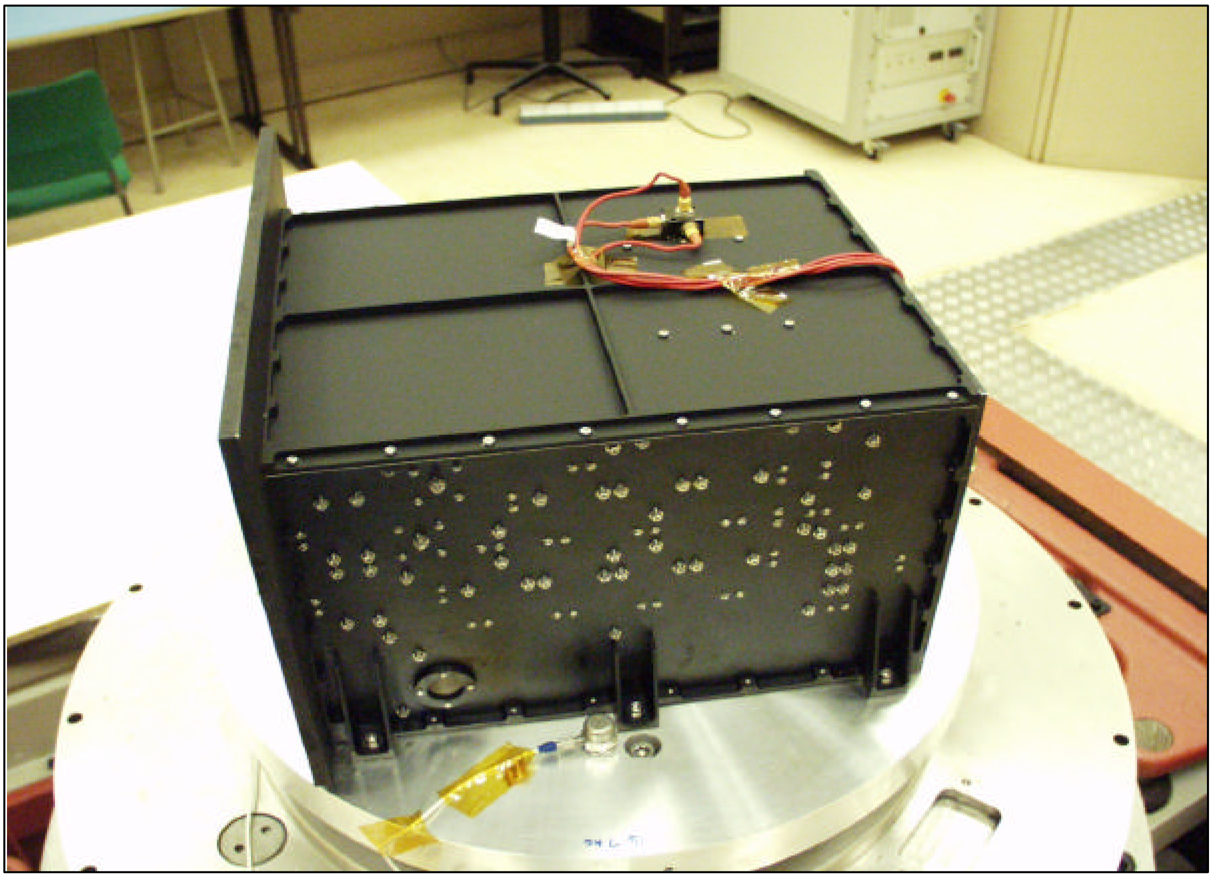


A view of the test item mounted on its vibration fixture. The control accelerometer can be seen attached to the fixture via an isolating stud. The monitoring accelerometer (triaxial assembly) can be seen attached to the top of the PCU.

Y AXIS TEST CONFIGURATION



Z AXIS TEST CONFIGURATION



6) TEST SUMMARY

Test Dates: 15 & 19 April 2001

Observers: Stan Jaroslawski, Alan Pearce and Nigel Morris.

Organisation **:** RAL

CHANNEL ALLOCATION:

CONTROL:-

Channel No.	Accelerometer Type/Serial No.	Testing Axis	Mounting Position
1	Endevco 11923	In Axis	Fixture

MONITORING:-

Channel No.	Accelerometer Type/Serial No.	Testing Axis	Mounting Position
2	Endevco 11286 X	**Y**	Test Item
3	Endevco 11286 Y	**X**	Test Item
4	Endevco 11286 Z	**Z**	Test Item

NOTE

On completion of testing in the Z-axis (final axis) it was discovered that one of the relays was not switching on an output. On inspection of the telemetry this fault could be traced to having occurred after testing in the Y-axis.

On investigation it was discovered a transistor had a 5.4-ohm resistance between collector and emitter. This was replaced and a Limited Performance Test confirmed the wellbeing of the unit. The faulty transistor, along with others from the same batch were sent away for D.P.A. (Destructive Parts Analysis)

ACCELEROMETER TEST PLOTS

VIBRATION TESTS in the X-axis

RUN 00002 SINE SURVEY *FIG 1*

***RUN 00002** SINE DWELL *FIG 2**

RUN 00003 RANDOM *FIG 3*

RUN 00003 POST RANDOM SINE SURVEY *FIG 4*

VIBRATION TESTS in the Y-axis

RUN 00004 SINE SURVEY *FIG 5*

***RUN 00003** SINE DWELL *FIG 6**

RUN 00002 RANDOM *FIG 7*

RUN 00005 POST RANDOM SINE SURVEY *FIG 8*

VIBRATION TESTS in the Z-axis

RUN 00006 SINE SURVEY *FIG 9*

***RUN 00004** SINE DWELL *FIG 10**

RUN 00003 RANDOM *FIG 11*

RUN 00007 POST RANDOM SINE SURVEY *FIG 12*

VIBRATION TESTS in the Y-axis (Workmanship Levels)

RUN 00009 SINE SURVEY *FIG 13*

RUN 00004 RANDOM *FIG 14*

RUN 00010 POST RANDOM SINE SURVEY *FIG 15*

NOTE
Due to the short duration of the sine dwell tests (0.5 seconds) and the limitations of the control software it was not possible to plot any data in graphical terms. However data is displayed in annotated form on each plot. (R.M.S. MAX, MIN, Pk to Pk and MEAN)

7) CONCLUSION

The test item was subjected to the levels of vibration on 15/04/01 as detailed by document ref. TP-RAL-201 Issue 3 dated 14/03/2001. As documented in the test summary problems were encountered during testing. The PCU was re-tested on 19/04/01 in the Y-axis only to workmanship levels as specified by ref. TP-RAL-217 dated 04/08/2000. No visible damage occurred during testing and a L.P.T. revealed no further problems.

FACILITY OPERATOR: -

Signature.............................. Date…………. 2001

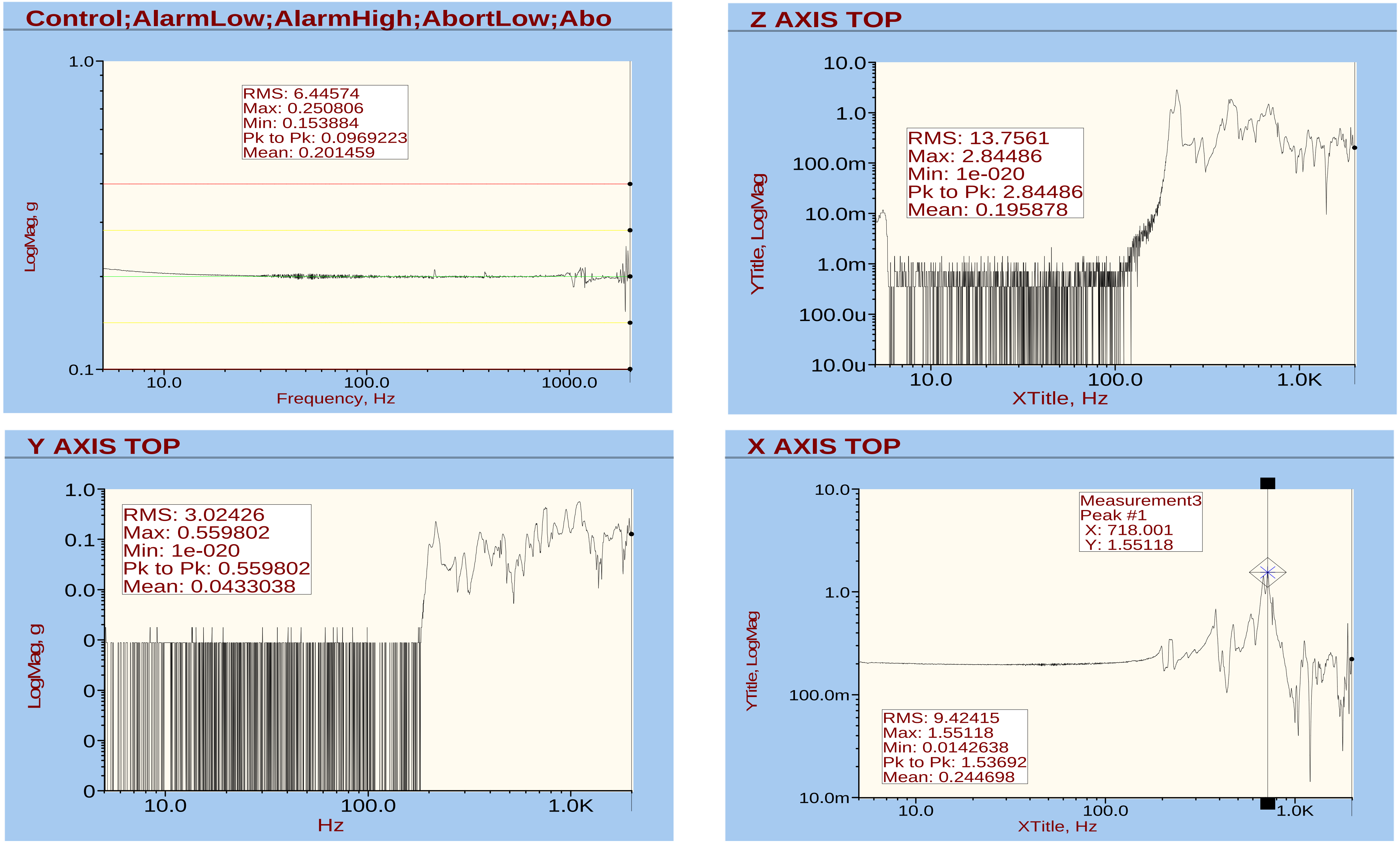
David RIPPINGTON

FACILITY MANAGER:-

Signature.............................. Date………..... 2001

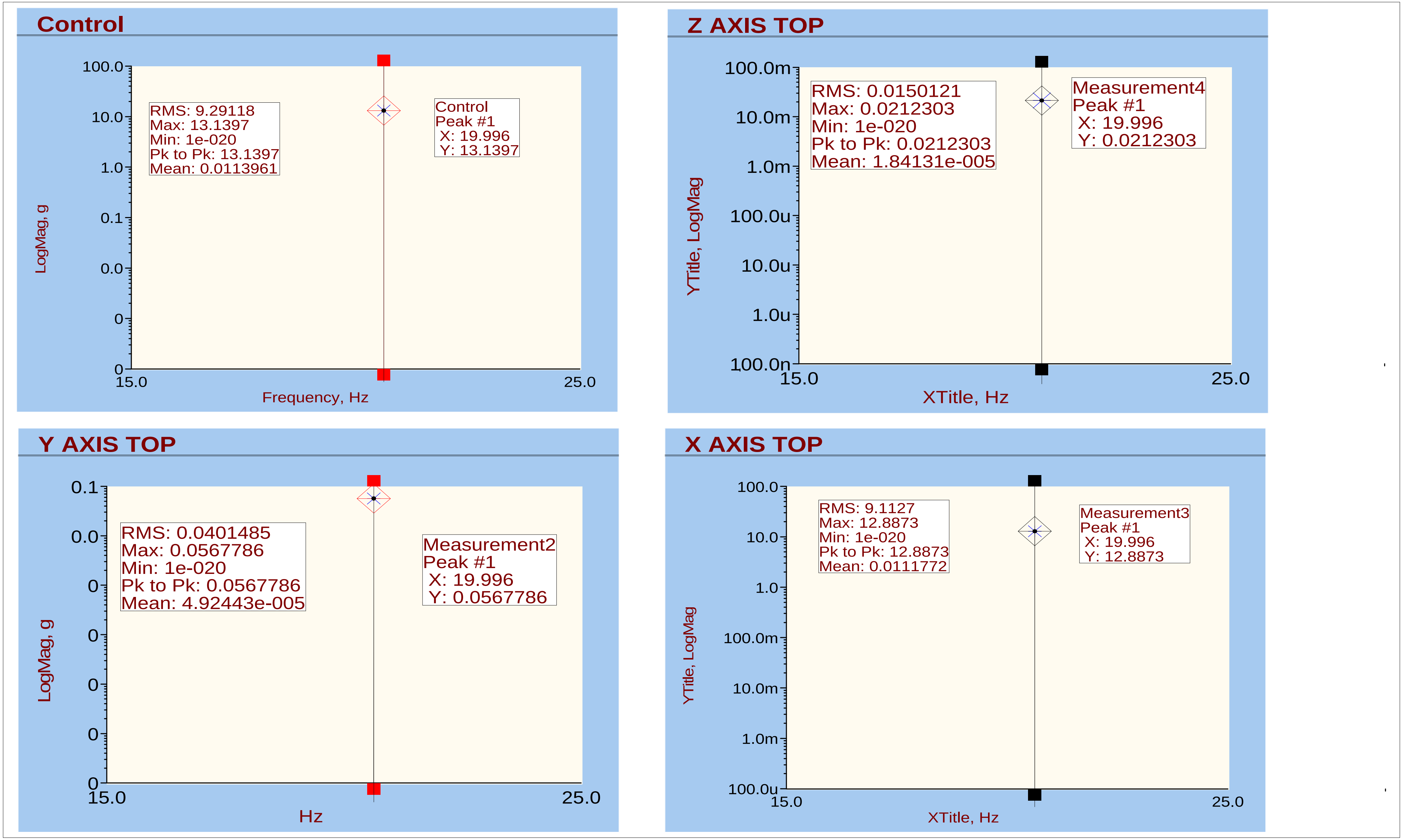
Graham TOPLIS

ANNEX:A ACCELEROMETER PLOTS



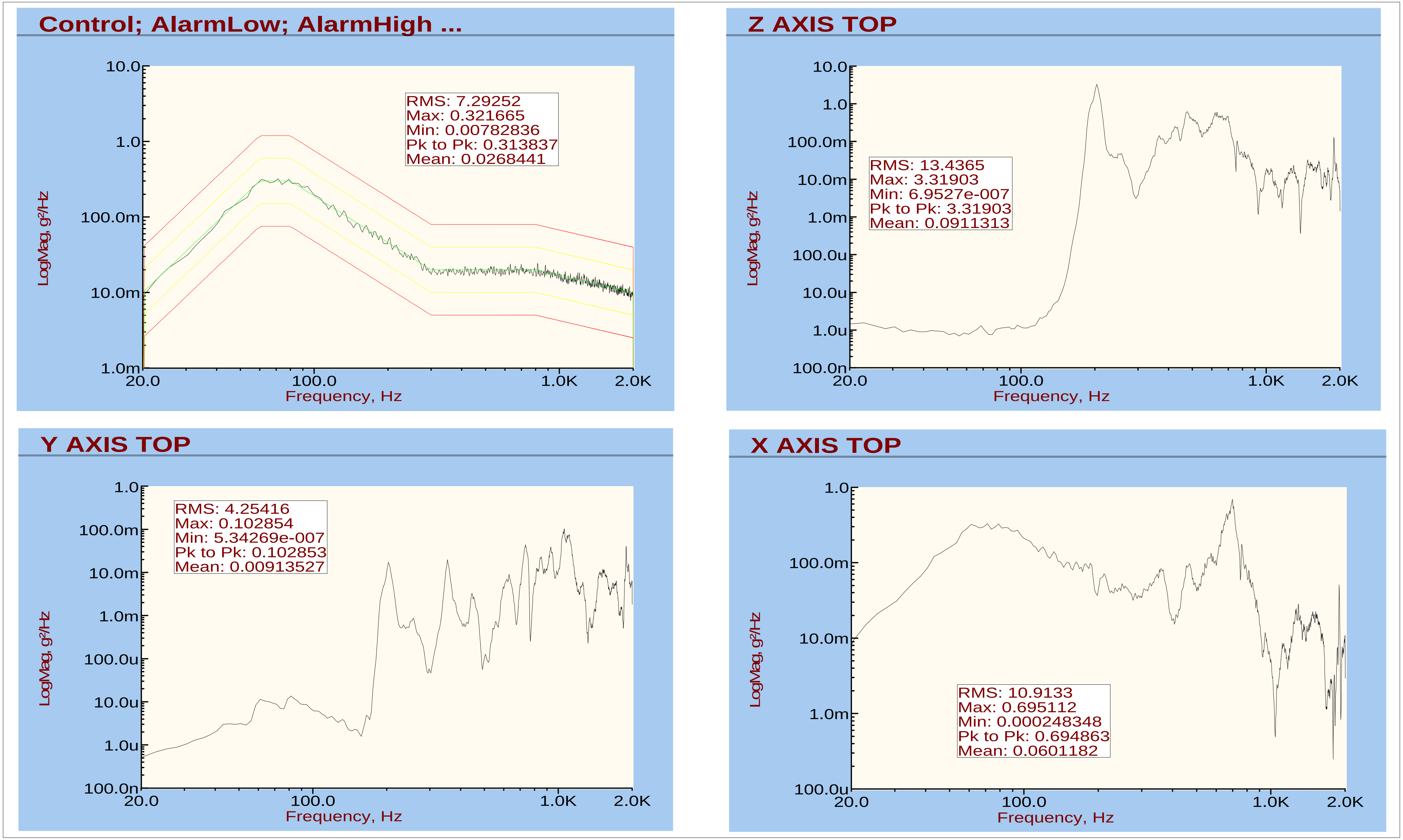
HIRDLS REWORKED PFM PCU SINE SURVEY
RUN 00002
X AXIS
09:36:24 15/04/2001

FIG 1



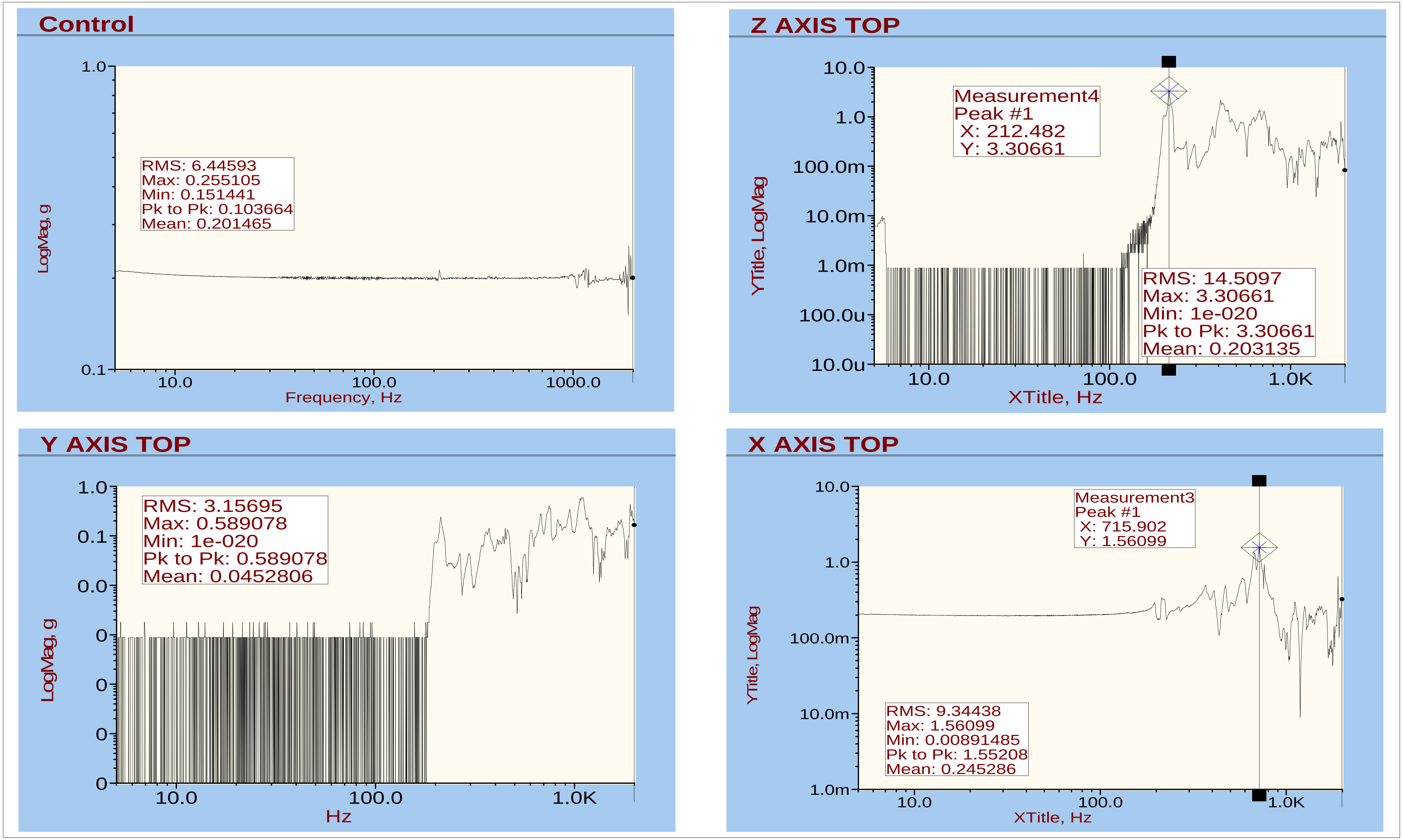
HIRDLS REWORKED PFM PCU SINE DWELL
RUN 00002
X AXIS
09:49:30 15/04/2001

FIG 2



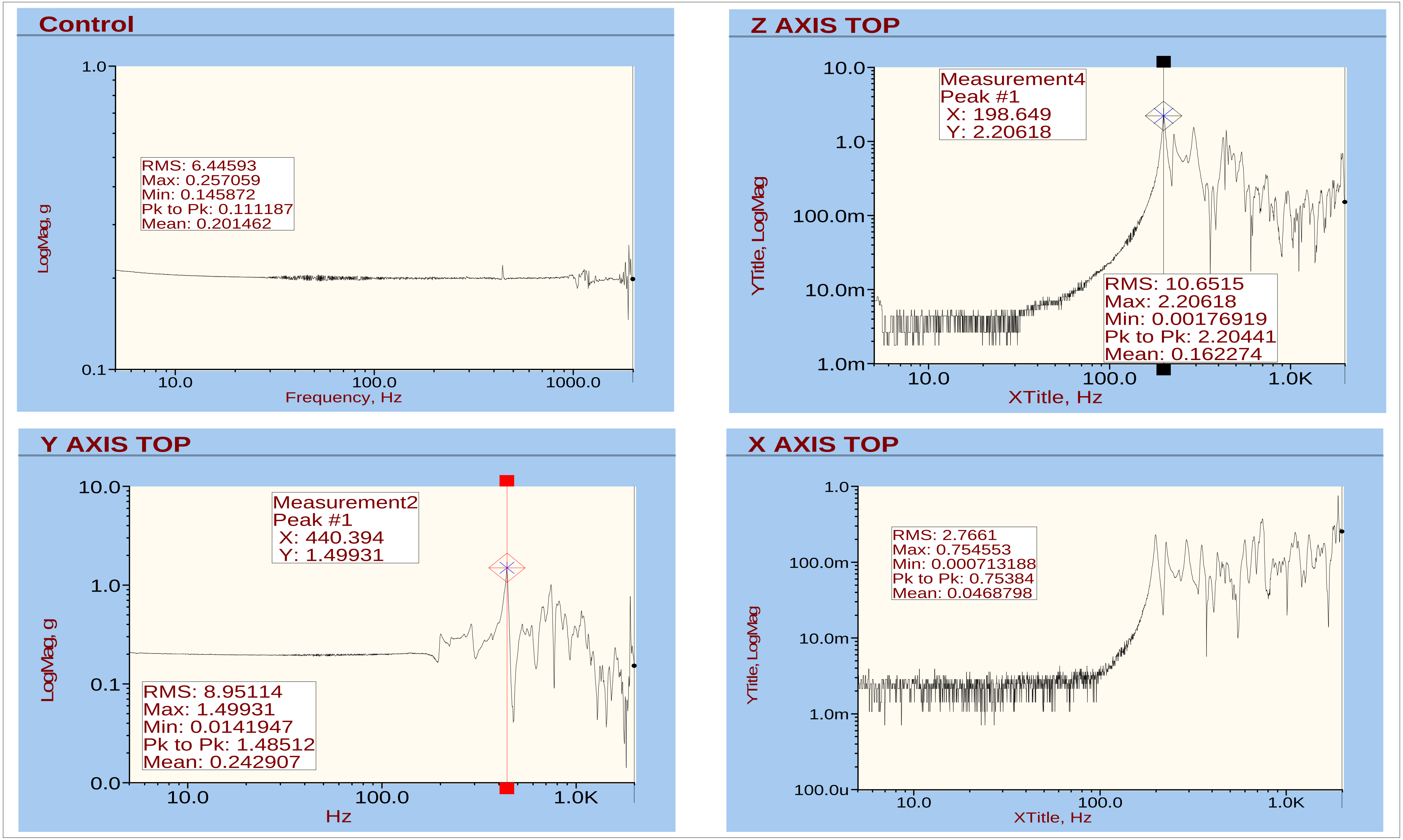
HIRDLS REWORKED PFM PCU RANDOM
RUN 00003
X AXIS
09:56:21 15/04/2001

FIG 3



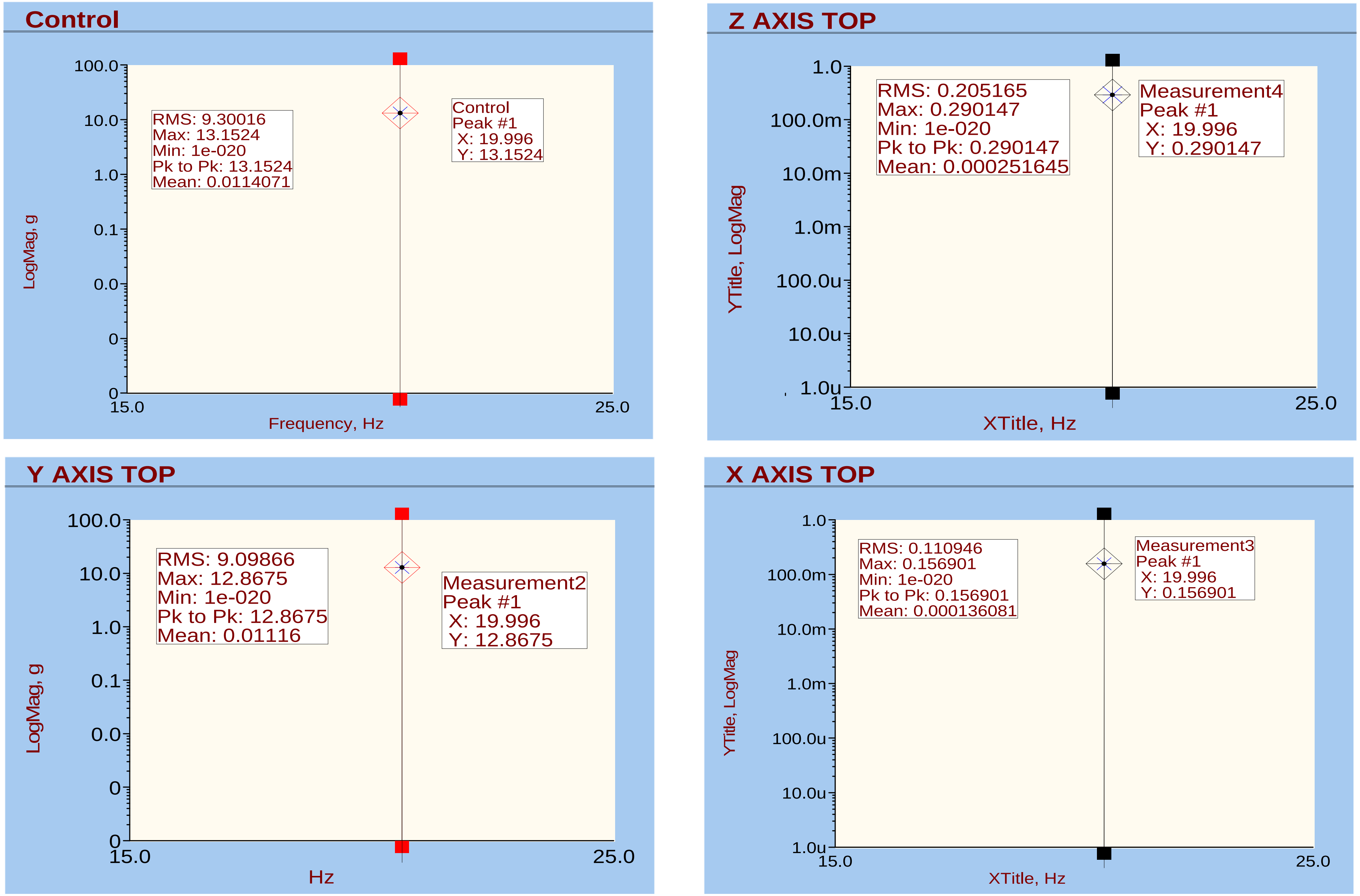
HIRDLS REWORKED PFM PCU   POST RANDOM SINE SURVEY
RUN 00003
X AXIS
09:59:04   15/04/2001

FIG 4



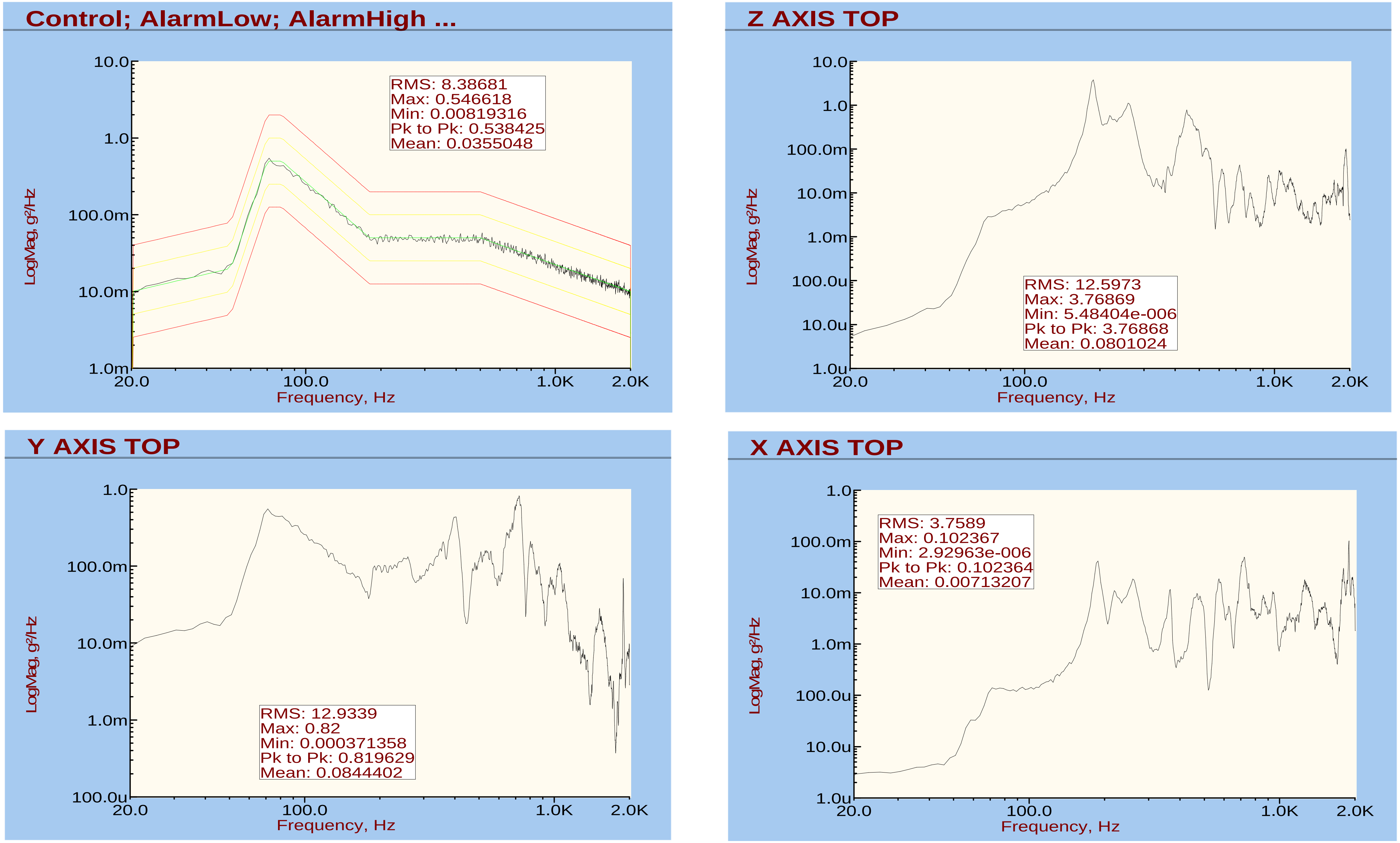
HIRDLS REWORKED PFM PCU SINE SURVEY
RUN 00004
Y AXIS
11:59:01 15/04/2001

FIG 5



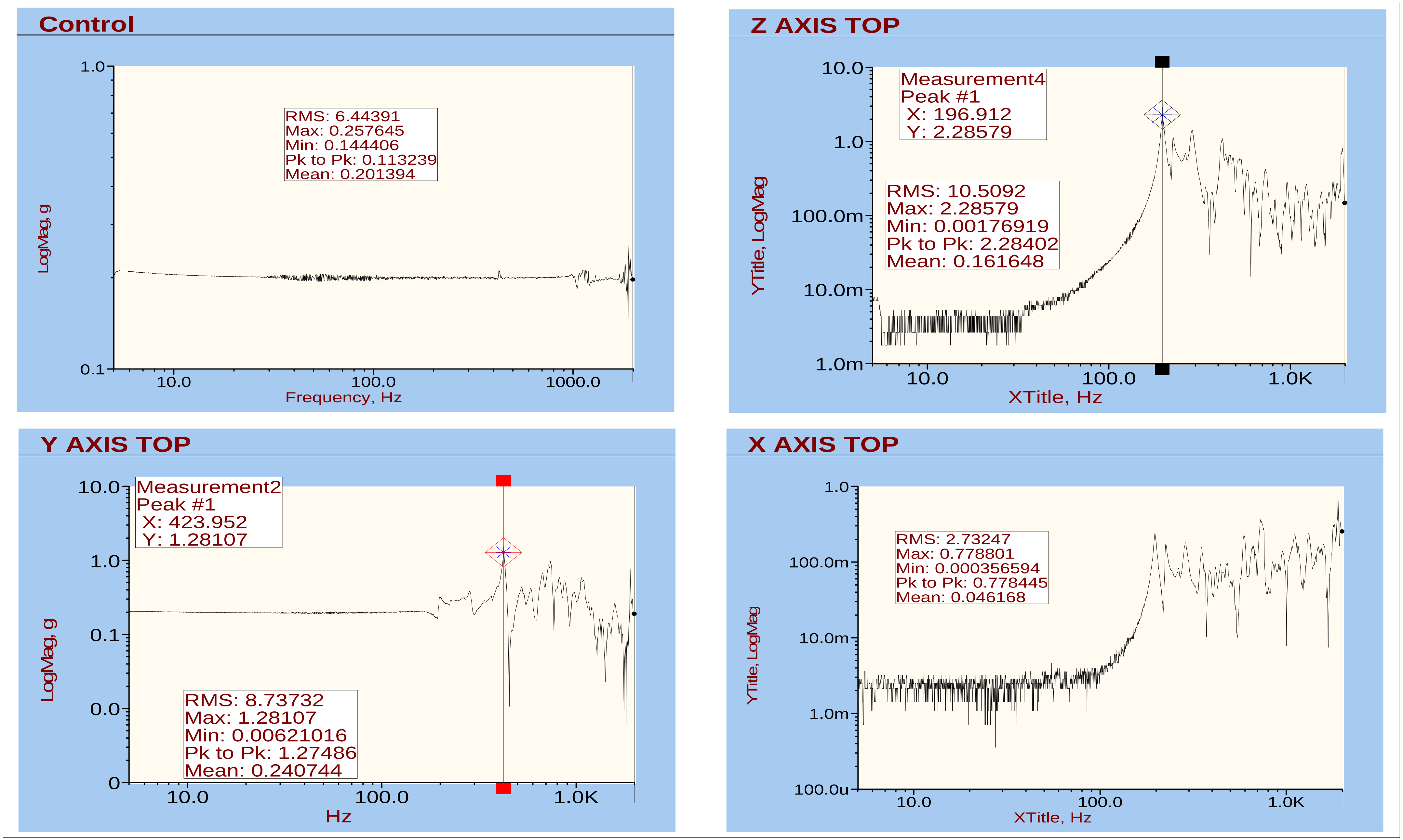
HIRDLS REWORKED PFM PCU   SINE DWELL
RUN 00003
Y AXIS
12:08:57   15/04/2001

FIG 6



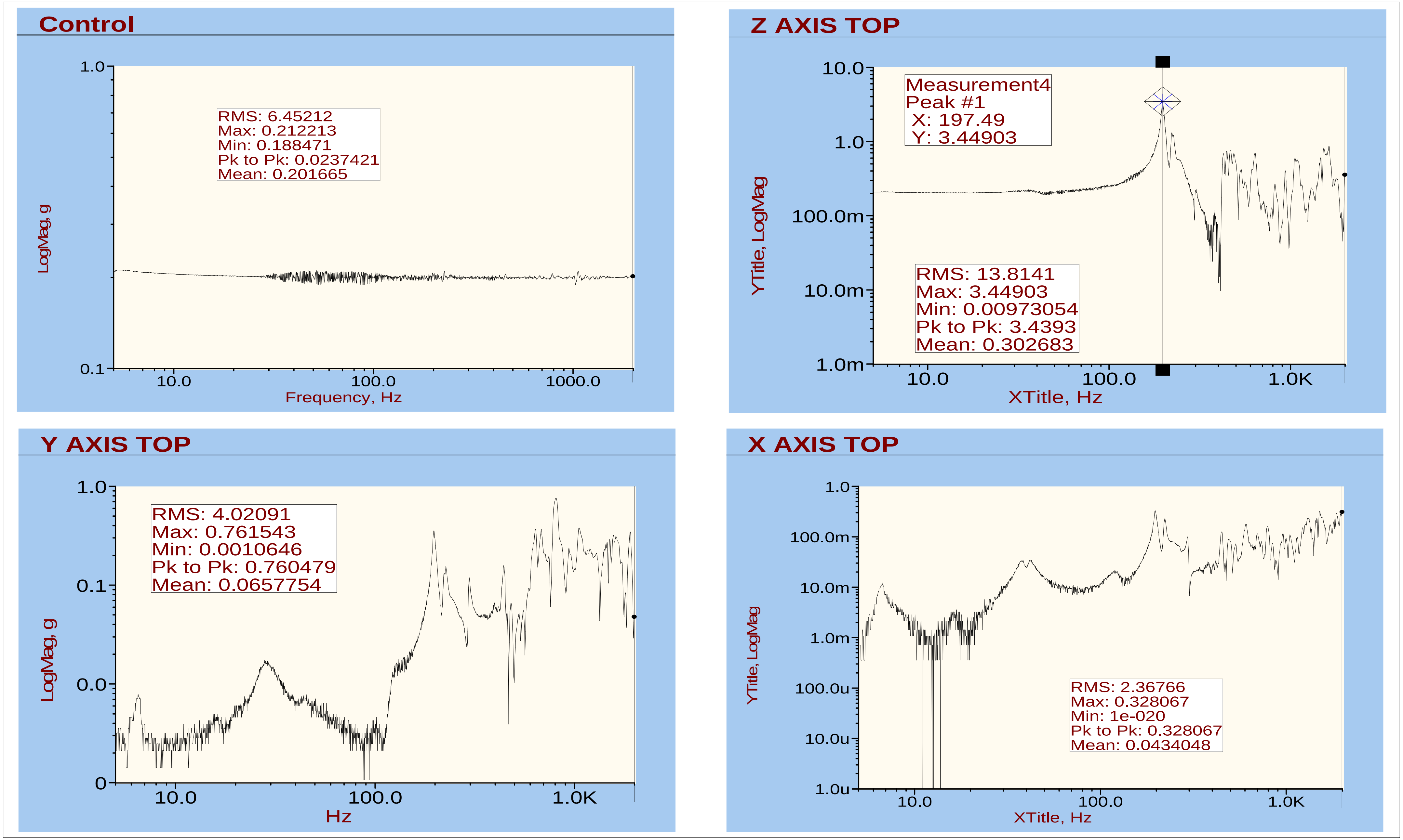
HIRDLS REWORKED PFM PCU RANDOM
RUN 00002
Y AXIS
12:14:32 15/04/2001

FIG 7



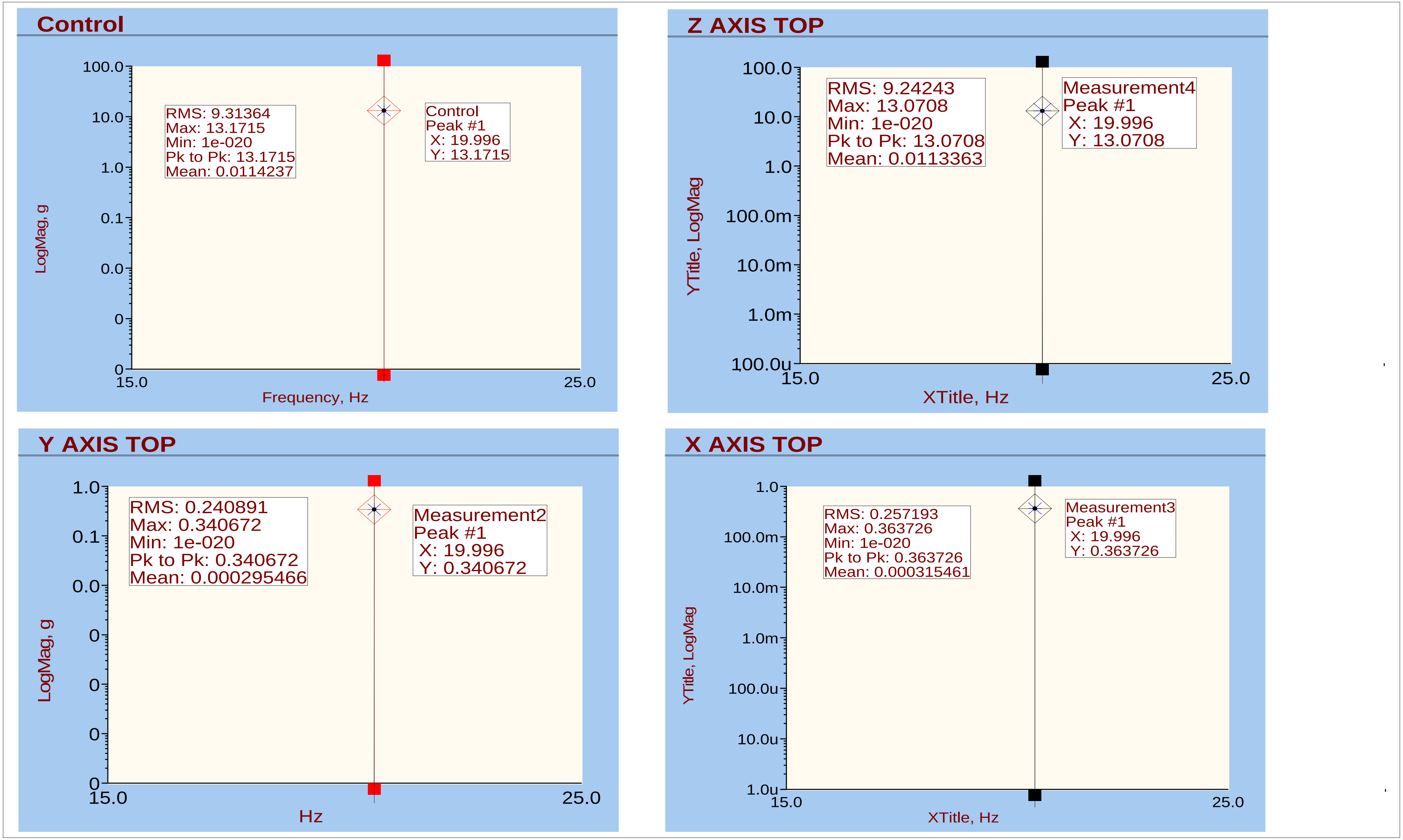
HIRDLS REWORKED PFM PCU POST RANDOM SINE SURVEY
RUN 00005
Y AXIS
12:16:25 15/04/2001

FIG 8



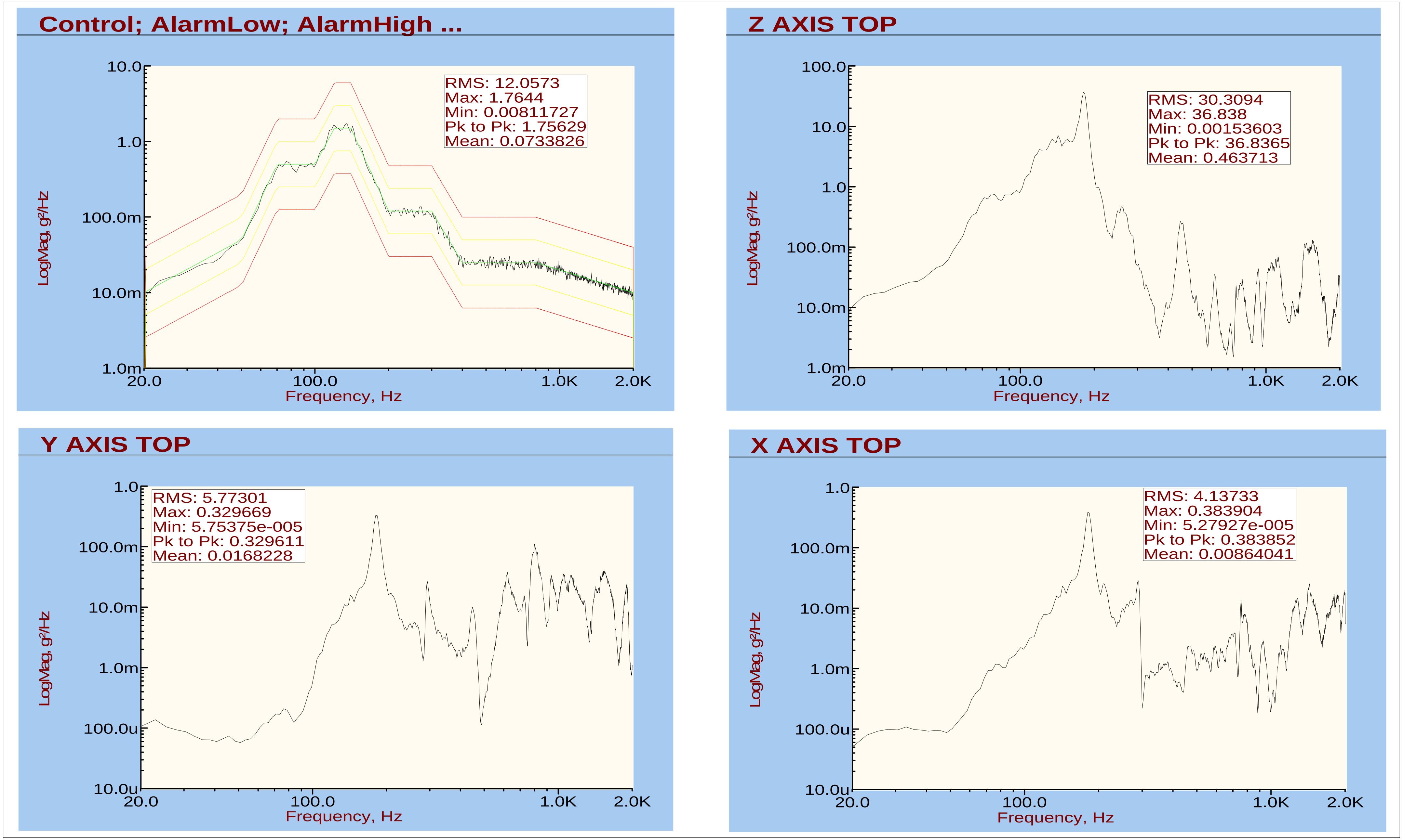
HIRDLS REWORKED PFM PCU SINE SURVEY
RUN 00006
Z AXIS
14:26:59 15/04/2001

FIG 9



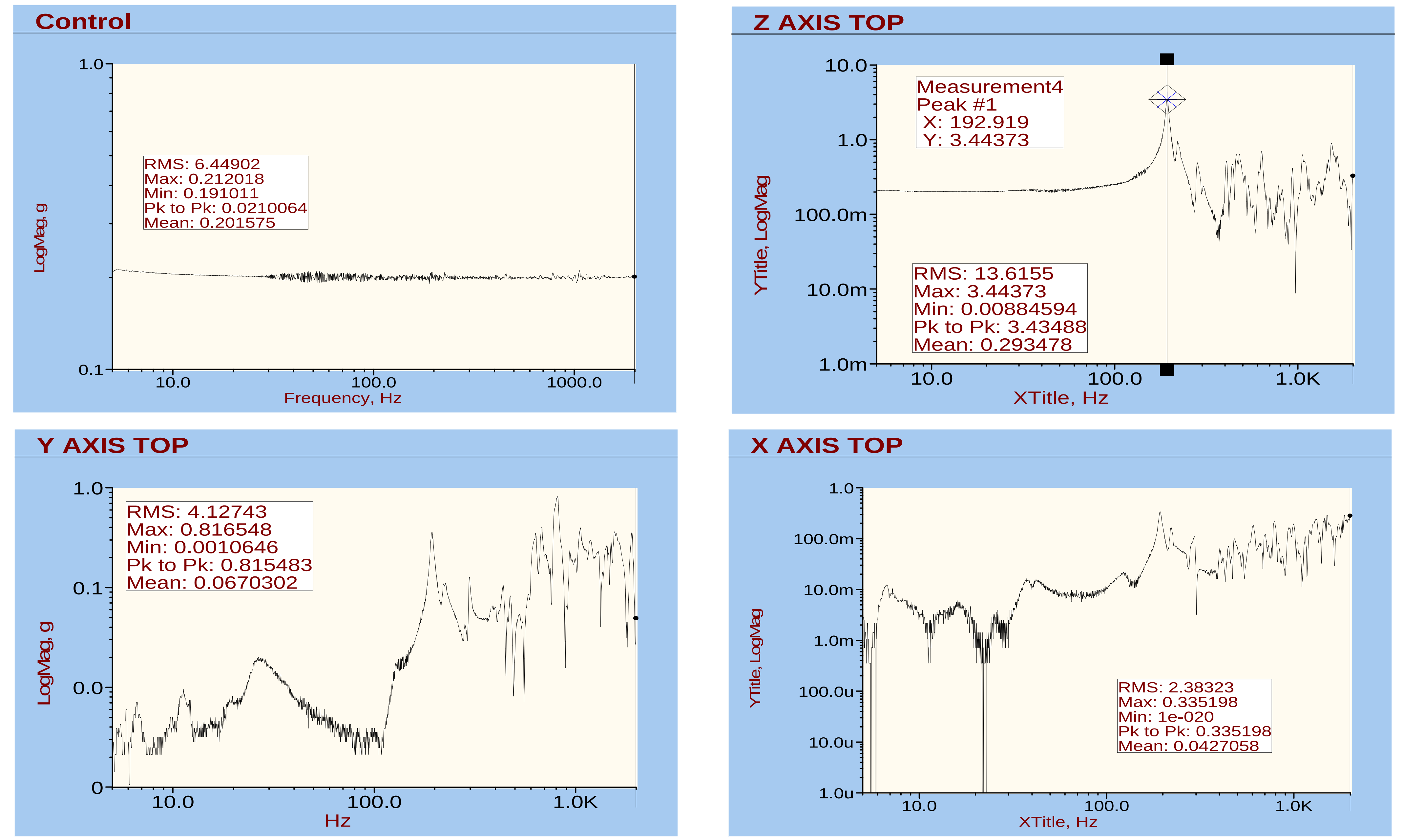
HIRDLS REWORKED PFM PCU   SINE DWELL
RUN 00004
Z AXIS
14:32:35   15/04/2001

FIG 10



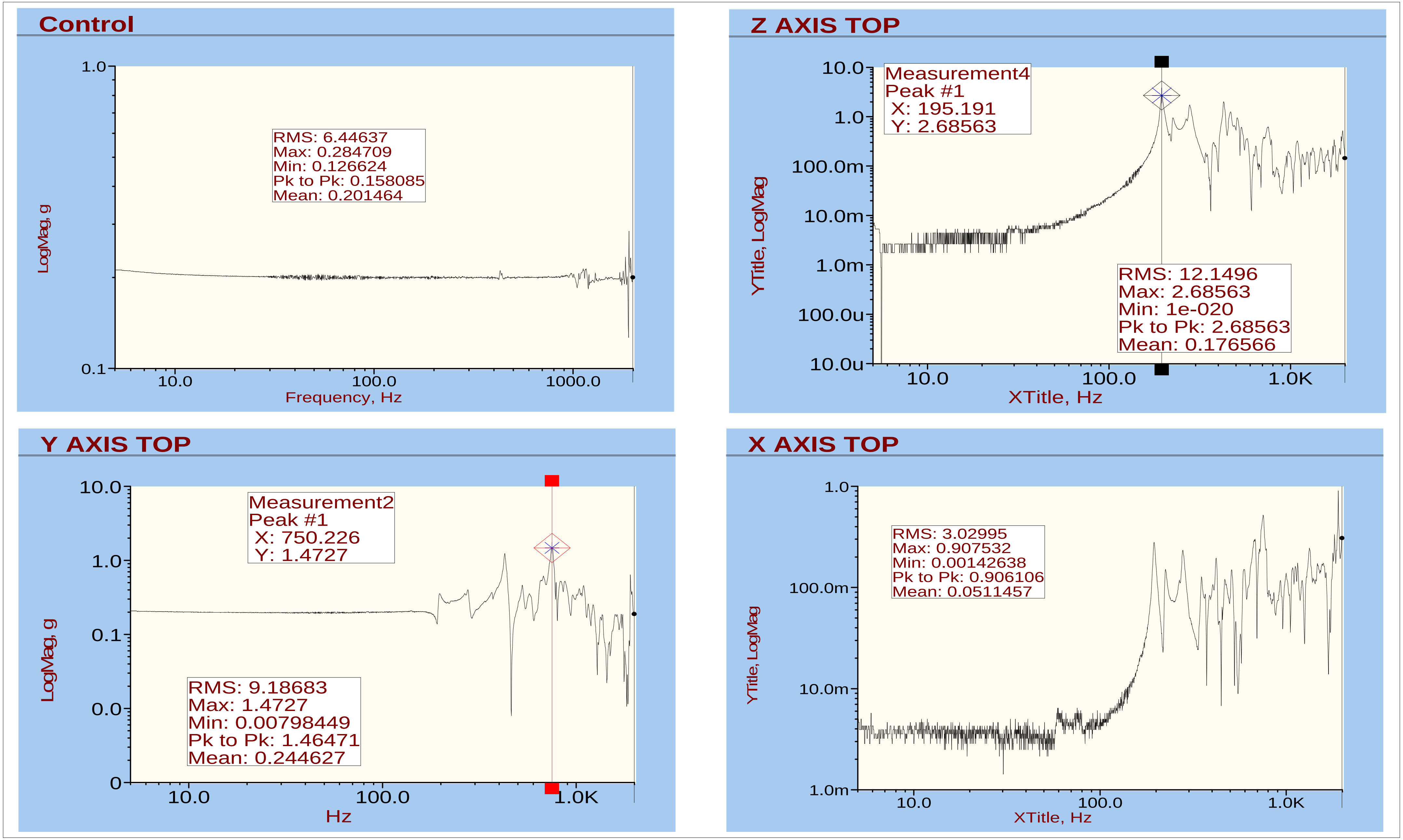
HIRDLS REWORKED PFM PCU RANDOM
RUN 00003
Z AXIS
14:39:28 15/04/2001

FIG 11



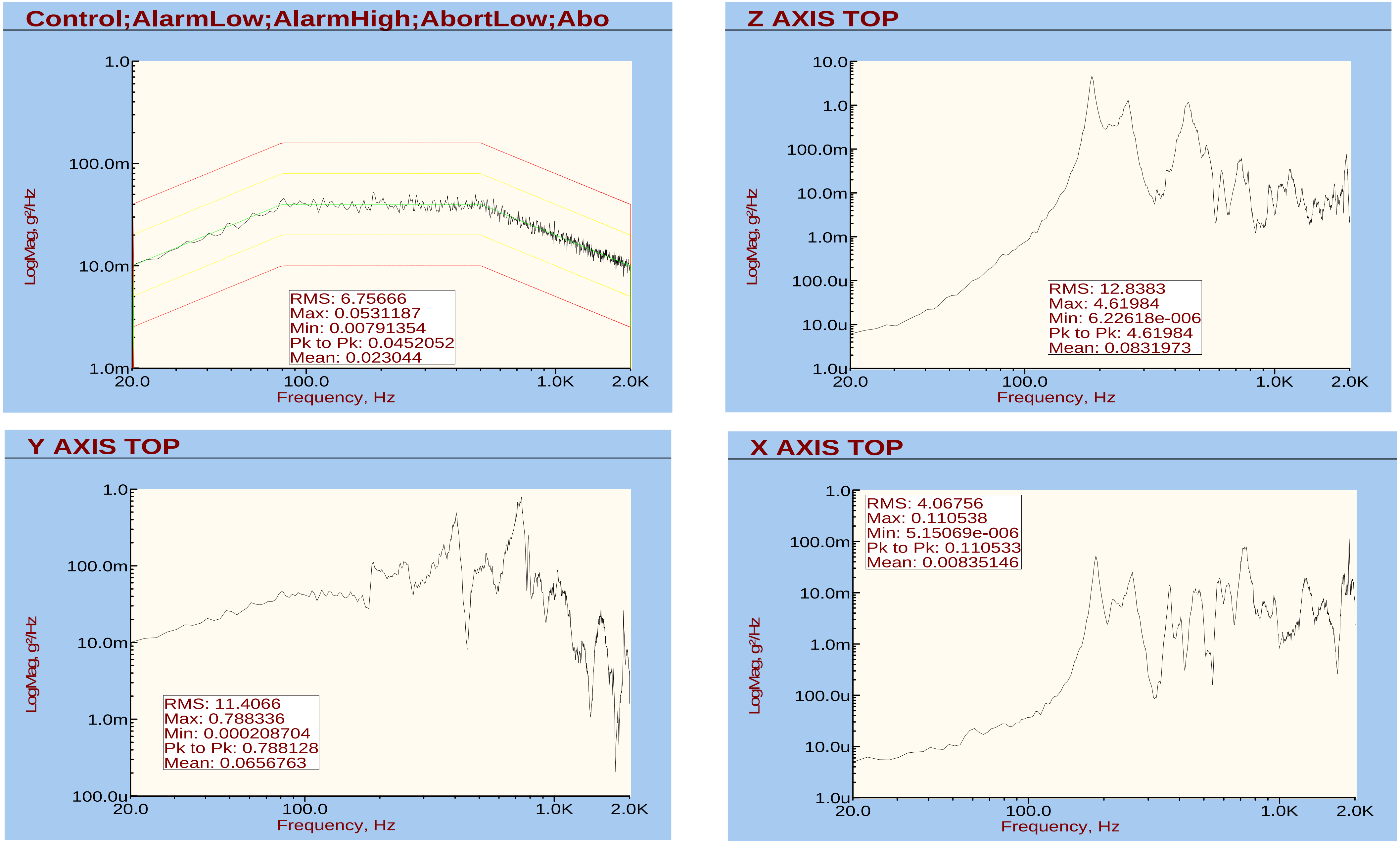
HIRDLS REWORKED PFM PCU POST RANDOM SINE SURVEY
RUN 00007
Z AXIS
14:43:12   15/04/2001

FIG 12



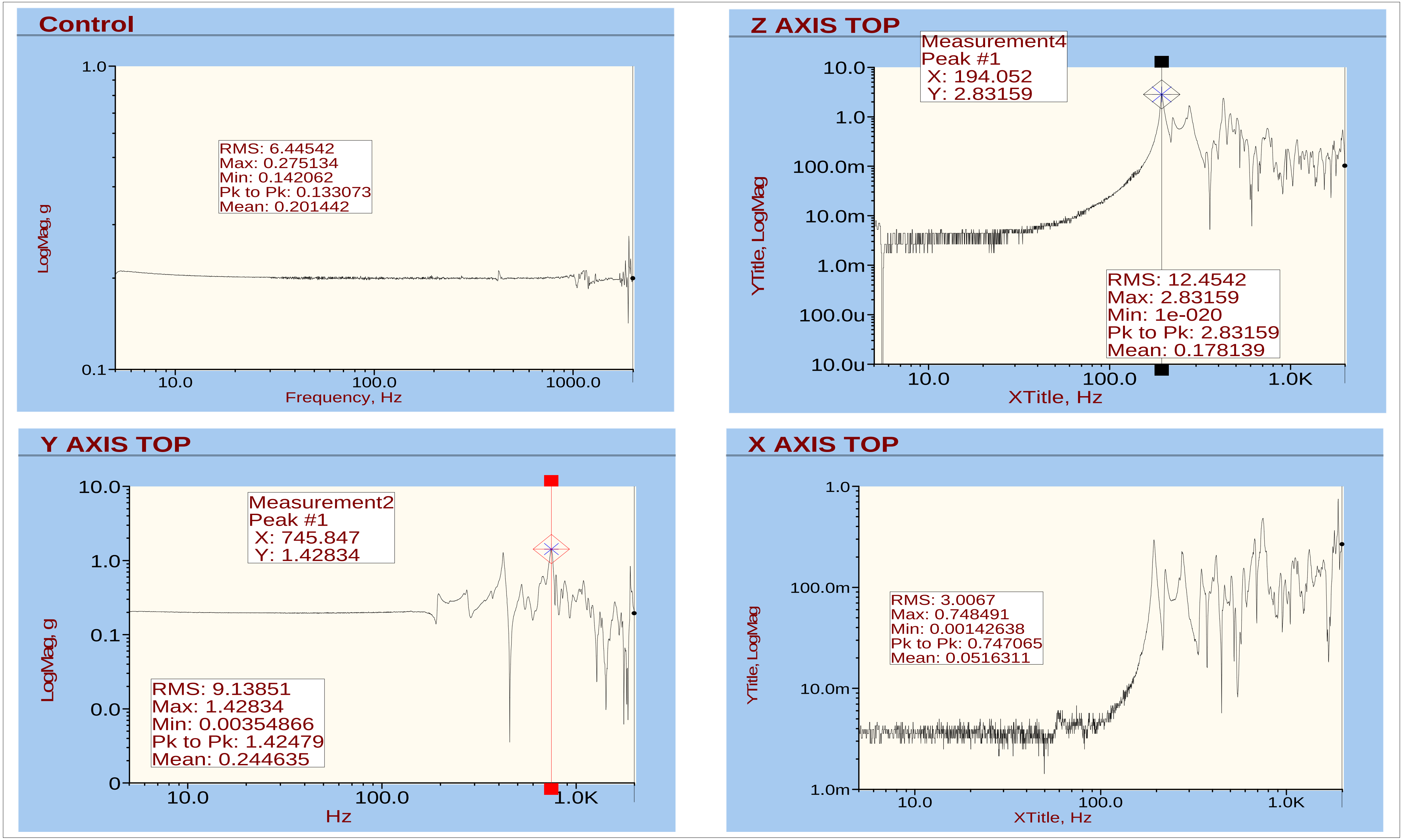
HIRDLS REWORKED PFM PCU SINE SURVEY
RUN 00009
Y AXIS
14:18:48 19/04/2001

FIG 13



HIRDLS REWORKED PFM PCU WORKMANSHIP RANDOM
RUN 00004
Y AXIS
14:25:57 19/04/2001

FIG 14



HIRDLS REWORKED PFM PCU POST RANDOM SINE SURVEY
RUN 000010
Y AXIS
14:28:10 19/04/2001

FIG 15

SECTION 26
Proof Load Certificates

(Not Applicable)

SECTION 27
Reference List of Lower Level ADP's

(Not Applicable)

SECTION 28
Mass Records

TP-RAL-205C

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: A. J. Perry/ N Morris **Date: 27th Apr. 2001**

Subject / Title: **HIRDLS PCU Mechanical Interface Test Procedure**

Contents / Description / Summary:

This Document describes which of the mechanical interface measurements should be performed on the HIRDLS PCU (Power Converter Unit) to demonstrate its compliance with the relevant ICDs.

Key Words: Mechanical interface measurements

Purpose (20 characters maximum):

Approved By: Nigel Morris

Date(yy-mm-dd):01-04-27

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Log of Changes

Revision	Date	Section	Description of Change
First	19/05/00	-	Initial release
A	22/11/00	2	AD2 changed to SP-HIR-111
		3.1	Dimensions now referenced to SP-HIR-219B
		3.3	Reference to SP-HIR-111 added.
B	23/11/00	3.1	Connector J917S changed to J917P
		3.1	Vent port height dim changed to 30 (as per SP-HIR-219B)
		3.4.1	CoM coordintae system changed to match
			definition in SP-HIR-219B
C	27/04/01	3.3	Surface finish on +Z panel changed to paint

Contents

1.0 SCOPE

This report lists interface measurements to be performed on the HIRDLS PFM Power Converter unit. The measurements have been chosen to demonstrate compliance with the relevant Interface Control Documents.

2.0 APPLICABLE DOCUMENTS

	Document Number	Document Title
AD1	SP-HIR-036B	PSS Subsystem Specification Document
AD2	SP-HIR-219B	STH to PSS Interface Control Document (ICD).
AD3	SP-HIR-111	Thermal Interface Requirements Document
AD4	TP-RAL-208	Test Procedure For Determining the Centre of Mass of the HIRDLS PCU

3.0 MECHANICAL INTERFACE CHECKS

3.1 Dimensional Measurements

Using a large vernier calliper measure the following dimensions;

Dimension	Dim. Grid Position (ref:AD2)	Dim. on Drw. (mm)	Measured Dim. (mm)	Compliant with AD2 (Y/N)
Overall width	E7	322	321.90	Y
Overall height of Radiator	D8	240	239.94	Y
Depth of box	E5	307	307.0	Y
Width of box	G4	254	254.02	Y
Height of box	C4	200	199.9	Y
Reference foot to front face	E6	28.5	28.5	Y
Reference foot to +X box side feet	G6	265	264.82	Y
Reference foot to mounting hole	E5	131.5	131.54	Y
Reference foot to mounting hole	E5	263	262.96	Y
Vent port height	B5	30	33.0	N
Reference foot to vent port	B5	39.5	39.5	Y

Using a plug gauge measure the following hole diameters;

Dimension	Dim. Grid Position (ref:AD2)	Dim. On Drw. (mm)	Measured Dim. (mm)	Compliant with AD2 (Y/N)
Reference hole	F6	4.5/4.6	4.6	Y
Mounting hole	F5	4.5/4.6	4.5	Y
Mounting hole	F4	4.5/4.6	4.5	Y
Mounting hole	H6	4.5/4.6	4.5	Y
Mounting hole	H5	4.5/4.6	4.5	Y
Mounting hole	H4	4.5/4.6	4.6	Y

3.2 Connectors

Visually inspect the connectors on the -Y face of the PCU.

Connector Identification	Type specified	Type actual	Compliant (Y/N)	Orientation as drg Y/N
J913S	25S D Type	25S	Y	Y
J918S	25S D Type	25S	Y	Y
J915S	15S D Type	15S	Y	Y
J919S	15S D Type	15S	Y	Y
J914P	78P D Type	78P	Y	Y
J916S	25S D type	25S	Y	Y
J911P	MS27468T13F98P	MS27468T13F98P	Y	Y
J912P	MS27468T13F98PA	MS27468T13F98PA	Y	Y
J917S	6 pin round S	MS274671T11F98S	Y	Y
J920P	MS27468T11F99P	MS27468T11F99P	Y	Y
J921P	MS27468T11F99PA	MS27468T11F99PA	Y	Y

Notes:
S – indicates socket (female)

3.3 Surface Finishes

Visually inspect the following surfaces;

Surface	Surface Finish (ref:AD3)	Actual Surface Finish	Complaint (Y/N)
+Y Face	FOSR	Silverized FEP Teflon	Y
-Y Face	Black anodized	Black anodized	Y
+/-X Faces	Black anodized	Black anodized	Y
+Z Face	Paint Z306	Paint	Y
-Z Face	Black anodized	Black anodized	Y
Mounting feet –Z faces	Bare Aluminum	Bare Aluminium	Y

3.4 Mass

Using a pair of electronic scales, measure the mass of the PCU with all connector savers and protective panels removed. Record the mass below.

Mass = 10610 grams

3.4.1 Centre of Mass

Using the procedure defined in AD4, measure the position of the CoM from the reference hole. Record the values below.

Axis	**Measurement (mm)**	**Tolerance on measurement (mm)**	**Requirement (mm)**	**Compliance (Y/N)**
A1	118.5	+/-3	not defined	n/a
A2	132.5	+/-3	not defined	n/a
A3	95.6	+/-3	not defined	n/a

Measurements carried out by: N. M

Date: 27/04/01

SECTION 29
Cleanliness Statement

TR-RAL-265

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: N Morris

Date:28-Apr-01

Subject / Title: HIRDLS PCU Cleanliness Statement

Contents / Description / Summary:

Key Words: Cleanliness Statement

Purpose (20 characters maximum):

Approved By: N Morris

Date (yy–mm–dd): 01-04-28

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Use one sheet for each item of hardware (box, harness, MLI)

Unit Identification (Instrument Box name and Model)

HIRDLS Power Converter Unit Protoflight Model

Harness Bakeout Conditions and Time

N/A

MLI Bakeout Conditions and Time

N/A

Supplier

Rutherford Appleton Laboratory

Materials List Reference

Document No. PA-RAL-115B

Thermal Vacuum / Balance Test Dates and Report Number

Outgassing report no. TR-RAL-261

QCM and RGA Number

TQCM Type - Faraday 15MHz . Steady state reading of 276Hz/hr. Background reading ~220Hz/Hr, therefore outgassing rate from PCU alone is ~ 56Hz/hr.

Results of Witness Plate Measurements from TV Test

N/A

Results of Wipes from TV Test (Wipe Positions and Data)

N/A

Results of Wipes @ Acceptance (Wipe Positions and Data)

N/A

Particle Cleanliness (Positions and Data, e.g. Tape Lift)

Tape lift tests results (+X panel)	51-100 micron	1327 sq. ft
	101- 250 micron	995 sq. ft
	251- 500 micron	0 sq. ft
	> 500 micron	0 sq. ft

Certified (PI Representative) and Date of Acceptance

N Morris 28th April 2001

SECTION 30
Other Useful Information

Rutherford Appleton Laboratory	DECLARED MATERIALS LIST INDEX	PRODUCT ASSURANCE Space Science and Technology Department

Spacecraft/Project:	EOS AURA (CHEM 1) REWORK	Document No:	PA-RAL-115B
Instrument/Model:	HIRDLS	Issue No:	1 REV: 1
Subsystem:	PCU	Date:	12TH APRIL 2001

LIST

Declared Materials List

		Name	Signature	Date
Prepared by	PA	P A SMITH		12 April 2001
Approved by	PA	D M KELSH		12 April 2001
Approved by	PM	N MORRIS	N. M	12 April 2001

DISTRIBUTION

Revision	Date	Name	Location
1	12th April 2001	ADP	RAL + LMMS

CHANGE RECORD

ISSUE	DATE	CHANGE
1	12 April 2001	First Issue

APPENDIX A

1. SCOPE

This document lists the declared materials used in the provision of the supplied parts of the HIRDLS Flight Model Instrument.

2. INTRODUCTION

Materials used by RAL Space Science Technical Department (SSTD) are listed on a spreadsheet,

Appendix A to this document is a printout from that spreadsheet showing the materials used on the RAL hardware provided for HIRDLS Flight Model Instrument.

The spread sheet printout is compliant with ESA: PSS-01-700 Issue 2, each material has an individual identification number, the first digit being the group type as follows.

1. Aluminium and aluminium alloys
2. Copper and copper alloys
3. Nickel and nickel alloys
4. Titanium and titanium alloys
5. Steels
6. Stainless steels
7. Filler metals: welding, brazing, and soldering
8. Miscellaneous metallic materials
9. Optical materials
10. Adhesives, coatings, varnishes
11. Adhesive tapes
12. Paints and inks
13. Lubricants
14. Potting compounds, sealants, foams
15. Reinforced plastics
16. Rubbers and elastomers
17. Thermoplastics (non adhesive tapes, foils (MLI)....)
18. Thermoset plastics
19. Wires and cables (for materials aspects only)
20. Miscellaneous non-metallic materials (ceramics....)

3. CONTENT OF THE DECLARED MATERIALS LIST

Extract from ESA PSS -01-700 Issue 2 (August 1993) ANNEX B

The materials list consists of 10 columns, which shall be completed as indicated below. Furthermore, similar materials shall be grouped together as specified above. If a particular item does not apply, write N.A (Not Applicable).

- **COLUMN 1** : Item number

Identification number in each group. One only per material type. Does not change during the life of the material list (sub-items permitted when deemed necessary).

- **COLUMN 2:** Commercial identification

Trade name and number (to be completed in full) e.g. “ARALDITE AV 100”. Correct and standard designation.
ESA has chosen :

- Trade name + number. For example “ARALDITE AY 105”
- If no trade name exists, then the manufacture’s name plus number are entered: e.g. “SCHOTT BK7”
- In the case of the AISI system for steel: for other metals or alloys, the main consistent will be entered first except in the case of a traditional name (e.g. brass or bronze).
- For each material as designated above, a unique item number shall be given. If several lines are used for different applications and /or processing, sub item numbers shall be added.

- **COLUMN 3** : Chemical nature and type of product

Example: epoxy resin, polyurethane adhesive, or Ti, 6Al, 4 alloy.

- **COLUMN 4 :** procurement information

Manufacturer/supplier: name of the manufacture and the name of the supplier if different. Specification: reference of the procurement specification with, if considered useful, issue and revision. It may be replaced by a national specification number if it exists and make source of procurement irrelevant.

- **COLUMN 5 :** Processing parameters (summary):

Give as relevant: mixture proportions, cure temperature, special-cleaning agents, surface treatment, thermal treatment, temperature, etc...
NOTE: Specification number is required, but not sufficient for ESA purposes.

- **COLUMN 6 :** Use and location

Indicate in what subsystem, box or item the material is used and whether it acts as structural element, thermal control, electrical insulation etc. as relevant.
ESA PSS -01-700 Issue 2 (August 1993)

COLUMN 7. Environmental code

Radiation /UV/ATAXIA (1) (R)		Ambience (A)	Temperature (T)
G = Geostationnary L = Low orbit B = Radiation belts I = Interplanetary	S = Outside shadow L = Outside light	V = Vacuum H = Hermetic M = Manned E = Elevated pressure	1 = 0 to 100 2 = 101 to 200K 3 = 201 to 300 K " etc.

(1) For materials inside the spacecraft, choose a letter from the left-hand side column. For materials on the surface of the spacecraft, combined this letter with "L" or "S".
(2) Thermal cycle to be indicated by two values, e.g. 3/5.

(3) "RT" can be accepted as a code between 238 K (10°C) and 313 K (40°C).

Materials which are at a boundary between environments shall be described by two sets of codes.

- **COLUMN 8:** Size code

AREA VOLUME MASS	A (cm^2) V (cm^3) W (g)	0 = 0 < 1 1 = 1 < 10 2 = 10 < 100 3 = 100 < 1000 etc.

ESA PSS -01-700 Issue 2 (August 1993)

Choose an alphanumeric combination from the above mentioned table, e.g. A5 or V2 or W3.

- **COLUMN 9** All the codes of Column 9 shall be relevant for the project concerned, which implies that they refer to validated data applicable to this project (not too old, same processing, same composition, QC tests run on the same procured lot, etc.).

Reference of test report and relevant test result code to be given in Subcolumn 9.1.

- **SUBCOLUMN 9.1**

Outgassing (OUT):

P - The material passed the outgassing test detailed in ESA PSS-01-702. Reference of test report to be given in Subcolumn 9.2.

F - The material failed. Waiver reference in Subcolumn 9.2.

U - Materials of which outgassing characteristics are unknown.

Stress Corrosion Cracking (SCC):

A - The material is known to have a high resistance to SCC. Table I document ESA PSS-01-736).

B - Table II and III document ESA PSS-01-736.

Justification for approval (test reference) stated in Subcolumn 9.2 (generally making reference to ESA PSS-01-736).

U - Materials and / or *weldments* for which SCC characteristics are unknown: An SCC evaluation form is required, based if necessary on tests (see ESA PSS-01-737).

Corrosion (Corr.):

ESA PSS -01-700 Issue 2 (August 1993)

A - The material does not require a surface treatment or coating for its intended application, otherwise it shall be rated B.

B - Details of the surface treatment to be given in Column 5.

Flammability (Flamm.) (If applicable):

P - The material passes the requirements of document ESA PSS - 01-721.

F - The material failed the test of document ESA PSS - 01 - 721 in the applicable atmosphere. Waiver reference in subcolumn 9.2.

U - Materials of which offgassing characteristics are unknown.

Offgassing (OFF) (if applicable) :

P - The material passes the requirements of document ESA PSS -01 -729.

F - The material failed : waiver reference in subcolumn 9.2

U - Materials of which offgassing characteristics are unknown.

- **SUBCOLUMN 9.2 :** Justification for approval

The purpose of this sub column is to enter any additional information that may be necessary in order to achieve customer approval. This information is reference of the Requests For Approval, reference of justificatory file for materials approved for other space or aeronautical programmes meeting the specific needs of the programme, reference of the evaluation report or waivers etc. These documents must be made available to ESA on request.

- **SUBCOLUMN 9.3** : Approval status of the contractor

A : Approved - All materials classified "A" may be used without restriction.

ESA PSS -01 -700 Issue 2 (August 1993)

Y : Approved with restriction - These materials require the preparation of QC test specimens or a treatment before use : potting, coating, test specimens...

W : Approved with a waiver - These materials do not meet the requirements but are used for functional reasons. The use of such materials shall be reduced to a minimum. All the waivers shall be approved by ESA. The waiver number shall be entered in subcolumn 9.2.

P : Pending a decision - Materials for which an evaluation report or a waiver is awaiting the contractor’s provisional or definitive approval.

O: Open - New materials or materials for which investigations and qualification are in progress.

D: Deleted - This clarification is used for a material, which is no longer used.

- **COLUMN 10 :** ESA approval and comments

This column will be completed by ESA in accordance with the standard comments list in Annex E.

APPENDIX A

TITLE

Declared Materials List.

Doc. No: PA-RAL-115B

Issue 1

PROJECT: HIRDLS

EXPERIMENT / SYSTEM:
HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 1 ALUMINIUM, ALUMINIUM ALLOYS																						
1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
1.00		Not Applicable																				
1.1		Al Alloy 6082, T651,	Si 0.7-1.3, Fe 0.5, Cu 0.1, Mn 0.4-1, Mg 0.5-1.2, Cr 0.25, Ni 0.1, Zn 0.2, Ti 0.2	BS L115, T651 Plate: BS L111, T651 Bar: BS L113 T651 Sheet:	Alochrom 1200. DEF STAN 03-18		I,L	V/E	3/4	1	N/A	N/A	A	A	N/A	U	N/A	N/A	PSS-01-736	N/A	N/A	N/A
1.2		Al Alloy 6061 T651	Si 0.4-0.8, Fe 0.7, Cu 0.15-0.4, Mn 0.15, Mg 0.8-1.2, Cr 0.04-0.35, Zn 0.25, Ti 0.15	BS L113	Alochrom 1200. DEF STAN 03-18		I,L	V/E	3/4	1	N/A	N/A	A	A	N/A	U	N/A	PSS-01-736			N/A	N/A

		MATERIAL CATEGORY 2 COPPER AND COPPER ALLOYS																				
1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
2.00		Not Applicable																				
2.1		Copper	TBD	BS C110	Machining		I,L	V/E	3/4	1	N/A	N/A				U		Previous use			N/A	N/A

PROJECT: HIRDLS

EXPERIMENT / SYSTEM: HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 3 NICKLEL AND NICKEL ALLOYS

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
3.00		Not Applicable																				

MATERIAL CATEGORY 4 TITANIUM AND TITANIUM ALLOYS																						
1		**2**	**3**	**4**	**5**	**6**	**7**			**8**			**9**							**10**		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	**A**	**T**	**W**	**A**	**V**	CORR	SCC	FLAM	OFF	OUT	Justification	Prime	ESA App		
4.00		Not Applicable																				

MATERIAL CATEGORY 5 STEELS

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
5.00		Not Applicable																				

MATERIAL CATEGORY 6 STAINLESS STEELS

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
6.00		Not Applicable																				
6.1		Stainless Steel Austenitic Screw (18/8) 321S31	C 0.08, Si 1, Mn 2, P 0.05, S 0.03, Cr 17-20, Ni 8-13 /Soft Austenitic	BS4168 Grade A2-50, DIN 934, BS 970 Pt 1:83: BS6105 81 Category 321S31	Clean								A	A	N/A	N/A	N/A				N/A	N/A
6.2		Stainless Steel	C<0.03%, Si<1.0%, Mn<2.0%, P<0.045%, S<0.03%, Cr16.0-18.0%, Mo2.0-3.0%, Ni9-12%	AISI 316									A		N/A	N/A					N/A	N/A

PROJECT: HIRDLS

EXPERIMENT / SYSTEM:
HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
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MATERIAL CATEGORY 7 FILLER METALS : WELDING BRAZING SOLDERING

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
7.00		Not Applicable																				
7.1	7.1	Solder	SN63 Eutectic	Bliewerk Goslar to ESA-PSS-01-708	PSS-01-708		I,L	V/E	3/4	1	N/A	N/A	A	A	N/A	U	N/A	PSS-01-708			N/A	N/A

PROJECT: HIRDLS

EXPERIMENT / SYSTEM:
HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 8 MISCELLANEOUS METALIC MATERILAS

1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	**A**	**T**	**W**	**A**	**V**	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
8.00		Not Applicable																				

PROJECT: HIRDLS

EXPERIMENT / SYSTEM: HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 9 OPTICAL MATERIALS

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
9.00		Not Applicable																				

MATERIAL CATEGORY 10 ADHESIVES COATINGS VARNISHES

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
10.00		Not Applicable																				
10.1		Scotchweld EC 2216	Modified Epoxy, Two Part Structural Adhesive	3M, USA, 3M Bracknell UK	5pbw Base/7pbw Accel. Cure: 24 Hrs. RT.(SPAS21)		I,L	V/E	3/4	1	N/A	N/A	N/A	N/A	U	U	P	PSS-01-701 S-2			1.00	0.02
10.2	10.9			BS L111 T6 Bar / BSL 113 T6 Sheet / BS L114 T6 Tube / BSL 115 T6 Sheet	Alochrom 1200. DEF STAN 03-18								B	A	N/A	U	N/A				N/A	N/A
10.3	10.9			BS L115, T651 Plate	Alochrom 1200. DEF STAN 03-18								B	A	N/A	U	N/A				N/A	N/A
10.4	10.24	Stycast 4952	Heat Conducting RTV Silicone Rubber Compound	Emmerson & Cumming	RAL/SSD/SPAS021:100A/0.2B 24h RT								N/A	N/A	U	U	P				0.34	0.10
10.5	10.33	Solithane 113/C 113-300	2 Part Polyurethane Conformal Coating	Thiokol, Chemical Co. USA	New process with Toluene								N/A	N/A	U	U	P				0.40	0.03

PROJECT: HIRDLS

EXPERIMENT / SYSTEM: HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 11 ADHESIVE TAPE																						
1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	**A**	**T**	**W**	**A**	**V**	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
11.00		Not Applicable																				

PROJECT: HIRDLS

EXPERIMENT / SYSTEM: HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 12 PAINTS AND INKS

1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	**A**	**T**	**W**	**A**	**V**	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
12.00		Not Applicable																				
12.1		Chemglaze Z 306 (now Aeroglaze)	Polyurethane	Lord Corporation Manchester UK	Bakeout		I,L	V/E	3/4	1	N/A	N/A	N/A	NA	U	U	F	PSS-01-725			1.50	0.03

MATERIAL CATEGORY 13 LUBRICANTS

1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
13.00		Not Applicable																				

PROJECT: HIRDLS

EXPERIMENT / SYSTEM: HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 14 POTTING COMPOUNDS SEALANTS FOAMS

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
14.00		Not Applicable																				

PROJECT: HIRDLS

EXPERIMENT / SYSTEM:
HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 15 REINFORCED PLASTICS

1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Iden	Chemical Nature & type of product	Procurment information Manufacturer /supplier specification isssue /rev.	Summary of process perameters	Use and locatic	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
15.00		Not Applicable																				

MATERIAL CATEGORY 16 RUBERS AND ELASTOMERS

1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	**A**	**T**	**W**	**A**	**V**	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
16.00		Not Applicable																				

MATERIAL CATEGORY 17 THERMOPLASTICS (NON ADHESIVE TAPES FOILS (MLI)....)

1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
17.00		Not Applicable																				
17.1	17.01	Delrin 150 SA	White Acetal	Du Pont 150 SA	Machining								N/A	N/A	U	U	P				TBD	TBD

PROJECT: HIRDLS

EXPERIMENT / SYSTEM:
HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 18 THERMOSET PLASTICS																						
1		2	3	4	5	6	7			8			9							10		
Item No		Commercial Identification	Chemical Nature & type of product	Procurement information Manufacturer / supplier specification isssue / rev.	Summary of process perameters	Use and location	Enviroment code			Size code			9.1					9.2	9.3		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
18.00		Not Applicable																				

PROJECT: HIRDLS

EXPERIMENT / SYSTEM: HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 19 WIRES AND CABLES (FOR MATERIALS ASPECTS ONLY)

1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	**A**	**T**	**W**	**A**	**V**	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
19.00		Not Applicable																				
19.1		Enamelled Copper Wire	Polyurethane enamelled	BS 6811 Pt.3 Sec. 3.9 1993	Clean		I,L	V/E	3/4	1	N/A	N/A	A	N/A	U	U	U	Past use IUE				
19.2	19.06	Insulated Wire	Silver Plated Copper AWG30 with PTFE Insulation	Not Yet Available										N/A		U					TBD	TBD
19.3		Polyester Copper Wire	0.200 Polyester / iec 317-13 grade 2	ALCATEL HI-WIRE	Clean									N/A	U							

PROJECT: HIRDLS

EXPERIMENT / SYSTEM: HIRDLS

DOC. No: PA-RAL-115B
ISSUE: 1
DATE:12/04/01

MATERIAL CATEGORY 20 MISCELLANEOUS NONMETALIC MATERIALS (CERAMICS)

1		2	3	4	5	6	7			8			9							10		
Item No		**Commercial Identification**	**Chemical Nature & type of product**	**Procurement information Manufacturer / supplier specification isssue / rev.**	**Summary of process perameters**	**Use and location**	**Enviroment code**			**Size code**			**9.1**					**9.2**	**9.3**		Outgassing TML %	Outgassing VCM %
							R	A	T	W	A	V	CORR	SCC	FLAM	OFF GAS	OUT GAS	Justification for approval	Prime contractor Approval	ESA App		
20.00		Not Applicable																				
20.1	20.23	Epoxy Glass Copper Clad Laminate	Epoxy/Glass/ Copper.Rolled Tin/Lead Coated	NEMA Type FR4	Clean								N/A	N/A	U	U	P				0.34	0.00
20.2	20.24	Dacron Lacing Cord	Dacron (Unwaxed) Natural	Gudebrod Inc. 22DPTH NATURAL GUDE-SPACE PT	Clean								A	N/A	U	U	P				0.35	0.02
20.3	20.25	Kynar: Heat Shrink Wire Insulation.	Irradiated Kynar	RAYCHEM	Clean								N/A	N/A	U	U	P				0.49	0.08

PA-RAL-116B

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: P A Smith

Date: 12-April-01

Subject / Title: PFM PCU Declared Processes List

Contents / Description / Summary:

Key Words: Processes List

Purpose (20 characters maximum): Identify processes used in the construction of the PFM PCU

Approved By: N Morris

Date (yy–mm–dd): 01-04-12

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

CHANGE RECORD PAGE

Revision	Date	Section affected	Description of Change
First	Jan-99	-	-
A	17-Aug-00	All	Complete revision of document
B	12 April-01	Table	HIRDLS 2001 Update

CONTENTS

1. SCOPE

This document lists the declared processes used in the provision of the supplied parts of the HIRDLS Protoflight Model Power Converter Unit from RAL.

2. INTRODUCTION

Processes used by RAL Space Science Department are listed on an Access database, Appendix A to this document is a printout from that database showing the processes used on the RAL hardware provided for. Additional processes will be added in future as they are developed particularly in the area of metalisation of ceramics and subsequent welding/brazing. The database printout is compliant with ESA:PSS-01-700 Issue 2, each process has an individual identification number, the first digit being the group type as follows. The database printout is compliant with ESA:PSS-01-700 Issue 2, each process has an individual identification number, the first digit being the group type as follows.

1. Adhesive bonding
2. Composite manufacture
3. Encapsulation/moulding
4. Painting/coating
5. Cleaning
6. Welding
7. Crimping/stripping/wire wrapping
8. Soldering/brazing
9. Surface conversion treatment
10. Plating
11. Machining
12. Forming
13. Heat treatment
14. Special fabrication: processes developed specifically for the programme
15. Marking
16. Miscellaneous processes
17. Inspection procedures
18. Tape

3. CONTENT OF THE DECLARED PROCESS LIST (DPL)

Extract from ESA PSS -01-700 Issue 2 (August 1993)

The process list consists of 10 columns that shall be completed as indicated below. If a particular item does not apply, write N.A (Not Applicable). Processes which apply to only one material (one Declared Material List item) and which are sufficiently defined in column 5 of the Declared Materials List should not appear in the Declared Processes List (unless they are critical).

COLUMN 1 : Process Category No.

COLUMN 2 : Process number
Sequential item number in each group of the Declared Processes List. One only per process type. Does not change during the life of the processes list.

COLUMN 3: Process identification
Process name, title, clear identification, etc. Connect and standard identification

COLUMN 4 : Specification
Specification number (whether national, ESA, company in house etc.) and issue status. Only the contractor's/subcontractor's specifications that can be physically transmitted to ESA for review purposes list.

COLUMN 5 : Process description
Brief description of the process.

COLUMN 6 : Criticality of process
Indicate here whether process is critical or non-critical. In the case of a critical process, add reasons for criticality (see the definition in Annex A).

NOTE : for critical processes other that those performed exactly to an ESA PSS- 01-7XX series specification, this form is to be supplemented by a **Process Request for Approval** (RFA /Process) (in the same Annex).

COLUMN 7 : Justification for approval
ESA PSS -01-700 Issue 2 (August 1993)

The purpose of this is to enter any additional information that may be necessary in order to achieve customer's approval. This information comprise reference and issue of the RFA / approval, process justification file, evaluation reports and waivers. These documents must be made available to ESA on request.

COLUMN 8 : Reference
Reference douments.

4. PROCESSES LIST

Process Category No	Process Number	Process	Spec & Issue	Description	Criticality Of The Process	Justification of approval	Reference
1	1.01	Screw Locking	RAL/SSD/SPAS 021 issue 1	Scotchweld 2216 7A/5B (pbw) 7D at RT	Non Critical	Previous use, many projects.	
1	1.15	Thermal bonding	RAL/SSD/SPAS 021 Issue 1	Stycast 4952,.2A/100B 24H RT	Non critical	Previous use, many projects.	
4	4.01	Solithane 113 Conformal Coating, Toluene process.	RAL/SSD/SPAS 009 Issue 1.	100A/73B mix:toluene/mix1/4. 4H 60c	Non Critical	ESA Recommended PL/1779/RT/840	ESA ESTEC:QM/90K784/MF
4	4.07	Outside Contract Application of Chemglaze Z306 Thermal Control Coating.	RAL/SSD/SPAS 008		Non Critical		
5	5.01	Cleaning	AECP/100				SPAS? Clarify.
5	5.07	Printed Circuit Board Cleaning Process (Non-CFC).	RAL/SSD/SPAS 019 Issue 1.	Cleaning PCBs with Zestron FA.	Non Critical	Previous use	
8	8.01	Soldering	ESA-PSS-01-708	Manual Soldering	Non Critical	ESA-PSS-01-708	ESA-PSS-01-708, ESA-PSS-01-738, NHB-5300-4-3A-1 & 2.
9	9.01	Alocrom 1200	MOD DEF STAN: 03-18.	AL Alloy Surface Conversion	Non Critical	Standard Process	Ref: MR010-91 SPAN 009/91

9	9.06	Anodising	(ESA PSS-01-703 Issue 1 OCT. 1982)				ESA-PSS-01-703

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originators: N Morris **Date: 30th April 2001.**

Subject / Title: **HIRDLS PCU Red & Green Tag Items**

Contents / Description / Summary:

This document lists the items that must be removed from the PCU prior to flight (Red Tag Items) and a list of items that must be fitted before flight (Green Tag Items).

Key Words: Red Green Tag Items

Purpose (20 characters maximum): Integration

Approved By: S Jaroslawski

Date: 2001-04-30

Rutherford Appleton Laboratory
Chilton, Didcot
Oxfordshire
OX11 0QX, United Kingdom

EOS

Document Change Record

Issue	Date	Page	Para.	Change Description
First	01-04-30	-	-	First Issue

Content

1 Scope

This document lists the Red and Green tag items associated with the HIRDLS PFM Power Converter Unit (part no. A0-KE-0123-500).

2 Introduction

Red tag items are those items that **MUST** be removed from the PCU before integration into the instrument or before any major test where the presence of the items could influence the results or cause harm to other subsystems or equipment.

Green tag items are conversely items that **MUST** be fitted to the PCU before integration into the instrument or before any major test where the absence of the items could influence the results or cause harm to other subsystems or equipment.

3 Red Tag Items

There are three red tag items fitted to the PCU at delivery to the Instrument Integrator;

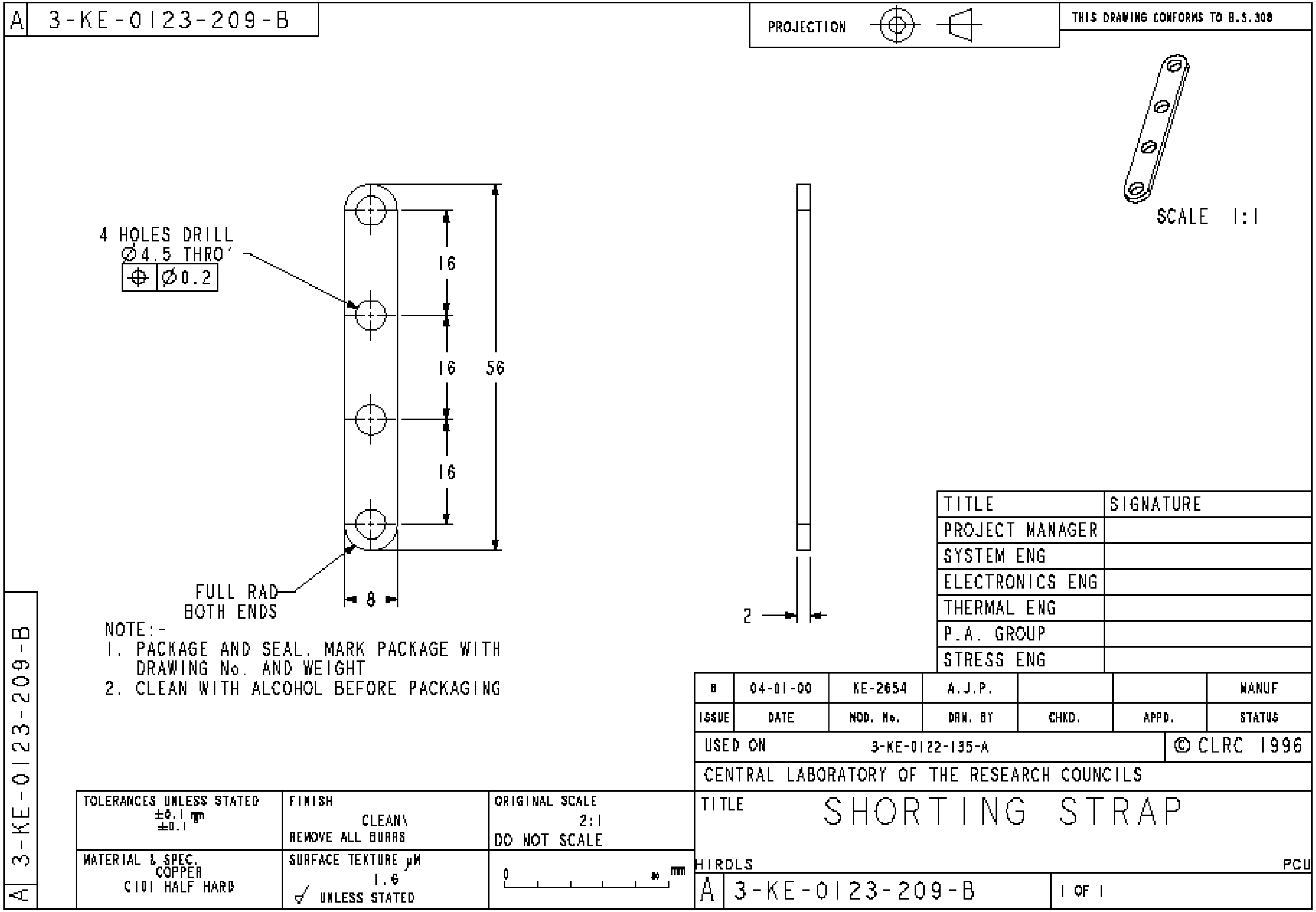
1. Connector Savers
   D-Types: J919S, J915S, J916S, J913S, and J914S
   Round connectors (on flying leads) J911, J912, J917, J920 and J921

2. Radiator Panel Cover (plastic transparent cover to protect Silverized Teflon finish)

3. Four Post Shorting Strap (part no. A3-KE-0123-209-B)

4 Green Tag Items

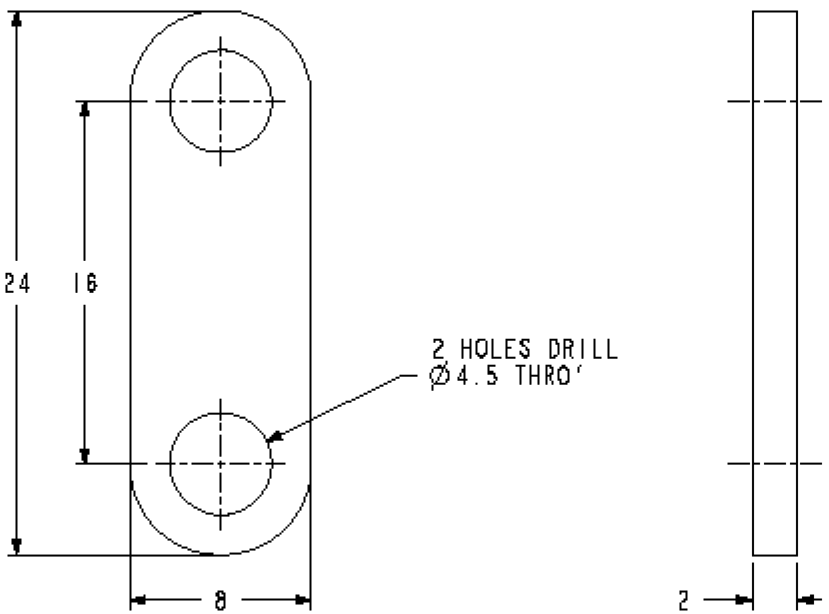
After removal of the four bar shorting strap, the two post shorting strap should be fitted (part no. A3-KE-0123-213A) across posts 3 and 4 (ref: SP-HIR-219B figure 1 for post numbering).

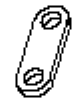

A 3-KE-0123-209-B
PROJECTION
THIS DRAWING CONFORMS TO B.S.308
SCALE 1:1
4 HOLES DRILL
Ø4.5 THRO'
Ø0.2
16
16
56
16
8
2
FULL RAD
BOTH ENDS
NOTE:-
1. PACKAGE AND SEAL. MARK PACKAGE WITH
DRAWING No. AND WEIGHT
2. CLEAN WITH ALCOHOL BEFORE PACKAGING
TITLE
SIGNATURE
PROJECT MANAGER
SYSTEM ENG
ELECTRONICS ENG
THERMAL ENG
P.A. GROUP
STRESS ENG
B
04-01-00
KE-2654
A.J.P.
MANUF
ISSUE
DATE
MOD. No.
DRN. BY
CHKD.
APPD.
STATUS
USED ON
3-KE-0122-135-A
© CLRC 1996
CENTRAL LABORATORY OF THE RESEARCH COUNCILS
TOLERANCES UNLESS STATED
FINISH
CLEAN
REMOVE ALL BURRS
ORIGINAL SCALE
2:1
DO NOT SCALE
TITLE
SHORTING STRAP
MATERIAL & SPEC.
COPPER
C101 HALF HARD
SURFACE TEXTURE µM
1.6
UNLESS STATED
mm
HIRDLS
PCU
A 3-KE-0123-209-B
1 OF 1
3-KE-0123-209-B

A 3-KE-0123-213-A

PROJECTION

THIS DRAWING CONFORMS TO B.S.308





SCALE 1:1

HIRDLS MASTER DRAWING	
PROJECT MEMBER	**APPROVED**
PROJECT MANAGER	
SYSTEM ENG	
ELECTRONICS ENG	
PA GROUP	
STRESS ENG	
OPTICAL ENG	
THERMAL ENG	
MECHANICAL ENG	

ISSUE	DATE	MOD. No.	DRN. BY	CHKD.	APPD.	STATUS
A	12/09/00	.	AJP			MANUF

USED ON KE-0123-200

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE SHORTING STRAP 2

TOLERANCES UNLESS STATED ±0.1 mm ±0.1	FINISH CLEAN REMOVE ALL BURRS	ORIGINAL SCALE 5:1 DO NOT SCALE
MATERIAL & SPEC. COPPER C101 HALF HARD	SURFACE TEXTURE μM 1.6 √ UNLESS STATED	0 mm

HIRDLS FLIGHT MODEL

A 3-KE-0123-213-A 1 OF 1

A 3-KE-0123-213-A

HIRDLS TR-RAL-256

High Resolution Dynamics Limb Sounder

Originator: AB Pearce Date: 30th Apr. 2001

Subject/Title: HIRDLS PCU Pin Matrix Report

Description/summary/contents:

This spreadsheet contains the results from the pin matrix test on the PFM PCU

Keywords : PFM PCU Pin Matrix Results

Purpose of this Document: Test Report

(20 Characters Maximum)

Reviewed/Approved By date (day-mon-yr)	4/30/01		

Rutherford Appleton Laboratory
Chilton, DIDCOT, OX11 0QX
United Kingdom

EOS

This spreadsheet contains worksheets for each connector on the HIRDLS PCU.

Ensure all connectors are fitted with connector savers before testing.

The pin connections are ordered in a matrix to minimise the shifting of one meter probe.
Each alternate column has been left blank to allow a check mark to be inserted on the printout.

Pin matrix J911 QA POWER

These connections taken from LMMS connection cable diagram 1A26270, as no information in any HIRDLS ICD

Pin No.	A		B		C		D		E		F		G		H		J		K		Chassis	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	X	
K	O/C	N/A	O/C	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	X		O/C	N/A
J	O/C	N/A	O/C	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	X		O/C	N/A	O/C	N/A
H	O/C	N/A	O/C	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	X		O/C	N/A	O/C	N/A	O/C	N/A
G	O/C	N/A	O/C	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	X		O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A
F	11k5	✓	11k5	✓	11k5	✓	S/C	✓	S/C	✓	X		O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	✓
E	11k5	✓	11k5	✓	11k5	✓	S/C	✓	X		S/C	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	✓
D	11k5	✓	11k5	✓	11k5	✓	X		S/C	✓	S/C	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	✓
C	S/C	✓	S/C	✓	X		11k5	✓	11k5	✓	11k5	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	✓
B	S/C	✓	X		S/C	✓	11k5	✓	11k5	✓	11k5	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	✓
A	X		S/C	✓	S/C	✓	11k5	✓	11k5	✓	11k5	✓	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	✓

Pin matrix J912 QB POWER

These connections taken from LMMS connection cable diagram 1A26271, as no information in any HIRDLS ICD

Pin No.	A		B		C		D		E		F		G		H		J		K		Chassis	
Chassis	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**X**	
K	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**X**		**O/C**	N/A
J	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**X**		**O/C**	N/A	**O/C**	N/A
H	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**X**		**O/C**	**N/A**	**O/C**	N/A	**O/C**	N/A
G	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**X**		**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**O/C**	N/A
F	**11k5**	✓	**11k5**	✓	**11k5**	✓	**S/C**	✓	**S/C**	✓	**X**		**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**O/C**	✓
E	**11k5**	✓	**11k5**	✓	**11k5**	✓	**S/C**	✓	**X**		**S/C**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**O/C**	✓
D	**11k5**	✓	**11k5**	✓	**11k5**	✓	**X**		**S/C**	✓	**S/C**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**O/C**	✓
C	**S/C**	✓	**S/C**	✓	**X**		**11k5**	✓	**11k5**	✓	**11k5**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**O/C**	✓
B	**S/C**	✓	**X**		**S/C**	✓	**11k5**	✓	**11k5**	✓	**11k5**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**O/C**	✓
A	**X**		**S/C**	✓	**S/C**	✓	**11k5**	✓	**11k5**	✓	**11k5**	✓	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	N/A	**O/C**	✓

Pin Matrix J913 (IPU Power) x J913 (IPU Power)

Pin No	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓
25	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓
24	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
23	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓
22	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓
21	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓
20	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓
19	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
18	O/C	✓	O/C	✓	O/C	✓	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
17	O/C	✓	O/C	✓	O/C	✓	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
16	O/C	✓	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
15	O/C	✓	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
14	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X	
13	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓
12	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	X		O/C	✓	O/C	✓
11	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓
10	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	117k	✓	118k	✓	S/C	✓	X		O/C	✓	59k	✓	O/C	✓	O/C	✓
9	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	117k	✓	118k	✓	X		S/C	✓	O/C	✓	59k	✓	O/C	✓	O/C	✓
8	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		118k	✓	118k	✓	O/C	✓	59k	✓	O/C	✓	O/C	✓
7	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		S/C	✓	117k	✓	117k	✓	O/C	✓	59k	✓	O/C	✓	O/C	✓
6	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
5	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
4	O/C	✓	O/C	✓	O/C		X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
3	O/C	✓	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
2	O/C	✓	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
1	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓

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Pin No	15		16		17		18		19		20		21		22		23		24		25		Chassis	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	S/C	✓	S/C	✓	S/C	✓	O/C	✓	O/C	X	X	
25	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	S/C	✓	S/C	✓	S/C	✓	O/C	✓	X		O/C	✓
24	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	X		O/C	✓	O/C	✓
23	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	S/C	✓	S/C	✓	X		O/C	✓	S/C	✓	S/C	✓
22	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	S/C	✓	X		S/C	✓	O/C	✓	S/C	✓	S/C	✓
21	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		S/C	✓	S/C	✓	O/C	✓	S/C	✓	S/C	✓
20	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		S/C	✓	S/C	✓	S/C	✓	O/C	✓	S/C	✓	S/C	✓
19	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
18	O/C	✓	O/C	✓	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
17	O/C	✓	O/C	✓	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
16	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
15	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
14	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
13	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
12	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	S/C	✓	S/C	✓	S/C	✓	O/C	✓	S/C	✓	O/C	X
11	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
10	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	59k	✓	59k	✓
9	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	59k	✓	59k	✓
8	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	59k	✓	59k	✓
7	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	59k	✓	59k	✓	59k	✓	59k	✓	O/C	✓	59k	✓	59k	✓
6	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
5	O/C	✓	O/C	✓	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
4	O/C	✓	O/C	✓	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
3	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
2	11k5	✓	11k5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
1	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓

Pin Matrix J914 (IPU Data)

Pin No.	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25		26
Chassis	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	✓	S/C	X	S/C	X	S/C
78	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
77	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
76	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
75	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
74	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
73	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
72	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
71	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
70	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
69	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
68	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
67	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
66	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
65	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
64	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
63	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
62	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
61	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
60	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
59	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
58	3k4	✓	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
57	O/C	✓	O/C	X	O/C		O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
56	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
55	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
54	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
53	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
52	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
51	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
50	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
49	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
48	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
47	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
46	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
45	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
44	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
43	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
42	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
41	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
40	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
39	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
38	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
37	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
36	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
35	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
34	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
33	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
32	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
31	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
30	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
29	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
28	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
27	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
26	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	S/C	X	x
25	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	S/C	X	x	N/A	S/C
24	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	S/C	X	x	N/A	S/C	X	S/C
23	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	x	N/A	S/C	X	S/C	X	S/C
22	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	x	N/A	O/C	X	O/C	X	O/C	X	O/C
21	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	✓	3k4	✓	3k4	✓	3k4	✓	3k4	✓	O/C	✓	O/C	✓	x	N/A	O/C	✓	S/C	X	S/C	X	S/C	X	S/C
20	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	x	N/A	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
19	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	x	N/A	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
18	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	x	N/A	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
17	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	x	N/A	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
16	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	X	6k8	✓	6k8	✓	x	N/A	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
15	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	X	6k8	✓	x	N/A	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
14	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	X	x	N/A	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
13	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	x	N/A	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
12	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	x	N/A	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
11	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	x	N/A	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
10	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
9	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	X	O/C
8	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	x	N/A	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
7	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	x	N/A	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
6	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	x	N/A	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
5	6k8	X	6k8	X	6k8	X	6k8	X	x	N/A	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
4	6k8	X	6k8	X	6k8	X	x	N/A	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
3	6k8	X	6k8	X	x	N/A	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
2	6k8	X	x	N/A	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4
1	x		6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	6k8	X	O/C	X	O/C	X	6k8	X	6k8	X	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	6k8	✓	O/C	✓	O/C	✓	3k4	✓	O/C	✓	3k4	X	3k4	X	3k4	X	3k4

Pin Matrix .

Pin No.	28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52	
Chassis	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
78	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
77	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
76	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
75	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
74	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
73	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
72	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
71	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
70	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
69	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
68	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X
67	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
66	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
65	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
64	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
63	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
62	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
61	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
60	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
59	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
58	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
57	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
56	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
55	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
54	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
53	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
52	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A
51	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X
50	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	x	N/A	O/C	X	O/C	X
49	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	S/C	X	O/C	X	O/C	X
48	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	>680R	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X
47	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	>680R	X	O/C	X	O/C	X	O/C	X	O/C	X
46	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	>680R	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
45	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	>680R	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
44	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	>680R	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
43	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	>680R	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
42	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
41	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
40	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
39	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
38	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
37	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
36	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	x	N/A	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
35	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	x	N/A	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
34	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	x	N/A	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
33	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	x	N/A	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
32	S/C	X	O/C	X	S/C	X	S/C	X	x	N/A	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
31	S/C	X	O/C	X	S/C	X	x	N/A	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
30	S/C	X	O/C	X	x	N/A	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
29	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
28	x	N/A	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
27	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
26	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
25	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
24	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
23	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
22	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
21	S/C	X	O/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	S/C	X	O/C	X	O/C	X
20	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
19	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
18	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
17	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
16	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
15	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
14	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
13	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
12	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
11	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
10	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
9	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
8	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
7	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
6	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
5	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
4	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
3	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
2	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X
1	3k4	X	O/C	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	3k4	X	O/C	X	O/C	X

Pin Matrix .

Pin No.	53		54		55		56		57		58		59		60		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75		76		77		78		Chassis	
Chassis	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	✓	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	X	X
78	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	✓	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	x	N/A	S/C	X
77	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X
76	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X
75	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	S/C	X	S/C	X
74	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
73	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
72	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
71	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
70	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
69	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
68	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
67	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
66	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
65	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
64	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
63	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
62	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
61	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
60	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	x	N/A	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
59	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
58	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
57	O/C	X	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
56	O/C	X	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
55	O/C	X	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
54	O/C	X	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
53	x	N/A	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
52	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
51	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
50	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
49	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
48	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
47	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
46	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
45	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
44	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
43	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
42	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
41	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
40	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
39	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
38	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
37	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
36	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
35	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
34	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
33	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
32	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
31	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
30	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
29	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
28	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
27	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
26	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
25	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
24	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
23	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
22	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
21	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	S/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	O/C	X	O/C	X	S/C	X	S/C	X
20	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
19	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
18	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
17	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
16	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
15	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
14	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
13	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
12	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
11	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
10	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
9	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X
8	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
7	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
6	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
5	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
4	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
3	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
2	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X
1	O/C	X	O/C	X	O/C	X	O/C	X	O/C	X	3k4	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	O/C	X	O/C	X	3k4	X	3k4	X

Pin matrix J915 (SPU Power)

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Chassis
Chassis	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	286k ✓	S/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	X ✓
15	O/C ✓	O/C ✓	O/C ✓	O/C ✓	172k ✓	O/C ✓	O/C ✓	O/C ✓	284k ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓
14	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	O/C ✓	X	O/C ✓	S/C ✓
13	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓
12	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓
11	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	S/C ✓	O/C ✓	S/C ✓
10	O/C ✓	O/C ✓	O/C ✓	O/C ✓	286k ✓	O/C ✓	O/C ✓	O/C ✓	398k ✓	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	286k ✓
9	O/C ✓	O/C ✓	O/C ✓	O/C ✓	284k ✓	O/C ✓	O/C ✓	O/C ✓	X	398k ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	284k ✓	O/C ✓
8	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓
7	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓
6	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	S/C ✓
5	O/C ✓	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	284k ✓	286k ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	172k ✓	O/C ✓
4	O/C ✓	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓
3	O/C ✓	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓
2	O/C ✓	X	O/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	O/C ✓	S/C ✓	O/C ✓	S/C ✓
1	X	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓	O/C ✓

Pin Matrix J916 (TEU Power)

Pin No.	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	✓	O/C	✓	30k	✓	O/C	✓	100k	✓	100k	✓	S/C	✓	O/C	✓	O/C	✓
25	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	✓	O/C	✓	30k	✓	O/C	✓	100k	✓	100k	✓	S/C	✓	O/C	✓	O/C	✓
24	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	200k	✓	S/C	✓	100k	✓	O/C	✓	O/C	✓
23	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	S/C	✓	200k	✓	100k	✓	O/C	✓	O/C	✓
22	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
21	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	60k	✓	O/C	✓	S/C	✓	O/C	✓	130k	✓	130k	✓	30k	✓	O/C	✓	O/C	✓
20	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
19	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	60k	✓	O/C	✓	130k	✓	130k	✓	30k	✓	O/C	✓	O/C	✓
18	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
17	O/C	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
16	O/C	✓	O/C	✓	S/C	✓	303k	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
15	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
14	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X	
13	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓
12	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	✓	O/C	✓	30k	✓	O/C	✓	100k	✓	100k	✓	X		O/C	✓	O/C	✓
11	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	200k	✓	X		100k	✓	O/C	✓	O/C	✓
10	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	X		200k	✓	100k	✓	O/C	✓	O/C	✓
9	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
8	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	60k	✓	O/C	✓	X		O/C	✓	130k	✓	130k	✓	30k	✓	O/C	✓	O/C	✓
7	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
6	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	60k	✓	O/C	✓	130k	✓	130k	✓	30k	✓	O/C	✓	O/C	✓
5	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
4	O/C	✓	O/C	✓	O/C		X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
3	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
2	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
1	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓

Pin Matrix J

Pin No.	15		16		17		18		19		20		21		22		23		24		25		Chassis	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	✓	O/C	✓	30k	✓	O/C	✓	100k	✓	100k	✓	S/C	✓	X	✓
25	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	✓	O/C	✓	30k	✓	O/C	✓	100k	✓	100k	✓	X		S/C	✓
24	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	200k	✓	X		100k	✓	100k	✓
23	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	X		200k	✓	100k	✓	100k	✓
22	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓
21	O/C	✓	O/C	✓	O/C	✓	O/C	✓	60k	✓	O/C	✓	X		O/C	✓	130k	✓	130k	✓	30k	✓	30k	✓
20	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
19	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	60k	✓	O/C	✓	130k	✓	130k	✓	30k	✓	30k	✓
18	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
17	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
16	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
15	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
14	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
13	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
12	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	✓	O/C	✓	30k	✓	O/C	✓	100k	✓	100k	✓	S/C	✓	S/C	✓
11	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	200k	✓	S/C	✓	100k	✓	100k	✓
10	O/C	✓	O/C	✓	O/C	✓	O/C	✓	130k	✓	O/C	✓	130k	✓	O/C	✓	S/C	✓	200k	✓	100k	✓	100k	✓
9	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
8	O/C	✓	O/C	✓	O/C	✓	O/C	✓	60k	✓	O/C	✓	S/C	✓	O/C	✓	130k	✓	130k	✓	30k	✓	30k	✓
7	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
6	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	O/C	✓	60k	✓	O/C	✓	130k	✓	130k	✓	30k	✓	30k	✓
5	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
4	O/C	✓	303k	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
3	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
2	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
1	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓

Pin matrix J917 (CCU Power)

Pin No.	A		B		C		D		E		F		Chassis	
Chassis	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**X**	
F	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**X**		**O/C**	✓
E	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**X**		**O/C**	✓	**O/C**	✓
D	**O/C**	✓	**O/C**	✓	**S/C**	✓	**X**		**O/C**	✓	**O/C**	✓	**O/C**	✓
C	**O/C**	✓	**O/C**	✓	**X**		**S/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓
B	**S/C**	✓	**X**		**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓
A	**X**		**S/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓

Pin matrix J917 (CCU Power)

Pin No.	A		B		C		D		E		F		Chassis	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X	
F	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓
E	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓
D	O/C	✓	O/C	✓	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓
C	O/C	✓	O/C	✓	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓
B	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
A	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓

Pin Matrix J918 (GEU Power)

Pin No.	1		2		3		4		5		6		7		8		9		10		11		12		13		14
Chassis	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
25	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
24	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
23	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
22	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
21	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
20	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	X	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
19	O/C	✓	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	S/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
18	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
17	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
16	O/C	✓	O/C	X	O/C	X	S/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
15	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C
14	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X
13	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C
12	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		O/C	✓	O/C
11	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		S/C	✓	O/C	✓	O/C
10	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C
9	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
8	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	X	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
7	O/C	X	O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	X		O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
6	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
5	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C
4	O/C	✓	O/C	X	O/C	X	X		O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
3	O/C	X	S/C	✓	X		O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
2	O/C	X	X		S/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C
1	X		O/C	X	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C

Pin Matrix J9

Pin No.		15		16		17		18		19		20		21		22		23		24		25		Chassis	
Chassis	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X	✓
25	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		O/C	✓
24	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		S/C	✓	O/C	✓
23	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓
22	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓
21	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
20	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	X	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
19	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	X		O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
18	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
17	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
16	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
15	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
14		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
13	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
12	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
11	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
10	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
9	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
8	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	X	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
7	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	S/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
6	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
5	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
4	✓	O/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
3	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
2	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X
1	✓	O/C	✓	O/C	X	O/C	✓	O/C	✓	O/C	X	O/C	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	X

Pin matrix J919 (EEA Power)

Pin No.	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		Chassis	
Chassis	100k	X	100k	X	30k	X	30k	X	O/C	✓	O/C	✓	S/C	✓	S/C	✓	S/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X	
15	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓
14	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		O/C	✓	O/C	✓
13	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		S/C	✓	O/C	✓	O/C	✓
12	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓
11	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
10	100k	X	100k	X	30k	X	30k	X	O/C	✓	O/C	✓	S/C	✓	S/C	✓	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓
9	100k	X	100k	X	30k	X	30k	X	O/C	✓	O/C	✓	S/C	✓	S/C	✓	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓
8	100k	X	100k	X	30k	X	30k	X	O/C	✓	O/C	✓	S/C	✓	X		S/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓
7	100k	X	100k	X	30k	X	30k	X	O/C	✓	O/C	✓	X		S/C	✓	S/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	S/C	✓
6	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
5	O/C	✓	O/C	✓	O/C	✓	O/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓
4	130k	X	130k	X	S/C	✓	X		O/C	✓	O/C	✓	30k	X	30k	X	30k	X	30k	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	X
3	130k	X	130k	X	X		S/C	✓	O/C	✓	O/C	✓	30k	X	30k	X	30k	X	30k	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	30k	X
2	S/C	✓	X		130k	X	130k	X	O/C	✓	O/C	✓	100k	X	100k	X	100k	X	100k	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	100k	X
1	X		S/C	✓	130k	X	130k	X	O/C	✓	O/C	✓	100k	X	100k	X	100k	X	100k	X	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	100k	X

Pin matrix J920

These connections taken from LMMS connection cable diagram 1A26313, as no information in any HIRDLS ICD

Pin No.	A		B		C		D		E		F		G		Chassis	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	X	
G	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	X		O/C	N/A
F	O/C	✓	O/C	✓	O/C	✓	S/C	✓	S/C	✓	X		O/C	N/A	O/C	✓
E	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		S/C	✓	O/C	N/A	O/C	✓
D	O/C	✓	O/C	✓	O/C	✓	X		S/C	✓	S/C	✓	O/C	N/A	O/C	✓
C	S/C	✓	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	N/A	O/C	✓
B	S/C	✓	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	O/C	✓
A	X		S/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	O/C	✓

Pin matrix J921

These connections taken from LMMS connection cable diagram 1A26314, as no information in any HIRDLS ICD

Pin No.	A		B		C		D		E		F		G		Chassis	
Chassis	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	X	
G	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	O/C	N/A	X		O/C	N/A
F	O/C	✓	O/C	✓	O/C	✓	S/C	✓	S/C	✓	X		O/C	N/A	O/C	✓
E	O/C	✓	O/C	✓	O/C	✓	S/C	✓	X		S/C	✓	O/C	N/A	O/C	✓
D	O/C	✓	O/C	✓	O/C	✓	X		S/C	✓	S/C	✓	O/C	N/A	O/C	✓
C	S/C	✓	S/C	✓	X		O/C	✓	O/C	✓	O/C	✓	O/C	N/A	O/C	✓
B	S/C	✓	X		S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	O/C	✓
A	X		S/C	✓	S/C	✓	O/C	✓	O/C	✓	O/C	✓	O/C	N/A	O/C	✓

Pin matrix J921

These connections taken from LMMS connection cable diagram 1A26314, as no information in any HIRDLS ICD

Pin No.	A		B		C		D		E		F		G		Chassis	
Chassis	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	**N/A**	**X**	
G	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**O/C**	**N/A**	**X**		**O/C**	**N/A**
F	**O/C**	✓	**O/C**	✓	**O/C**	✓	**S/C**	✓	**S/C**	✓	**X**		**O/C**	**N/A**	**O/C**	✓
E	**O/C**	✓	**O/C**	✓	**O/C**	✓	**S/C**	✓	**X**		**S/C**	✓	**O/C**	**N/A**	**O/C**	✓
D	**O/C**	✓	**O/C**	✓	**O/C**	✓	**X**		**S/C**	✓	**S/C**	✓	**O/C**	**N/A**	**O/C**	✓
C	**S/C**	✓	**S/C**	✓	**X**		**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	**N/A**	**O/C**	✓
B	**S/C**	✓	**X**		**S/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	**N/A**	**O/C**	✓
A	**X**		**S/C**	✓	**S/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	✓	**O/C**	**N/A**	**O/C**	✓