SPIRE-AST-MOM-2333

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Minutes of Meeting

Herschel

Date:	18/04/02		
Doc.-No.:	HP-2-ASED-MN-0112		
Meeting place:	RAL	Chairman:	Horst Faas
Date/Time:	18/04/02 / 09h00	Secretary	Horst Faas
Agenda dated:	Handout, 17/04/02 (annex 4)	Close of Meeting:	19/04/02, PM

Subject: ~~Preparation Meeting for Instrument Thermal Interface Meeting~~ SPIRE – Cryo Harness Interface Meeting #2

Participants:	RAL: D. Griffin, J. Delderfield (First day) Tekdata: R. Blake (First day) ASED: R. Hohn, J. Lang, H. Faas (First day)	Additional Distribution:	Dr. Moritz, W. Rühe, E. Hölzle, A. Hauser, Hund, Kamuter, Peters ESA: G. Crone, J. Bruston, A. Hoffe ASPI: B. Collaudin, G. Lund,

Page: 1 of 3 Page(s)

☐ Brief-Minutes (except following sheets) ☐ Summary of Results of Sheets 2 till

19/4/02.

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Reference	Results	Remarks
	Agenda Item: Introduction Agenda was presented and under AOB the following subjects were added: • Harness routing • EMC classes RAL/JD stated that the Harness Definition Document, Version 0.9 is reasonable working baseline. Errors will be corrected. ASED received only the request for review, but no formal change request has been received yet from Alcatel. **Relevant Harness Documentation:** The three SPIRE harness document are not self-consistent. RAL would prefer to use the SPIRE Harness Definition Document, Version 0.9. The already known errors, e.g. • Dissipation of C13 not correct • Some impedance are still too high Will be corrected in the Redlined Copy of the Harness Def. Doc., Annex 1 and 2. The SPIRE ECR#010 is irrelevant, when the Harness Definition Document, Version 0.9 is used as PDR baseline, plus some additional amendments identified during this harness meeting. (Redline Copy) SPIRE ECR#010 is based on Harness Definition Document, Version 0.8. A new ECR is the pipeline, which corresponds to Version 0.9. It is the intention that this document will be processed in the framework of the Spire IID-B, Issue 2.2. The Spire Block diagram, Version 4.1 is the present issue and has been received by Astrium on 16/04/02. The Harness Definition, Version is consistent with Version 4.0 of the Block Diagram. The Ground Diagram is out-of-date in the Harness Def. Doc., Version 0.9. It includes the overshielding inside the CVV. **ASED Harness Documentation:** The ASED TN HP-2-ASED-TN-0010, Issue 1.0 includes the current baseline length of harness, except for the CVV internal. There a length of 1.8m has been assumed. It represents the current status. (status of today)	The overall Astrium harness design authority is not respected and restricted

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Reference	Results	Remarks
*(4c) by Alcatel	SVM Connector The brackets between the warm harness and cryo harness will be discussed with Alenia and Alcatel on 30/04/02. The position of the bracket shall optimised to shorten the SST harness as much as possible.	
	ASED TN: List of connectors, HP-2-ASED-TN-0030. SPIRE identifiers and spacecraft identifiers are not consistent and as required as in the IIDB.	
Annex 6	SPIRE-RAL-DOC-000646 The instrument block diagram shows unit connector, not harness connector numbers. A note shall be added to state that this diagram shall not be used for assigning connector names. Furthermore, RAL will include in the update of the Harness Document a note to this effect and in the section to define the harness, connectors which are plugged in will be designated P and connector which are bracket mounted will be J, including the harness diagram. The connector to be of type J are the chassis mounted connector, which are inside the CVV and are not the cryoharness side of the SVM panel.	This block diagram will be submitted to Astrium in elect. form.
	RAL TN-0030 comments will be ~~discussed Friday~~ provided to Astrium It was agreed that RAL will update the harness naming as follows: • E will be changed to I • I will be changed to S	AIP Spire due 25.04.02
Annex 1	The set of SPIRE I/F drawings (issue 13) is attached at Annex 1. AI#1: Updated SPIRE I/F drawings containing the following information shall be supplied by SPIRE by 30 April 2002: • Position of all connector, • Orientation • Type, size and sex • Pin-1 position	AI#1: Updated SPIRE I/F drawings containing the following information shall be supplied by SPIRE by 30 April 2002: • Position of all connector, • Orientation • Type, size and sex • Pin-1 position
	It was noted that SPIRE need to check the details of the connector mating to ensure that the back shells which may project past the IF plane do not clash with other metal work. Astrium was will supply the details of the intended back shells, so that RAL can perform the analysis.	AI 3 : RAL due 28.4.02

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Reference	Results	Remarks
	SPIRE presently intends to use MDM connectors as sourced by JPL to QPL, and on the warm units to use whatever connectors Technologica supply to the relevant ESA SCC part number. SPIRE is not planning to insist on the particular manufacturers.	
Annex 2-1 Annex 2-2 (location tables for integration)	**ICD Abbreviation Codes (generated by ASED):** The following comments were generated (see redlined Annex 2-1 and Annex 2-2): • PTC (photometer thermal control) to be added to the list (connected to F28A): proposed number: 1211G0, E, 72 • BSM (Beam steering mirror) missing: proposed number 1211H0, E, 72 • Correct code numbers in table to 77 • 121169 should be SCO • 121170 should be SCAL • 121180 should be PCAL • 127000 will become WHARN • 128000 will become SHARN, description updated	
	SPIRE proposed that the SVM-cryo harness branches should be realised in Cu. Astrium initial analysis showed that the inner shields for such an implementation should fit in the available crimp contacts.	
	It was noted that for the bolometer signal cables four screened twisted pairs (AWG-28) from the SVM-harness followed through into the I-harness as one 12-ax. Otherwise the intention is that the cable configuration/construction should be maintained through the whole harness run.	?
Annex 3	Astrium ASED-TN-0018, Draft is completed by the Astrium SPIRE harness routing from Mr. F. Gareißen, IP35, dated 19/04/02 (see Annex 3).	
	AGENDA ITEM: Closure of open action items	
	HP-2-ASED.MN-0027 / AI#004: FPU-JFET instrument harness routing missing: Cover by AI#001 of these MOM. **HP-2-ASED.MN-0027 / AI#005:** Closed by delivery of FPU IF drawings, Issue 13 → b1A **HP-2-ASED.MN-0027 / AI#007:** Closed. Spire stated that they intend to establish a requirement in the	

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Reference	Results	Remarks
Annex 4	updated IID-B (tbc) that the CVV feed through connectors and the SVM connector bracket shall equipped shorting plugs or termination plugs. This is to cope with the situation where either the CVV or the SVM is stand-alone without the cryoharness attached. The information shall consist of a termination configuration described by signal descriptions. If the information is not received at Astrium by 30 April, the items can be procured within the harness ITT. Otherwise it will be SPIRE's responsibility or has to be dealt with an ECP. Details have to be clarified with ESA/Alcatel **HP-2-ASED.MN-0027 / AI#008:** Closed. Answer: No. **HP-2-ASED.MN-0027 / AI#009:** Closed. The cryoharness integrity will be established by Astrium. **HP-2-ASED.MN-0027 / AI#010:** Closed. No problem, see above. **AGENDA ITEM: Cable Types / Configuration** ASED presented a list of the identified cable configurations and its overall length. The cable types specified in the HDD, Issue 0.9 are consistent with those which are already designed for the Herschel Programme. The 12-ax cable has been designed in AWG38 SST and the Cable code is GSC-05-82250-00. ~~To be completed on Friday!~~ updated (requirements) SPIRE stated that the C-harness (from the JFETS to the CCV wall) have a DC resistance of <500Ohms instead of <200Ohms in the HDD, Version 0.9. This applies to the I-Harness, as well. The SPIRE resistance has been specified for [redacted] temperature of 30K (inside CVV) and 80K (outside CVV). Nevertheless, Astrium can assume that the resistance values provided are at room temperature, giving some margin. ~~Are there critical resistance values?~~ (See Annex 5)	
Annex 5: Harness Def. Doc., Annex 1 and 2, Redlined Copy	**Agenda Item: Clarification of electrical interfaces** • **C10/12 and C11/C13:** Both pairs are cold redundant. Only one dissipates power at any one	

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Reference	Results	Remarks
	time. (see Annex 5) • **Prime and Redundant wires:** no impact on the heat dissipation SPIRE will update the Harness summary spreadsheet to remove the assumed duty cycles from the mean power column, the mean power column will be the power, when operating and additional colmun will be added to the spreadsheet for the each of the SPIRE modes agreed for use in thermal analysis to show if that wire is active or not. Astrium claims that the information shall be provided by 30/04/02 in order to achieve the overall PDR schedule. average electric currents SPIRE stated that all the values in the harness document do not have margin added. • **Bundle overshield isolation** SPIRE initially required for the harness between the CVV and the SVM bracket overshielding plus additional isolation. Assuming that local plastic isolation can be wrapped around locally at a later stage, if required. this requirement is disregarded **To be clarified in the redlined copy of HDD, Issue 0.9** The external shields on the warm harness were discussed and no problems were identified. • **Selection of feed through connectors (100/128 pins)** The ASED analysis resulted in the selection of 100 pin connectors. SPIRE selected 128 pin connectors for the test cryostat. (Eric Sawyer) AI#3: SPIRE/ES to estimate the effort to change from 128 to 100 pin connector. AI#4: ASED will analysis the impact of changing the feed through connectors from 100 to 128 pin connectors. • **EMC classes** Considering the IID-A definition of EMC classes in Section 15.14.2.1 EMC classes need to be identified. In order to complete the flight harness design Astrium requires for the harness design the EMC class per wire.	AI#002: SPIRE will send Astrium the updated Excel spreadsheet. Due date: 06/05/02 (based on Photometer, Spectrometer, Recycling and Standby Mode) Power Dissipation per Mode? + Warm units AI#3: SPIRE/ES to estimate the effort to change from 128 to 100 pin connector. due 25/4 AI#4: ASED will analysis the impact of changing the feed through connectors from 100 to 128 pin connectors. due 3/5

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Reference	Results	Remarks
	SPIRE confirms that all wires are Class 3, except that the brass wires in C/I/S 10 to 13 carry higher currents and may be considered as Class 2.	

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Reference	Results	Remarks
	19.04.02 The Spine Harness Definition Document (version 09) has been redlined. It is attached as annex 5. - Ased to investigate daisy chaining of SS wires with regard to single TSPs (concern JFETs MDM25 con.) and to clarify with PH - In the above mentioned document the harness connectors are specified. - The SKin Connectors will be allocated in the SVM connecto-brackets (mechanical launch log, Shin Ho) Spine request access 6 to 10 days prior to launch (before the Fairing is mounted to the launch vehicle - All individual cable shields will be connected on Contacts and interconnections will be done on the rear side of the connector.	Spine intents to to connect 15 wires to one pin. Astrium doubts the feasibility of this approach. This approach is not in line with the ESA/Alcatel general requirements ref. page 72

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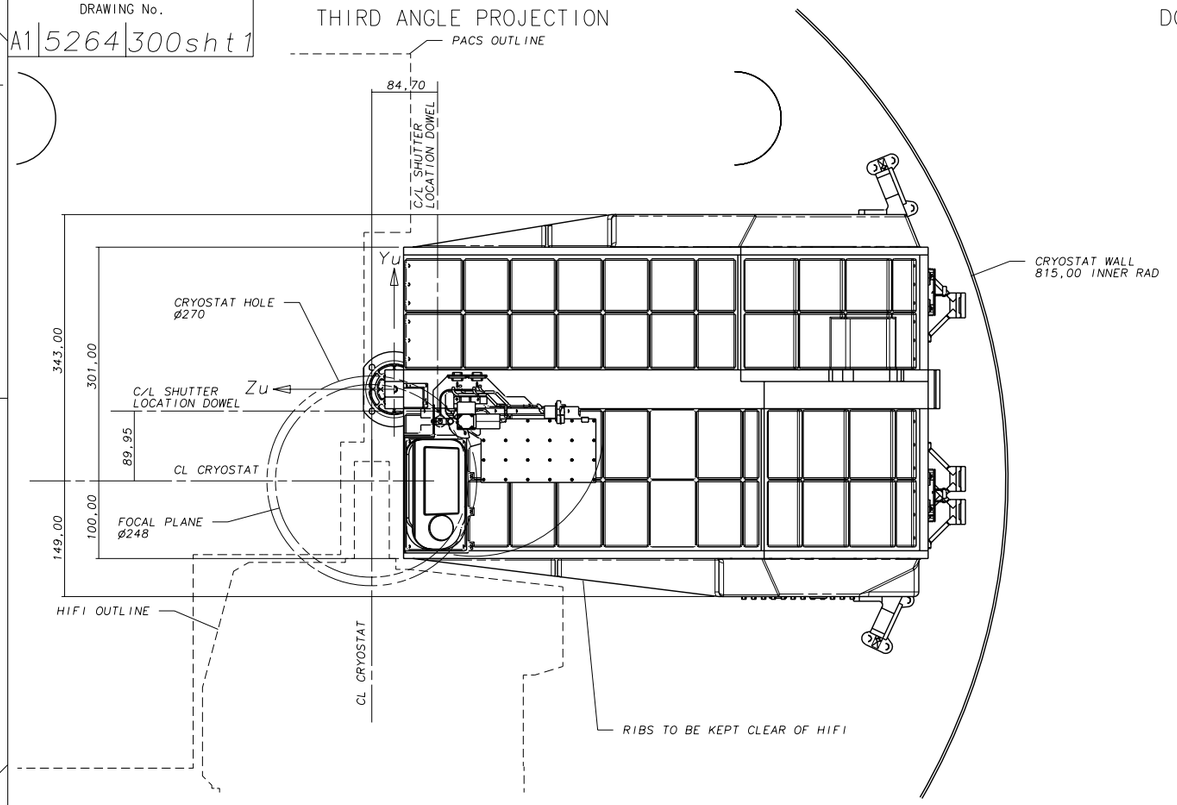
Reference	Results	Remarks
page 72, 74,	Spire to investigate commoning of power lines to be performed until internally - The Spire internal ground test cases are not applicable for the EQM/PFM Cryo harness design - Spire will provide the standoffs for harness fixation on their units. Astrium will provide available information within the next two weeks * the shutter - ASED to investigate the feasability of connecting the FPU Faraday Shield Link to the Backshells on the cold units.	AI 6 Spire AI 7 Astrium due 15.05.02 AI 10

DRAWING No.
A1 | 5264 | 300sht1

THIRD ANGLE PROJECTION

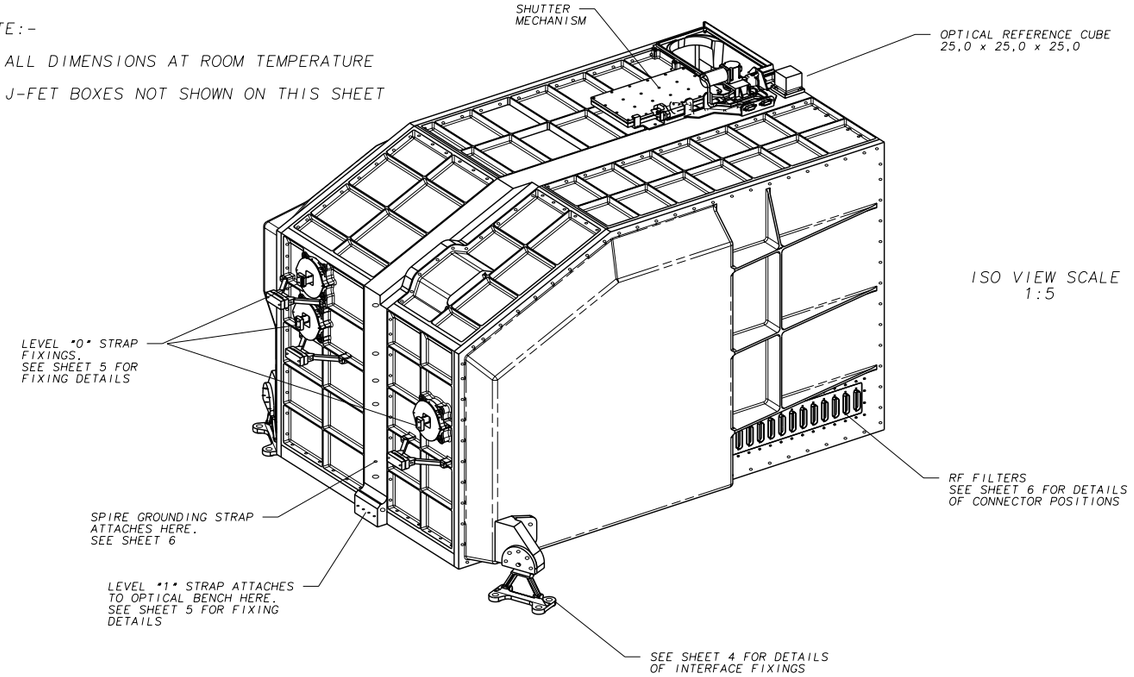
DO NOT SCALE

USED ON HERSCHEL

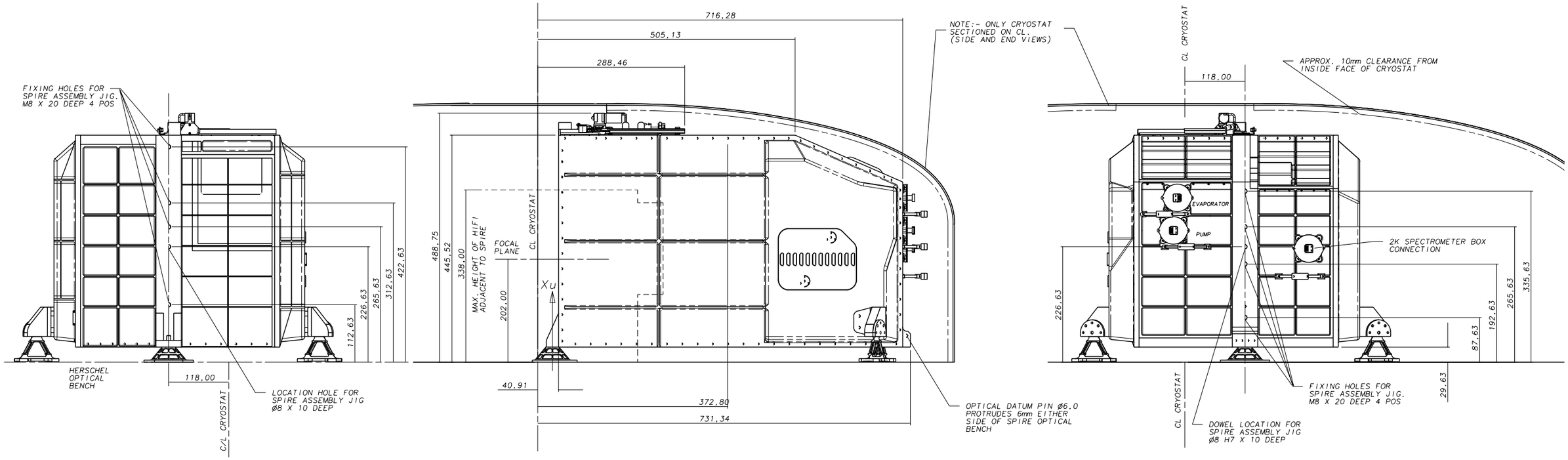


NOTE:-

1. ALL DIMENSIONS AT ROOM TEMPERATURE
2. J-FET BOXES NOT SHOWN ON THIS SHEET



ISO VIEW SCALE 1:5



DRAWN	ISSUE	DATE	AMENDMENT	SPIRE Flight Assemblies
AJC	1	24/11/01		COMPUTER FILE
CHECKED	13	19/11/01	UPDATED RFI FILTER & PHOT CONNECTORS ADDED. FOCAL PLANE & "A" FRAME MOUNT DIM ADDED. SHEET 7 ADDED.	
	12	4/9/01	AUGUST ISSUE SHUTTER MECHANISM ADDED, COLD STRAPS AND MOUNTINGS ADDED., LINE WEIGHTS MODIFIED	
TRACED PBG	11	30/7/01	RE-DRAWN. 2X CABLE HARNESS HOLES REMOVED (SHT 6) SENSOR CONNECTORS ADDED TO PHOT COVER 3 POS	
	10	28/6/01	DRAWING SHEETS 3, 4 & 5 ADDED. DIMENSIONS SHOWN ON OTHER SHEETS REMOVED FROM THIS SHEET	

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED -
AS LISTED	AS LISTED	LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT. 50kg(INC.CONT.)		
ACTL WT.	DIMENSIONS IN mm	SCALE 1:4

DEPARTMENT OF SPACE AND CLIMATE PHYSICS
UNIVERSITY COLLEGE LONDON
MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.

TITLE
SPIRE INTERFACE (GENERAL DIMENSIONS)

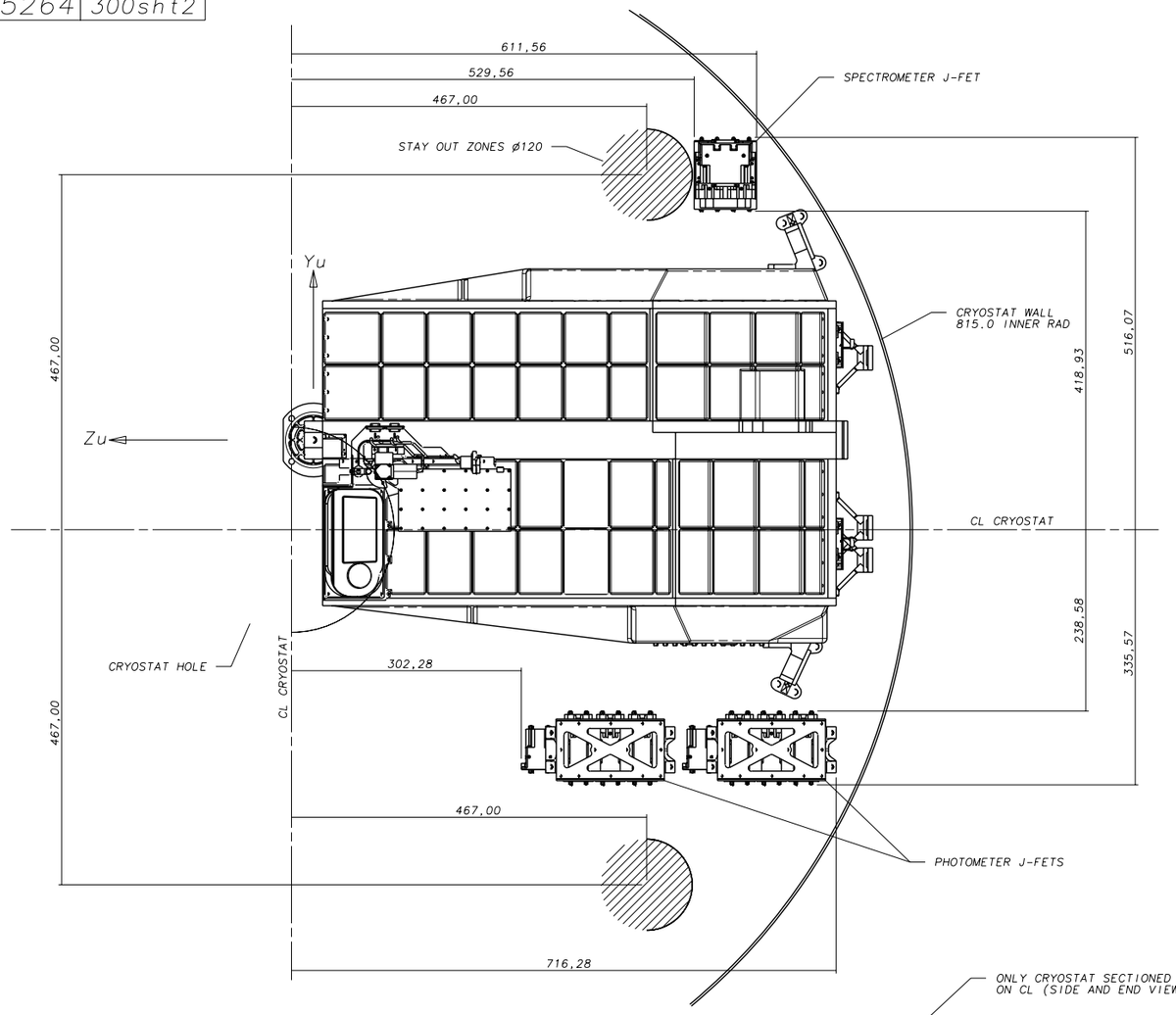
DRAWING No
A1 | 5264 | 300sht1

DRAWING No.
A1 | 5264 | 300sht2

THIRD ANGLE PROJECTION

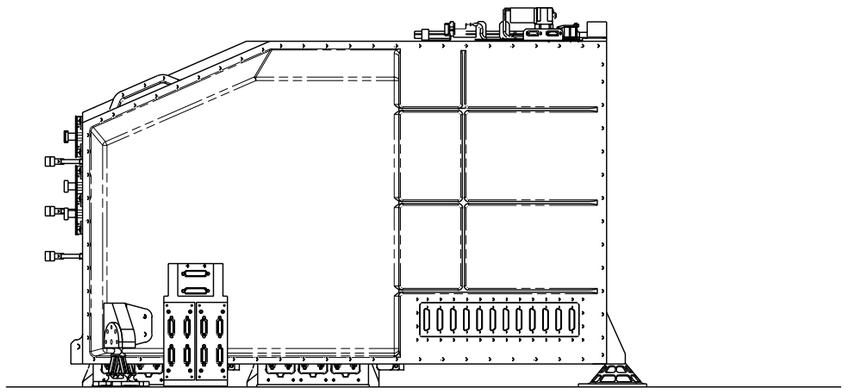
DO NOT SCALE

USED ON HERSCHEL



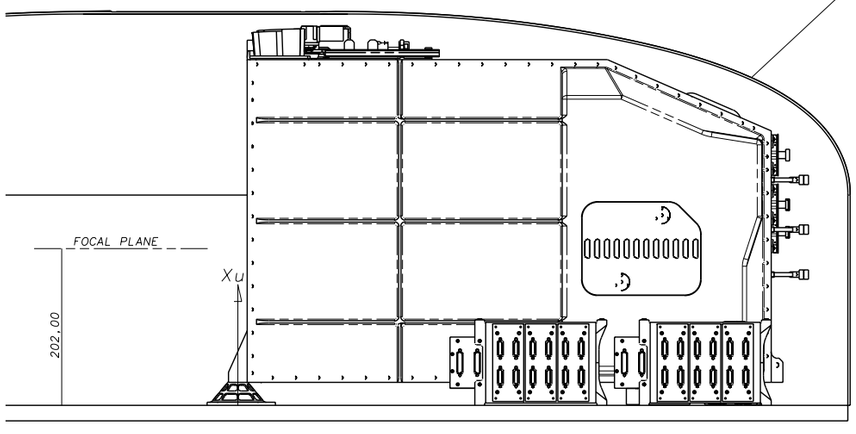
NOTE:-

1. ALL DIMENSIONS AT ROOM TEMPERATURE



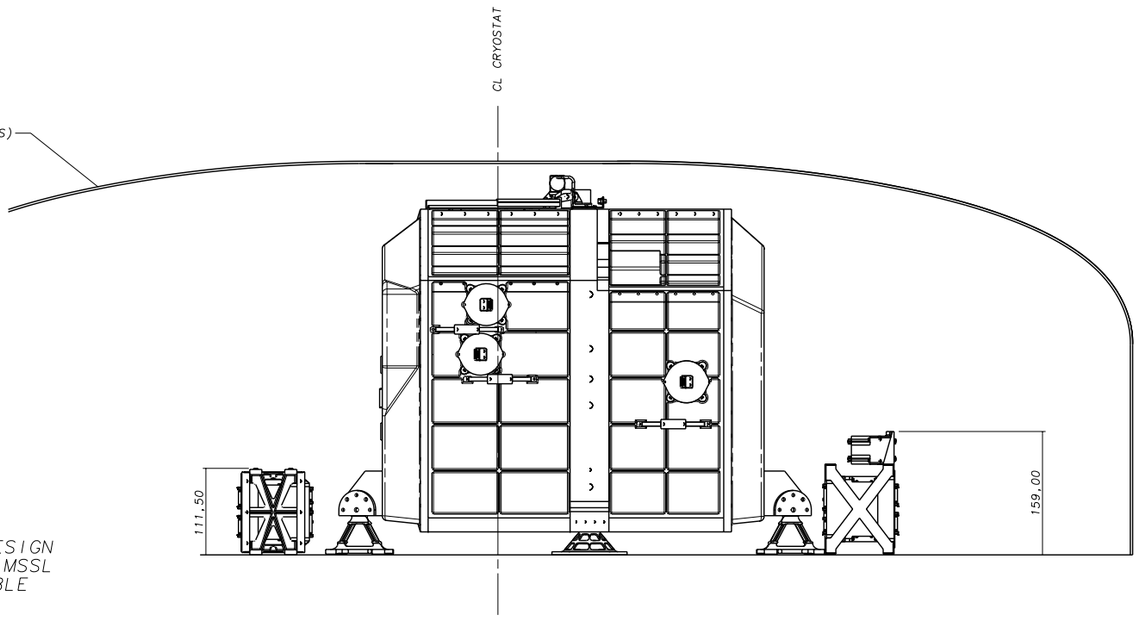
SPECTROMETER SIDE

(VIEWED IN -Yu DIRECTION)



PHOTOMETER SIDE

NOTE:
J-FET DETAIL DESIGN
IS EXTERNAL TO MSSL
SPIRE DELIVERABLE



CHECKED				
	13	19/11/01	UPDATED RFI FILTER & PHOT CONNECTORS ADDED. FOCAL PLANE & "A" FRAME MOUNT DIM ADDED. SHEET 7 ADDED.	
	12	4/9/01	AUGUST ISSUE SHUTTER MECHANISM ADDED, COLD STRAPS AND MOUNTINGS ADDED, LINE WEIGHTS MODIFIED	
TRACED PBG	11	30/7/01	RE-DRAWN, 2X CABLE HARNESS HOLES REMOVED (SHT 6) SENSOR CONNECTORS ADDED TO PHOT COVER 3 POS	
	10	28/6/01	DRAWING SHEETS 3, 4 & 5 ADDED. DIMENSIONS SHOWN ON OTHER SHEETS REMOVED FROM THIS SHEET	
DRAWN	ISSUE	DATE	AMENDMENT	SPIRE Flight Assemblies
AJC	1	24/11/01		COMPUTER FILE

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED -
AS LISTED	AS LISTED	LINEAR +/- 0.10
		ANGULAR +/- 0°15'
ESTD WT. 50kg(INC.CONT.)		
ACTL WT.	DIMENSIONS IN mm	SCALE 1:4

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MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY,
DORKING, SURREY.

TITLE: SPIRE INTERFACE (J-FET POSITIONS)

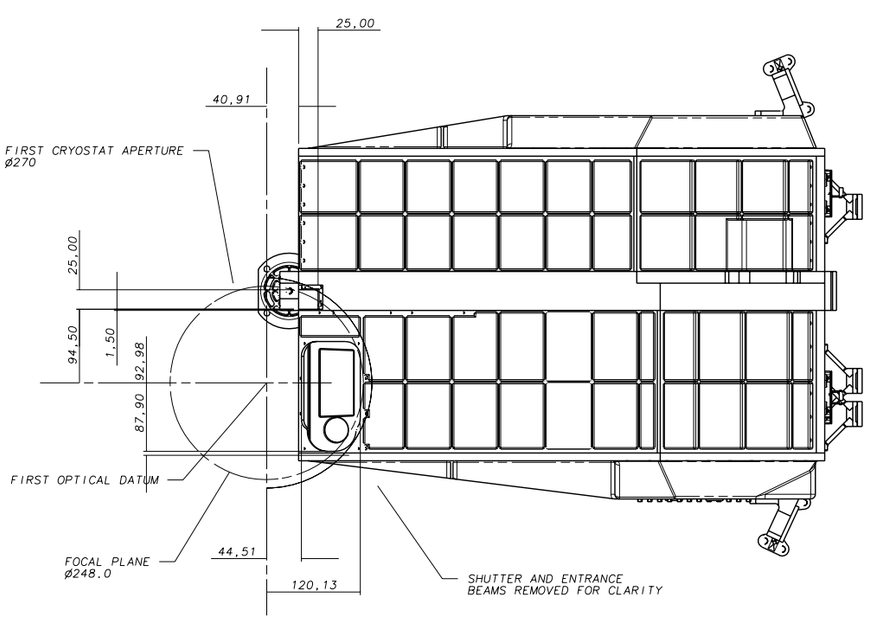
DRAWING No: A1 | 5264 | 300sht2

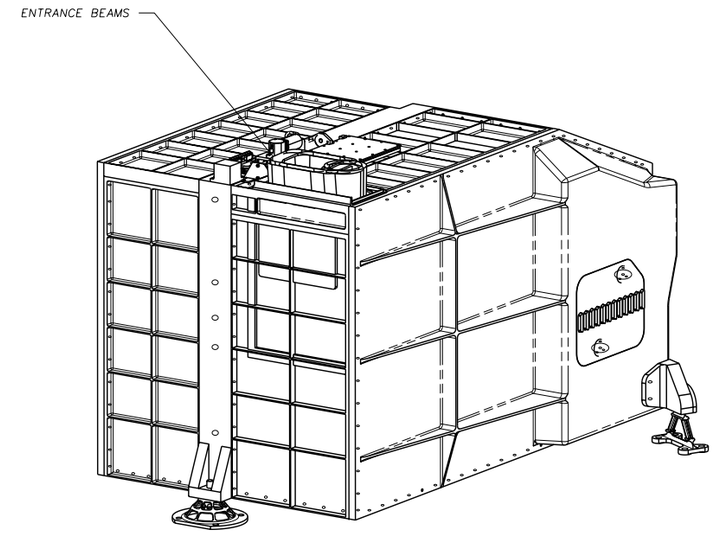
DRAWING No.
A1 | 5264 | 300sht3

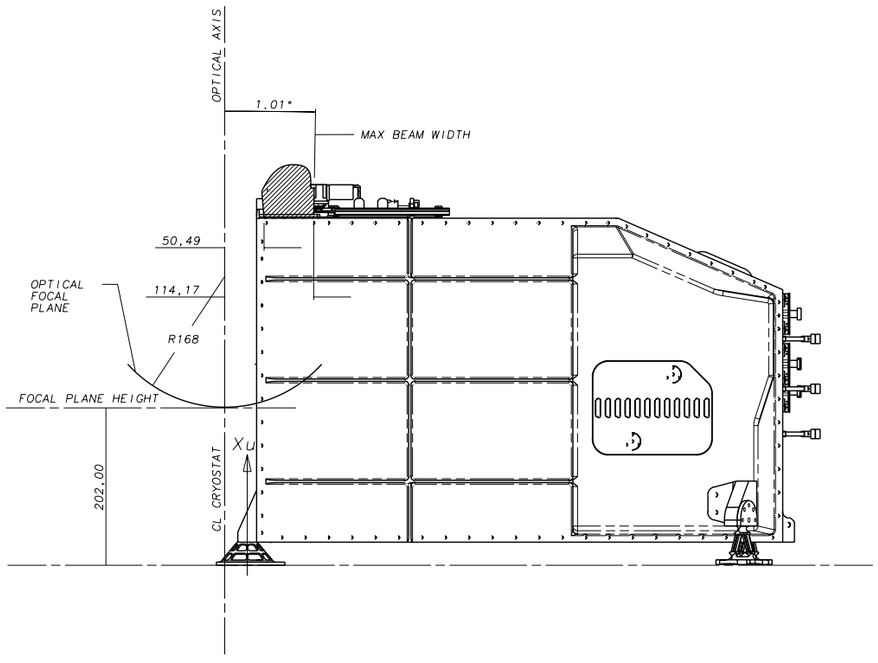
THIRD ANGLE PROJECTION

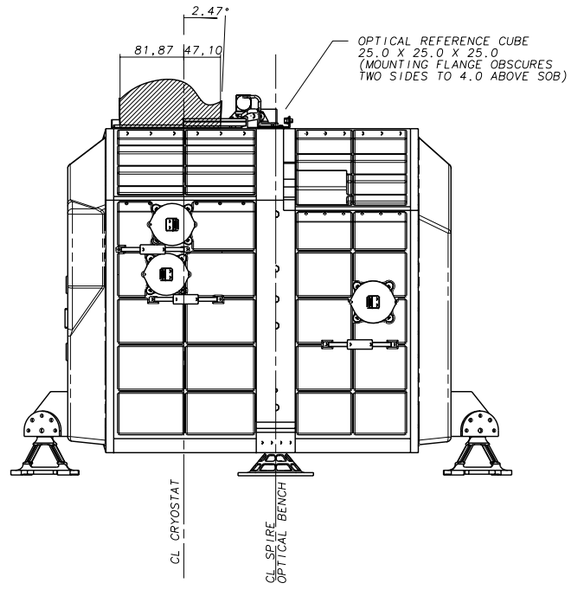
DO NOT SCALE

USED ON
HERSCHEL









NOTE:-

1. ALL DIMENSIONS AT ROOM TEMPERATURE

CHECKED				
	13	19/11/01	UPDATED RFI FILTER & PHOT CONNECTORS ADDED. FOCAL PLANE & "A" FRAME MOUNT DIM ADDED. SHEET 7 ADDED.	
	12	4/9/01	AUGUST ISSUE SHUTTER MECHANISM ADDED, COLD STRAPS AND MOUNTINGS ADDED, LINE WEIGHTS MODIFIED	
TRACED	11	30/7/01	RE-DRAWN. 2X CABLE HARNESS HOLES REMOVED (SHT 6) SENSOR CONNECTORS ADDED TO PHOT COVER 3 POS	
PBG	10	28/6/01	DRAWING SHEETS 3, 4 & 5 ADDED. DIMENSIONS SHOWN ON OTHER SHEETS REMOVED FROM THIS SHEET	
DRAWN	ISSUE	DATE	AMENDMENT	SPIRE Flight Assemblies
AJC	1	24/11/01		COMPUTER FILE

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED -
AS LISTED	AS LISTED	LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT. 50kg(INC.CONT.)		
ACTL WT.	DIMENSIONS IN mm	SCALE 1:1

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UNIVERSITY COLLEGE LONDON
MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY,
DORKING, SURREY.

TITLE
SPIRE INTERFACE
(OPTICAL DETAILS)

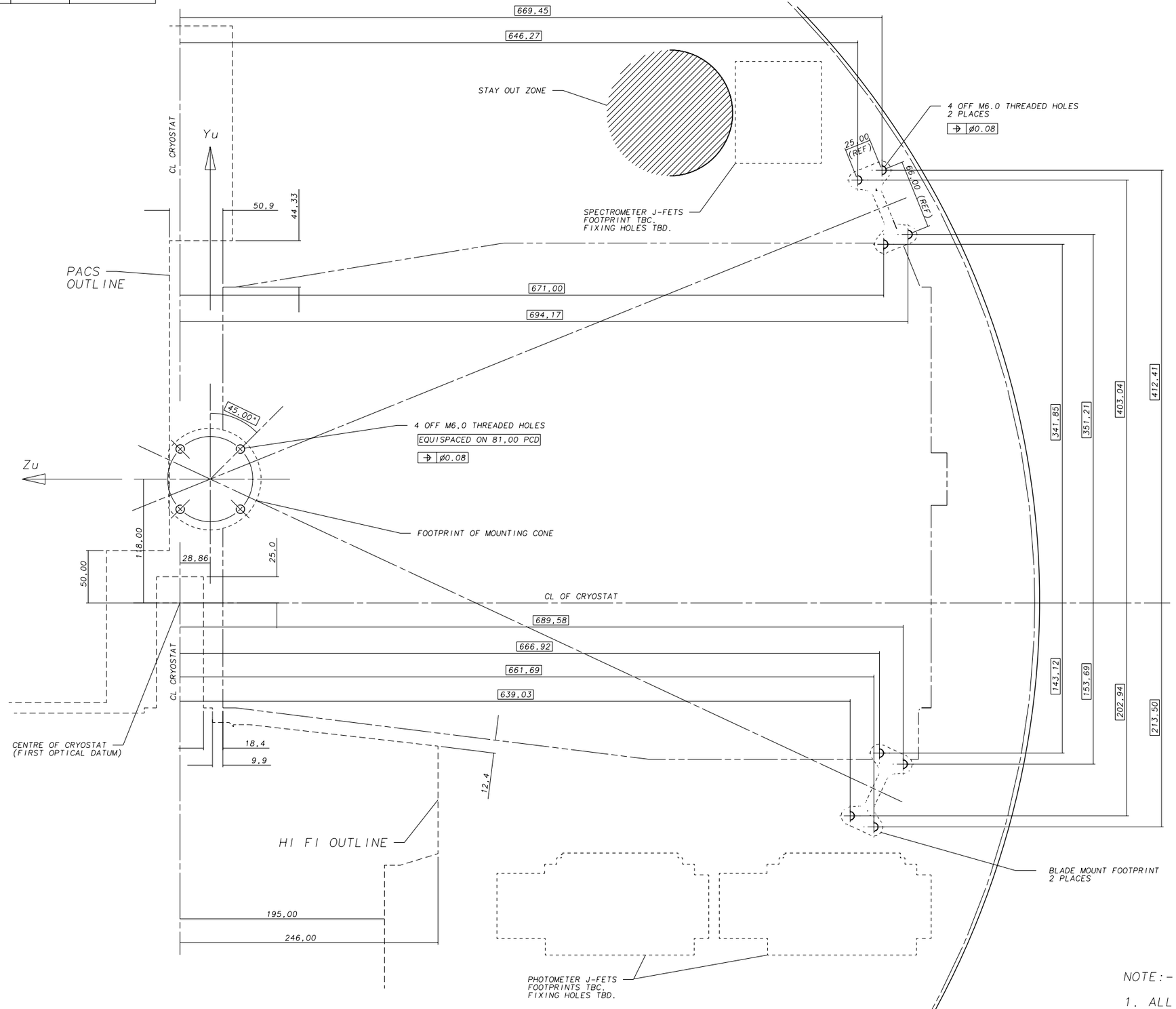
DRAWING No
A1 | 5264 | 300sht3

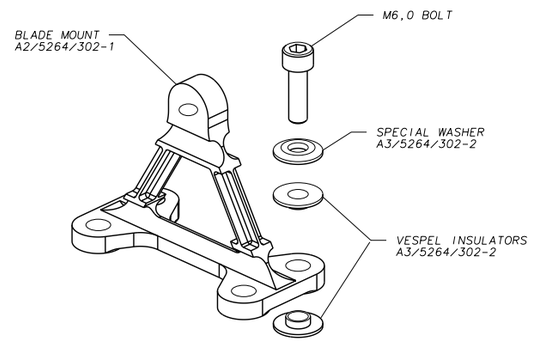
DRAWING No.
A1 | 5264 | 300sht4

THIRD ANGLE PROJECTION

DO NOT SCALE

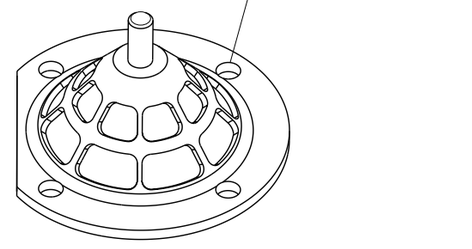
USED ON HERSCHEL





DETAIL OF BLADE MOUNT FIXINGS

SCALE 1 : 1



DETAIL OF FIXED MOUNTING

SCALE 1 : 1

NOTE:-

1. ALL DIMENSIONS AT ROOM TEMPERATURE

CHECKED	13	19/11/01	UPDATED RFI FILTER & PHOT CONNECTORS ADDED. FOCAL PLANE & "A" FRAME MOUNT DIM ADDED. SHEET 7 ADDED.	
	12	4/9/01	AUGUST ISSUE SHUTTER MECHANISM ADDED. COLD STRAPS AND MOUNTINGS ADDED. LINE WEIGHTS MODIFIED	
TRACED PBG	11	30/7/01	RE-DRAWN. 2X CABLE HARNESS HOLES REMOVED (SHT 6) SENSOR CONNECTORS ADDED TO PHOT COVER 3 POS	
	10	28/6/01	DRAWING SHEETS 3, 4 & 5 ADDED. DIMENSIONS SHOWN ON OTHER SHEETS REMOVED FROM THIS SHEET	
DRAWN	ISSUE	DATE	AMENDMENT	SPIRE Flight Assemblies
AJC	1	24/11/01		COMPUTER FILE

PROTECTIVE FINISH AS LISTED	MATERIAL & SPEC. AS LISTED	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT. 50kg(INC.CONT.)		
ACTL WT.	DIMENSIONS IN mm	SCALE SCALE 1:2 & 1:1

DEPARTMENT OF SPACE AND CLIMATE PHYSICS
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MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY,
DORKING, SURREY.

TITLE: SPIRE INTERFACE (INTERFACE FIXING DETAILS)

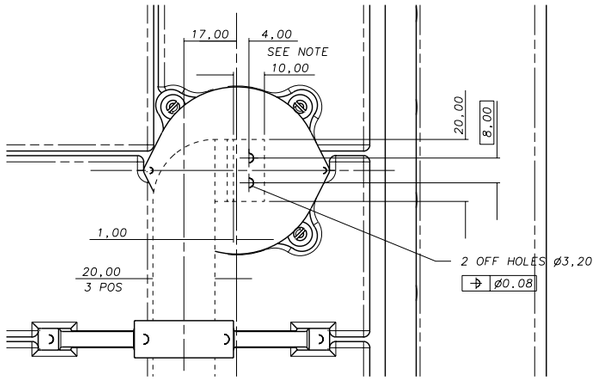
DRAWING No: A1 | 5264 | 300sht4

DRAWING No.
A1 | 5264 | 300sht5

USED ON HERSCHEL

THIRD ANGLE PROJECTION

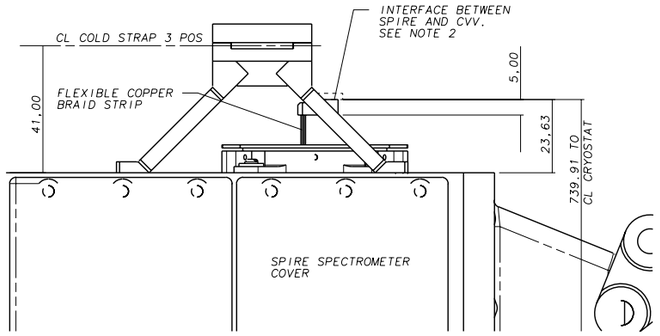
DO NOT SCALE

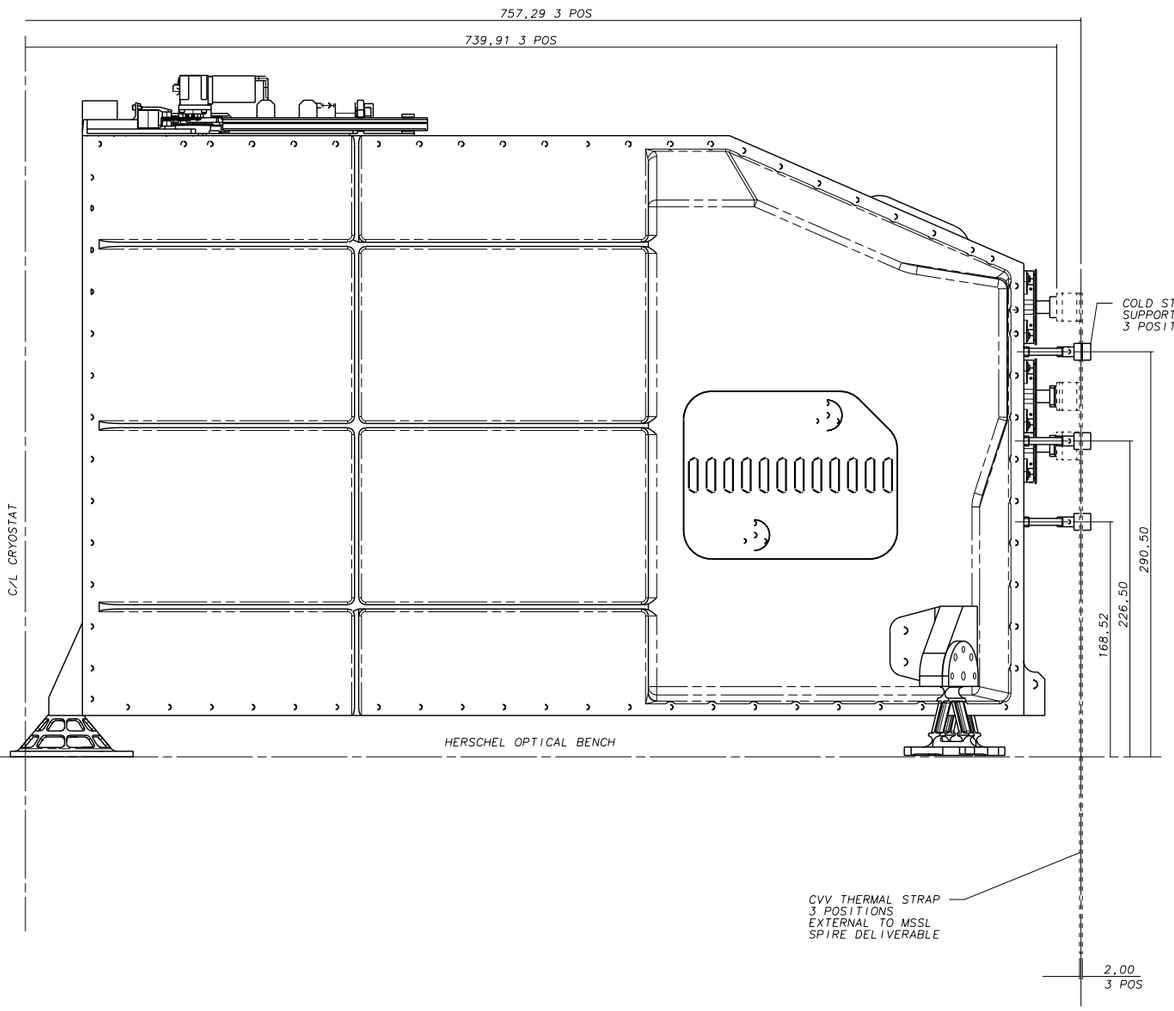


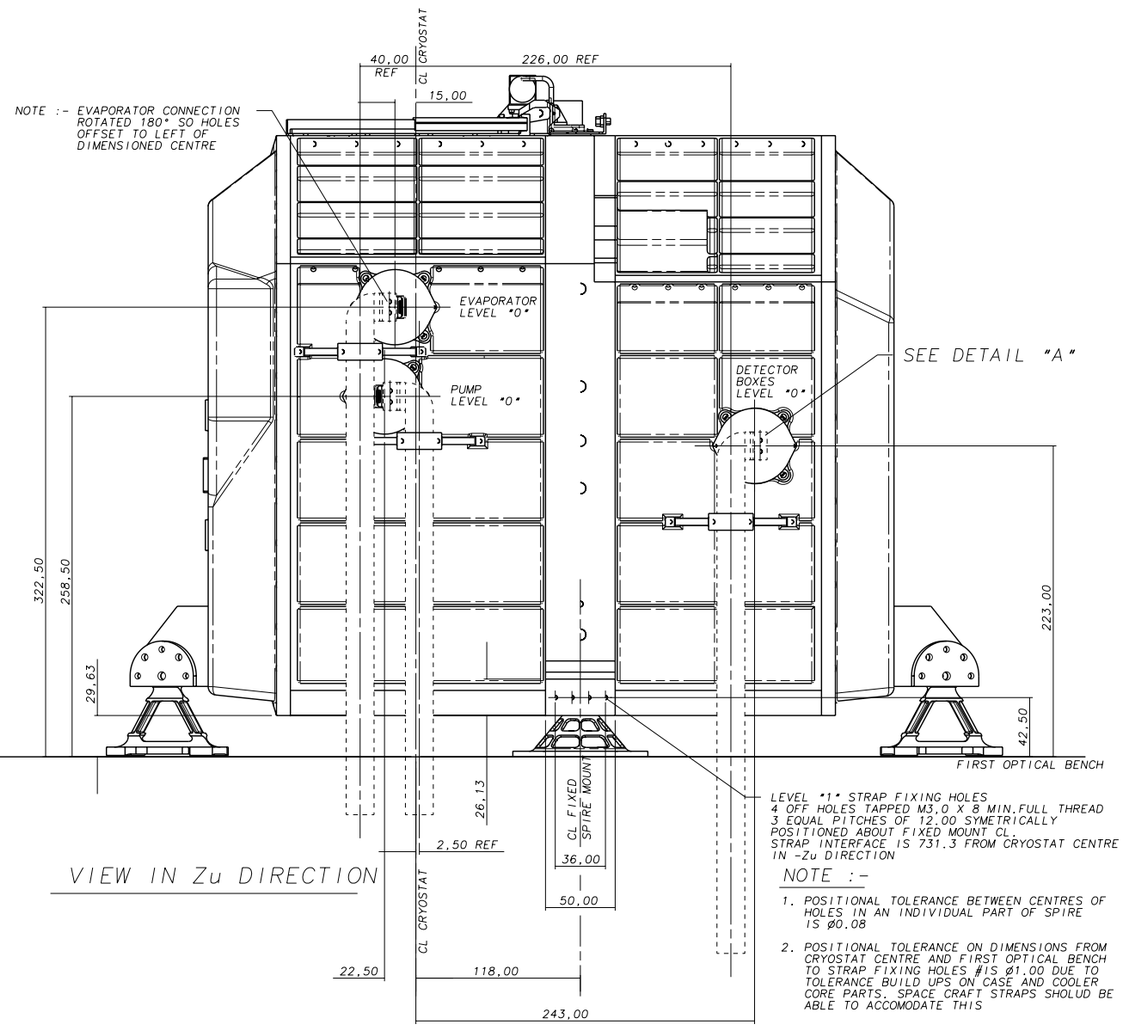
DETAIL "A"

NOTE:-

1. DIMENSIONS OF ALL LEVEL "0" CONNECTIONS ARE THE SAME BUT EVAPORATOR CONNECTION IS ROTATED 180° ABOUT CL.
2. THERMAL STRAP INTERFACE FOR SPIRE STOPS AT CONNECTION WITH CVV STRAP AND SUPPORT.
3. ELECTRICAL INSULATION REQUIRED ON CVV SIDE. REF 11D-B







VIEW IN Zu DIRECTION

NOTE :-

1. POSITIONAL TOLERANCE BETWEEN CENTRES OF HOLES IN AN INDIVIDUAL PART OF SPIRE IS ø0.08
2. POSITIONAL TOLERANCE ON DIMENSIONS FROM CRYOSTAT CENTRE AND FIRST OPTICAL BENCH TO STRAP FIXING HOLES #IS ø1.00 DUE TO TOLERANCE BUILD UPS ON CASE AND COOLER CORE PARTS. SPACE CRAFT STRAPS SHOLUD BE ABLE TO ACCOMODATE THIS

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	10	28/6/01	DRAWING SHEETS 3, 4 & 5 ADDED. DIMENSIONS SHOWN ON OTHER SHEETS REMOVED FROM THIS SHEET
DRAWN	ISSUE	DATE	AMENDMENT
AJC	1	24/11/01	

SPIRE Flight Assemblies
COMPUTER FILE

NOTE:-
ALL DIMENSIONS AT ROOM TEMPERATURE

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED -
AS LISTED	AS LISTED	LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT. 50kg(INC.CONT.)		
ACTL WT.	DIMENSIONS IN mm	SCALE 1:2 & 1:1

DEPARTMENT OF SPACE AND CLIMATE PHYSICS
UNIVERSITY COLLEGE LONDON
MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.

TITLE
SPIRE INTERFACE
(THERMAL STRAP CONNECTIONS)

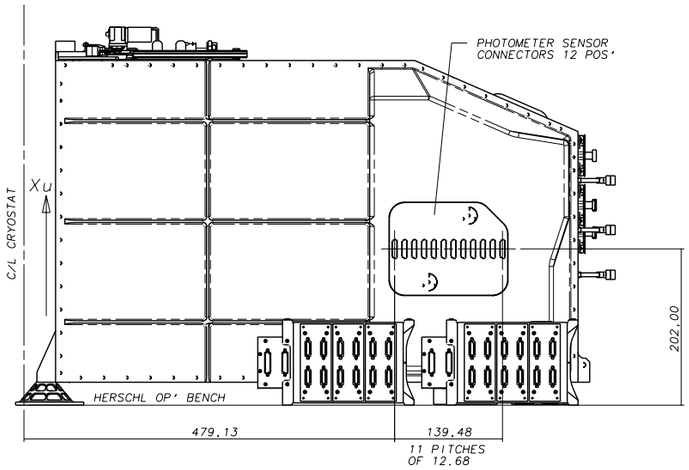
DRAWING No
A1 | 5264 | 300sht5

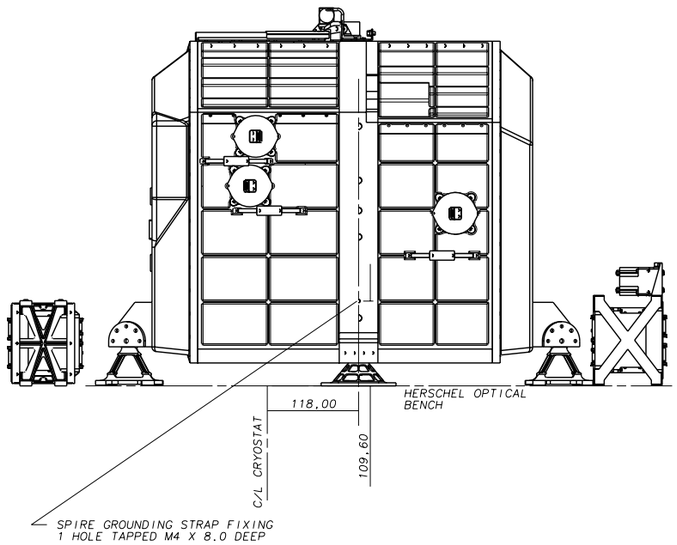
DRAWING No.
A1 | 5264 | 300sht6

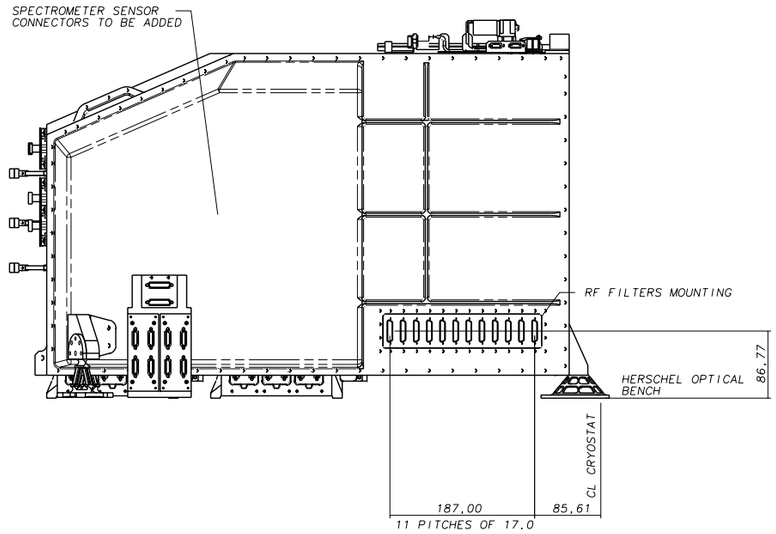
USED ON HERSCHEL

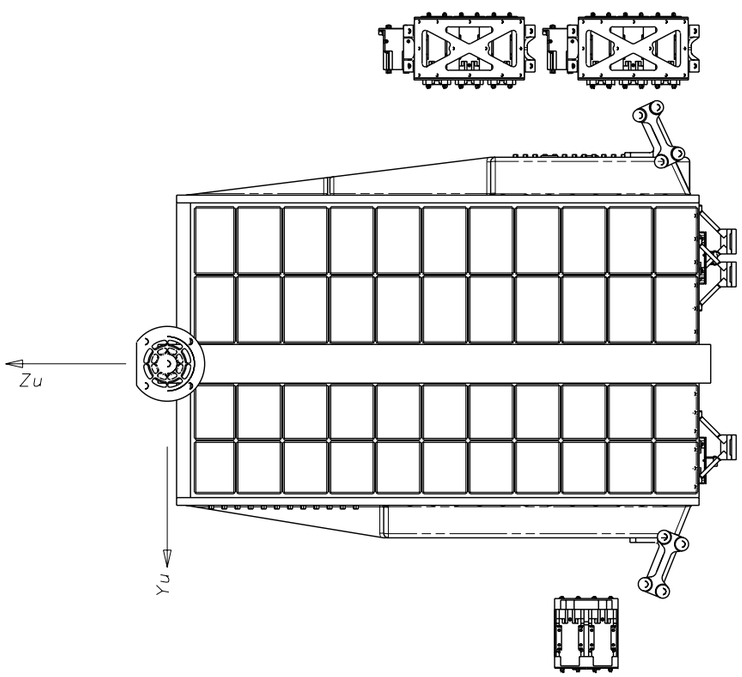
THIRD ANGLE PROJECTION

DO NOT SCALE









VIEW ON Xu (UNDERSIDE OF SPIRE)

NOTE :-

1. ALL DIMENSIONS AT ROOM TEMPERATURE

CHECKED	13	19/11/01	UPDATED RF1 FILTER & PHOT CONNECTORS ADDED. FOCAL PLANE & *A* FRAME MOUNT DIM ADDED. SHEET 7 ADDED.	
	12	4/9/01	AUGUST ISSUE SHUTTER MECHANISM ADDED, COLD STRAPS AND MOUNTINGS ADDED. LINE WEIGHTS MODIFIED	
TRACED PBG	11	30/7/01	RE-DRAWN. 2X CABLE HARNESS HOLES REMOVED (SHT 6) SENSOR CONNECTORS ADDED TO PHOT COVER 3 POS	
	10	28/6/01	DRAWING SHEETS 3, 4 & 5 ADDED. DIMENSIONS SHOWN ON OTHER SHEETS REMOVED FROM THIS SHEET	
DRAWN	ISSUE	DATE	AMENDMENT	SPIRE Flight Assemblies
AJC	1	24/11/01		COMPUTER FILE

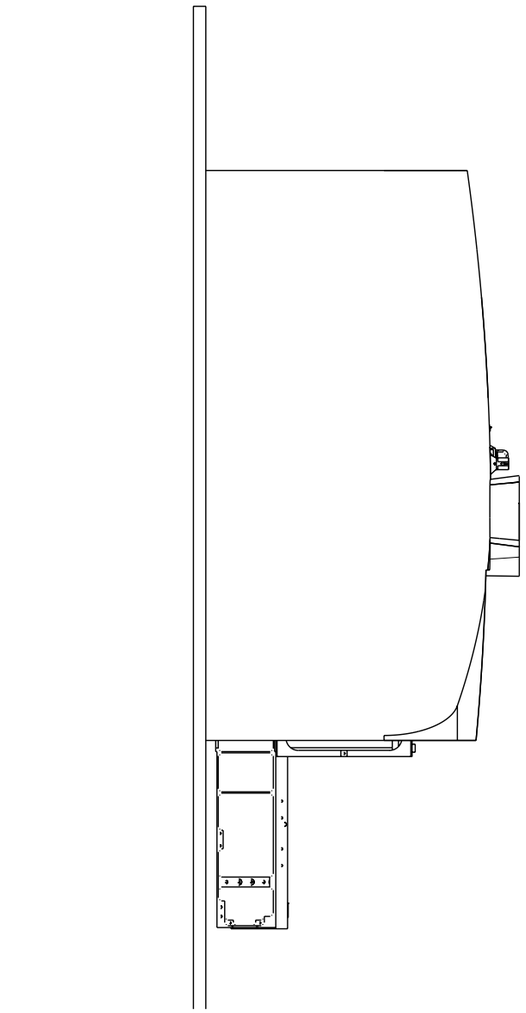
PROTECTIVE FINISH AS LISTED	MATERIAL & SPEC. AS LISTED	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'	DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.
ESTD WT. 50kg(INC.CONT.)			TITLE: SPIRE INTERFACE (ELECTRICAL) — DRAWING No: A1 5264 300 sht6
ACTL WT.	DIMENSIONS IN mm	SCALE 1:4	SHEET 6 OF 7

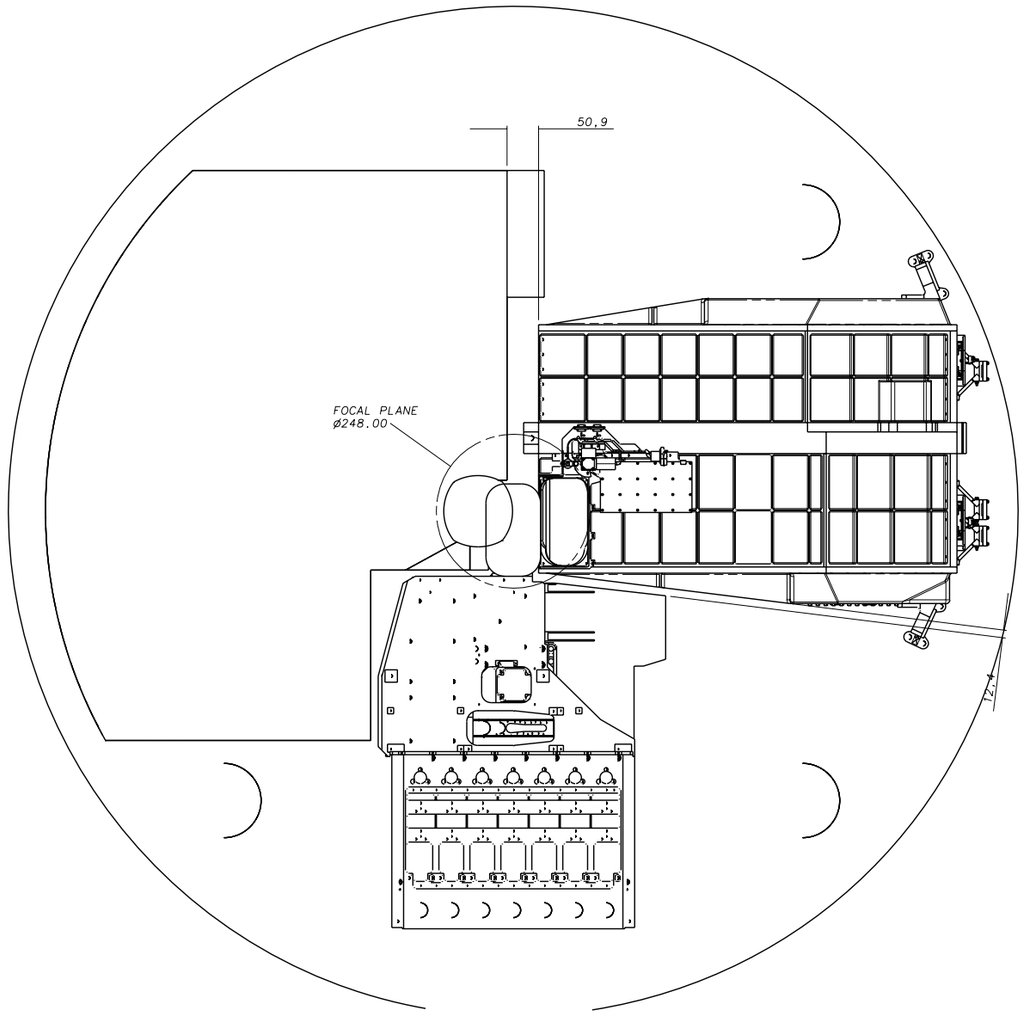
DRAWING No.
A1 | 5264 | 300sht7

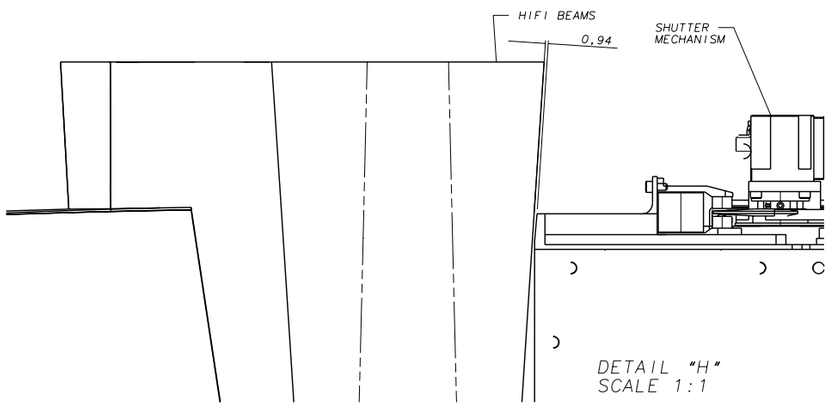
USED ON HERSCHEL

THIRD ANGLE PROJECTION

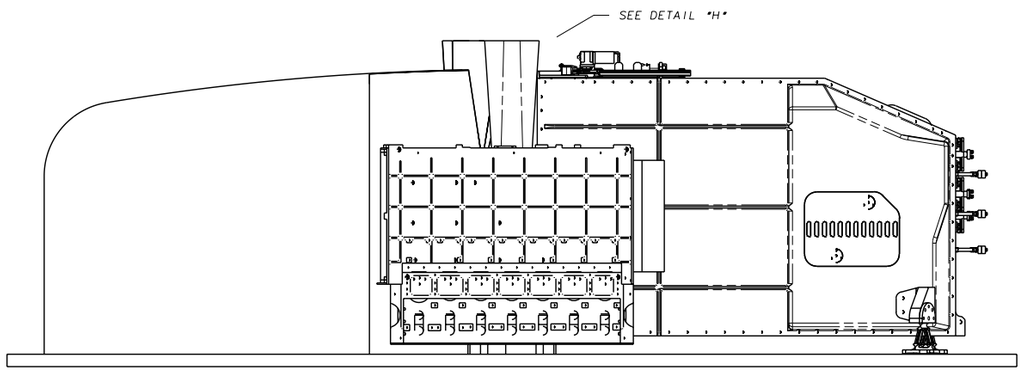
DO NOT SCALE







DETAIL "H"
SCALE 1:1



CHECKED	13	19/11/01	UPDATED RFI FILTER & PHOT CONNECTORS ADDED. FOCAL PLANE & "A" FRAME MOUNT DIM ADDED. SHEET 7 ADDED.	
	12	4/9/01	AUGUST ISSUE SHUTTER MECHANISM ADDED. COLD STRAPS AND MOUNTINGS ADDED. LINE WEIGHTS MODIFIED	
TRACED PBG	11	30/7/01	RE-DRAWN. 2X CABLE HARNESS HOLES REMOVED (SHT 6) SENSOR CONNECTORS ADDED TO PHOT COVER 3 POS	
	10	28/6/01	DRAWING SHEETS 3, 4 & 5 ADDED. DIMENSIONS SHOWN ON OTHER SHEETS REMOVED FROM THIS SHEET	
DRAWN	ISSUE	DATE	AMENDMENT	SPIRE Flight Assemblies
AJC	1	24/11/01		COMPUTER FILE

PROTECTIVE FINISH *AS LISTED*	MATERIAL & SPEC. *AS LISTED*	TOLERANCES UNLESS OTHERWISE STATED – LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT. 50kg(INC.CONT.)		
ACTL WT.	DIMENSIONS IN mm	SCALE

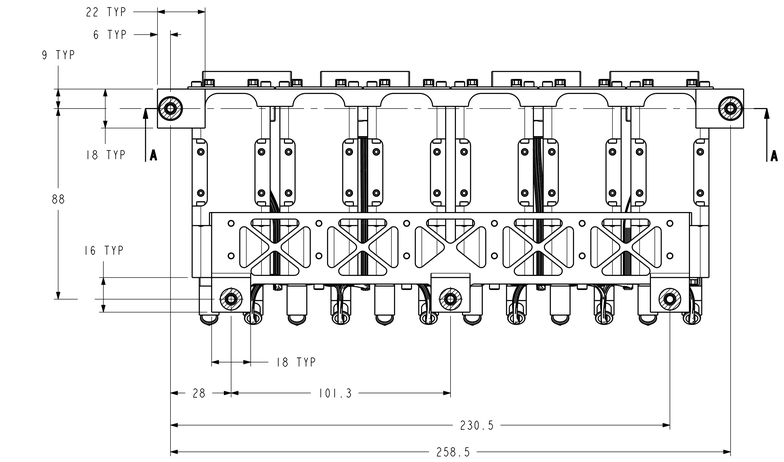
DEPARTMENT OF SPACE AND CLIMATE PHYSICS
UNIVERSITY COLLEGE LONDON
MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.

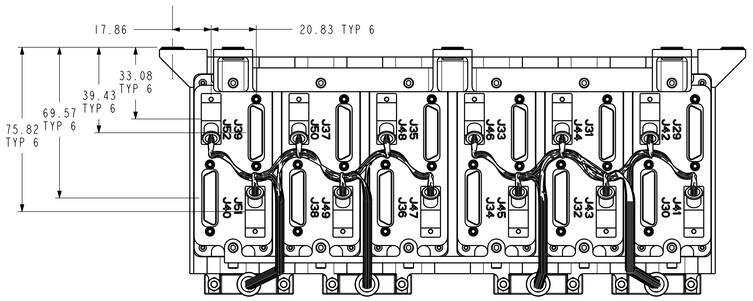
TITLE
SPIRE INTERFACE
PACS AND HIFI INTERFACE

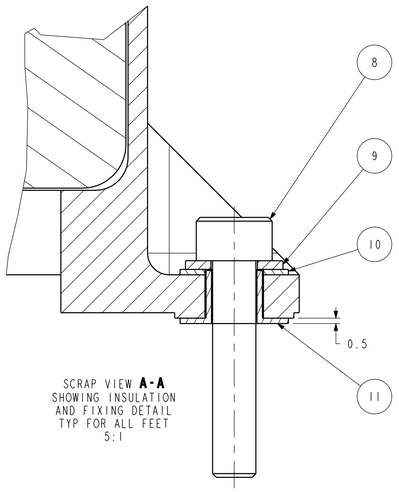
DRAWING No
A1 | 5264 | 300sht7

SHEET 7 OF 7

A 0-6JFET_ASSY-D | PROJECTION | THIS DRAWING CONFORMS TO B.S.308





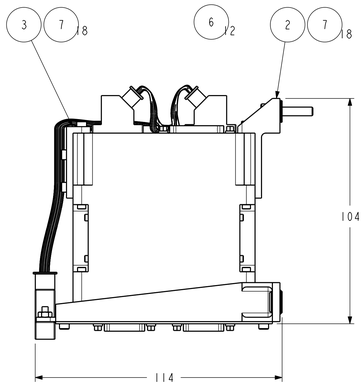


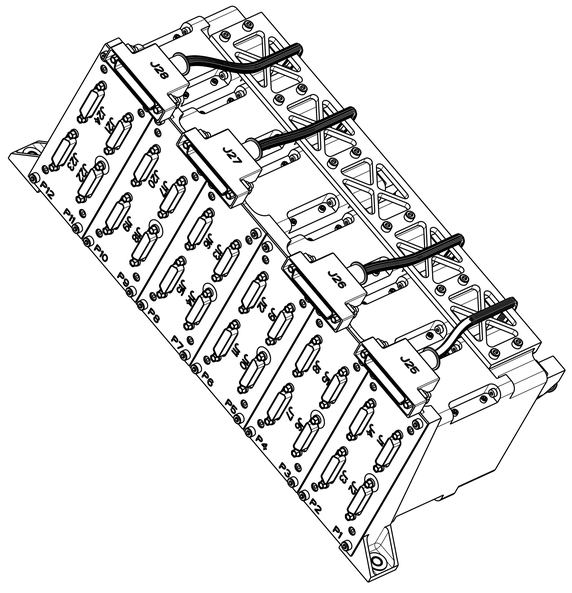
SCRAP VIEW **A-A**
SHOWING INSULATION
AND FIXING DETAIL
TYP FOR ALL FEET
5:1

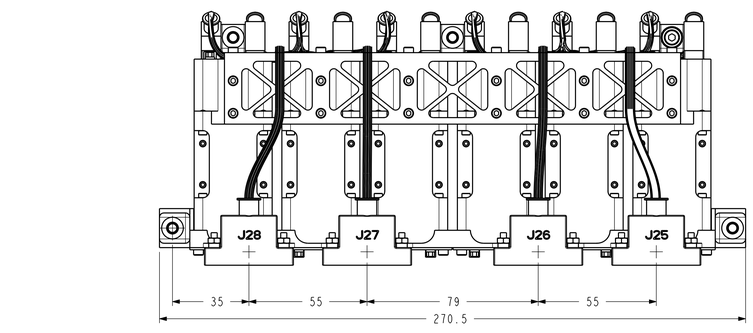
No.	DESCRIPTION	QTY	MASS (g) / ITEM	MASS (g) TOTAL	REMARKS
1	FRONT PLATE	1	108.0	108.0	
2	LOWER REAR PLATE	1	32.4	32.4	
3	UPPER REAR PLATE	1	51.6	51.6	
4	JFET MODULE	6	305	1830	
5	37 WAY MICRO-D ASSY	4	17.0	68.0	CONNECTOR AND BACKSHELL
6	15 WAY MICRO_D ASSY	12	8.3	99.6	CONNECTOR AND BACKSHELL
7	SCREW M2.5 x 8 LONG	60	0.6	36.0	
8	SCREW M4 x 20 LONG	5	3.0	15.0	
9	WASHER M4	5	3.1	15.5	
10	TOP INSULATOR	5	0.04	0.20	
11	BOTTOM INSULATOR	5	0.09	0.45	
GRAND TOTAL				2256.8	

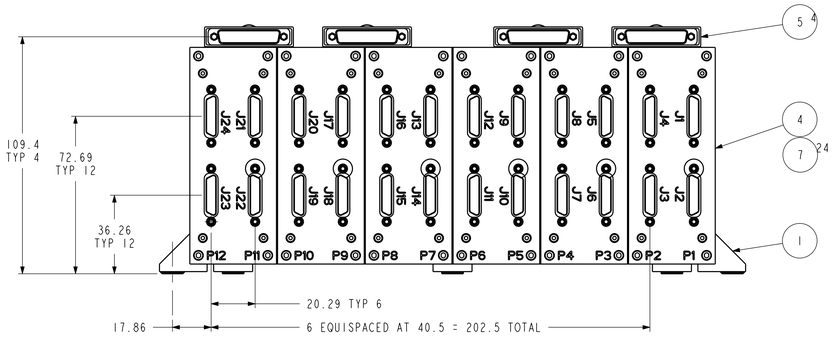
NOTE

ITEMS 10 & 11 TO BE PERMANENTLY BONDED TO FEET POSITIONS









FOR INFORMATION ONLY

SPIRE 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
D	11-01-02	KE-2896.	T.R.F			PROVISIONAL

TOLERANCES UNLESS STATED ±0.2 mm ±0.3 °	FINISH CLEAN REMOVE ALL BURRS	ORIGINAL SCALE 1:1 DO NOT SCALE
MATERIAL & SPEC.	SURFACE TEXTURE µM 1.6 ✓ UNLESS STATED	0 50mm

USED ON

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE 6 JFET ASSEMBLY

SPIRE JFET

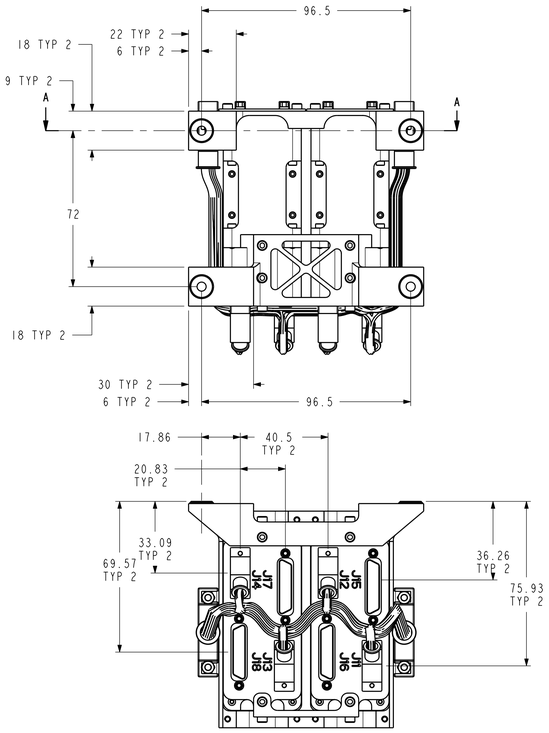
A | 0-6JFET_ASSY-D | 1 OF 1

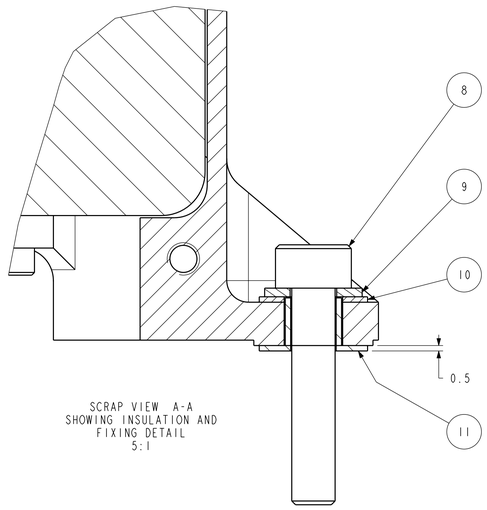
A 0-6JFET_ASSY-D

A0-JFET_RACK_2JFETS.C

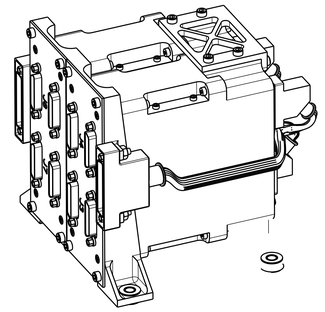
PROJECTION

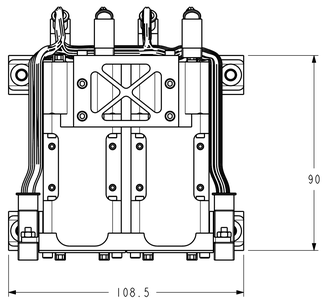
THIS DRAWING CONFORMS TO B.S.308

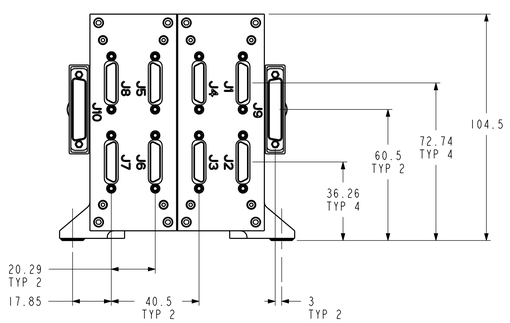


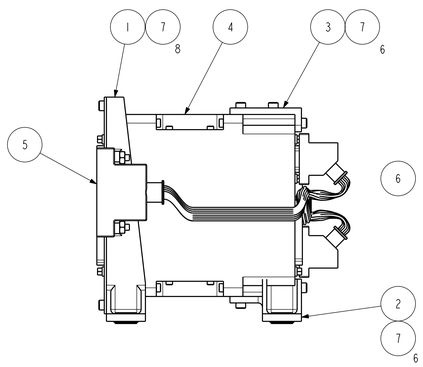


SCRAP VIEW A-A
SHOWING INSULATION AND
FIXING DETAIL
5:1









No.	DESCRIPTION	QTY	MASS (g) / ITEM	MASS (g) TOTAL	REMARKS
1	FRONT PLATE	1	36.0	36.0	
2	LOWER BACK PLATE	1	6.6	6.6	
3	UPPER BACK PLATE	1	23.0	23.0	
4	JFET MODULE	2	305	610	
5	37 WAY MICRO-D	2	17.0	34.0	CONNECTOR AND BACKPLATE
6	15 WAY MICRO-D	4	8.3	33.2	CONNECTOR AND BACKPLATE
7	CP.HD SCREW	20	0.6	12.0	M2.5 x 8 LONG
8	CP.HD SCREW	4	3.0	12.0	M4 x 20 LONG
9	WASHER	4	3.1	12.4	M4
10	TOP INSULATOR	4	0.04	0.16	VESPEL
11	BOTTOM INSULATOR	4	0.09	0.36	VESPEL
GRAND TOTAL				779.7	

NOTE

ITEMS 10 & 11 TO BE PERMANENTLY BONDED TO FEET

FOR INFORMATION ONLY

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
C	16-01-02	KE-2897.	T.R.F			PROV.

TOLERANCES UNLESS STATED ±0.2 mm ±0.3°

FINISH CLEAN REMOVE ALL BURRS

ORIGINAL SCALE 1:1 DO NOT SCALE

MATERIAL & SPEC. SEE DETAILS

SURFACE TEXTURE µM SEE DETAILS ✓UNLESS STATED

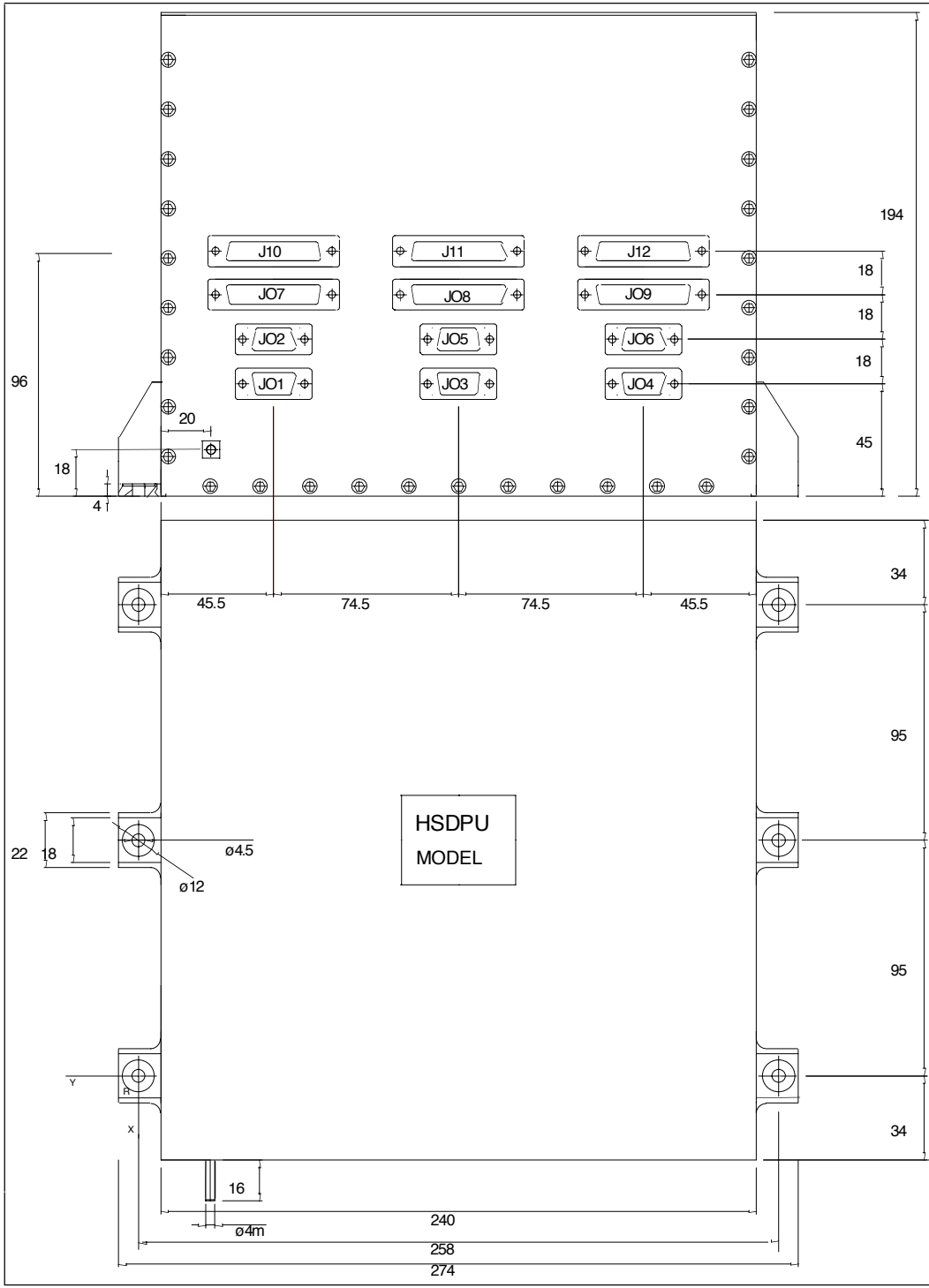
0 50mm

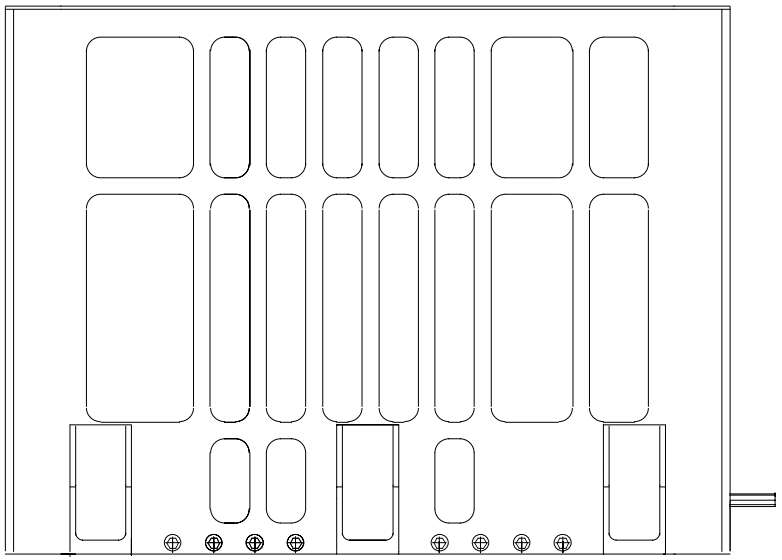
USED ON

CENTRAL LABORATORY OF THE RESEARCH COUNCILS

TITLE 2 JFET ASSEMBLY

A 0-JFET_RACK_2JFETS1-0C1





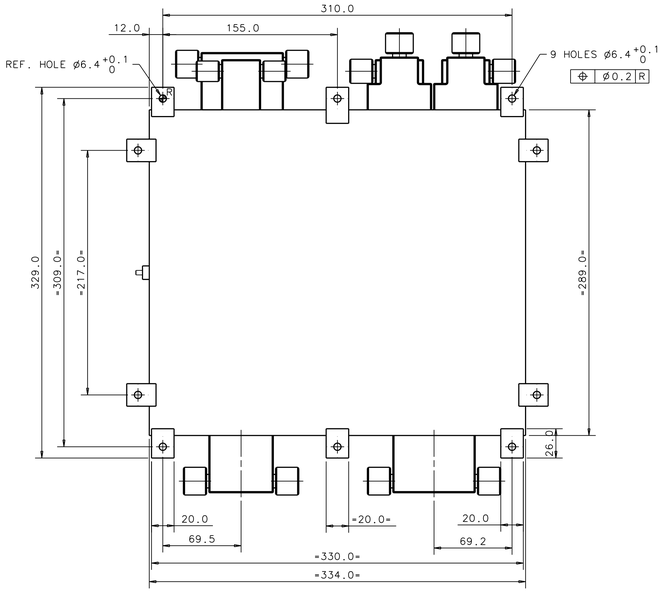
GENERAL TOLERANCE± 1mm
WEIGHT 6,621 Kg ±10%
DIMENSION 274 X 258 X 194mm3
CENTRE OF GRAVITY (E) X=120; Y=110; Z=96(TBC)
MOMENT OF INERTIA (E) Jx=5.6X10-2Kgm2(TBC)
Jy=5.40X10-2Kgm2(TBC)
Jz=7.2X10-2Kgm2(TBC)
CASING MATERIAL: ANTICORODAL 6082
SURFACE TREATMENT: ALODINE 1200:
alfa solar = 0,604
R-solar = 0,396
epsilon IR = 0,172
R-IR = 0,828
THERMAL CAPACITANCE: 6.621J/°C (TBC)
CONTACT AREA OF BASEPLATE PLUS FEET 64428 mm2
FLATNESS OF MOUNTING AREA: 0.1mm/100mm
CONNECTORS:

J01= DEMA-9P From DPU Prime to PDU Prime
J02= DEMA-9P From DPU Red. to PDU Red.
J03= DEMA-9S From DPU Prime to Bus A Prime
J04= DEMA-9S From DPU Prime to Bus B Prime
J05= DEMA-9S From DPU Red. to Bus A Red.
J06= DEMA-9S From DPU Red. to Bus B Red.
J07= DBMA-25P From DPU Prime to DCE Prime
J10= DBMA-25P From DPU Red. to DCE Red.
J08= DBMA-25P From DPU Prime to MCE Prime
J11= DBMA-25P From DPU Red. to MCE Red.
J09= DBMA-25P From DPU Prime to SCE Prime
J12= DBMA-25P From DPU Red. to SCE Red.

UPDATED:10/02/2002P.Baldetti
UPDATED:29/01/2002P.Baldetti
UPDATED:16/01/2002P.Baldetti

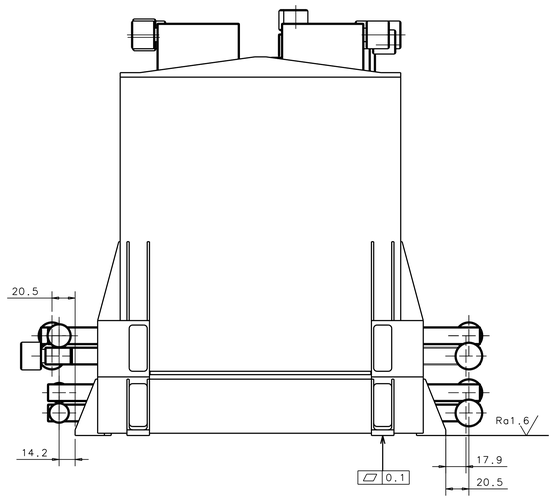
Consiglio Nazionale delle Ricerche
ISTITUTO DI FISICA dello SPAZIO INTERPLANETARIO
Via di Fosso del Cavaliere n. 100
tel 06/4993481 fax 06/49934383

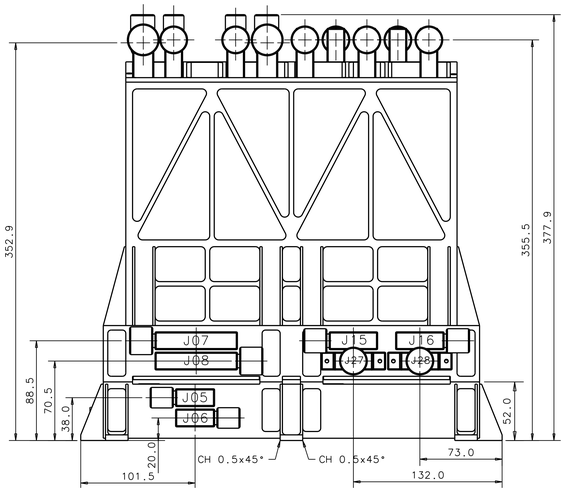
data 5/04/2001	prog. Baldetti	dis.	
scala	materiale		
tratt.			
toll.	Progetto: HERSCHEL-HSDPU		
rev.	titilo: HSDPUAVM	N.dis HER S005/02	
data			

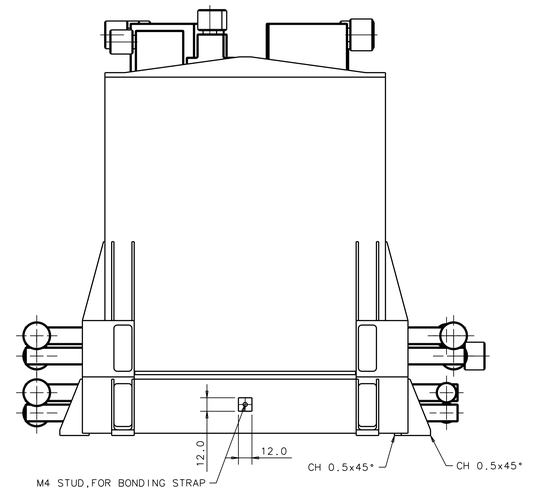


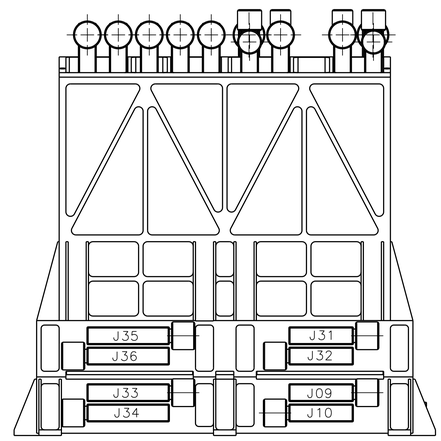
J01	DBMA-25S
J02	DBMA-25S
J03	DBMA-25S
J04	DBMA-25S
J05	DEMA- 9P
J06	DEMA- 9P
J07	DCMA-37S
J08	DCMA-37S
J09	DBMA-25S
J10	DBMA-25S
J11	DBMA-25S
J12	DBMA-25S
J13	DEMA- 9S
J14	DEMA- 9S
J15	DAMA-15S
J16	DAMA-15S
J17	DCMA-37S
J18	DCMA-37S

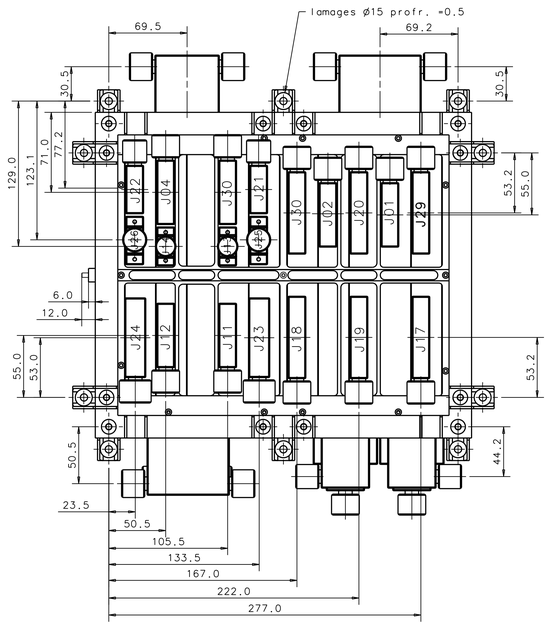
J19	DCMA-37S
J20	DCMA-37S
J21	DAMA-15S
J22	DAMA-15S
J23	DDMA-50S
J24	DDMA-50S
J25	DAMA-15S
J26	DAMA-15S
J27	DBMA-25P
J28	DBMA-25P
J29	DCMA-37S
J30	DCMA-37S
J31	DBMA-25P
J32	DBMA-25P
J33	DCMA-37S
J34	DCMA-37S
J35	DCMA-37P
J36	DCMA-37P

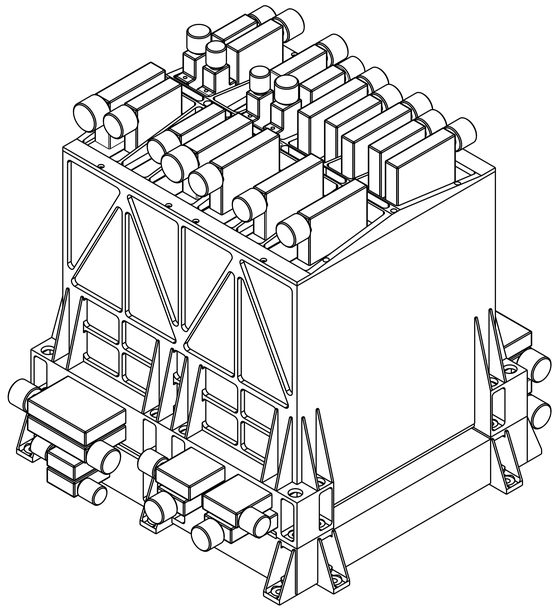












indice	Modifications	Date	Dessiné par	Vérifié par	Approu
A	Origine	12/01	DHENAIN	.....	....

Spécifications particulières

tolérances générales

Indice de rugosité général	SOUS-TRAIT
Tol.ang.:	
Casser les angles vifs	

Matière:

Traitement thermique:

Protection

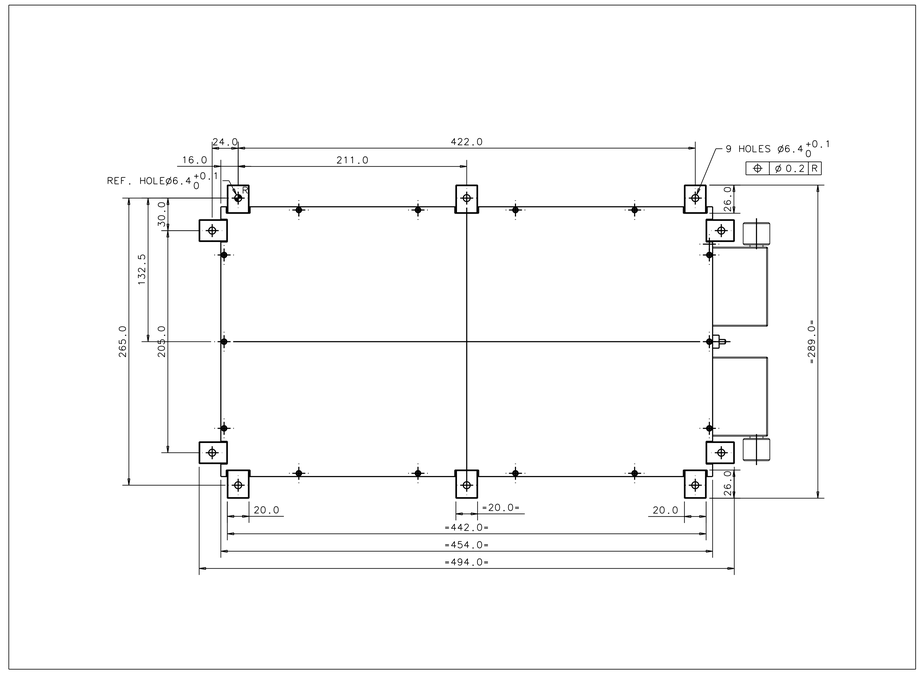
Echelle	Poids	Niveau qua
1/2		

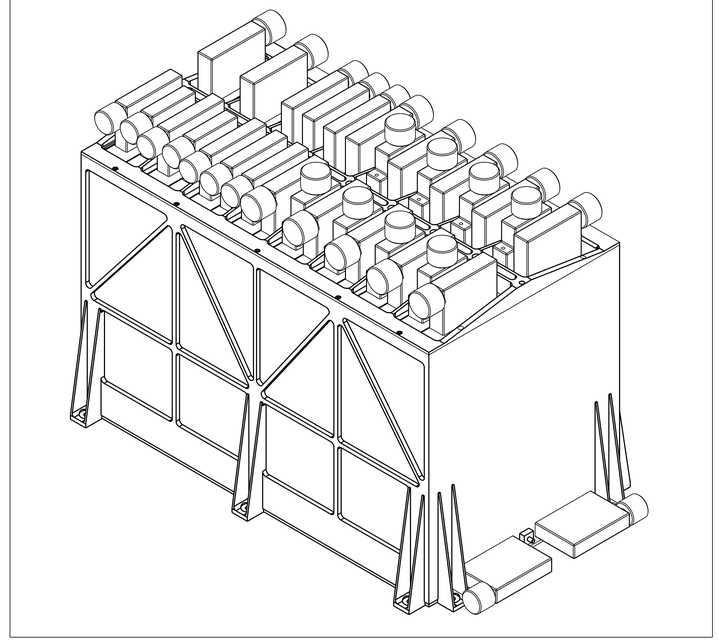
SPIRE
FCU ELECTRONIC BOX
MECHANICHAL INTERFACE CONTROL DRAWING

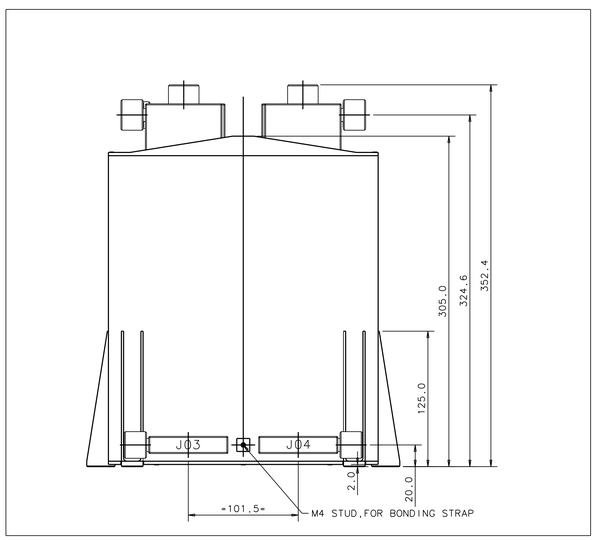
SAP/GERES
Tel:01.69.08.78.25
01.69.08.59.76
Fax:01.69.08.79.96

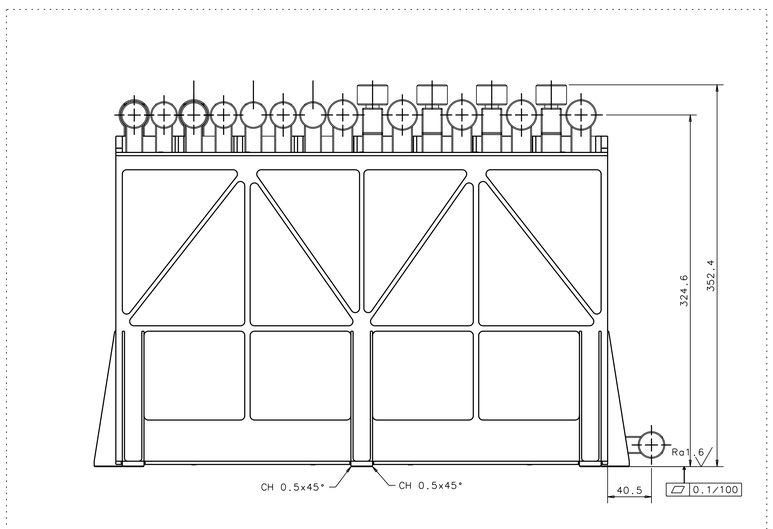
COMMISSARIAT A L'ENERGIE ATOMIQUE
C.E.N SAC

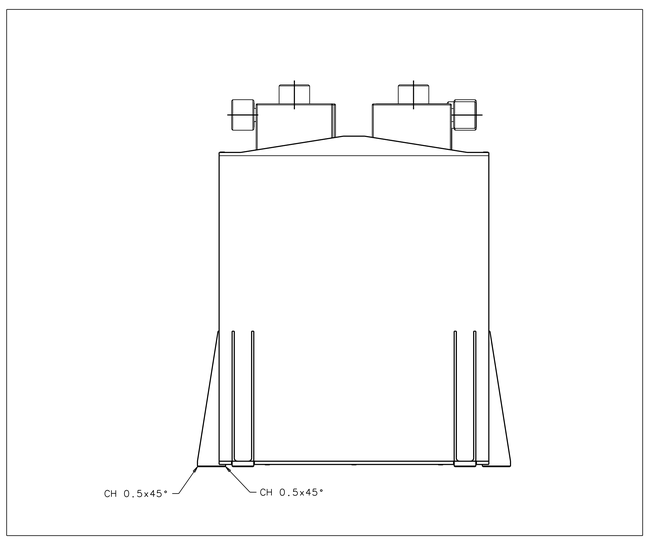
AO SPIR-MX-5200 000 A

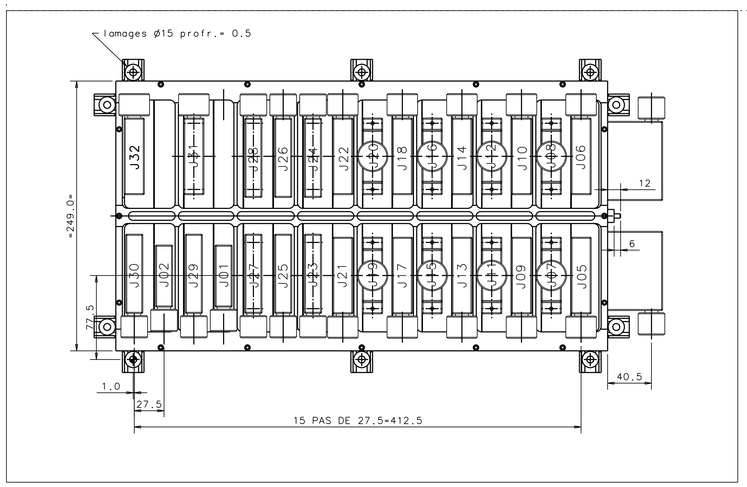












J01	DBMA-25S	J18	DDMA-50P
J02	DBMA-25S	J19	DDMA-50P
J03	DCMA-37P	J20	DDMA-50P
J04	DCMA-37P	J21	DDMA-50P
J05	DDMA-50P	J22	DDMA-50P
J06	DDMA-50P	J23	DCMA-37P
J07	DDMA-50P	J24	DCMA-37P
J08	DDMA-50P	J25	DCMA-37P
J09	DDMA-50P	J26	DCMA-37P
J10	DDMA-50P	J27	DCMA-37P
J11	DDMA-50P	J28	DCMA-37P
J12	DDMA-50P	J29	DCMA-37S
J13	DDMA-50P	J30	DCMA-37S
J14	DDMA-50P	J31	DDMA-78S
J15	DDMA-50P	J32	DDMA-78S
J16	DDMA-50P		
J17	DDMA-50P		

indice	Modifications	Date	Dessiné par	Vérifié par	Approuvé par
A	Origine	11/01	DHENAIN	.....	.....

Spécifications particulières

POUR INFORMATION

Tolérances générales: Indice de rugosité général — SOUS-TRAITANT; Tol.ang.:±XX°; Casser les angles vifs

Matière: XXXXX — Protection

Traitement thermique: — Echelle 1/2 — Poids XXXXX — Niveau qualité

SPIRE
HSDCU ELECTRONIC BOX
MECHANICAL INTERFACE CONTROL DRAWING

SAP/GERES
Tel:01.69.08.78.25
01.69.08.59.76
Fax:01.69.08.79.96

COMMISSARIAT A L'ENERGIE ATOMIQUE — C.E.N SACLAY

AO SPIR-MX-5100 000 A

Annex 2-1

Data base code	Unit	Item List fromDatase	Product-Tree				
		SPIRE (Item Code: 12*)					
120000	SPIRE	SPIRE Units	12	SPIRE	-	INS	DR
121000	SPIRE C UN	SPIRE Cryostat Units (cold)	121	SPIRE	E	72	DR
121100	HSFPU	SPIRE Focal Plane Unit	121	SPIRE	E	77	
121110	HS SLW BDA	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121120	HS SSW BDA	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121130	HS PLW BDA	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121140	HSPMW BDA	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121150	HS PSW BDA	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121160	HS SCO	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121170	HS ~~SCAL~~	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121180	HS PCAL	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121190	HS SMEC	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
1211A0	HS FPU FA	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
1211B0	HS FPU FB	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
1211C0	HS FPU FC	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
1211D0	HS FPU FD	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121100	HS FPU FE	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
1211F0	HS FPU FF	SPIRE FPU (Instr. Intern)	121	SPIRE	E	72	DR
121200	HSJFET	SPIRE JFET Boxen ~~(outs. Cryost.)~~	121	SPIRE	-	75	DR
121210	HSJFP	SPIRE JFET Box Photometer	121	SPIRE	E	76	DR
121220	HSJFS	SPIRE JFET Box Spectrometer	121	SPIRE	E	76	DR
121400	HS SHUT	SPIRE FPU Shutter	121	SPIRE	E	70	
121500	HS C HARN	SPIRE Cryogenic Harness (C)	121	SPIRE	E	INS	
121600	HS I HARN	SPIRE CVV Int Harness (I)	121	SPIRE	E	INS	
122000	SPIRE W UN	SPIRE Units on SVM (warm)	122	SPIRE	E	17	DR
122100	HSDPU	SPIRE Dig Proc Unit	122	SPIRE	E	17	DR
122200	HSFCU	SPIRE Focal Plane Control Unit	122	SPIRE	E	17	DR
122300	HSDCU	SPIRE Det. Readout & Control Unit	122	SPIRE	E	17	DR
125000	HSGSE	SPIRE Instrument GSE	125	SPIRE	E	GSE	
127000	HS W HARN	SPIRE SVM Intercon. Harn (W2) Instr.	127	SPIRE	E	17	
128000	HS S HARN	SPIRE SVM Cryo Warm C/H = S	128	SPIRE	E	17/27	DR
129000	HSSCCOHA	SPIRE S/C & Ceck Out Harness (T)	129	SPIRE	E	GSE	

+ PTC 1211G∅ Photometer Control Hardware E 77

BSM 1211H∅ Beam Steering Mirror. E 77

Thermister 1211I∅ Thermistors E 77

121110 P01

Harness connector code.

Annex 2-2

Connector allocation	code
SVM UMB-I/F-CB	10
units on SVM Sidepanel 1	11
units on SVM Sidepanel 2	12
units on SVM Sidepanel 3	13
units on SVM Sidepanel 4	14
units on SVM Sidepanel 5	15
units on SVM Sidepanel 6	16
units on SVM Sidepanel 7	17
units on SVM Sidepanel 8	18
SVM I/F-CB	20
I/F-CB obove SVM Panel 1	21
I/F-CB obove SVM Panel 2	22
I/F-CB obove SVM Panel 3	23
I/F-CB obove SVM Panel 4	24
I/F-CB obove SVM Panel 5	25
I/F-CB obove SVM Panel 6	26
I/F-CB obove SVM Panel 7	27
I/F-CB obove SVM Panel 8	28
CVV external	30
CVV I/F-CB Bottom	31
CVV I/F-CB Mid	32
CVV I/F-CB Top PFM	33
CVV I/F-CB Top EQM	34
CVV ext envelope Sensor I/F connectors	35
NCA	36
CVV ext. Components	40
on Struts	41
on Radiation Shield	42
BOLA	43
LOU	44
CVV internal	50
on lower chains	51
on lower spatial framework	52
on Thermal Shield 1 (outer)	53
on Thermal Shield 2 (mid)	54
on Thermal Shield 3 (inner)	55
on upper chains	56
on upper spatial framework	57
He-Tanks	60
on AUX Tank	61
on HOT	62
on Pipework	63
optical Bench	70
on lower side	71
on upper side	72
on HIFI FPU	73
on PACS FPU	74
on SPIRE JFET groß Photometer	75
on SPIRE JFET klein Spectrometer	76
on SPIRE FPU	77
on Pipework	78
EPLM Components	80
SSD	81
SSH	82
Telescope	83

HERSCHEL PFM

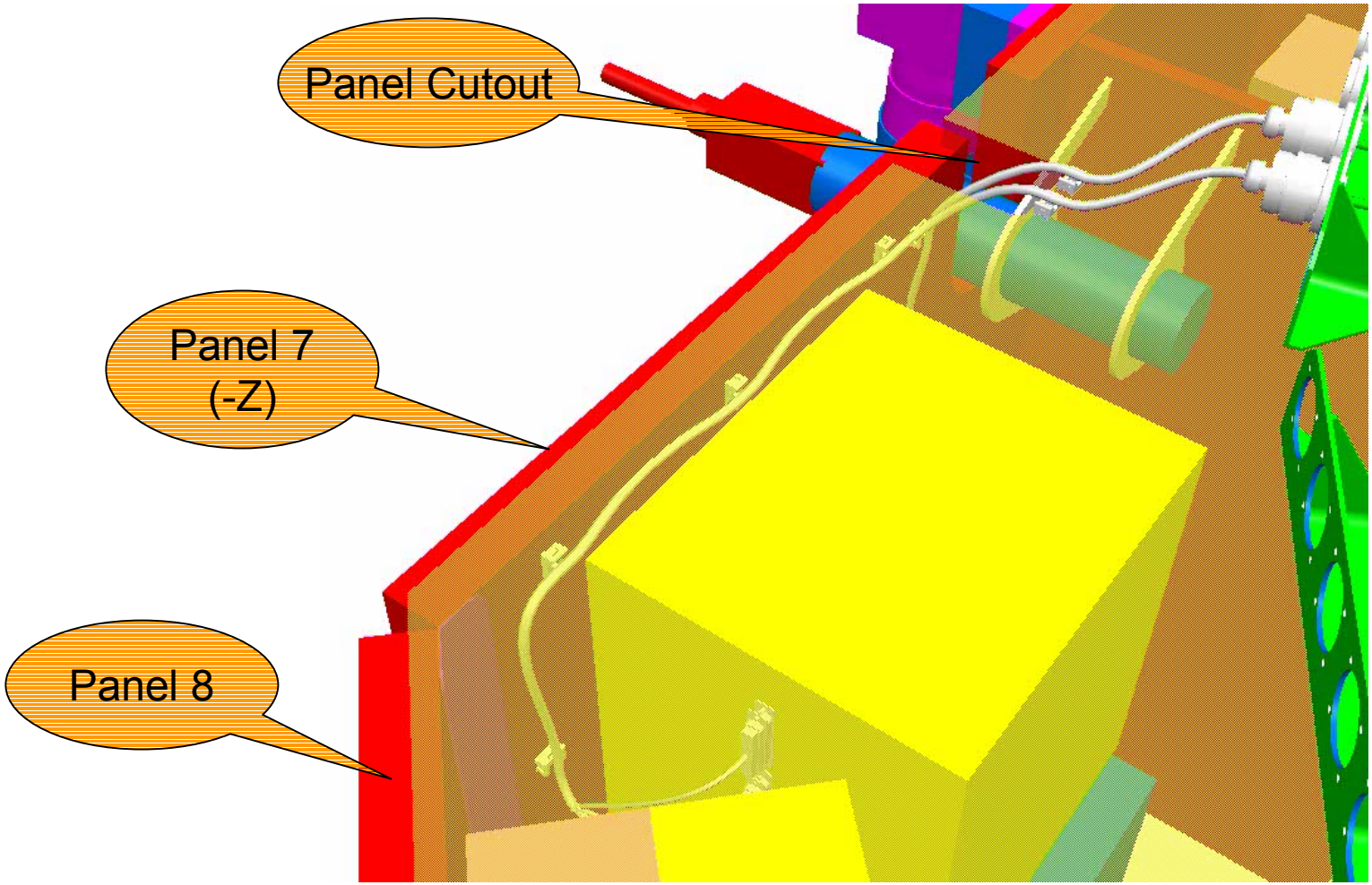
SPIRE - Harnessrouting

astrium

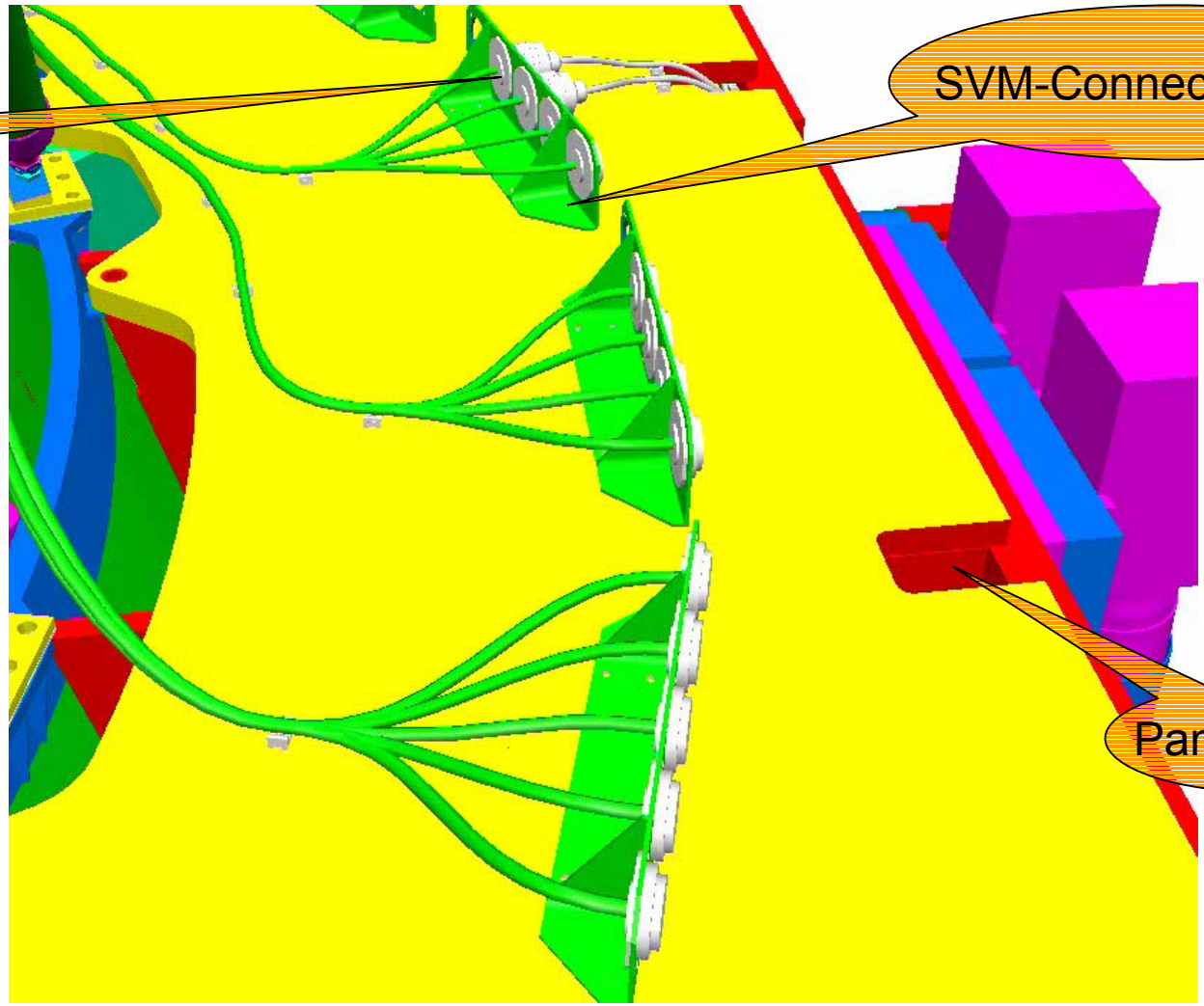
F. Gareißen IP35

19.04.2002

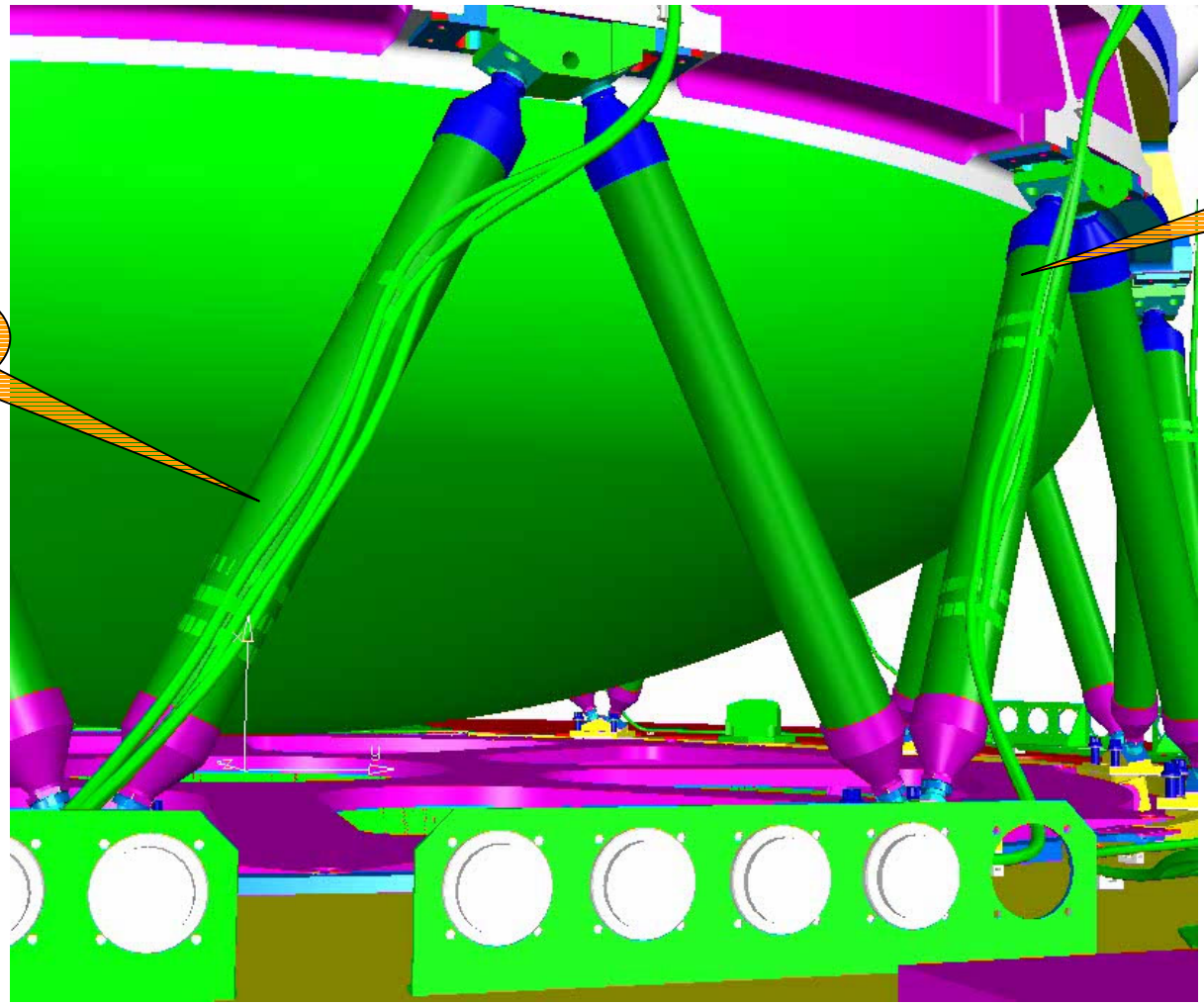
SVM-Harness



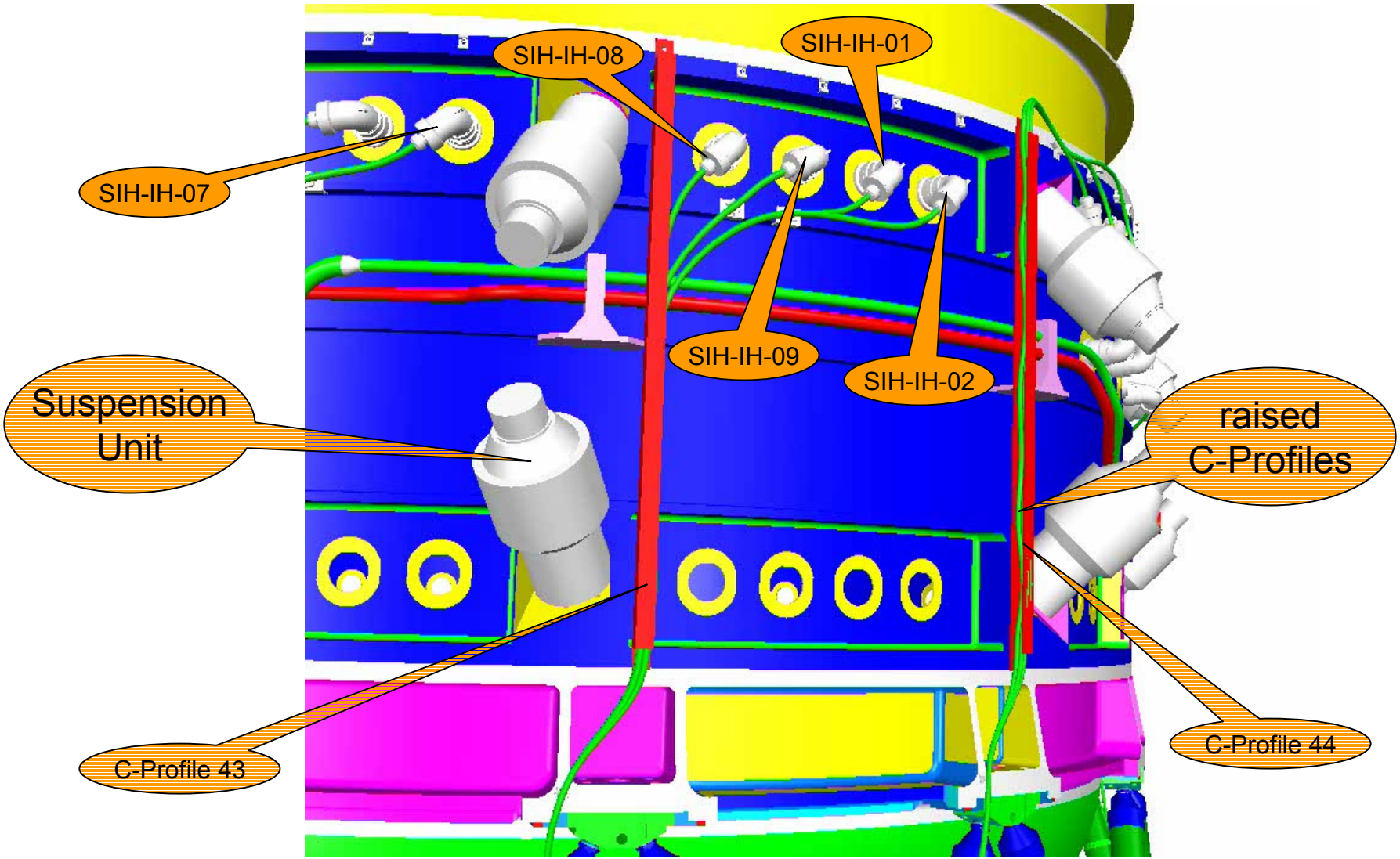
SVM-Connectorbackets



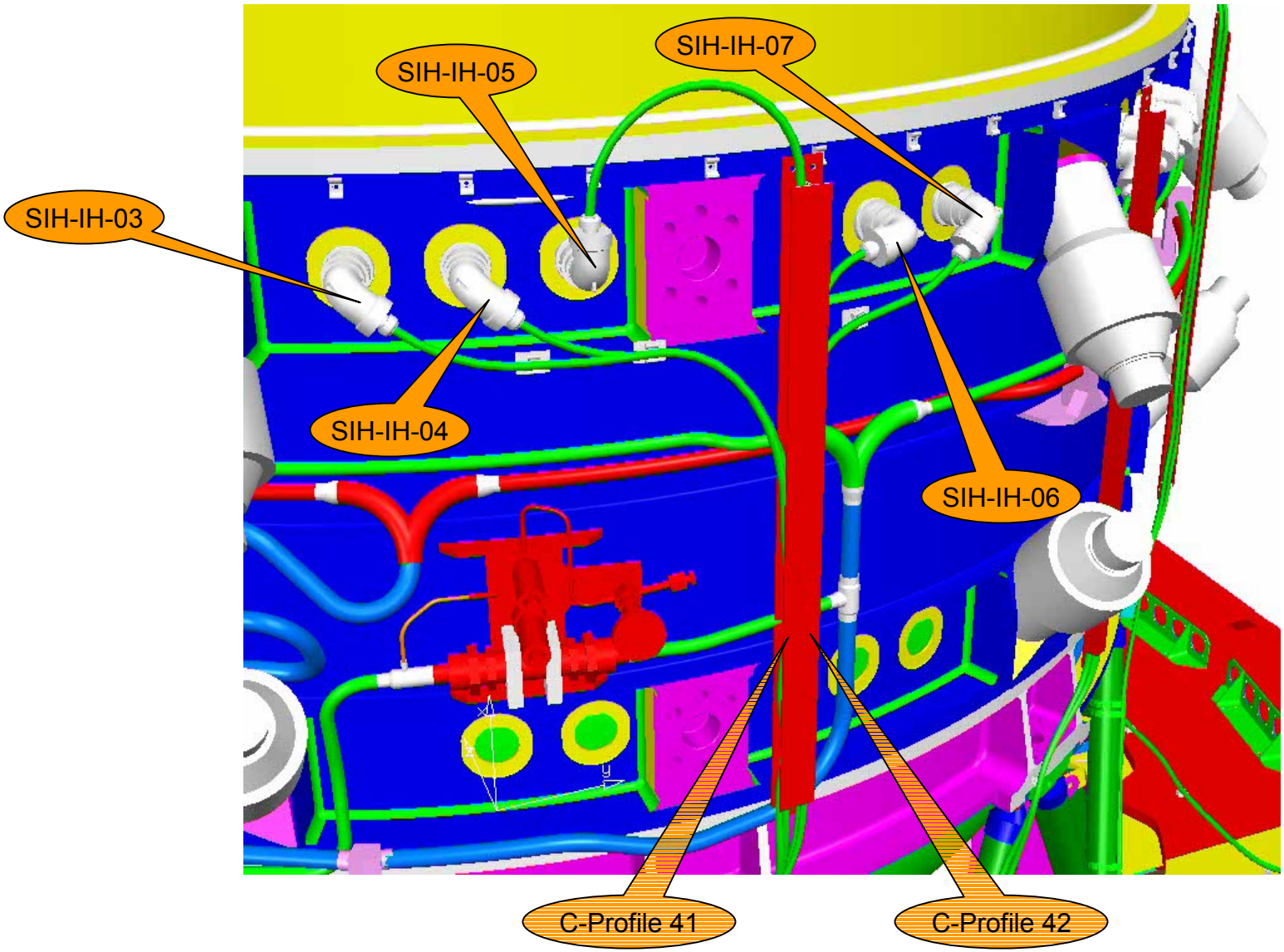
SVM-PLM I/F-Struts



CVV-Cylinder



C-Profiles



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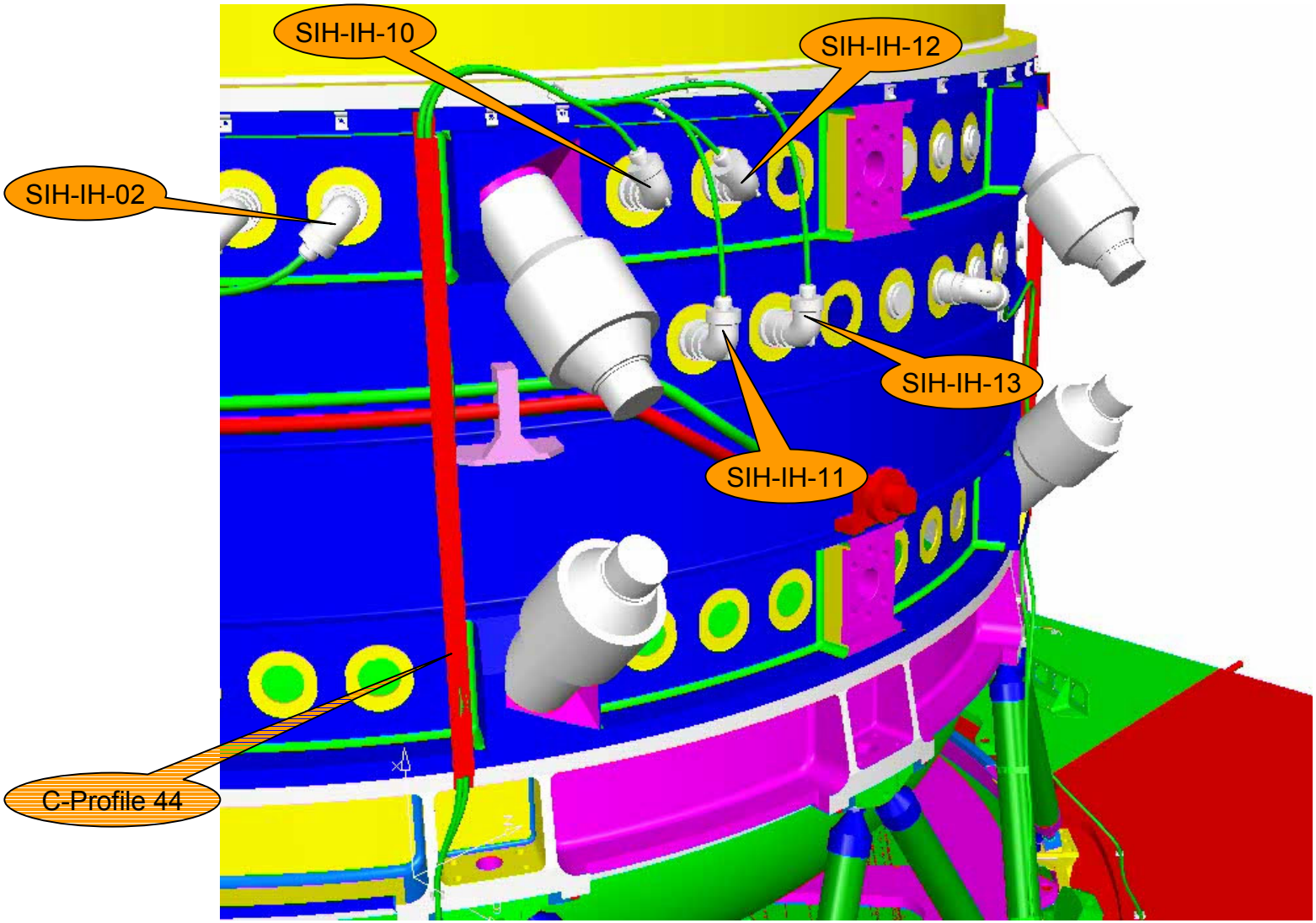
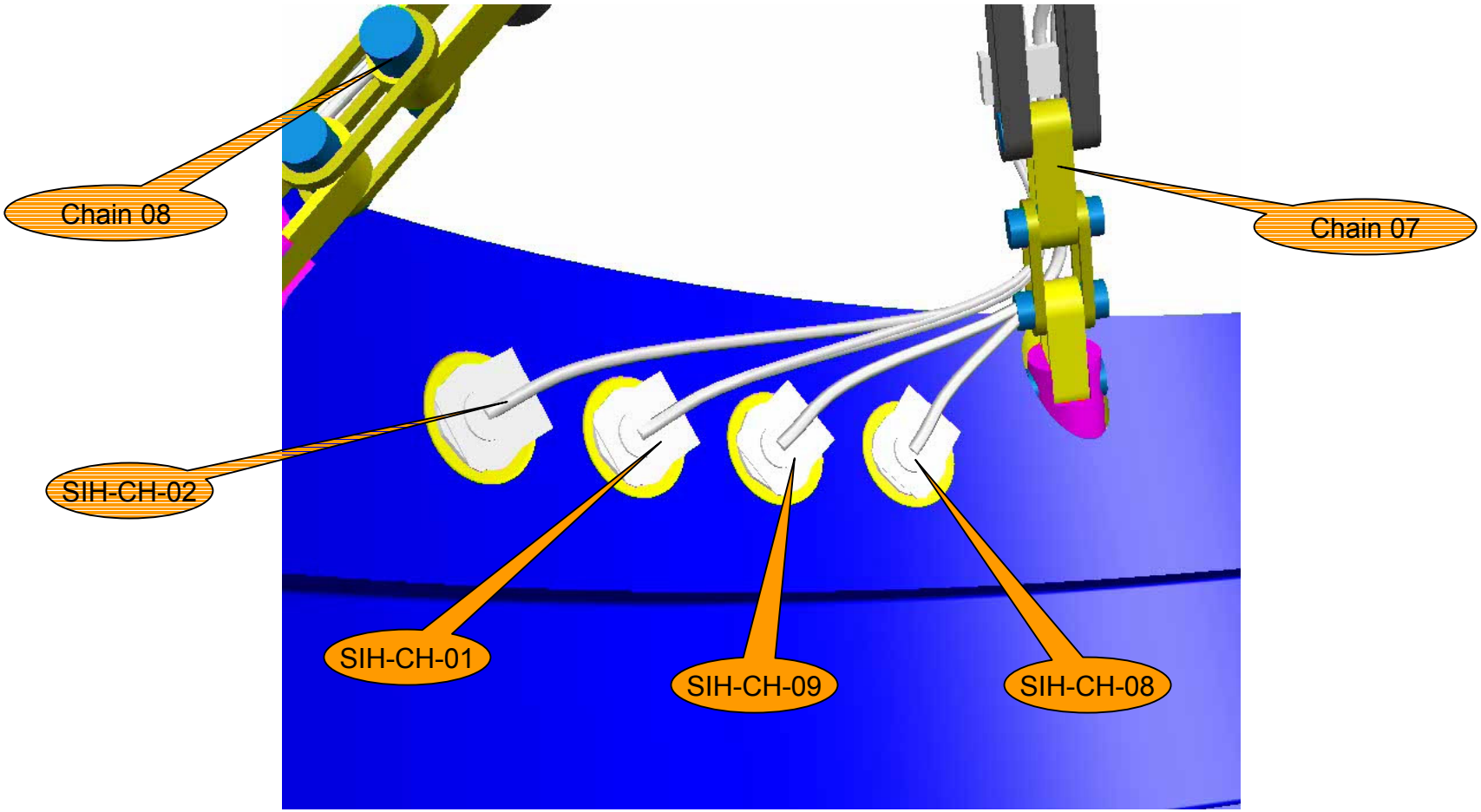
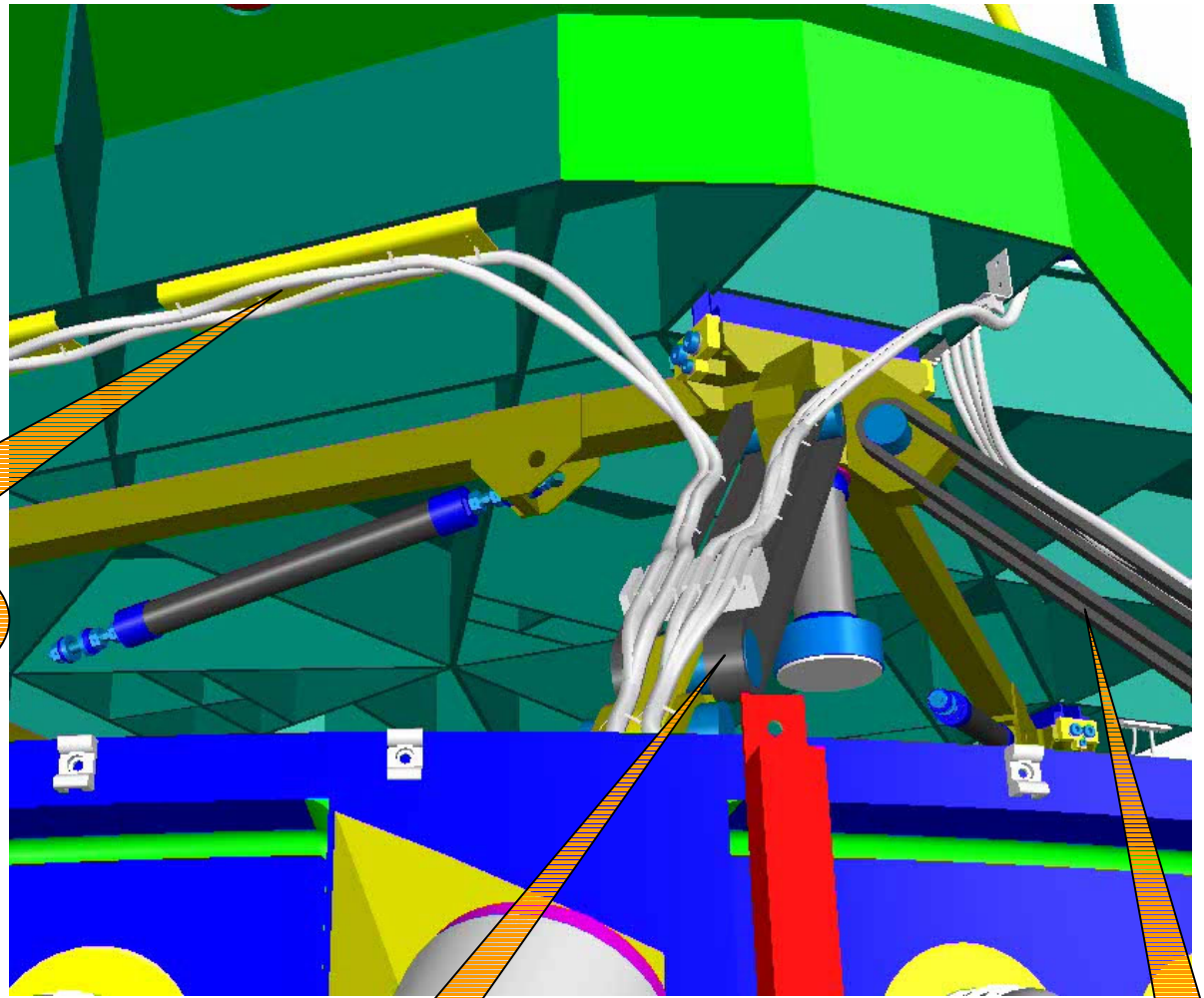


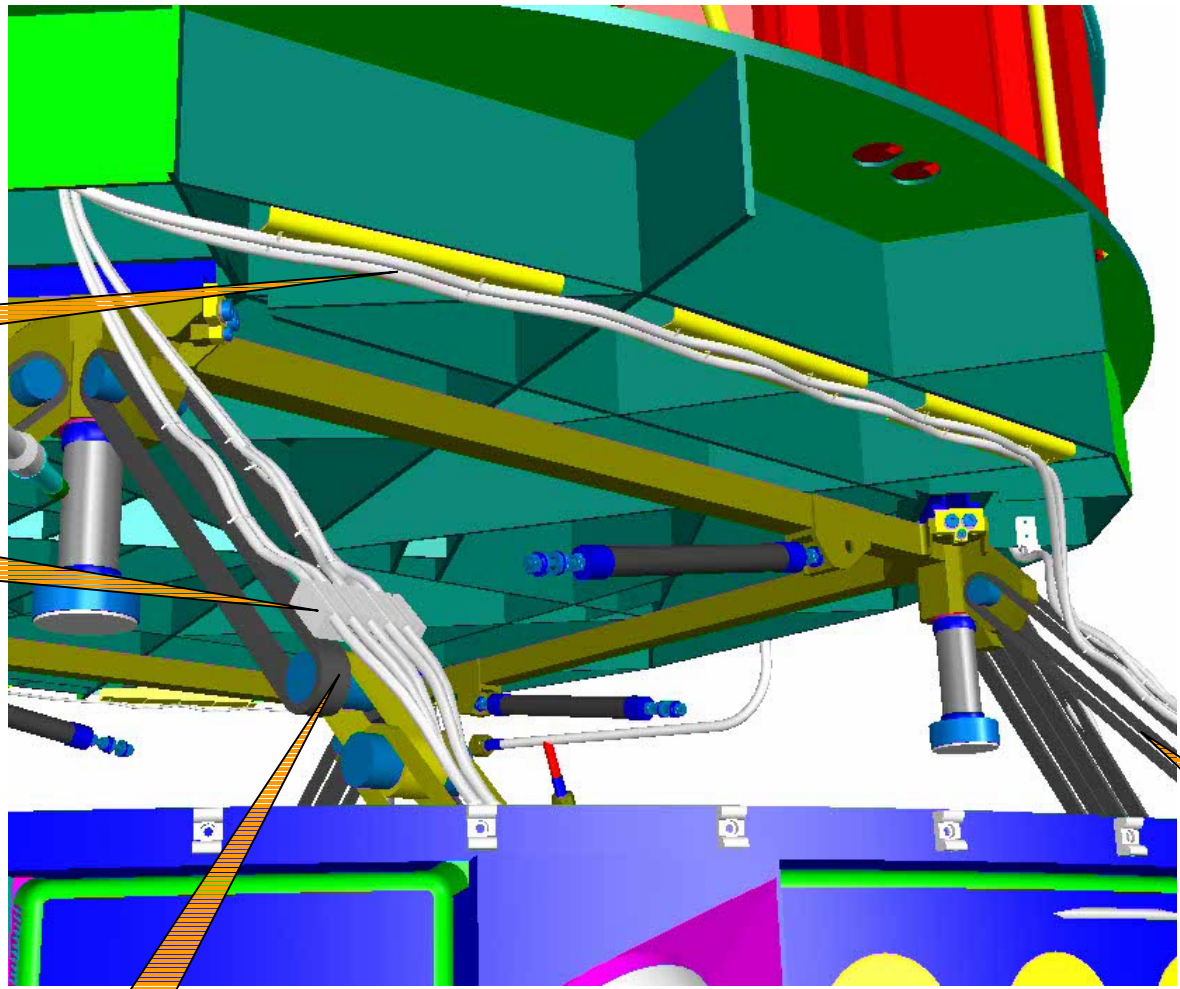
Inner-Vessel-Routing



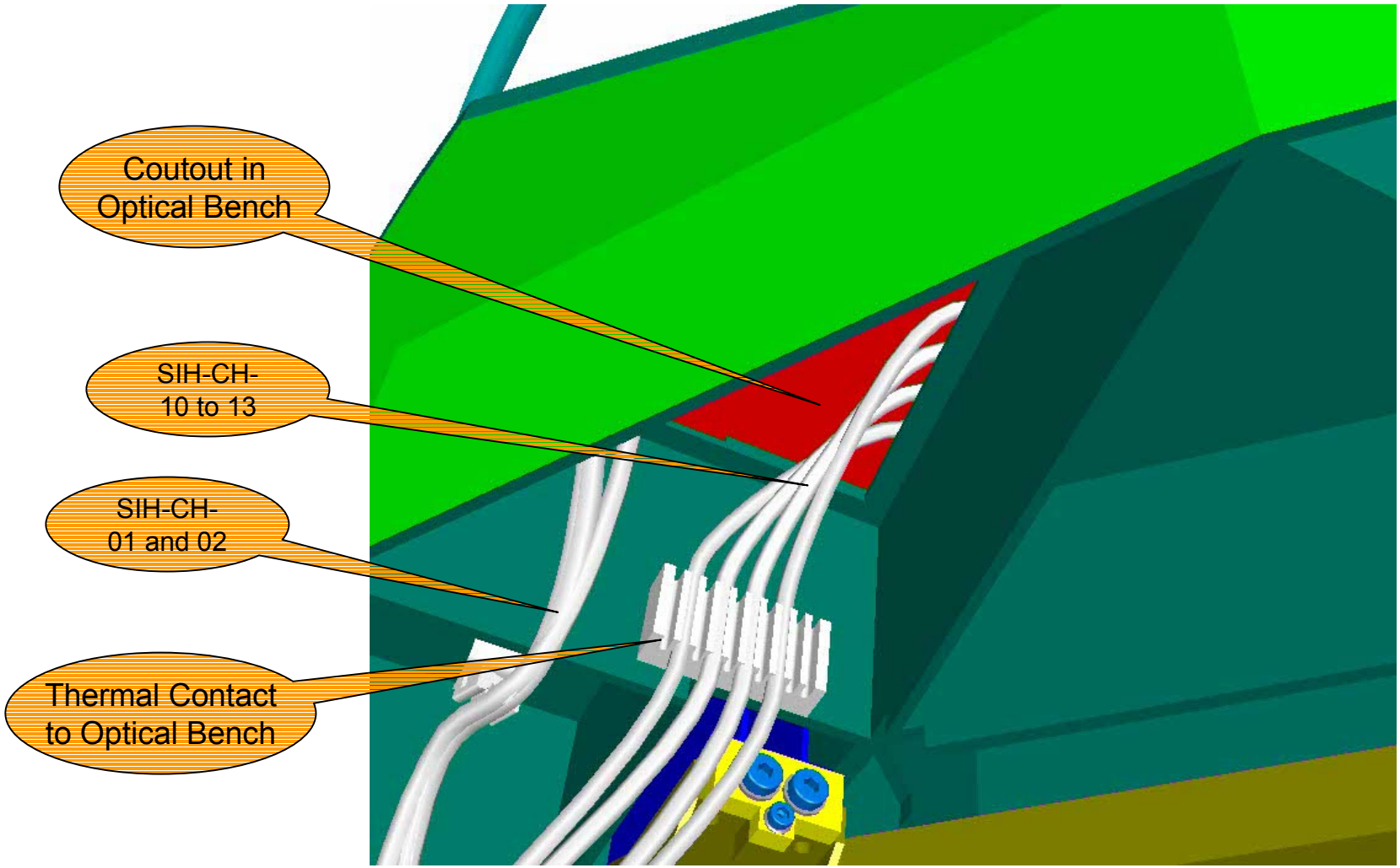
Routing on Chain



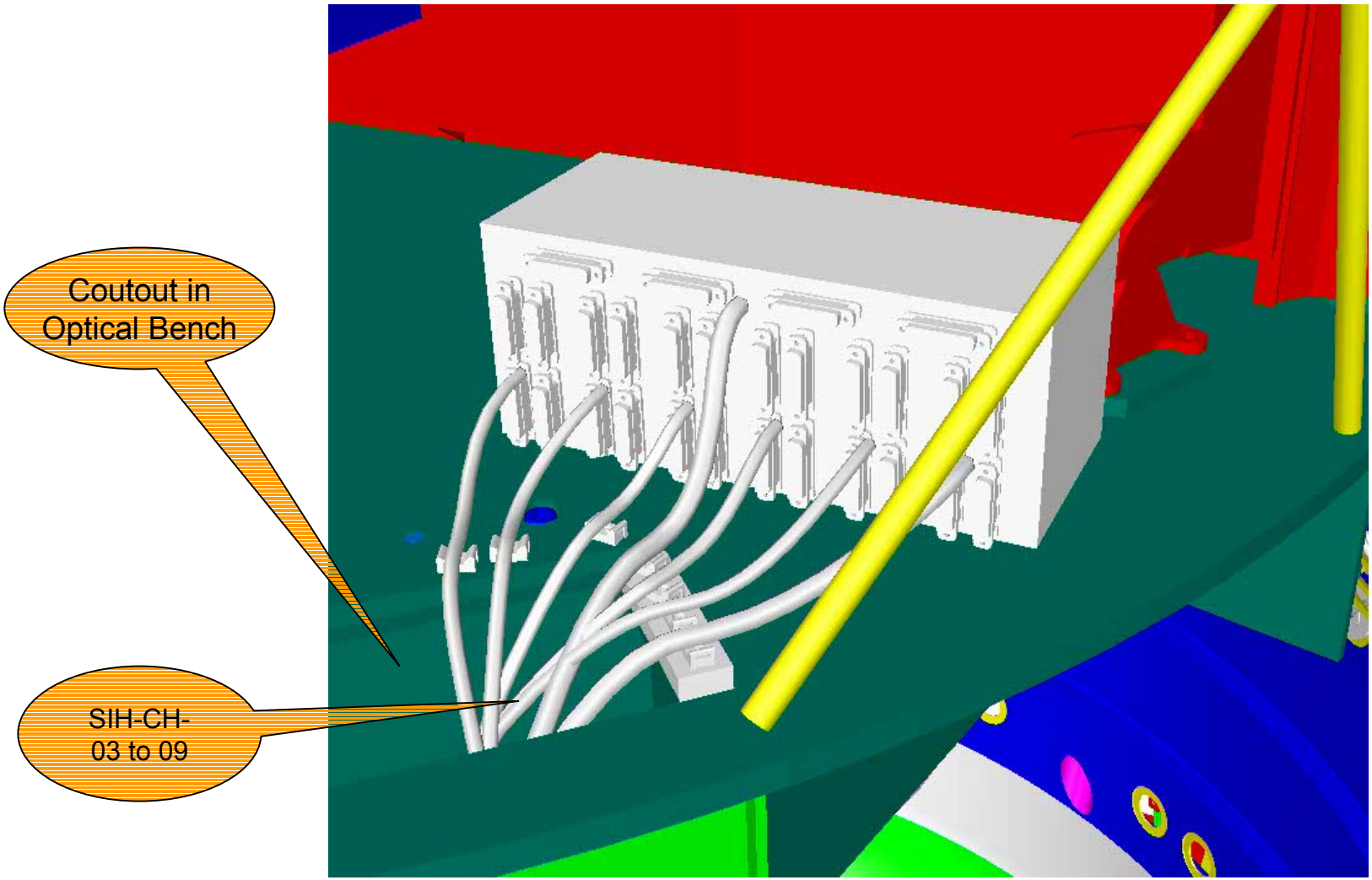
Routing on Chain



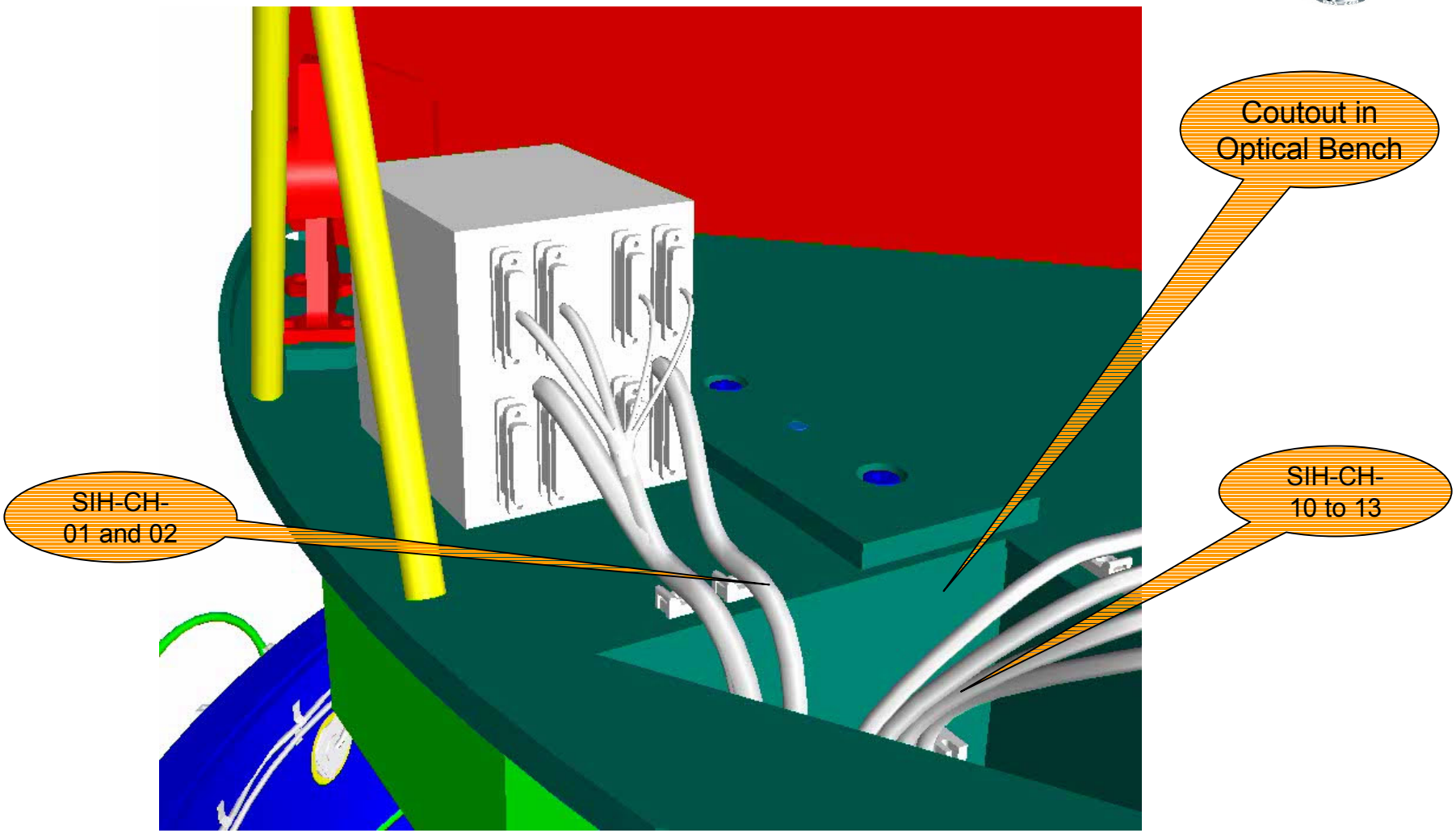
Thermal-Connection at Optical Bench



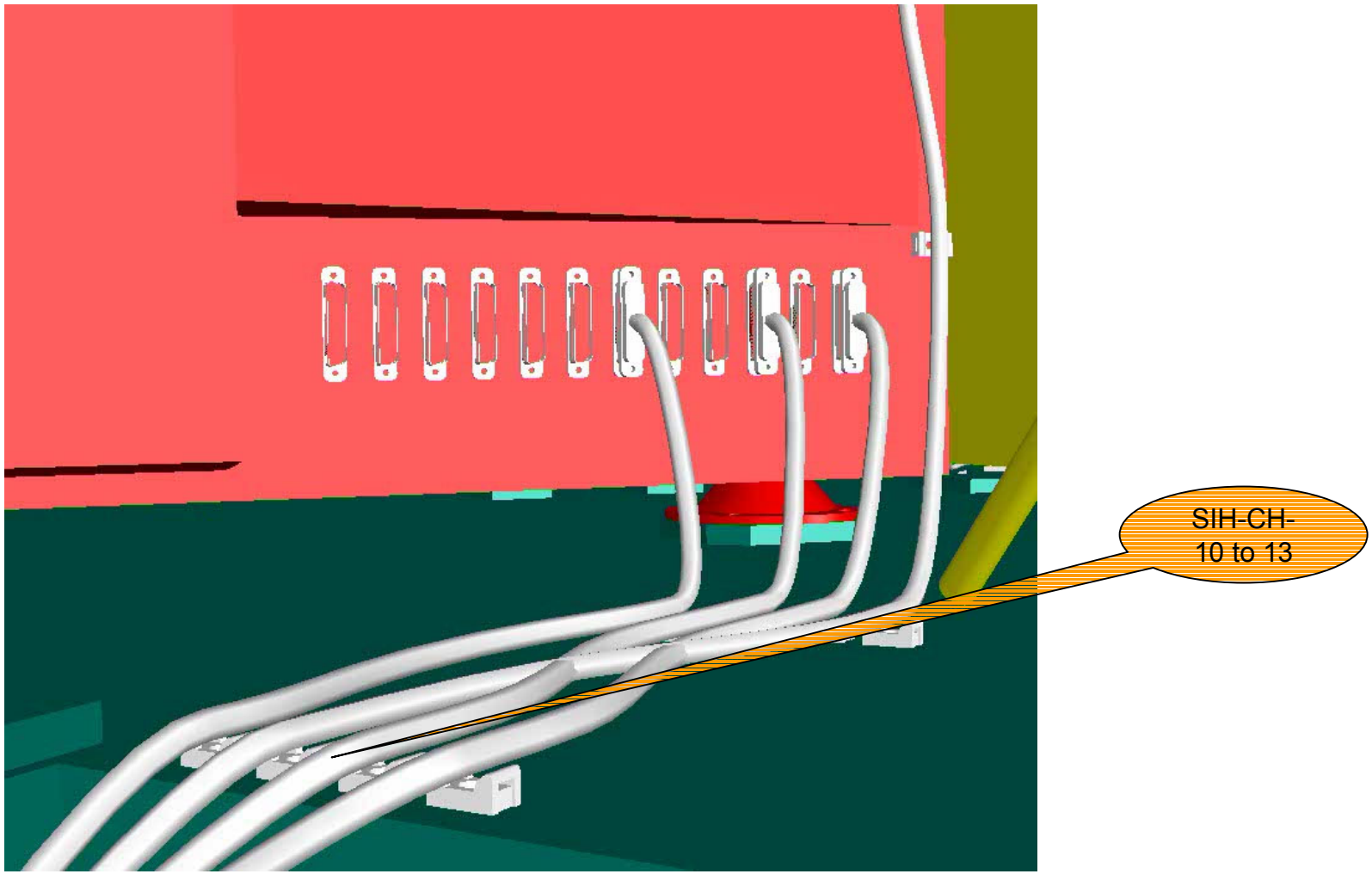
Routing to Jfet



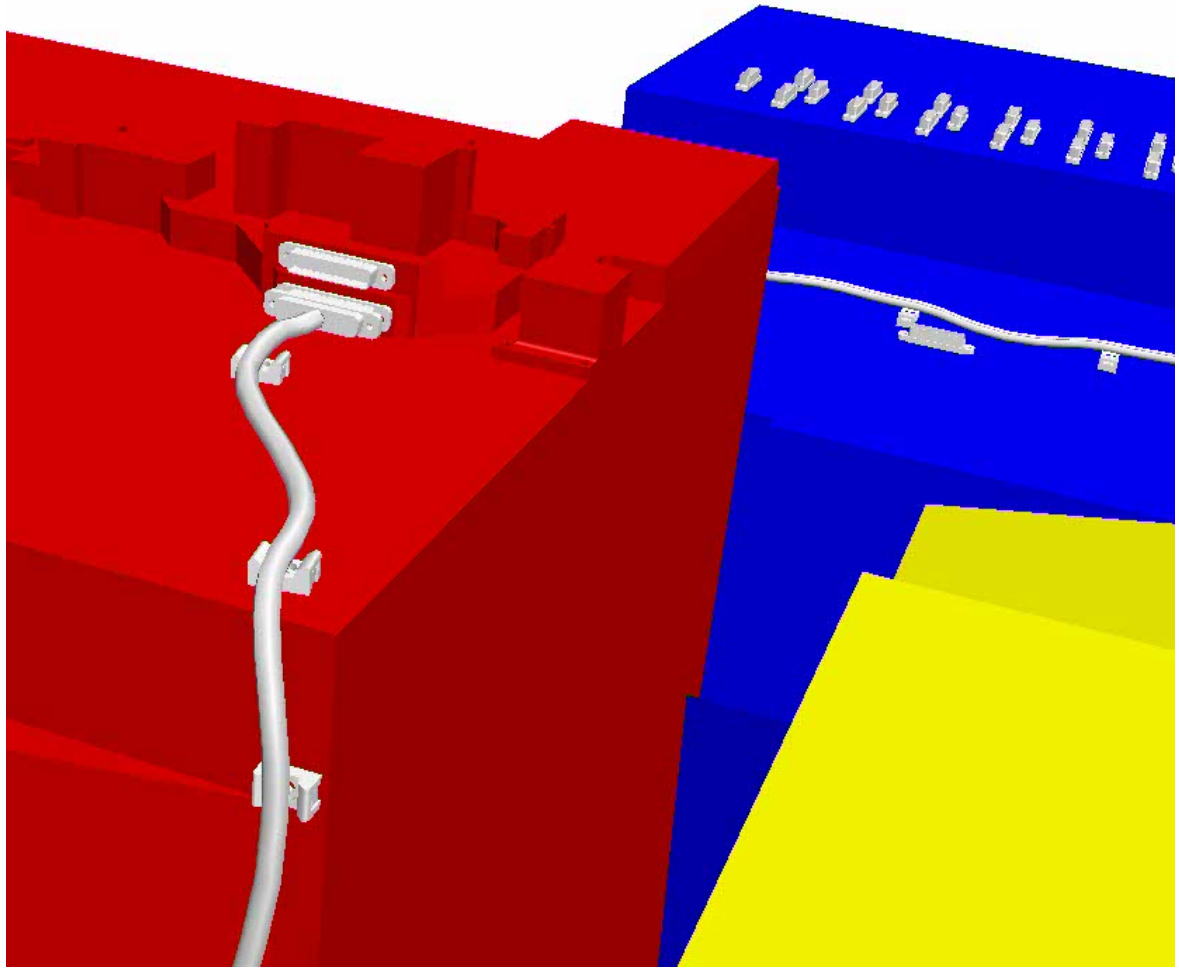
Routing to Jfet



Routing on Optical Bench to SPIRE-FPU



Routing on SPIRE



Herschel

SPIRE Cryo-harness I/F Meeting

astrium

18-19 April 2002

Introduction

Draft Agenda

1. Introduction
2. Closure of open action items (SPIRE Cryo-harness mtg., HP-2-ASED-0027, 24/10/01)
3. Agreement on required cryo-cable types (ref. Spire Harness Definition, Issue 0.9)
4. Clarification of electrical interfaces (ref. Spire Harness Definition, Issue 0.9)
5. SPIRE instrument unit drawings of connectors and orientations
6. SPIRE SVM instrument panel layout
6. Clarification of potential needs for over shields
7. AOB

Introduction

Objectives:

- Agreement on cable types
- Clarification of electrical interface requirements
- Clarification of harness layout and routing

Introduction: Relevant Harness Documentation

RAL/SPIRE Harness Documentation:

- SPIRE IID-B, SCI-PT-IIDB/SPIRE-02124, Issue 2/0, 31/07/01
- Change Request: HP-ASPI-CR-0030 / HR-SP-RAL-ECR-010, 12/12/01
- SPIRE Harness Definition, Annex 1, 2 and 4, SPIRE-RAL-PRJ-000608, Issue 0.9, 15/03/02

Change Request Responses and Minutes:

- Response to Change Request HP-ASPI-CR-0030 / SPIRE ECR#010, Fax HP-ASED-0019/02, 16/01/02
- Change Request close-out Mtg., HP-1-ESTE-MN-010, ESTEC, 13/02/02 and ASED input provided by telephone concerning ECR#010

ASED Harness Documentation:

- Herschel Cryo-harness inputs to Thermal Analysis, HP-2-ASED-TN-0010, Issue 1, 18/03/02
- List of Connectors – Units side for the SPIRE Instrument, HP-2-ASED-TN-0030, Issue 1.0, 22/02/02
- Cryo-Harness Electrical ICD, HP-2-ASED-IC-0001, Issue Draft
- Herschel Payload Module Cryo-Harness (PCH) Layout and Routing Overview, HP-2-ASED-TN-0018, Issue: Draft

Closure of open Action Items

- **HP-2-ASED-MN-0027/004: SPIRE will show the space availability for the Cryo harness on the next Configuration Drawing**
  - Draft CVV internal cryo harness routing over chain provided by J. Delderfield and implemented by ASED
  - Missing: FPU-JFET instrument harness routing missing
- **HP-2-ASED-MN-0027/005: SPIRE to investigat to reposition the FPU connectors in a line lang close to the base plate**
  - Comment: Has SPIRE changed the connector plate position (Ver 11 to Ver. 13)?
- **HP-2-ASED-MN-0027/007: SPIRE will assess the requirements for covers on open harnesses for all positions where harness may be disconnected**
  - JL to check the MOM
- **HP-2-ASED-MN-0027/008: SPIRE will consider whether BOB's with special conductor configuration will be needed for failure investigation between SVM unit and SVM I/F CB connectors**
- **HP-2-ASED-MN-0027/009: SPIRE AIV plan should include/specify at what stages and with what equipment/configuration cryoharness integrity is checked (at next issue of AIV plan)**
- **HP-2-ASED-MN-0027/010: SPIRE to verify that the selection of Glenair connectors (proposed by ASED) does not present a problem**

Agreement on required cryo-cable types

- **Review results from ASED analysis**

- **SPIRE cable type 12-ax Definition:**
  - 4 twisted triples, each triple being three isolated multicore wires, inside one braided shield, all inside an outer insulator
  - material stainless steel for all conductors, nominally 38AWG

Clarification of electrical interfaces (1/3)

List of Questions / Issues to be discussed:

- Are C10/C12 and C11/C13 redundant and what is the implication to the average dissipation?
- Average dissipation in SPIRE operational modes, I.e. spectrometer, photometer, recycling modes?

- Bundle overshield isolation
- Signal source and drain of Ixx and Exx Harness branches to be explained w.r.t. Pin / Socket connectors on SVM I/F connector-brackets
- I3 with Nom. And Red. Branch through one SVM and CVV connectors
- Backshell types and outlet dimensions on warm and cold units
- Test connector configurations w.r.t. EGSE and Shutter connectors and routing configurations
- (missing annexes in Herschel SPIRE Harness definition)

Clarification of electrical interfaces (2/3)

List of Questions / Issues to be discussed:

- Alternative Shutter Pin-allocation will be proposed ASED (EGSE 1+2 wires to be routed via one connector similar to I3)
- Additional I/F connectors for EGSE I/F`s (proposal ASED)
- Rectangular Pin –allocations shown in reverse configurations to original connector arrangements
- NC contacts will be used for daisy-chain of additional single shield connections
- Harness connector identifications to be changed from Jxx to Pxx
- Harness connector types and Unit connector types as defined in SPIRE-RAL-PRJ-000608 and Grounding diagram version 3.9 e.g. I10 to J23 shall be I10 to P23, same as all others

Clarification of electrical interfaces (3/3)

List of Questions / Issues to be discussed:

- Contact 1 and Pin-allocations are correct for Socket connectors but not for Pin-connectors in „PRJ 00608“
- Editorial errors of connector types in „PRJ-000608“ (page 62 and 64)
- Wired Bridge links at FCU P29 Cryo Warm unit I/F harness connector to be interconnected unit internal.
- Impact of CVV Test pin-allocations to PLM Cryo-harness pin-allocations and tests on PLM level
- Re-arrangements on CVV connector pin-allocations w.r.t. shielded cables and manufacturing access to contacts (twist of wires to be avoided)
- Connector type control, unit and harness connectors
- Harness overshielding to be identified on harness branches Exx.

Definition of unit configuration and connector allocations

- I/F drawings (preferably in A2 format) containing all units, connectors and its names:
  - SPIRE FPU
  - Photometer JFET and Spectrometer JFET
  - DCU
  - FCU

- SPIRE review comments to ASED connector list (ref. HP-2-ASED-TN-003)

SPIRE SVM instrument panel layout

- Information about the current instrument unit lay-out, as outcome of the I/F meeting at Alenia

Clarification of potential needs for over shields

- **Internal over shields:**
  - currently not foreseen
  - conflict between inner thermal shield and CVV with back shells

- **External over shields:**
  - part of the baseline

Annex 5 [illegible]

For Info
am 14.3.02 abgeliefert

CLRC	SPIRE HARNESS DEFINITION	Doc #: SPIRE-RAL-PRJ-000608 Issue: 0.9 Date: 15/03/02 Page 1 of 208

HP-2-HSED-MN-0112

Cold redundant C and I-Harness 12 and 13
C and I- " C1 and C3 (RED I=0)

Subject:	**HERSCHEL SPIRE HARNESS DEFINITION**

- This issue is consistent with the SPIRE Block Diagram Issue 4.0 and represents the status of the design at the time of the IBDR, see page 207.
- The BDA – JFET harnesses (F1-F15, F28) are indicated as being split at the wall of the FPU. They may subsequently be joined into a single harness with a connector plate and EMC backshells at the FPU wall.

PREPARED BY: D.K. GRIFFIN Douglas Griffin ..... **Date:** .....

APPROVED BY: J. DELDERFIELD..... John Delderfield **Date:** .....

APPROVED BY: K. KING..... **Date:** .....

CHANGE RECORD

ISSUE	DATE	SECTION	CHANGE(S) MADE
Draft 0.1	28/3/01	All	First Issue
Draft 0.2	11/4/01	All	Still getting it together! No unified style for lists yet.
Draft 0.3	10/5/01	Section 3	Update diagrams to fit latest SPIRE block diagram
		W1-6	Clarify screens as per communication 26/4/01, leaving other pins unchanged.
		C&I 1&3	Update Type 2 and Type 3 harnesses to fit 1:1 to membranes' back harness contacts, using 25pin filters.
		C Type1s	Simplify by carrying signal ground on screens.
		I1	Remove nasty 3 row double density 44 way connectors
		All Cs	Put in JFET and FET filter designations
		I1 Type3	Nasty 44 pin 3row DCU connectors removed.
		C10-C13	Add tail wiring details. omitting FCU pin details until unit layout confirmed. Changed HSFCU J21 and J22 to 15 way because don't need more pins.
Draft 0.4	10/8/01	Section 3	Update diagrams to fit SPIRE block diagram iss. 2.5. This uses 37way not 25way BDA service filter modules.
		BP & BS	Include JFET unit Back-Harnesses as separate section, in order to control all major Spire harnesses herein. Move overview of them from section 3 into this new one.
		I11&I13	Change HSFCU J21 and J22 back to 25way because do actually need more pins…stimulator heater omitted in iss0.3!
		F1-15	Make clear has plug/socket at HSFPU wall [A & B]
		C1-13	Ensure harness outer shields inside the cryostat include a break and do not unchangeably join the 100Way CVV connector bodies to the HSFPU/HSJFP/HSJFS backshells. Linking them is a left-over from when these units and the 300mK plumbing were all fixed grounded to the cryostat. Shields inside the cryostat now come through 100way pins, reducing their availability for use as signal grounds. The harness is now compatible with the Spire grounding scheme in which either the cryogenic or the warm end of the bolometer analogue system can be joined to chassis ground.
		Acronym	List inserted.
		Wiring list	Append as Annex. This will be included in the IID-B but IS NOT a sufficient specification for the C/I harnesses
		C1 and C3	In draft 0.2 fixed on 12ax for C harnesses inside cryostat where practical to minimise heatleak with screened twisted pairs used on I harnesses outside where RF fields may be larger. Switch to screened twisted pairs on bias lines in C1 and C3 to improve screening at JPL's request, but taking this as OK because they are only small proportion of the overall wires.
		C1 and C3	JFET membrane heater wires sized same as combined JFET voltage supply wires because power needs to be the same and heaters will now be sized to make their voltages similar
Draft 0.4 contd.	10/8/01	C1-2 & C4-9	Show 12ax third wires as joined to ground pin at 25way MDMs and not just at the 100way CVV connectors, to reduce ground noise.
		C1 and I1	Remove 300mK Thermal Control Thermistor a.c. Biasing from

ISSUE	DATE	SECTION	CHANGE(S) MADE
			Spectrometer side harness.
		I11 & I13	BSM temp. removed from BSM tail listing as is already in temperature sensors' tail
		T Harnesses	Update Harness drawing etc. to remove "sync": from S/C to HSDRCU and to split EGSE units.
		C/I 10 &12	Remove JFET box thermistors included in error. Affects DCU J23 and J24 + FCU J23 and J24. Permits cleaner shield to 100way pin allocations.
		C/I 10 &12	Change to updated Spectrometer Calibrator Wiring.
		C3	Alter multiple heater wires to be in same proportions as multiplicity of JFET modules they heat, rather than the reverse! This arrangement is a bit of a left-over from using 12-ax for this harness, and may disappear in the next issue.
0.5	22/8/01	Appendix	Include Channel # cross-reference listing.
		C4	Remove notes on tail connector PCB tracking.
		F1-15	Include pinouts
		C/I 11&13	Adjust launch latch wires as requested.
0.6	15/09/01	C/I 11&13	Update based on SMEC lists "010906.doc"
		Section 3	Update harness layout with new SMEC FCU connectors
		At end	Append grounding diagram as agreed.
		Annex	Put SMEC updates into wiring list.
		C1/3+Annex	Sort out sexes of RF filters so all the same as C11/13
		C/I 11&13	Make BSM latch drive wire resistance same as SMEC's
0.7	19/09/01	All	Get HOB and SOB sorted
			Change Spectrometer Stim temperature to be Flange, not "near SOB"
0.8	02/11/01	4.3.4	Spelling error corrected
		N.A.	Added paragraph numbering to Annexes.
		All	References to the 100-way CVV conectors changed to 128-way
		All	References to "CVV Harness shield link" changed to "FPU Faraday Shield link"
		4.2.4	Colours updated on Type 1 DCU tails harness layup
		4.2.4	Type-1 128-way pin allocations assigned
		I and C	The pin allocations to the 128-way CVV connectors were added.
		I10	J11 and 12 tails amended to incorporate J13 and J14
		I10	Thermal control heater moved from J23 and J24 to J11 and J12
		I11	Split 25way tail to J21 to 15way J21 and 9-way J13.
		I13	Split 25way tail to J22 to 15way J22 and 9-way J14.
		Section 4.5.1	Simplify backharness to remove cross-linking and route temperature control via spare HSJFS membrane.
		BS and BP	Work through changes implied by section 4.5.1.
		C1 & C4	Work through changes implied by section 4.5.1.
		Section 3	Update harness layouts to match issue 0.8 changes.
		F28	Insert section for new harness
		I1 and I3	Insert a note, explaining configuration.
		All	Added backshell numbers.
		T7 and T8	Inserted J27 and J28 pinouts
		T1 and T2	Correct connector content as Sync is long gone.
		C2	Added extra tail for the 300-mK Thermometer signals

ISSUE	DATE	SECTION	CHANGE(S) MADE
		Annex	Added information about the configuration of the CVV backshells
		4.2.10 - I10	Added 128-Way pin assignments to Shutter Table
		4.2.10 – I10	Assigned 128-way pins
		4.3.10 – C10	Added 128-Way pin assignments to Shutter Table
		4.3.10 – C10	Assigned 128-way pins
		4.2.10-I10	Added FPU Faraday Shield Link to harness in J23
		4.2.10-I10	Removed commoning of shields in thermometry tails at 128-way
		4.2.11-I11	Phot Stim. Heater changed to STQ as per C11 and J13 Pin allocation changed
		4.2.11/4.3.11	Chop Motor Pin allocation corrected to be Jiggle Motor
		4.2.2/4.3.2	Changed allocations of pins to accommodate a FPU Shield Link on the I2 harnesses.
		4.2.3	Added extra PMW heater so that each JFET module has a A/B heater lines. Updated pin allocation accordingly.
		Scope	Added note regarding EMI Backshells
		4.2.3-I3	Removed discussion notes
		4.6.1	Discussion updated
0.8 Rev A	12/12/01	Annexes 1 & 2	Wiring lists brought into line with issue 0.8.
0.9	1/1/02	Cover	Update summary notes (JD)
		Section 3	Bring figures into line with SPIRE Block Diagram 3.8 (JD)
		W3-6	Swop J1-4 to agree with HSFCU numbering (JD)
		I10-13	Update warm end tail connector splitout to HSFCU design (JD)
		I11 & 13	Fix duplicate use of pin 31 on J17 and J18! (JD)
		I10	Update FCU J23-26 to Christophe's pinout. (JD)
		J37	Put in J37 pinout, removing wires from other I11 tails (JD)
	4/2/02	I1	
		Acronym list	Updated
		Notes	Clarify wording
		I1-I13	Corrected statement on the figures illustrating the D-Sub pin allocations indicating that overshield was not connected to an EMC backshell connector at wall of the CVV.
		I1	Updated Figure to show the ground reference for the FJET heaters to pass through the CVV connector
		I1	Updated figure to indicate commoning of ground references within connectors in the harness.
		I1	Connector names corrected on 128-way pin allocation figure
		I1-I13	Pin allocation tables corrected and notes added.
		I1	Spectrometer Heater ground reference wire deleted from pin allocation table.
		I1	Order of the pin allocation table adjusted to correspond to the order shown in the tail drawings
		I3	Reallocated pins for two 78-way connectors on DCU. (Previously four 37-way)
		W1-W6	Bring into line with DRCU ICD
			Added SPIRE Block diagram as a Reference Document
			Incorporated the connector panel into the cryoharness. This split the "I-Harness" section of the cryoharness into the "E-Harness" running from the wall of the CVV to the SVM connector panel

ISSUE	DATE	SECTION	CHANGE(S) MADE
			and the "I-Harness" running from the SVM connector panel to the DRCU.
		C2/I2/I4	Incorporated provision for reading out the 300-mK thermal control hardware.
		2.1	The SPIRE Block Diagram called up as a reference document
		W1-W6	Discrepancies between this document and the DRCU and DPU ICDs reconciled. (regarding the harnesses carrying the LSLs and FSDLs)
		Annex 6	SPIRE Instrument Grounding Diagram amended
		Annex 7	Wiring diagram for readout of the 300-mK TC added
		W7/W8	Added pin allocations as per DRCU ICD 1.1
		All	Revised and updated part numbers for Backshells (see notes 7 and 8 in §3-Introduction
		I1	Corrected labelling of tails on 128-Way
		I1	Moved ground pins of the two bolometer tails on the 128-Way so they are close to each other to facilitate their interconnection
		I4	Connected all ground pins together as indicated.
		I4	Reallocated pins to connector to reflect the incorporation of the 300-mK TC. There are three less signal pairs passing through the 128-Way here.
		I10/12	Updated tail listing to reflect the incorporation of the 50-way connector for Thermometry Tail A (J23)
		I10/I12	Updated to reflect the incorporation of the skin connector for routing of the Shutter EGSE
		I10/I12	Updated SMEC I/F to conform to DRCU ICD
		I11	Rearranged pin assignments on the 128-way to allow for the addition of a dedicated launch lock confirmation tail
		C1	Ground pins associated with JFS J5/J6 moved to be adjacent to each other to facilitate the interconnection of the ground pins
		C2	JFS J7 Moved 12-ax cable to centre of connector and grounded un-used signal triplet
		C2	JFS J1 Moved the pair of 12-ax to the centre of the connector
		C2	Added 5MΩ resistor to 300-mK harness as per SPIRE Block Diagram
		C3	Added drawing of 128-Way pin assignments
		C3	Corrected erroneous reference to PSW Bias in listing table
		C4	Corrected error in ground pin assignment on 128-Way
		C10/C12	Changed FPU J17/J18 to MDM 21 S and rearranged harness to conform to this. (including reallocation of the 128-Way)
		C10/C12	Changed pin allocations to FPU J27/J28/J29/J30 to bring into line with LAM design
		C11/C13	Provision for two SMEC launch latches incorporated
		C11/C13	Launch latches for BSM and SMEC rearranged on the 128-Way so that they are adjacent to each other to enable a single tail to be made from them
		C11/C13	Corrected BSM Launch Latch drive to be STP
0.9	15/3/02	I	Issued

ACRONYM LIST

Term	Meaning
ADC	Analogue to Digital Converter
AIV	Assembly, Integration and Verification
AME	Absolute Measurement Error
AOCS	Attitude and Orbit Control System
APART	Arizona's Program for the Analysis of Radiation Transfer
APE	Absolute Pointing Error
ASAP	Advanced Systems Analysis Program
AVM	Avionics Model
BDA	Bolometer Detector Assembly
BFL	Back Focal Length
BRO	Breault Research Organization
BSM	Beam Steering Mirror
CDMS	Command and Data Management System
CDMU	Command and Data Management Unit
CDR	Critical Design Review
CMOS	Complimentary Metal Oxide Silicon
CPU	Central Processing Unit
CVV	Cryostat Vacuum Vessel
DAC	Digital to Analogue Converter
DAQ	Data Acquisition
DCU	Detector Control Unit = HSDCU
DPU	Digital Processing Unit = HSDPU
DQE	Detective Quantum Efficiency
DSP	Digital Signal Processor
EDAC	Error Detection and Correction
EGSE	Electrical Ground Support Equipment
EMC	Electro-magnetic Compatibility
EMI	Electro-magnetic Interference
ESA	European Space Agency
FCU	FCU Control Unit = HSFCU
FIR	Far Infrared
FIRST	Far Infra-Red and Submillimetre Telescope
FOV	Field of View
F-P	Fabry-Perot
FPGA	Field Programmable Gate Array
FPU	Focal Plane Unit
FTS	Fourier Transform Spectrometer
FWHM	Full Width Half maximum
GSFC	Goddard Space Flight Center
HK	House Keeping
HOB	Herschel Optical Bench
HPDU	Herschel Power Distribution Unit
HSDCU	Herschel-SPIRE Detector Control Unit
HSDPU	Herschel-SPIRE Digital Processing Unit
HSFCU	Herschel-SPIRE FPU Control Unit
HSO	Herschel Space Observatory
IF	Interface
IID-A	Instrument Interface Document - Part A
IID-B	Instrument Interface Document - Part B
IMF	Initial Mass Function
IR	Infrared

Term	Meaning
IRD	Instrument Requirements Document
IRTS	Infrared Telescope in Space
ISM	Interstellar Medium
ISO	Infrared Space Observatory
JFET	Junction Field Effect Transistor
LCL	Latching Current Limiter
LIA	Lock-In Amplifier
LVDT	Linear Variable Differential Transformer
LWS	Long Wave Spectrometer (an instrument used on ISO)
MAC	Multi Axis Controller
MCU	Mechanism Control Unit = HSMCU
M-P	Martin-Puplett
NEP	Noise Equivalent Power
NTD	Neutron Transmutation Doped
OBS	On-Board Software
OMD	Observing Modes Document
OPD	Optical Path Difference
PACS	Photodetector Array Camera and Spectrometer
PCAL	Photometer Calibration source
PID	Proportional, Integral and Differential (used in the context of feedback control loop architecture)
PLW	Photometer, Long Wavelength
PMW	Photometer, Medium Wavelength ← PMW GND ? and SSW GND ?
POF	Photometer Observatory Function
PROM	Programmable Read Only Memory
PSW	Photometer, Short Wavelength
PUS	Packet Utilisation Standard
RMS	Root Mean Squared
SCAL	Spectrometer Calibration Source
SCUBA	Submillimetre Common User Bolometer Array
SED	Spectral Energy Distribution
SMEC	Spectrometer Mechanics
SMPS	Switch Mode Power Supply
SOB	SPIRE Optical Bench
SOF	Spectrometer Observatory Function
SPIRE	Spectral and Photometric Imaging Receiver
SRAM	Static Random Access Memory
SSSD	SubSystem Specification Document
STP	Screened Twisted Pair
STQ	Screened Twisted Quad
STT	Screened Twisted Triple
SVM	Service Module
TBC	To Be Confirmed
TBD	To Be Determined
TC	Thermal Control
TP	Twisted Pair (unscreened)
TQ	Twisted Quad (unscreened)
TT	Twisted Triple (unscreened)
URD	User Requirements Document
UV	Ultra Violet
WE	Warm Electronics
ZPD	Zero Path Difference

DISTRIBUTION LIST

Institute	Holder	Issue/ Revision and Distribution Date							
		0.2 11/4/01	0.3 10/5/01	0.4 10/8/01	0.5 22/8/01	0.6 15/9/01	0.7 19/9/01	0.8 2/11/01	0.9 10/3/02
RAL	Delderfield	x	x	x	x	x	x	x	x
	Swinyard	x	x	x	x	x	x	x	x
	Griffin	x	x	x	x	x	x	x	x
	Parker	x	x	x	x	x	x	x	x
	King	x	x	x	x	x	x	x	x
	Smith								
QMW/	Griffin	x	x	x	x	x	x	x	x
Cardiff	Hargrave	x	x	x	x	x	x	x	x
ATC	Cunningham	x	x	x	x	x	x	x	x
	Stobie	x	x	x	x	x	x	x	x
MSSL	Winter	x	x	x	x	x	x	x	x
	Brockley-Blatt								x
CEA-SBT	Duband	x	x	x	x	x	x	x	x
CEA-SAP	Cara	x	x	x	x	x	x	x	x
	Augueres	x	x	x	x	x	x	x	x
	Pinsard	x	x	x	x	x	x	x	x
JPL	Bock	x	x	x	x	x	x	x	x
	Lilienthal	x	x	x	x	x	x	x	x
	Hristov	x	x	x	x	x	x	x	x
	Huston								x
LAM	Pouliquen	x	x	x	x	x	x	x	x
	Ferrand						x	x	x
Can.	Taylor	x	x	x	x	x	x	x	x
	Peterson	x	x	x	x	x	x	x	x
ESA	Jackson	x	x	x	x	x	x	x	x
	Heske	x	x	x	x	x	x	x	x
	Bruston			x	x	x	x	x	x
CESR	Pons	x	x	x	x	x	x	x	x
IFSI	Giorgio	x	x	x	x	x	x	x	x
	Orfei	x	x	x	x	x	x	x	x
ALCATEL	Lund			x	x	x	x	x	x
	Collaudin								x
Astrium	Fass					x	x	x	x
	Hoelzle						x	x	x

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1. SCOPE

This document at its latest issue is the primary definition of all HERSCHEL SPIRE flight harnesses.

It is an applicable document in the SPIRE IID-B, and as such is called up, and is applicable in full to all SPIRE subsystems

It also contains information covering some test harnesses, but some harnesses / back-planes that stay entirely within sub-systems are not necessarily included.

Electrical and physical data are included, included contact functions, screening details, hold-down/shape details if appropriate, etc. This information will become more detailed as designs are refined until it can be used as a basis for harness manufacture. As of Issue 0.9, detailed harness shapes for the F-Harnesses are still omitted.

A function count/format/sizing summary list for the C/E/I series cryoharness is appended as an Annex and may, together with other summary information, be edited into the SPIRE IID-B. Spire is unusual in that these harnesses are not standard I/Fs between separately grounded systems but rather links within extended analogue systems. As such, the conductor count/sizing summary list alone is not an adequate specification to ensure the required performance, particularly with respect to consistency between ground calibration and flight performance.

The SPIRE instrument-grounding diagram is appended.

The backshells called up for cryoharness are selected for the RAL test conditions. Astrium should substitute suitable hardware for the flight implementation.

2. APPLICABLE DOCUMENTS

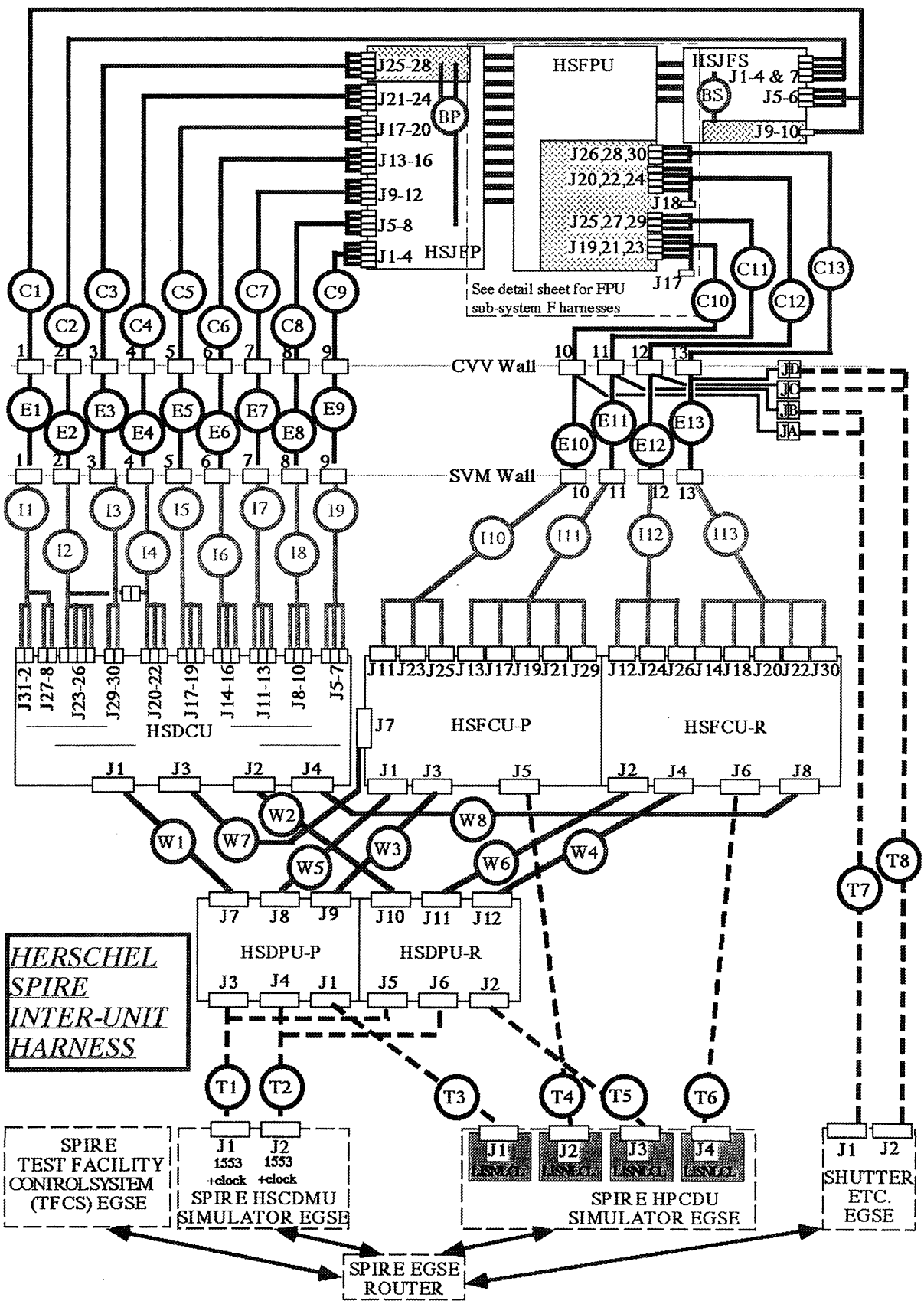
ID	TITLE	NUMBER
AD-1	SPIRE Development Plan and Model Philosophy	SPIRE-RAL-PRJ-000035

2.1 REFERENCE DOCUMENTS

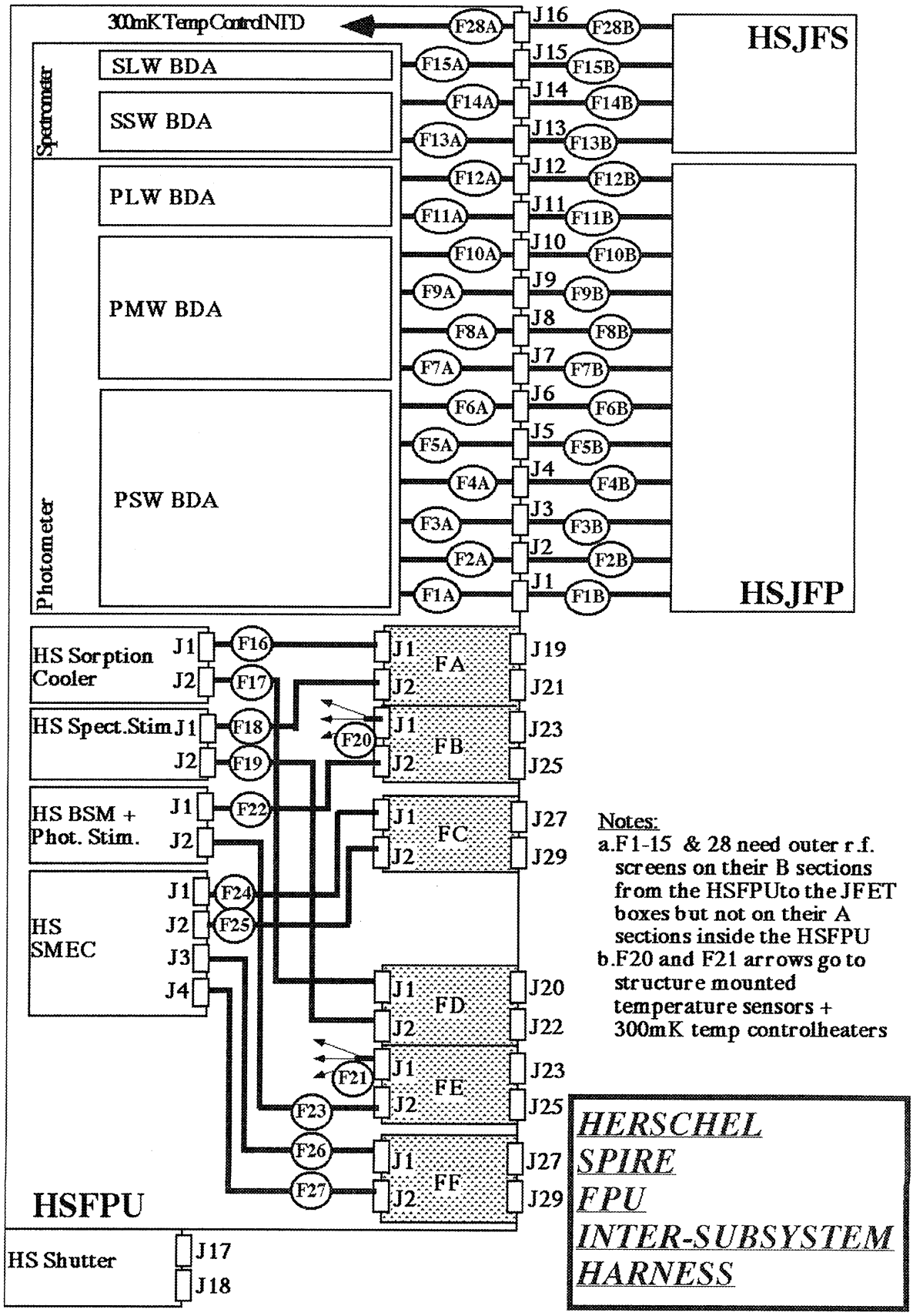
ID	TITLE	NUMBER	ISSUE	DATE
RD-1	SPIRE Block Diagram	SPIRE-RAL-DWG-000646	4.0	6 March 2002

3. INTRODUCTION

The overall HERSCHEL SPIRE harnesses are configured as shown:



The details in the HSFPU are as follows:



Notes:

1. There are some "loop" harnesses that start and terminate within the same unit, such as on the HS DCU. These are treated as parts of the units rather than instrument harness.
2. The HSJFS + HSJFP "back-harnesses", BS and BP respectively, although supplied as part of the JFET units are now within the scope of this document as this permits the instrument's architecture to be followed more clearly.
3. The Test harnesses, type T, are shown dashed as they are non-flight and will be substituted by ESA Contractor furnished items as SPIRE is integrated on to HERSCHEL. They will be RAL furnished for use with the instrument EGSE, but individual suppliers will need to make their own versions for unit level testing before delivery to the instrument.
4. The Cryogenic and Intermediate harnesses, types C and I, are RAL furnished for instrument level calibration but again are substituted by ESA Contractor furnished items as SPIRE is integrated on to HERSCHEL. Harnesses of type "E" are not needed for instrument level calibration.
5. The provision of the FPU harnesses (F series) is the responsibility of the institute that sources the sub-system to which they connect, noting that the structure subsystem group covers the temperature sensors.
6. The model philosophy definition, in AD-1, can be used to determine how many versions of each harness are required for the programme. For SPIRE it is necessary that most harnesses, of whatever version, are EMC and thermally representative.
7. For the D-Subminiature connectors on the DRCU and DPU, EMC Backshells have been selected with the following general specifications:
   a. Glenair Basic Part number 550-039 D-Subminiature Backshells
   b. Top or End entry according to the connector accommodation (T/E)
   c. Electroless Nickel finish (M)
   d. Rear mounted receptacle
   e. Hex head jackscrew option
8. For the MDM connectors inside the Herschel Cryostat,
   a. Glenair Basic Part number 500-010 (or 507-145) MDM Backshells depending on whether the harness fabricator wished them to be split or not.
   b. Top entry listed but alternative angles may be needed
   c. Electroless Nickel finish (M)
   d. Rear mounted receptacle
   e. Hex head jackscrew option
   f. The use of potted MDM connectors with integral conductive backshells is an option, depending in part on routing
9. Some inner shields of signal groups within a single harness are connected together at the connectors (MDM, D-Sub and 128-Way) to form an analogue ground reference network for EMC and anti-crosstalk reasons. This is indicated in the drawings of the Harness Layups and on the tables of the pin assignments of the 128-Way connectors by the letters A, B, C and D. When there are ground planes formed on several tails of the same harness, these letters are suffixed by digits to differentiate between them. This convention of assigning a letter to commoned grounds is adhered to in the tail listing tables.

4. HARNESS DETAILS

4.1 Warm Harnesses

4.1.1 W1 HSDPU-P to HSDCU-P

Overall Mechanical Drawing

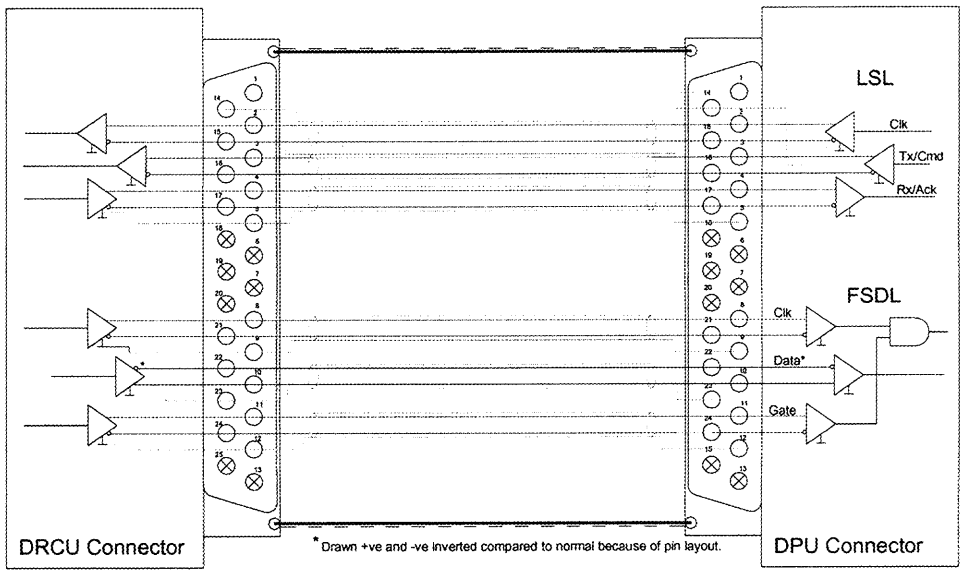
1:1 harness of insulated screened 28AWG twisted pairs with backshell to backshell screen, covered on outside with insulation.

Connector/Backshell Details

Prime Side Harness

DBMA 25 P + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DCUJ1
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPUJ7

Harness Layup



Contact Details: Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
C_CLK_SHD	1		C_SHD	14	
C_CLK_DCU_P+	2	28AWG STP-A	C_CLK_DCU_P-	15	28AWG STP-A
C_CMD_DCU_P+	3	28AWG STP-B	C_CMD_DCU_P-	16	28AWG STP-B
C_RES_DCU_P+	4	28AWG STP-C	C_RES_DCU_P-	17	28AWG STP-C
C_RES_SHD	5			18	
	6			19	
	7			20	
D_CLK_DCU_P+	8	28AWG STP-D	D_CLK_DCU_P-	21	28AWG STP-D
D_CLK_SHD	9		D_DAT_DCU_P-	22	28AWG STP-E
D_DAT_DCU_P+	10	28AWG STP-E	D_SHD	23	
D_GAT_DCU_P+	11	28AWG STP-F	D_GAT_DCU_P-	24	28AWG STP-E
D_GAT_SHD	12			25	
	13				
RF Overshield	EMC Backshell-Backshell				

4.1.2 W2 HSDPU-R to HSDCU-R

Overall Mechanical Drawing

1:1 harness of insulated screened 28AWG twisted pairs with backshell to backshell screen, covered on outside with insulation.

Connector/Backshell Details
Redundant Side Harness

DBMA 25 P + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DCUJ2
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPUJ10

Harness Layup

As W1

Contact Details
Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
C_CLK_SHD	1		C_SHD	14	
C_CLK_DCU_R+	2	28AWG STP-A	C_CLK_DCU_R-	15	28AWG STP-A
C_CMD_DCU_R+	3	28AWG STP-B	C_CMD_DCU_R-	16	28AWG STP-B
C_RES_DCU_R+	4	28AWG STP-C	C_RES_DCU_R-	17	28AWG STP-C
C_RES_SHD	5			18	
	6			19	
	7			20	
D_CLK_DCU_R+	8	28AWG STP-D	D_CLK_DCU_R-	21	28AWG STP-D
D_CLK_SHD	9		D_DAT_DCU_R-	22	28AWG STP-E
D_DAT_DCU_R+	10	28AWG STP-E	D_SHD	23	
D_GAT_DCU_R+	11	28AWG STP-F	D_GAT_DCU_R-	24	28AWG STP-E
D_GAT_SHD	12			25	
	13				
RF Overshield	EMC Backshell-Backshell				

4.1.3 W3 HSDPU-P to HSSCU-P

Overall Mechanical Drawing

1:1 harness of insulated screened 28AWG twisted pairs with backshell to backshell screen, covered on outside with insulation.

Connector/Backshell Details
Redundant Side Harness

DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to FCUJ3
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPUJ9

Harness Layup

As W1

Contact Details
Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
C_CLK_SHD	1		C_SHD	14	
C_CLK_SCU_P+	2	28AWG STP-A	C_CLK_SCU_P-	15	28AWG STP-A
C_CMD_SCU_P+	3	28AWG STP-B	C_CMD_SCU_P-	16	28AWG STP-B
C_RES_SCU_P+	4	28AWG STP-C	C_RES_SCU_P-	17	28AWG STP-C
C_RES_SHD	5			18	
	6			19	
	7			20	
D_CLK_SCU_P+	8	28AWG STP-D	D_CLK_SCU_P-	21	28AWG STP-D
D_CLK_SHD	9		D_DAT_SCU_P-	22	28AWG STP-E
D_DAT_SCU_P+	10	28AWG STP-E	D_SHD	23	
D_GAT_SCU_P+	11	28AWG STP-F	D_GAT_SCU_P-	24	28AWG STP-E
D_GAT_SHD	12			25	
	13				
RF Overshield	EMC Backshell-Backshell				

4.1.4 W4 HSDPU-R to HSSCU-R

Overall Mechanical Drawing

1:1 harness of insulated screened 28AWG twisted pairs with backshell to backshell screen, covered on outside with insulation.

Connector/Backshell Details
Redundant Side Harness

DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to FCUJ4
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPUJ12

Harness Layup

As W1

Contact Details
Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
C_CLK_SHD	1		C_SHD	14	
C_CLK_SCU_R+	2	28AWG STP-A	C_CLK_SCU_R-	15	28AWG STP-A
C_CMD_SCU_R+	3	28AWG STP-B	C_CMD_SCU_R-	16	28AWG STP-B
C_RES_SCU_R+	4	28AWG STP-C	C_RES_SCU_R-	17	28AWG STP-C
C_RES_SHD	5			18	
	6			19	
	7			20	
D_CLK_SCU_R+	8	28AWG STP-D	D_CLK_SCU_R-	21	28AWG STP-D
D_CLK_SHD	9		D_DAT_SCU_R-	22	28AWG STP-E
D_DAT_SCU_R+	10	28AWG STP-E	D_SHD	23	
D_GAT_SCU_R+	11	28AWG STP-F	D_GAT_SCU_R-	24	28AWG STP-E
D_GAT_SHD	12			25	
	13				
RF Overshield	EMC Backshell-Backshell				

4.1.5 W5 HSDPU-P to HSMCU-P

Overall Mechanical Drawing

1:1 harness of insulated screened 28AWG twisted pairs with backshell to backshell screen, covered on outside with insulation.

Connector/Backshell Details

Redundant Side Harness

DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to FCUJ1

DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPUJ8

Harness Layup

As W1

Contact Details

Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
C_CLK_SHD	1		C_SHD	14	
C_CLK_MCU_P+	2	28AWG STP-A	C_CLK_MCU_P-	15	28AWG STP-A
C_CMD_MCU_P+	3	28AWG STP-B	C_CMD_MCU_P-	16	28AWG STP-B
C_RES_MCU_P+	4	28AWG STP-C	C_RES_MCU_P-	17	28AWG STP-C
C_RES_SHD	5			18	
	6			19	
	7			20	
D_CLK_MCU_P+	8	28AWG STP-D	D_CLK_MCU_P-	21	28AWG STP-D
D_CLK_SHD	9		D_DAT_MCU_P-	22	28AWG STP-E
D_DAT_MCU_P+	10	28AWG STP-E	D_SHD	23	
D_GAT_MCU_P+	11	28AWG STP-F	D_GAT_MCU_P-	24	28AWG STP-E
D_GAT_SHD	12			25	
	13				
RF Overshield	EMC Backshell-Backshell				

4.1.6 W6 HSDPU-R to HSMCU-R

Overall Mechanical Drawing

1:1 harness of insulated screened 28AWG twisted pairs with backshell to backshell screen, covered on outside with insulation.

Connector/Backshell Details
Redundant Side Harness

DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to FCUJ2
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPUJ11

Harness Layup

As W1

Contact Details
Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
C_CLK_SHD	1		C_SHD	14	
C_CLK_MCU_R+	2	28AWG STP-A	C_CLK_MCU_R-	15	28AWG STP-A
C_CMD_MCU_R+	3	28AWG STP-B	C_CMD_MCU_R-	16	28AWG STP-B
C_RES_MCU_R+	4	28AWG STP-C	C_RES_MCU_R-	17	28AWG STP-C
C_RES_SHD	5			18	
	6			19	
	7			20	
D_CLK_MCU_R+	8	28AWG STP-D	D_CLK_MCU_R-	21	28AWG STP-D
D_CLK_SHD	9		D_DAT_MCU_R-	22	28AWG STP-E
D_DAT_MCU_R+	10	28AWG STP-E	D_SHD	23	
D_GAT_MCU_R+	11	28AWG STP-F	D_GAT_MCU_R-	24	28AWG STP-E
D_GAT_SHD	12			25	
	13				
RF Overshield	EMC Backshell-Backshell				

4.1.7 W7 HSFCU-P to HSDCU-P

Overall Mechanical Drawing

1:1 harness of insulated screened TBD AWG conductors, backshell to backshell screen, covered on outside with insulation.

Connector/Backshell Details

Prime side secondary power distribution harness

DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to FCUJ7
DBMA 25 S + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to DCUJ3

Harness Layup

Contact Details

Pin Number	Signal
1	LIA_P_P9V
2	LIA_P_GND9V
3	LIA_P_N9V
4	LIA_S_P9V
5	LIA_S_GND9V
6	LIA_S_N9V
7	PDAQ_P9V
8	PDAQ_GND9V
9	PDAQ_N9V
10	PDAQ_P5V
11	LIA_S_P5V
12	LIA_P_P5V
13	Chassis
14	LIA_P_P9V
15	LIA_P_GND9V
16	LIA_P_N9V
17	LIA_S_P9V
18	LIA_S_GND9V
19	LIA_S_N9V
20	PDAQ_P9V
21	PDAQ_GND9V
22	PDAQ_N9V
23	PDAQ_GND9V
24	LIA_P_GND5V
25	LIA_S_GND5V

4.1.8 W8 HSFCU-R to HSDCU-R

Overall Mechanical Drawing

As per W7

Connector/Backshell Details

Prime side secondary power distribution harness

DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to FCUJ8

DBMA 25 S + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to DCUJ4

Harness Layup

As W7

Contact Details

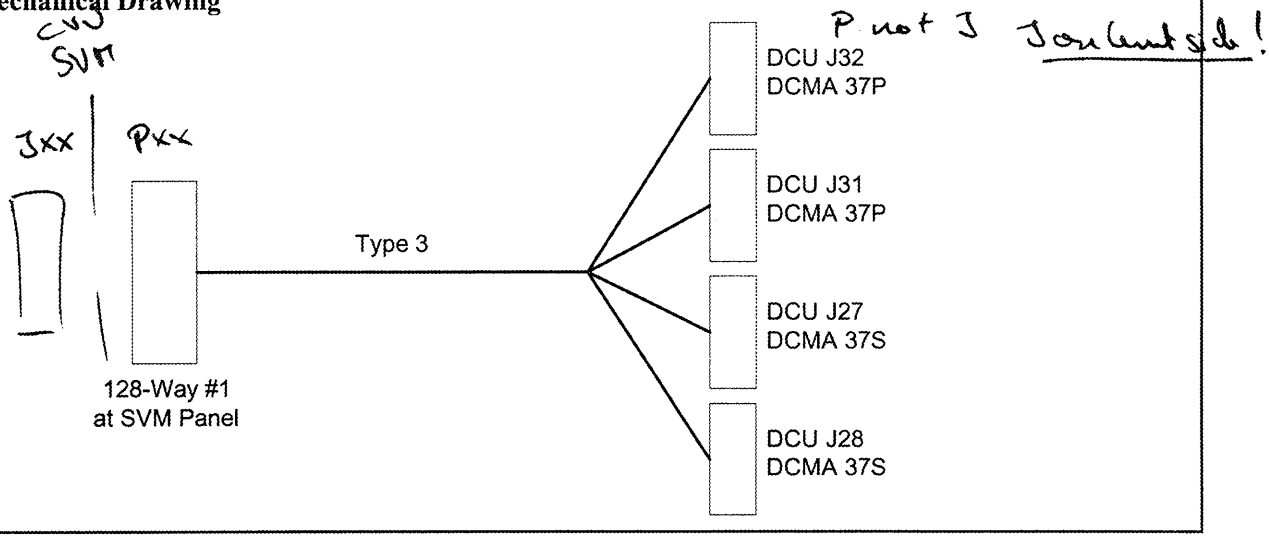
As W7

4.2 Intermediate Harnesses

The individual conductors for this harness are 28 AWG stranded Copper. This gives very low impedance, relevant for the bolometer channels, which would otherwise be susceptible to Johnson noise contributions from this harness.

4.2.1 I1 SVM 1 – DRCU (Type3) Spectrometer Biases and SLW

Overall Mechanical Drawing



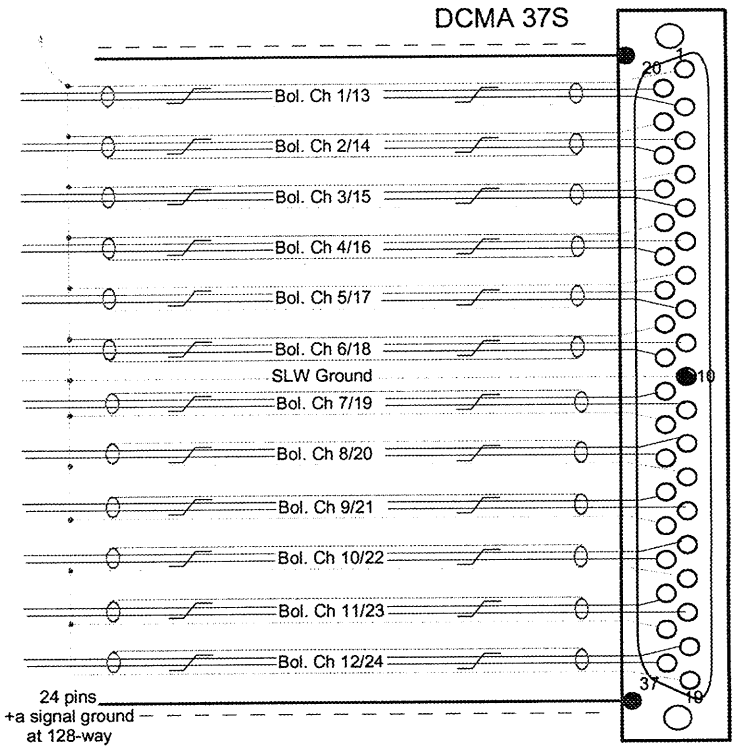
Connector/Backshell Details:

DCMA37S+Glenair	550	- E -	039	- M - 4 -	TBD	- H -	TBD	- TBD	to DCU J27	DCU-JFS
DCMA37S+Glenair	550	- E -	039	- M - 4 -	TBD	- H -	TBD	- TBD	to DCU J28	DCU-JFS
DCMA37P+Glenair	550	- E -	039	- M - 4 -	TBD	- H -	TBD	- TBD	to DCU J31	Spect. Bias (Prime)
DCMA37P+Glenair	550	- E -	039	- M - 4 -	TBD	- H -	TBD	- TBD	to DCU J32	Spect. Bias (Red.)

Note that within the bias tails to DCU J31/J32 the different "BDA" analogue grounds are kept separate.

Harness Lay-up

Two Bolometer Tails Thus:



12 Channel Bolometer SLW Tail (DCU J27/J28)

- 12 Insulated STPs
- 1 Insulated Single Wire

- J27 Carries bolometer signals 1-12
- J28 Carries bolometer signals 13-24

- Good flat layup for cryoharness

- The whole harness bundle is overlain with an RF screen Indicated by: which is connected to EMC backshells at the DCU amd wall of the CVV.

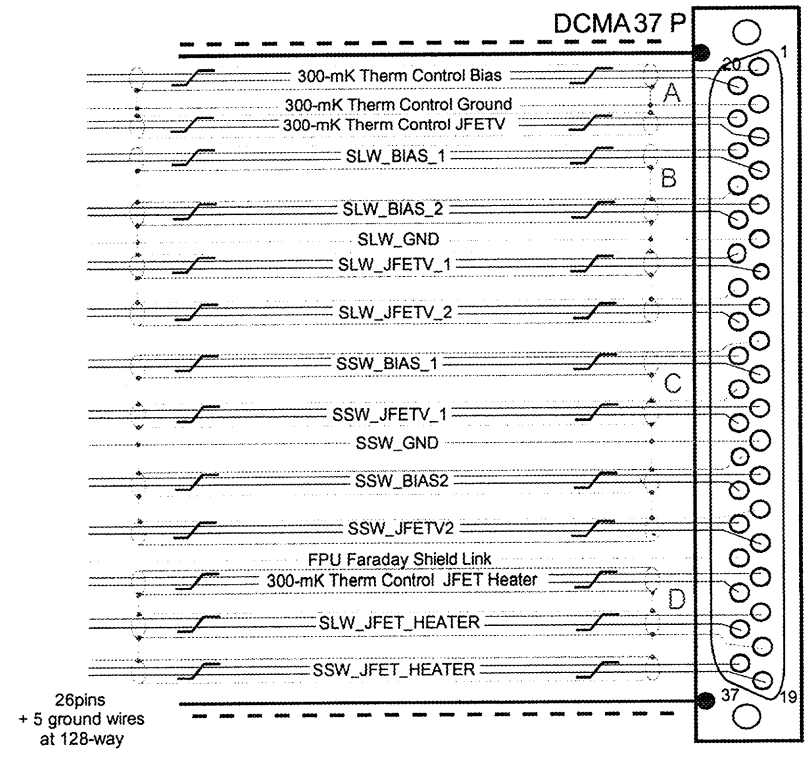
- SLW grounds of J27 and J28 are commoned at the 128-way connector

- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

Bundle shield isolation ⊗

Shield protection on bundles to be skipped off!
See HN-0112 page 6 General Note

Two Spectrometer Bias tails thus:



Type 3 Bias Tails (DCU J31/J32)

- 13 Insulated STPs
- 4 Single insulated ground wires
- Note SLW and SSW Ground Separation

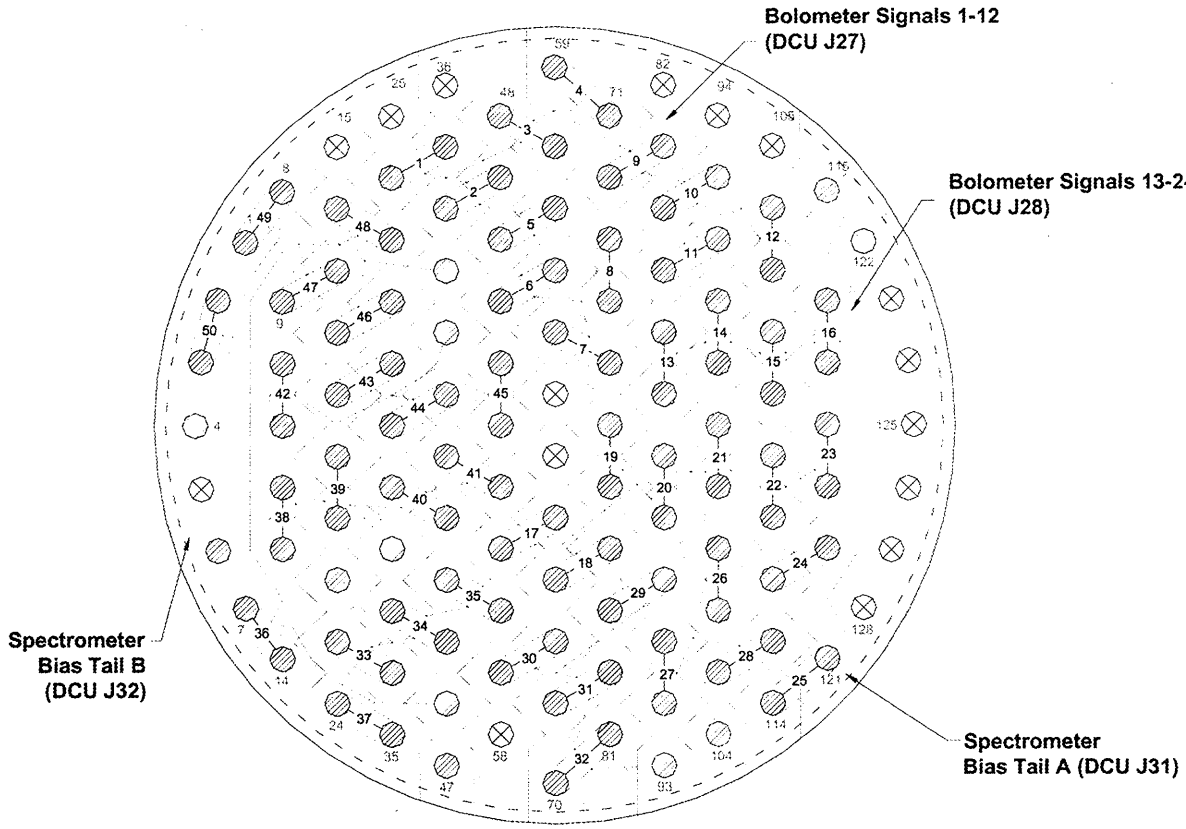
- The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the WE and the wall of the CVV.

- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

- A, B, C and D represent the commoning of ground references within the connectors which pass through the 128-way CVV connector on single individual pins. The four prime and reduandant ground *planes* are not commoned at the 128-Way connector.

max 4 Shields to 1 contact ✓

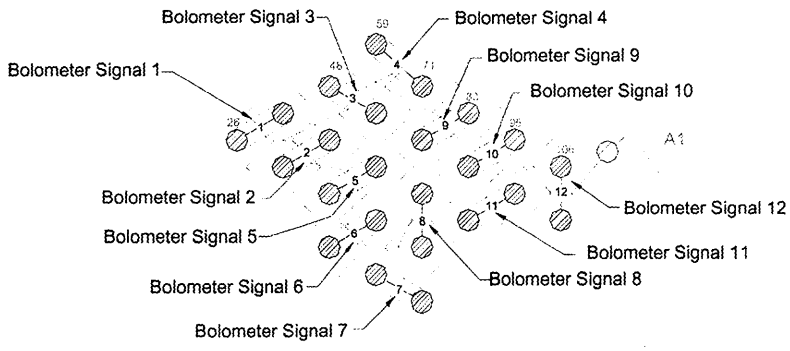
128-Way Pin Allocations



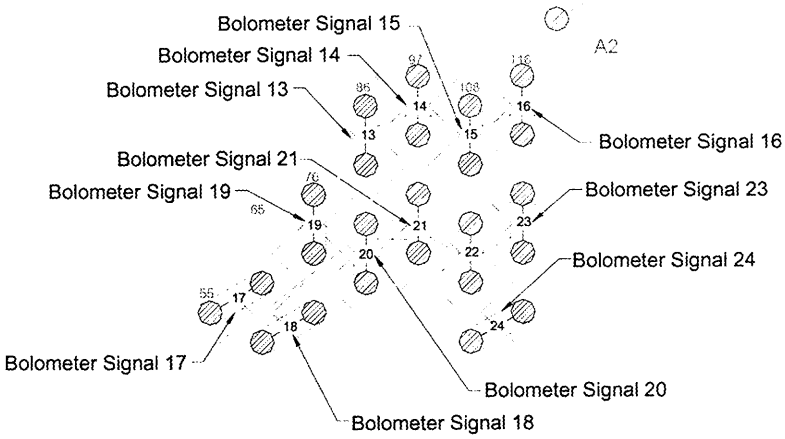
- Signal Supply Pin
- Signal Return Pin
- Signal Ground Pin
- FPU Faraday Shield Link Pin
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)
- Signal Ground Connection

Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way on dedicated ground pins.

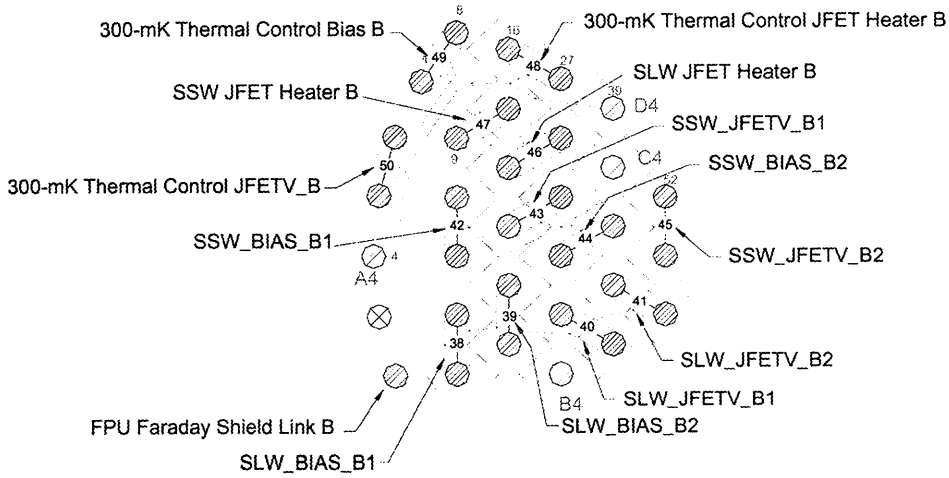
112 Contacts used out of 128



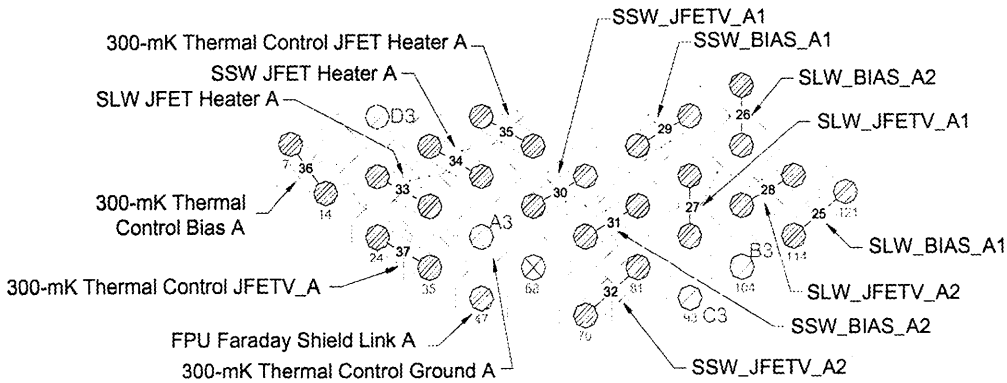
Bolometer Signals 1-12
(DCU J27)



Bolometer Signals 13-24
(DCU J28)



Spectrometer Bias Tail B
(DCU J32)



Spectrometer Bias Tail A
(DCU J31)

Contact Details

Notes:

1. Pin numbers on the 128-way suffixed by a letter in parentheses indicate the commoning of several ground reference wires or shields within the connector to a single pin on the 128-way CVV connector or the 37-way DCU connector.
2. Ground pins 115 and 122 are commoned within the connector.

Name	128-way #1	37-way A (J27) Bol. Sig. 1-12	37-way B (J28) Bol. Sig. 13-24	37-way C (J31) S. Bias Tail A	37-way D (J32) S. Bias Tail B
Channel 1 +	26	20			
Channel 1 -	37	2			
Channel 1gnd shld	115 (A1)	1			
Channel 2 +	38	3			
Channel 2 -	49	22			
Channel 2gnd shld	115 (A1)	21			
Channel 3 +	48	23			
Channel 3 -	60	5			
Channel 3gnd shld	115 (A1)	4			
Channel 4 +	59	6			
Channel 4 -	71	25			
Channel 4gnd shld	115 (A1)	24			
Channel 5 +	50	26			
Channel 5 -	61	8			
Channel 5gnd shld	115 (A1)	7			
Channel 6 +	62	9			
Channel 6 -	51	28			
Channel 6gnd shld	115 (A1)	27			
SLW GND WIRE	115 (A1)	10			
Channel 7 +	63	11			
Channel 7 -	75	29			
Channel 7gnd shld	115 (A1)	30			
Channel 8 +	74	31			
Channel 8 -	73	12			
Channel 8gnd shld	115 (A1)	13			
Channel 9 +	83	14			
Channel 9 -	72	32			
Channel 9gnd shld	115 (A1)	33			
Channel 10 +	95	34			
Channel 10 -	84	15			
Channel 10gnd shld	115 (A1)	16			
Channel 11 +	96	17			
Channel 11 -	85	35			
Channel 11gnd shld	115 (A1)	36			
Channel 12 +	106	37			
Channel 12 -	107	18			
Channel 12gnd shld	115 (A1)	19			
Channel 13 +	86		20		

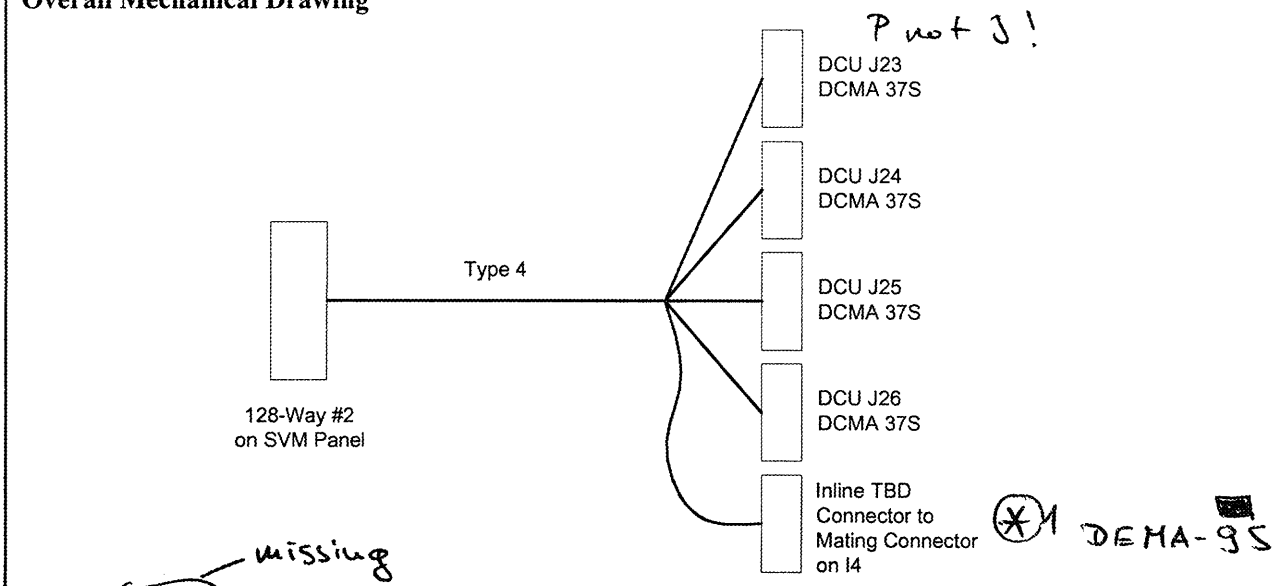
Name	128-way #1	37-way A (J27) Bol. Sig. 1-12	37-way B (J28) Bol. Sig. 13-24	37-way C (J31) S. Bias Tail A	37-way D (J32) S. Bias Tail B
Channel 13 -	87		2		
Channel 13gnd shld	122 (A2)		1		
Channel 14 +	97		3		
Channel 14 -	98		22		
Channel 14gnd shld	122 (A2)		21		
Channel 15 +	108		23		
Channel 15 -	109		5		
Channel 15gnd shld	122 (A2)		4		
Channel 16 +	116		6		
Channel 16 -	117		25		
Channel 16gnd shld	122 (A2)		24		
Channel 17 +	55		26		
Channel 17 -	66		8		
Channel 17gnd shld	122 (A2)		7		
Channel 18 +	67		9		
Channel 18 -	78		28		
Channel 18gnd shld	122 (A2)		27		
SLW GND WIRE	122 (A2)		10		
Channel 19 +	76		11		
Channel 19 -	77		29		
Channel 19gnd shld	122 (A2)		30		
Channel 20 +	88		31		
Channel 20 -	89		12		
Channel 20gnd shld	122 (A2)		13		
Channel 21 +	99		14		
Channel 21 -	100		32		
Channel 21gnd shld	122 (A2)		33		
Channel 22 +	110		34		
Channel 22 -	111		15		
Channel 22gnd shld	122 (A2)		16		
Channel 23 +	118		17		
Channel 23 -	119		35		
Channel 23gnd shld	122 (A2)		36		
Channel 24 +	112		37		
Channel 24 -	120		18		
Channel 24gnd shld	122 (A2)		19		
300-mK TC Bias_A +ve	7			1	
300-mK TC Bias_A –ve	14			20	
300-mK TC Bias_A Shield	46 (A3)			2 (A)	
300-mK TC Ground_A	46 (A3)			2 (A)	
300-mK JFETV Bias_A +ve	24			21	
300-mK JFETV Bias_A -ve	35			3	
300-mK JFETV Bias_A Shield	46 (A3)			2 (A)	
SLW_BIAS_A1+ve	121			22	
SLW_BIAS_A1-ve	114			4	

Name	128-way #1	37-way A (J27) Bol. Sig. 1-12	37-way B (J28) Bol. Sig. 13-24	37-way C (J31) S. Bias Tail A	37-way D (J32) S. Bias Tail B
SLW_BIAS_A1 shld	104 (B3)			6 (B)	
SLW_BIAS_A2 +ve	102			5	
SLW_BIAS_A2 -ve	101			24	
SLW_BIAS_A2 shld	104 (B3)			23 (B)	
SLW GND WIRE_A	104 (B3)			6 (B)	
SLW_JFETV_A1 +ve	92			25	
SLW_JFETV_A1 -ve	91			7	
SLW_JFETV_A1 shld	104 (B3)			6 (B)	
SLW_JFETV_A2 +ve	103			8	
SLW_JFETV_A2 -ve	113			27	
SLW_JFETV_A2 shld	104 (B3)			6 (B)	
FPU Faraday Shield Link_A	47			34	
SSW_BIAS1_A +ve	90			28	
SSW_BIAS1_A –ve	79			10	
SSW_BIAS1_A shld	93 (C3)			9 (C)	
SSW_JFETV1_A +ve	68			11	
SSW_JFETV1_A -ve	57			30	
SSW_JFETV1_A shld	93 (C3)			29 (C)	
SSW GND WIRE_A	93 (C3)			12 (C)	
SSW_BIAS2_A +ve	69			13	
SSW_BIAS2_A –ve	80			32	
SSW_BIAS2_A shld	93 (C3)			31 (C)	
SSW_JFETV2_A +ve	70			33	
SSW_JFETV2_A -ve	81			15	
SSW_JFETV2_A shld	93 (C3)			14 (C)	
S_HEATER GROUND PIN_A	22 (D3)			NC	
SLW_JFET_HEATER_A +ve	23			17	
SLW_JFET_HEATER_A -ve	34			36	
SLW_JFET_HEATER_A shld	22 (D3)			18 (D)	
SSW_JFET_HEATER_A +ve	33			37	
SSW_JFET_HEATER_A -ve	45			19	
SSW_JFET_HEATER_A shld	22 (D3)			18 (D)	
300-mK_TC_JFET_HEATER_A +ve	44			16	
300-mK_TC_JFET_HEATER_A -ve	56			35	
300-mK_TC_JFET_HEATER_A shld	22 (D3)			18 (D)	
300-mK TC Bias_B +ve	1				1
300-mK TC Bias_B –ve	8				20
300-mK TC Bias_B Shield	4 (A4)				2 (A)
300-mK TC Ground_B	4 (A4)				2 (A)
300-mK JFETV Bias_B +ve	3				21
300-mK JFETV Bias_B –ve	2				3
300-mK JFETV Bias_B Shield	4 (A4)				2 (A)
SLW_BIAS_B1+ve	13				22
SLW_BIAS_B1-ve	12				4
SLW_BIAS_B1 shld	32 (B4)				6 (B)

Name	128-way #1	37-way A (J27) Bol. Sig. 1-12	37-way B (J28) Bol. Sig. 13-24	37-way C (J31) S. Bias Tail A	37-way D (J32) S. Bias Tail B
SLW_BIAS_B2 +ve	21				5
SLW_BIAS_B2 –ve	20				24
SLW_BIAS_B2 shld	32 (B4)				23
SLW_JFETV_B1 +ve	31				25
SLW_JFETV_B1 –ve	43				7
SLW_JFETV_B1 shld	32 (B4)				6 (B)
SLW_JFETV_B2 +ve	42				8
SLW_JFETV_B2 –ve	54				27
SLW_JFETV_B2 shld	32 (B4)				6 (B)
SLW GND WIRE_B	32 (B4)				6 (B)
FPU Faraday Shield Link_B	6				34
SSW GND WIRE_B	40 (C4)				12 (C)
SSW_BIAS1_B +ve	10				28
SSW_BIAS1_B –ve	11				10
SSW_BIAS1_B shld	40 (C4)				9 (C)
SSW_JFETV1_B +ve	19				11
SSW_JFETV1_B -ve	29				30
SSW_JFETV1_B shld	40 (C4)				29 (C)
SSW_BIAS2_B +ve	41				13
SSW_BIAS2_B –ve	30				32
SSW_BIAS2_B shld	40 (C4)				31 (C)
SSW_JFETV2_B +ve	53				33
SSW_JFETV2_B -ve	52				15
SSW_JFETV2_B shld	40 (C4)				14 (C)
S_HEATER GROUND PIN B	39 (D4)				NC
SLW_HEATER_B +ve	18				17
SLW_HEATER_B -ve	28				36
SLW_HEATER_B shld	39 (D4)				18 (D)
SSW_HEATER_B +ve	9				37
SSW_HEATER_B -ve	17				19
SSW_HEATER_B shld	39 (D4)				18 (D)
300-mK_TC_JFET_HEATER_A +ve	16				16
300-mK_TC_JFET_HEATER_A -ve	27				35
300-mK_TC_JFET_HEATER_A shld	39 (D4)				18 (D)
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

4.2.2 I2 SVM 2 – DRCU (Type 4) SSW and 300-mK T.C

Overall Mechanical Drawing

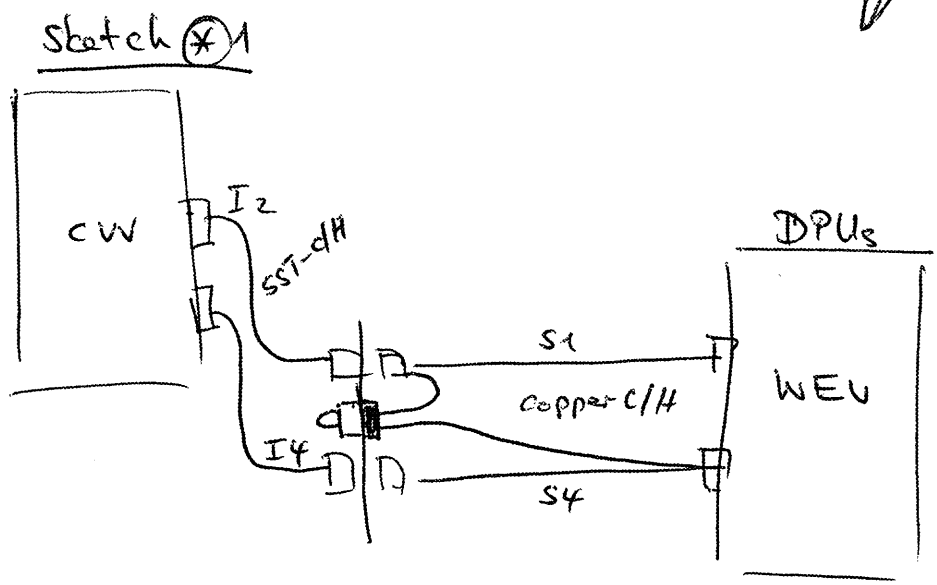


missing

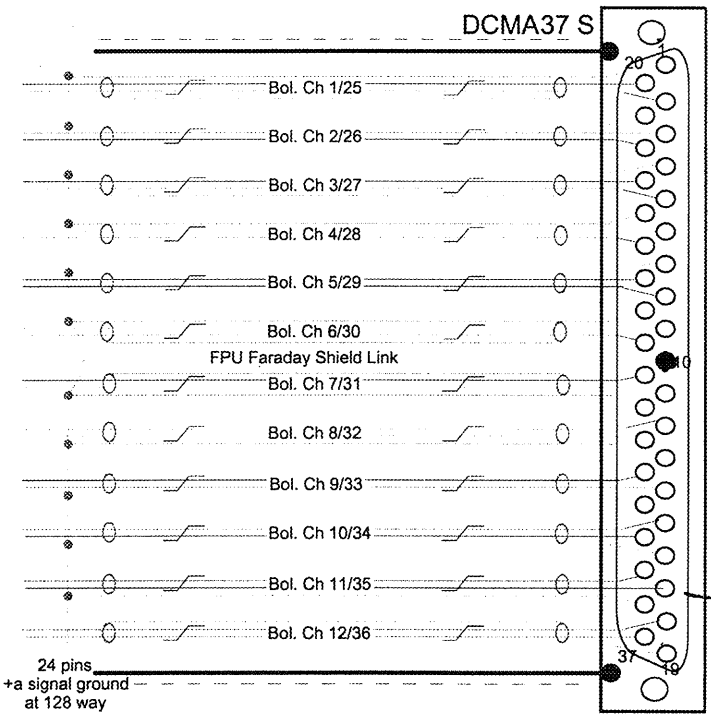
Refer to Annex 7 for details of how the I2 and I4 harnesses together with the inline connector to incorporate readout of the 300-mK thermal control hardware within the photometer LIAs.

Connector/Backshell Details

DCMA37S+Glenair550-E-039-M-4- TBD -H- TBD - TBD to DCU J23 DCU-JFS
DCMA37S+Glenair550-E-039-M-4- TBD -H- TBD - TBD to DCU J24 DCU-JFS
DCMA37S+Glenair550-E-039-M-4- TBD -H- TBD - TBD to DCU J25 DCU-JFS
DCMA37S+Glenair550-E-039-M-4- TBD -H- TBD - TBD to DCU J26 DCU-JFS
+ TBD Inline Connector RF Backshell



Harness Layup



12 Channel Bolometer Tail (typ) for Type 4 Spectrometer Harness (DCU J23/J25).

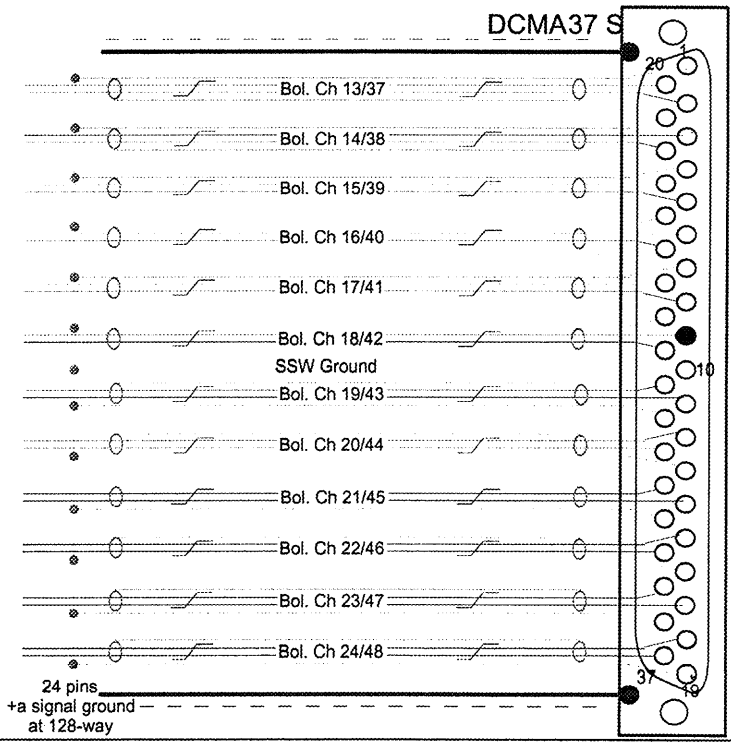
Common to all such tails, although others have ch. 13-24, etc.
Good flat layup for cryoharness

12 insulated screened twisted pairs plus 1 ground wire.

The whole overlain with RF screen shown:——— joined to backshell CVV and DCU ends.

Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.

Harness Layup (cont.)



12 Channel Bolometer Tail (typ) for Type 4 Spectrometer Harness (J24/J26).

Common to all such tails, although others have ch. 13-24, etc.
Good flat layup for cryoharness

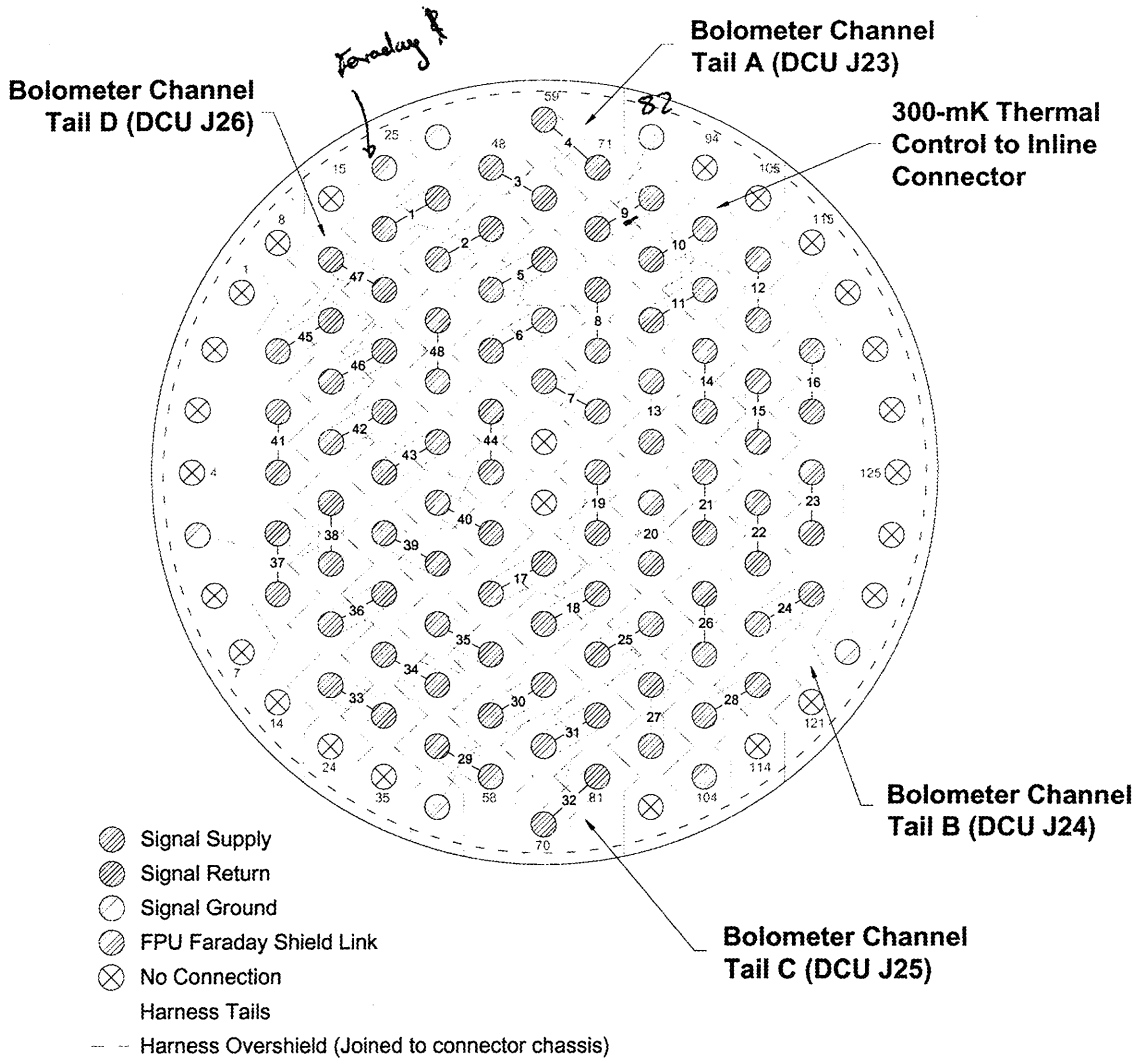
12 insulated screened twisted pairs plus 1 ground wire.

The whole overlain with RF screen shown:——— joined to backshell CVV and DCU ends.

Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.

Inline Connector: TBD

I2 128-Way Pin Allocation

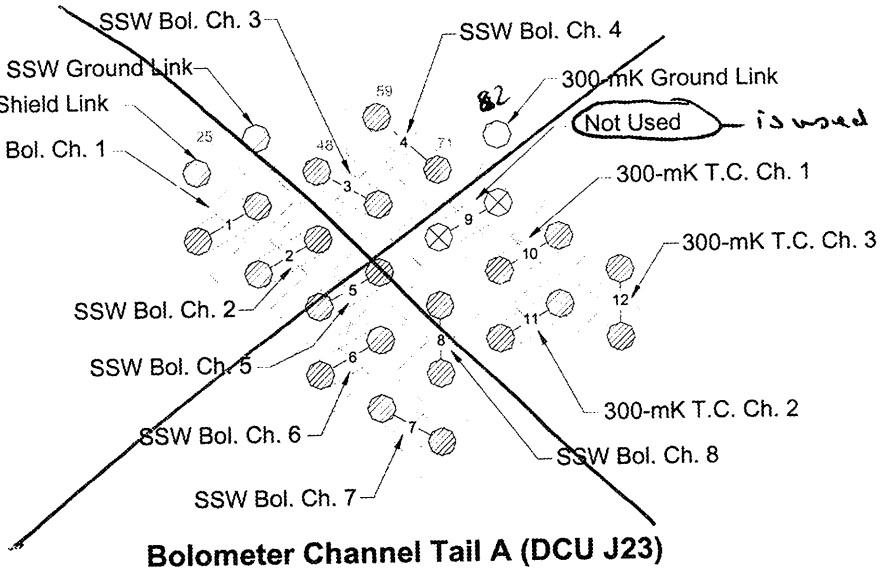


Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

102 out of 128 Contacts used

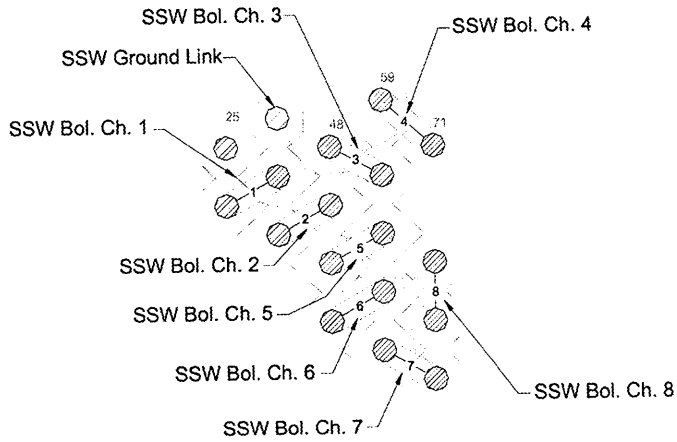
Ground Test Configuration

N/A

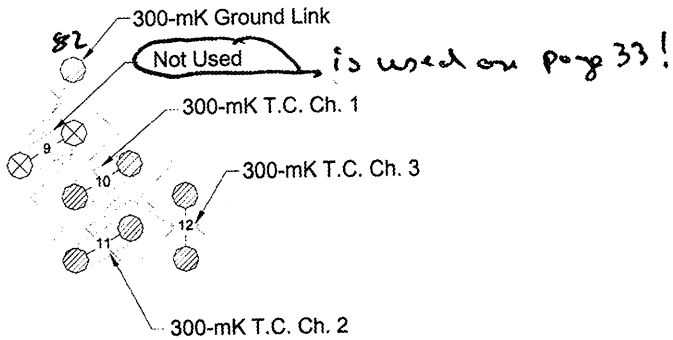


Bolometer Channel Tail A (DCU J23)
Ground Test Configuration

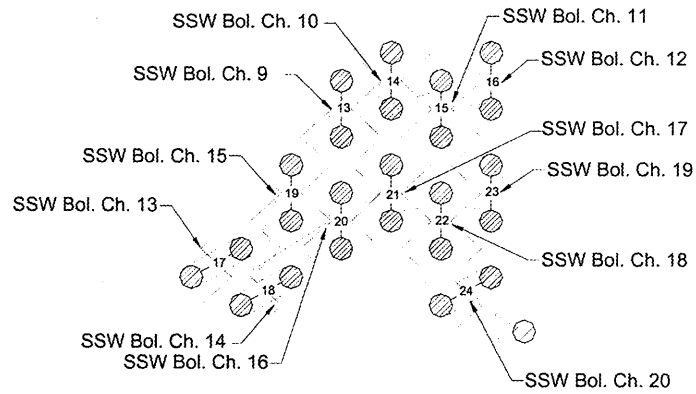
Flight Configuration



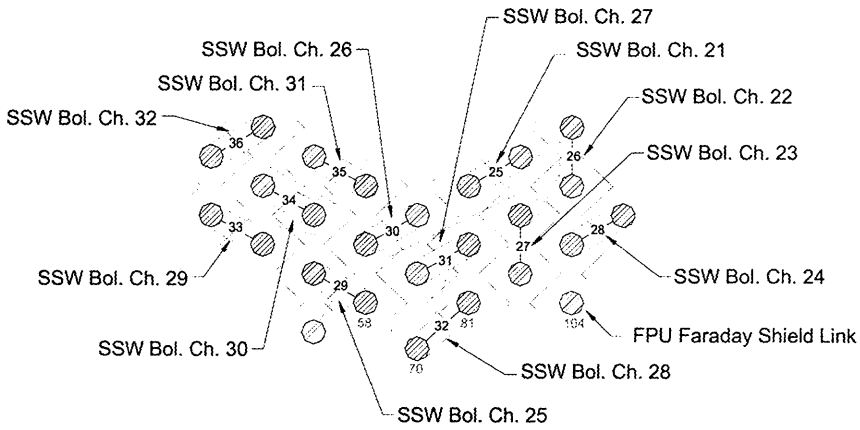
Bolometer Channel Tail A (DCU J23)
Flight Configuration



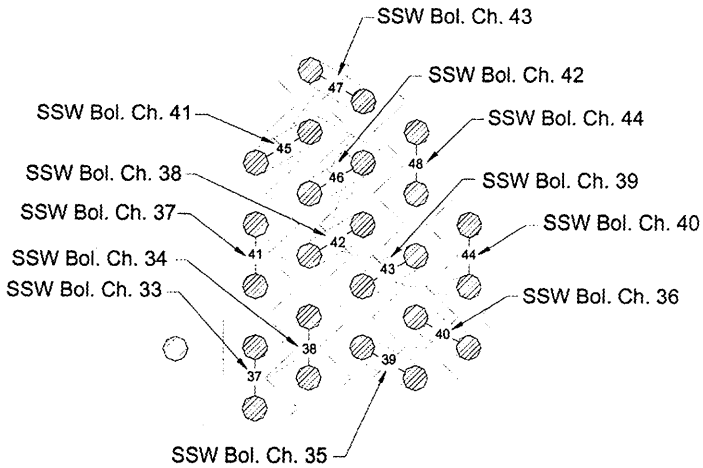
300-mK Thermal Control
Inline Connector Tail



Bolometer Channel Tail B (DCU J24)



Bolometer Channel Tail C (DCU J25)



Bolometer Channel Tail D (DCU J26)

Contact Details

Notes: Pin numbers on the 128-way suffixed by a letter in parentheses indicate the commoning of several ground reference wires or shields within the connector to a single pin on the 128-way CVV connector or the 37-way DCU connector.

The signals in 37-Way J23 (shown as being hatched grey) are connected to the corresponding pins on the 128-Way connector in the Ground Test Configuration. In the Flight Configuration, these pins in the 128-Way are connected to the Inline Connector (shown as being hatched blue).

Refer to Annex 7 - 300-mK Cryoharnessing that indicates graphically the means by which these signals are wired.

I/F I2 to I4

Name	128Way #2	37-Way J23	37-Way J24	37-Way J25	37-Way J26	300-mK Thermal Control Inline Connector
Channel 1 +	26	20				
Channel 1 -	37	2				
Channel 1gnd shld	36 (A)	1				
Channel 2 +	38	3				
Channel 2 -	49	22				
Channel 2gnd shld	36 (A)	21				
Channel 3 +	48	23				
Channel 3 -	60	5				
Channel 3gnd shld	36 (A)	4				
Channel 4 +	59	6				
Channel 4 -	71	25				
Channel 4gnd shld	36 (A)	24				
Channel 5 +	50	26				
Channel 5 -	61	8				
Channel 5gnd shld	36 (A)	7				
Channel 6 +	62	9				
Channel 6 -	51	28				
Channel 6gnd shld	36 (A)	27				
FPU Faraday Shield Link	25	10				
Channel 7 +	63	11				
Channel 7 -	75	29				
Channel 7gnd shld	36 (A)	30				
Channel 8 +	74	31				
Channel 8 -	73	12				
Channel 8gnd shld	36 (A)	13				
Spare	83	14				
Spare	72	32				
Spare	36 (A)	33				
300-mK T.C. Ch 1 +	95	34				TBD
300-mK T.C. Ch 1 +	84	15				TBD
300-mK T.C. Gnd	82 (A)	16				TBD (A)
300-mK T.C. Ch 2 +	96	17				TBD
300-mK T.C. Ch 2 -	85	35	EGSE Tst			TBD
300-mK T.C. Gnd	82 (A)	36				TBD (A)
300-mK T.C. Ch 3 +	106	37				TBD
300-mK T.C. Ch 3 -	107	18				TBD
300-mK T.C. Gnd	82 (A)	19				TBD (A)
Channel 9 +	86		20			
Channel 9 -	87		2			
Channel 9gnd shld	128 (B)		1			
Channel 10 +	97		3			
Channel 10 -	98		22			
Channel 10gnd shld	128 (B)		21			
Channel 11 +	108		23			
Channel 11 -	109		5			

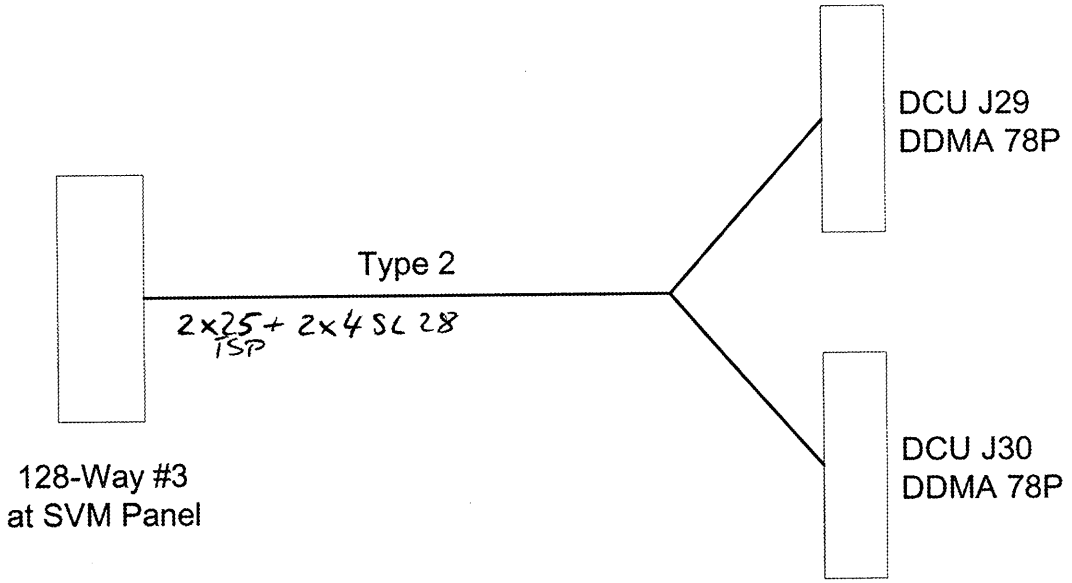
2x 9 pol. PFM

Name	128Way #2	37-Way J23	37-Way J24	37-Way J25	37-Way J26	300-mK Thermal Control Inline Connector
Channel 11gnd shld	128 (B)		4			
Channel 12 +	116		6			
Channel 12 -	117		25			
Channel 12gnd shld	128 (B)		24			
Channel 13 +	55		26			
Channel 13 -	66		8			
Channel 1gnd shld	128 (B)		7			
Channel 14 +	67		9			
Channel 14 -	78		28			
Channel 1gnd shld	128 (B)		27			
GND WIRE	128 (B)		10			
Channel 15 +	76		11			
Channel 15 -	77		29			
Channel 15gnd shld	128 (B)		30			
Channel 16 +	88		31			
Channel 16 -	89		12			
Channel 16gnd shld	128 (B)		13			
Channel 17 +	99		14			
Channel 17 -	100		32			
Channel 17gnd shld	128 (B)		33			
Channel 18 +	110		34			
Channel 18 -	111		15			
Channel 18gnd shld	128 (B)		16			
Channel 19 +	118		17			
Channel 19 -	119		35			
Channel 19gnd shld	128 (B)		36			
Channel 20 +	112		37			
Channel 20 -	120		18			
Channel 1gnd shld	128 (B)		19			
Channel 21 +	90			20		
Channel 21 -	79			2		
Channel 21gnd shld	47 (C)			1		
Channel 22 +	102			3		
Channel 22 -	101			22		
Channel 22gnd shld	47 (C)			21		
Channel 23 +	92			23		
Channel 23 -	91			5		
Channel 23gnd shld	47 (C)			4		
Channel 24 +	103			6		
Channel 24 -	113			25		
Channel 24gnd shld	47 (C)			24		
Channel 25 +	58			26		
Channel 25 -	46			8		
Channel 25gnd shld	47 (C)			7		
Channel 26 +	68			9		
Channel 26 -	57			28		
Channel 26gnd shld	47 (C)			27		
FPU Faraday Shield Link	104			10		
Channel 27 +	69			11		
Channel 27 -	80			29		
Channel 27gnd shld	47 (C)			30		
Channel 28 +	70			31		
Channel 28 -	81			12		
Channel 28gnd shld	47 (C)			13		
Channel 29 +	23			14		
Channel 29 -	34			32		
Channel 29gnd shld	47 (C)			33		

Name	128Way #2	37-Way J23	37-Way J24	37-Way J25	37-Way J26	300-mK Thermal Control Inline Connector
Channel 30 +	33			34		
Channel 30 -	45			15		
Channel 30gnd shld	47 (C)			16		
Channel 31 +	44			17		
Channel 31 -	56			35		
Channel 31gnd shld	47 (C)			36		
Channel 32 +	22			37		
Channel 32 -	32			18		
Channel 32gnd shld	47 (C)			19		
Channel 33 +	13				20	
Channel 33 -	12				2	
Channel 33gnd shld	5 (D)				1	
Channel 34 +	21				3	
Channel 34 -	20				22	
Channel 34gnd shld	5 (D)				21	
Channel 35 +	31				23	
Channel 35 -	43				5	
Channel 35gnd shld	5 (D)				4	
Channel 36 +	42				6	
Channel 36 -	54				25	
Channel 36gnd shld	5 (D)				24	
Channel 37 +	10				26	
Channel 37 -	11				8	
Channel 37gnd shld	5 (D)				7	
Channel 38 +	19				9	
Channel 38 -	29				28	
Channel 38gnd shld	5 (D)				27	
GND WIRE	5 (D)				10	
Channel 39 +	41				11	
Channel 39 -	30				29	
Channel 39gnd shld	5 (D)				30	
Channel 40 +	53				31	
Channel 40 -	52				12	
Channel 40gnd shld	5 (D)				13	
Channel 41 +	9				14	
Channel 41 -	17				32	
Channel 41gnd shld	5 (D)				33	
Channel 42 +	18				34	
Channel 42 -	28				15	
Channel 42gnd shld	5 (D)				16	
Channel 43 +	16				17	
Channel 43 -	27				35	
Channel 43gnd shld	5 (D)				36	
Channel 44 +	40				37	
Channel 44 -	39				18	
Channel 44gnd shld	5 (D)				19	
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	

4.2.3 I3 SVM 3 – DRCU (Type 2) Photometer Biases

Overall Mechanical Drawing



Connector/Backshell Details

DDMA78P+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to	DCUJ29	Phot Bias (Prime)
DDMA78P+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to	DCUJ30	Phot Bias (Red.)

Harness Layup

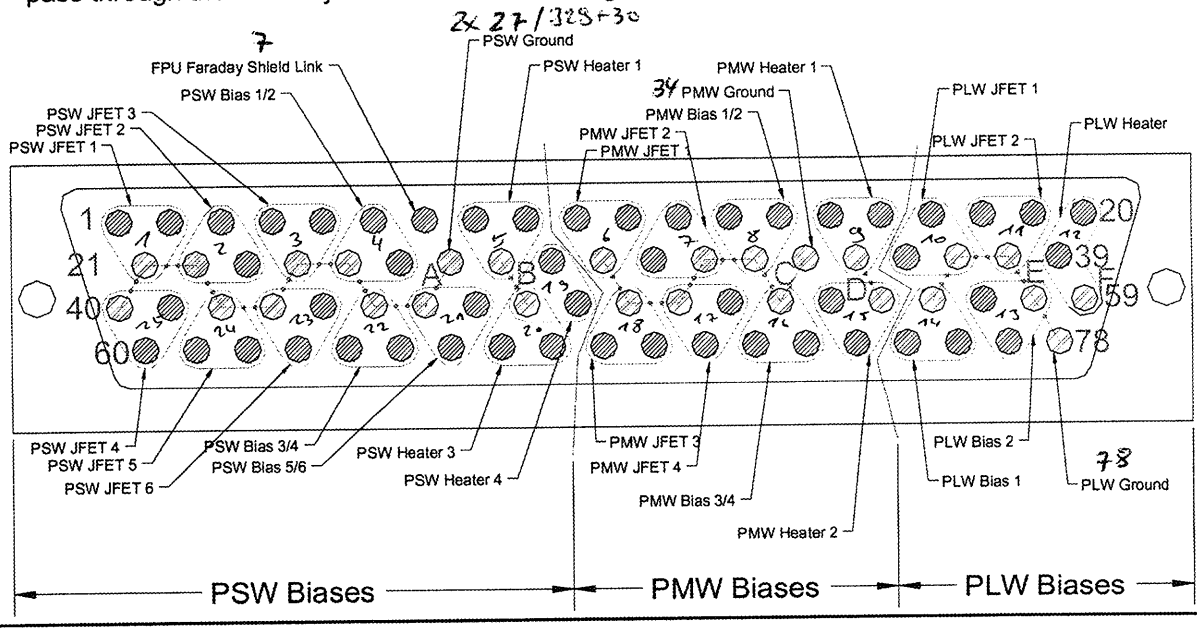
Type 2 Bias Tails (DCU J29/J30)

· 25 Insulated STPs
· 4 Single insulated ground wires
· Note PSW, PMW and PSW Ground Separation (+ PLW GROUND ?)

· The whole harness bundle is overlain with an RF screen connected to EMC backshells at the DCU and the wall of the CVV.

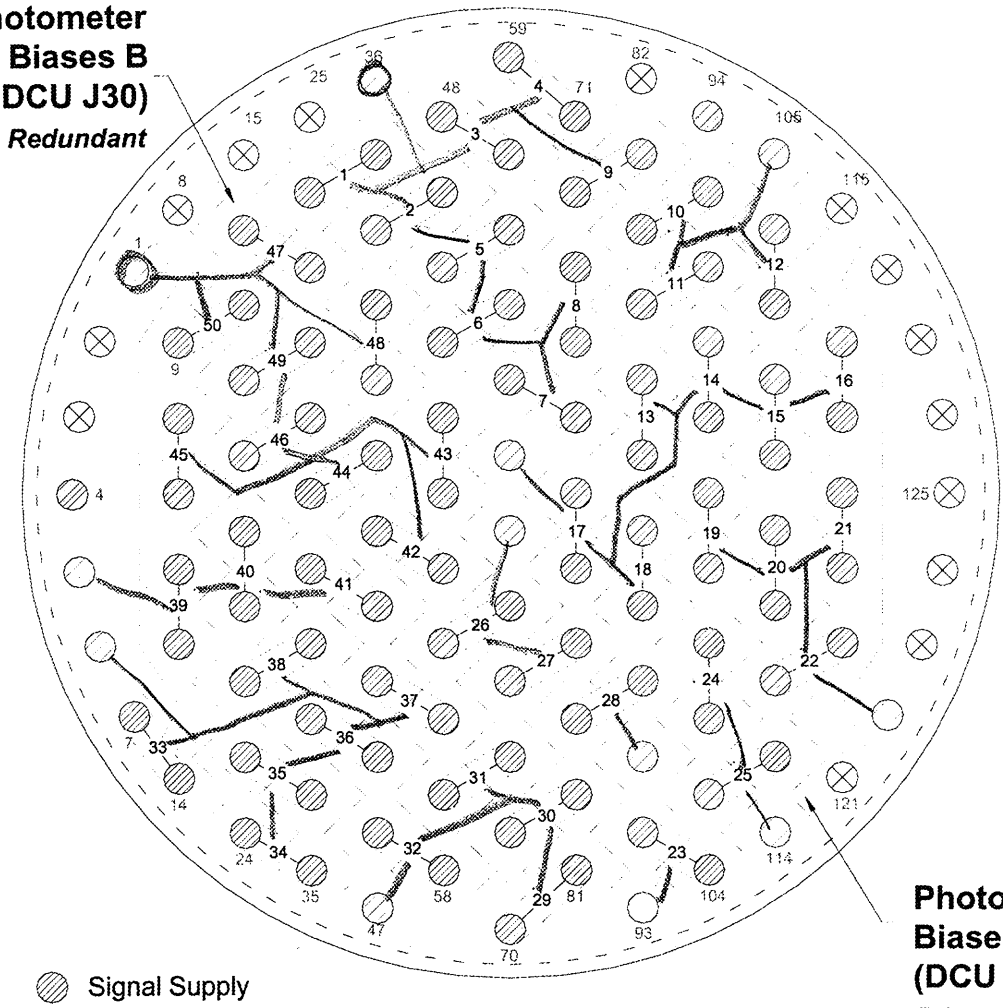
· An insulation jacket covers the overshield. (Only required at clamp points but could cover entire length of harness.)

· A, B, C, D, E and F represent the commoning of ground references within the connectors which pass through the 128-way CVV connector on single individual pins.



128-Way Pin Allocations

Photometer Biases B (DCU J30)
Redundant



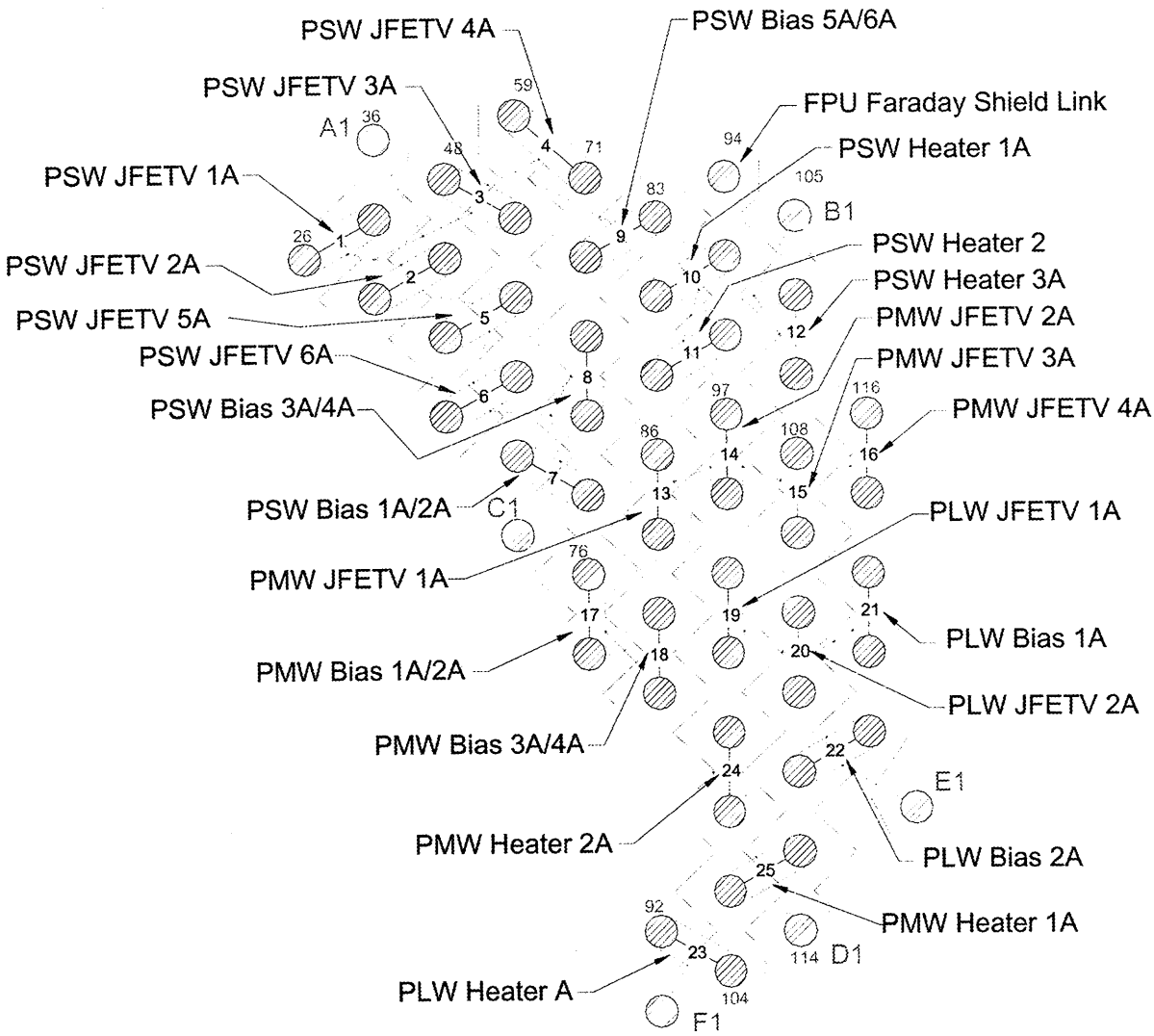
Photometer Biases (DCU J29)
Prime

- Signal Supply
- Signal Return
- Signal Ground
- FPU Faraday Shield Link
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)

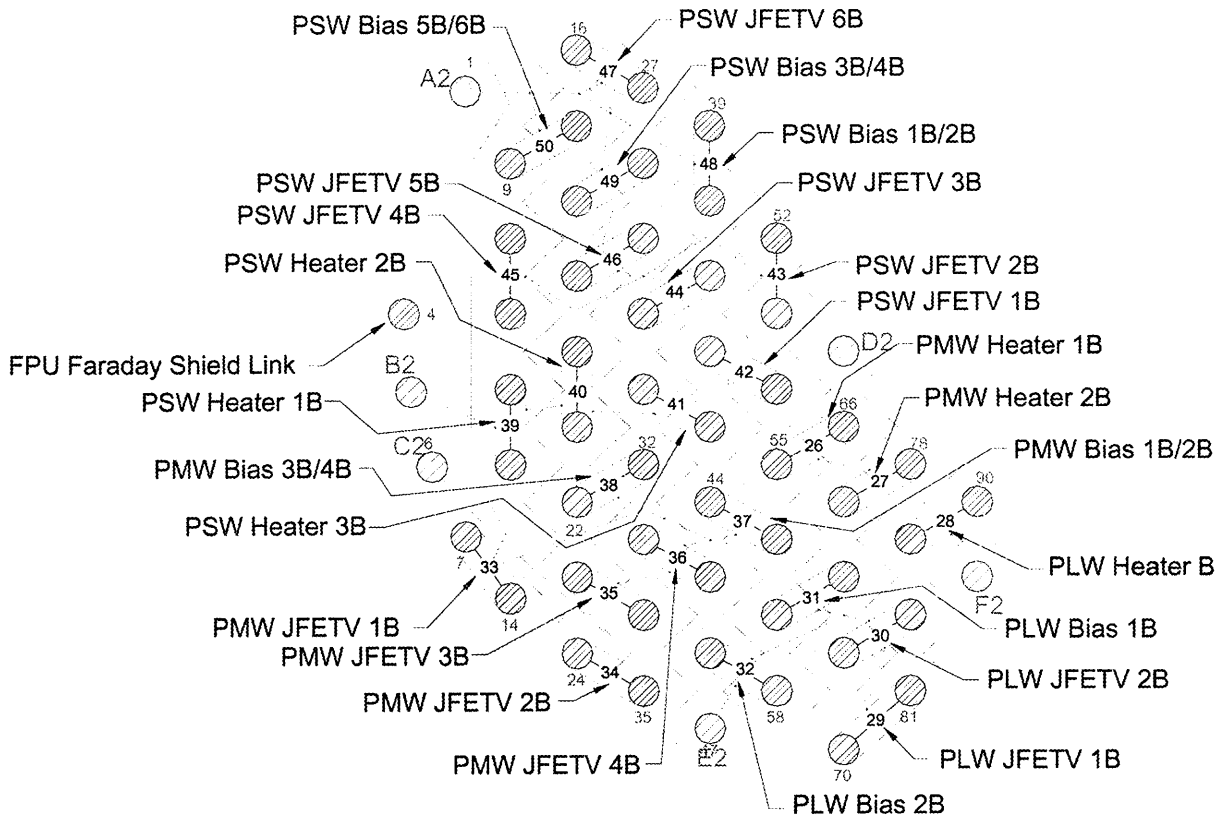
94, 4 ?

Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

112 out of 128 Contacts used



Photometer Biases A (DCU J29)
Prime



Photometer Biases B (DCU J30)
Redundant

Contact Details

Notes: Pin numbers on the 128-way suffixed by a letter in parentheses indicate the commoning of several ground reference wires or shields within the connector to a single pin on the 128-way CVV connector or the 37-way DCU connector.

Name	128-Way #3	78-way Photometer Biases (J29)	78-way Photometer Biases (J30)
PSW_JFETV1_A +	26	1	
PSW_JFETV1_A -	37	2	
PSW_JFETV1_A shld	36 (A1)	21 (A1)	
PSW_JFETV2_A +	38	3	
PSW_JFETV2_A -	49	23	
PSW_JFETV2_A shld	36 (A1)	22 (A1)	
PSW_JFETV3_A +	48	4	
PSW_JFETV3_A -	60	5	
PSW_JFETV3_A shld	36 (A1)	24 (A1)	
PSW_JFETV4_A +	59	41	
PSW_JFETV4_A -	71	60	
PSW_JFETV4_A shld	36 (A1)	40 (A1)	
PSW_JFETV5_A +	50	61	
PSW_JFETV5_A -	61	62	
PSW_JFETV5_A shld	36 (A1)	42 (A1)	
PSW_JFETV6_A +	62	63	
PSW_JFETV6_A -	51	44	
PSW_JFETV6_A shld	36 (A1)	43 (A1)	
PSW GRND_A	36 (A1)	27 (A1)	
PSW_BIAS1/2_A +	63	6	
PSW_BIAS1/2_A -	75	26	
PSW_BIAS1/2_A shld	36 (A1)	25 (A1)	
PSW_BIAS3/4_A +	74	65	
PSW_BIAS3/4_A -	73	64	
PSW_BIAS3/4_A shld	36 (A1)	45 (A1)	
PSW_BIAS5/6_A +	83	47	
PSW_BIAS5/6_A -	72	66	
PSW_BIAS5/6_A shld	36 (A1)	46 (A1)	
PSW_HEATER_A1 +	95	8	
PSW_HEATER_A1 -	84	9	
PSW_HEATER_A1 shld	105 (B1)	28 (B1)	
PSW_HEATER_A2 +	96	29	
PSW_HEATER_A2 -	85	49	
PSW_HEATER_A2 shld	105 (B1)	48 (B1)	
PSW_HEATER_A3 +	106	68	
PSW_HEATER_A3 -	107	67	
PSW_HEATER_A3 shld	105 (B1)	48 (B1)	
FPU Faraday Shield Link	94	7	
PMW_JFETV1_A +	86	10	
PMW_JFETV1_A -	87	11	
PMW_JFETV1_A shld	64 (C1)	30 (C1)	
PMW_JFETV2_A +	97	12	
PMW_JFETV2_A -	98	31	
PMW_JFETV2_A shld	64 (C1)	32 (C1)	
PMW_JFETV3_A +	108	69	
PMW_JFETV3_A -	109	70	
PMW_JFETV3_A shld	64 (C1)	50 (C1)	
PMW_JFETV4_A +	116	71	
PMW_JFETV4_A -	117	52	
PMW_JFETV4_A shld	64 (C1)	51 (C1)	
PMW_BIAS1/2_A +	76	14	
PMW_BIAS1/2_A -	77	13	
PMW_BIAS1/2_A shld	64 (C1)	33 (C1)	

cont
10x36
3x10.5
5x64

Name	128-Way #3	78-way Photometer Biases (J29)	78-way Photometer Biases (J30)
PMW_BIAS3/4_A +	88	73	
PMW_BIAS3/4_A -	89	72	
PMW_BIAS3/4_A shld	64 (C1)	53 (C1)	
PMW GND WIRE_A	64 (C1)	34 (C1)	
PMW HEATER A1 +	103	16	
PMW HEATER A1 -	113	15	
PMW HEATER A1 shld	114 (D1)	35 (D1)	
PMW HEATER A2 +	102	54	
PMW HEATER A2 -	101	74	
PMW HEATER A2 shld	114 (D1)	55 (D1)	
PLW HEATER A +	92	20	
PLW HEATER A -	104	39	
PLW HEATER A shld	93 (F1)	59	
PLW_JFETV1_A +	99	36	
PLW_JFETV1_A -	100	17	
PLW_JFETV1_A shld	128 (E1)	37 (E1)	
PLW_JFETV2_A +	110	18	
PLW_JFETV2_A -	111	19	
PLW_JFETV2_A shld	128 (E1)	38 (E1)	
PLW_BIAS1_A +	118	75	
PLW_BIAS1_A -	119	76	
PLW_BIAS1_A shld	128 (E1)	56 (E1)	
PLW_BIAS2_A +	112	77	
PLW_BIAS2_A -	120	57	
PLW_BIAS2_A shld	128 (E1)	58 (E1)	
PLW GROUND WIRE A	128 (E1)	78 (E1)	
PSW_JFETV1_B +	42		1
PSW_JFETV1_B -	54		2
PSW_JFETV1_B shld	1 (A2)		21 (A2)
PSW_JFETV2_B +	53		3
PSW_JFETV2_B -	52		23
PSW_JFETV2_B shld	1 (A2)		22 (A2)
PSW_JFETV3_B +	41		4
PSW_JFETV3_B -	30		5
PSW_JFETV3_B shld	1 (A2)		24 (A2)
PSW_JFETV4_B +	10		41
PSW_JFETV4_B -	11		60
PSW_JFETV4_B shld	1 (A2)		40 (A2)
PSW_JFETV5_B +	19		61
PSW_JFETV5_B -	29		62
PSW_JFETV5_B shld	1 (A2)		42 (A2)
PSW_JFETV6_B +	16		63
PSW_JFETV6_B -	27		44
PSW_JFETV6_B shld	1 (A2)		43 (A2)
PSW GRND_B	1 (A2)		27 (A2)
PSW_BIAS1/2_B +	40		6
PSW_BIAS1/2_B -	39		26
PSW_BIAS1/2_B shld	1 (A2)		25 (A2)
PSW_BIAS3/4_B +	18		65
PSW_BIAS3/4_B -	28		64
PSW_BIAS3/4_B shld	1 (A2)		45 (A2)
PSW_BIAS5/6_B +	9		47
PSW_BIAS5/6_B -	17		66
PSW_BIAS5/6_B shld	1 (A2)		46 (A2)
PSW_HEATER_B1 +	13		8
PSW_HEATER_B1 -	12		9
PSW_HEATER_B1 shld	5 (B2)		28 (B2)
PSW_HEATER_B2 +	21		29

2x 64
2x 114
1x 93
5x 128
10x 1
9 x 5

Name	128-Way #3	78-way Photometer Biases (J29)	78-way Photometer Biases (J30)
PSW_HEATER_B2 -	20		49
PSW_HEATER_B2 shld	5 (B2)		48 (B2)
PSW_HEATER_B3 +	31		68
PSW_HEATER_B3 -	43		67
PSW_HEATER_B3 shld	5 (B2)		48 (B2)
FPU Faraday Shield Link	4		7
PMW_JFETV1_B +	7		10
PMW_JFETV1_B -	14		11
PMW_JFETV1_B shld	6 (C2)		30 (C2)
PMW_JFETV2_B +	24		12
PMW_JFETV2_B -	35		31
PMW_JFETV2_B shld	6 (C2)		32 (C2)
PMW_JFETV3_B +	23		69
PMW_JFETV3_B -	34		70
PMW_JFETV3_B shld	6 (C2)		50 (C2)
PMW_JFETV4_B +	33		71
PMW_JFETV4_B -	45		52
PMW_JFETV4_B shld	6 (C2)		51 (C2)
PMW_BIAS1/2_B +	44		14
PMW_BIAS1/2_B -	56		13
PMW_BIAS1/2_B shld	6 (C2)		33 (C2)
PMW_BIAS3/4_B +	22		73
PMW_BIAS3/4_B -	32		72
PMW_BIAS3/4_B shld	6 (C2)		53 (C2)
PMW GND WIRE_B	6 (C2)		34 (C2)
PMW HEATER B1 +	55		16
PMW HEATER B1 -	66		15
PMW HEATER B1 shld	65 (D2)		35 (D2)
PMW HEATER B2 +	67		54
PMW HEATER B2 -	78		74
PMW HEATER B2 shld	65 (D2)		55 (D2)
PLW HEATER B +	90		20
PLW HEATER B -	79		39
PLW HEATER B shld	91 (F2)		59
PLW_JFETV1_B +	70		36
PLW_JFETV1_B -	81		17
PLW_JFETV1_B shld	47 (E2)		37 (E2)
PLW_JFETV2_B +	69		18
PLW_JFETV2_B -	80		19
PLW_JFETV2_B shld	47 (E2)		38 (E2)
PLW_BIAS1_B +	68		75
PLW_BIAS1_B -	57		76
PLW_BIAS1_B shld	47 (E2)		56 (E2)
PLW_BIAS2_B +	58		77
PLW_BIAS2_B -	46		57
PLW_BIAS2_B shld	47 (E2)		58 (E2)
PLW GROUND WIRE B	47 (E2)		78 (E2)
Harness Over-shield	EMC Backshell	EMC Backshell	EMC Backshell

Gnd.
2x 5
7x 6
2x 65
1x 91
5x 47

Σ of shield wires to conduit no's:

10 on 36
3 on 105
7 on 64
1 on 93

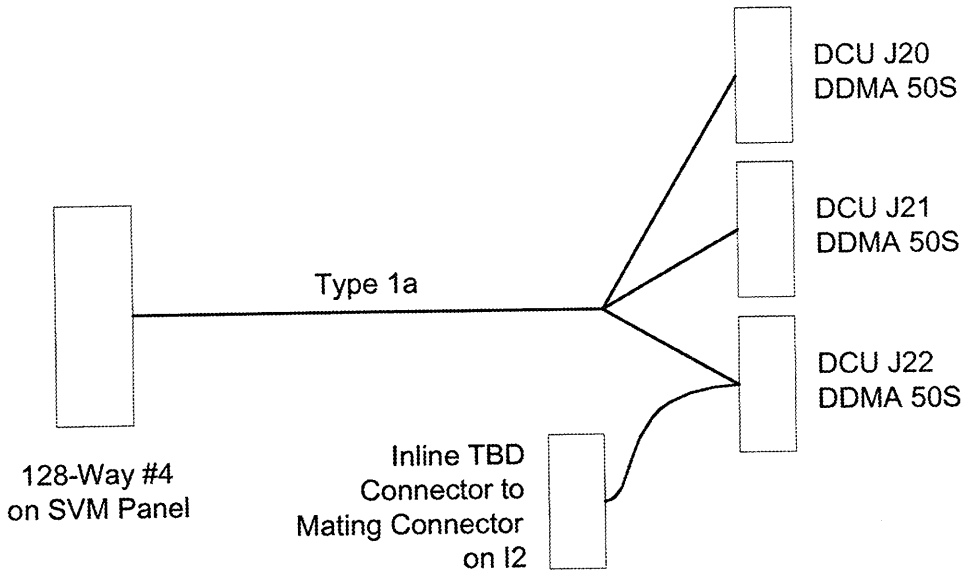
5 on 128
10 on 1
3 on 5
7 on 6

2 on 65
1 on 91
5 on 47

14x NC
C

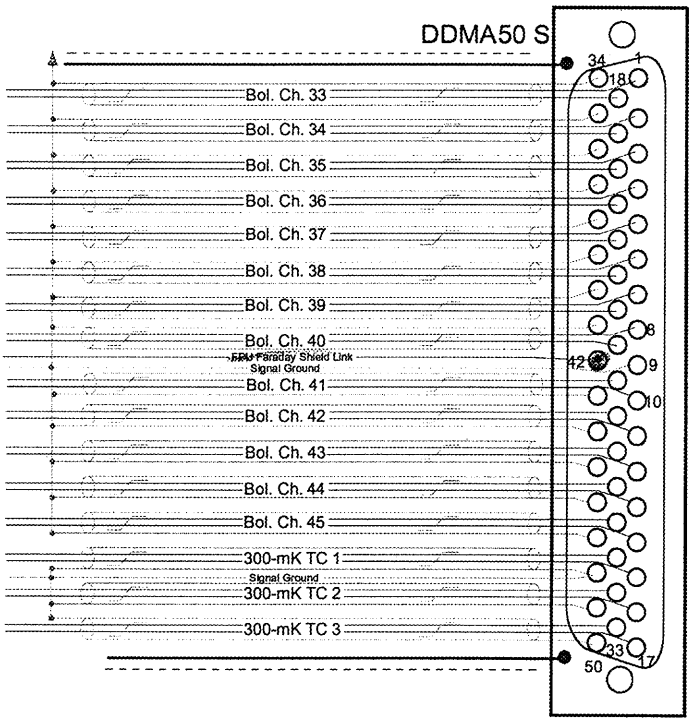
4.2.4 I4 SVM 4 – DRCU (Type 1) PMW

Overall Mechanical Drawing



Connector/Backshell Details

DDMA 50 S + Glenair 550 - T - 039 - M - 5- TBD -H- TBD - TBD to DCU J20 DCU-JFP
DDMA 50 S + Glenair 550 - E - 039 - M - 5- TBD -H- TBD - TBD to DCU J21 DCU-JFP
DDMA 50 S + Glenair 550 - E - 039 - M - 5- TBD -H- TBD - TBD to DCU J22 DCU-JFP
+ Inline TBD Connector EMC Backshell



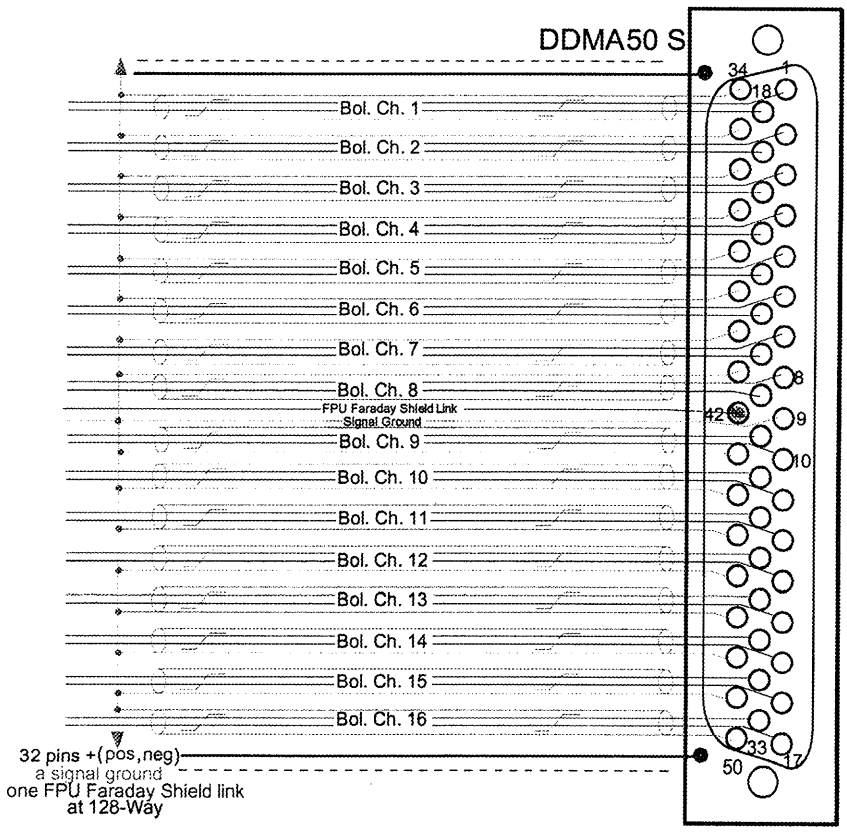
DCU J22
PMW and 300-mK Thermal Control Readout

· 16 Insulated STPs
· 3 Single insulated ground wires

· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the WE and the wall of the CVV.

· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

· A and B represent the commoning of ground references within the connectors which pass through the 128-way CVV connector on individual pins.



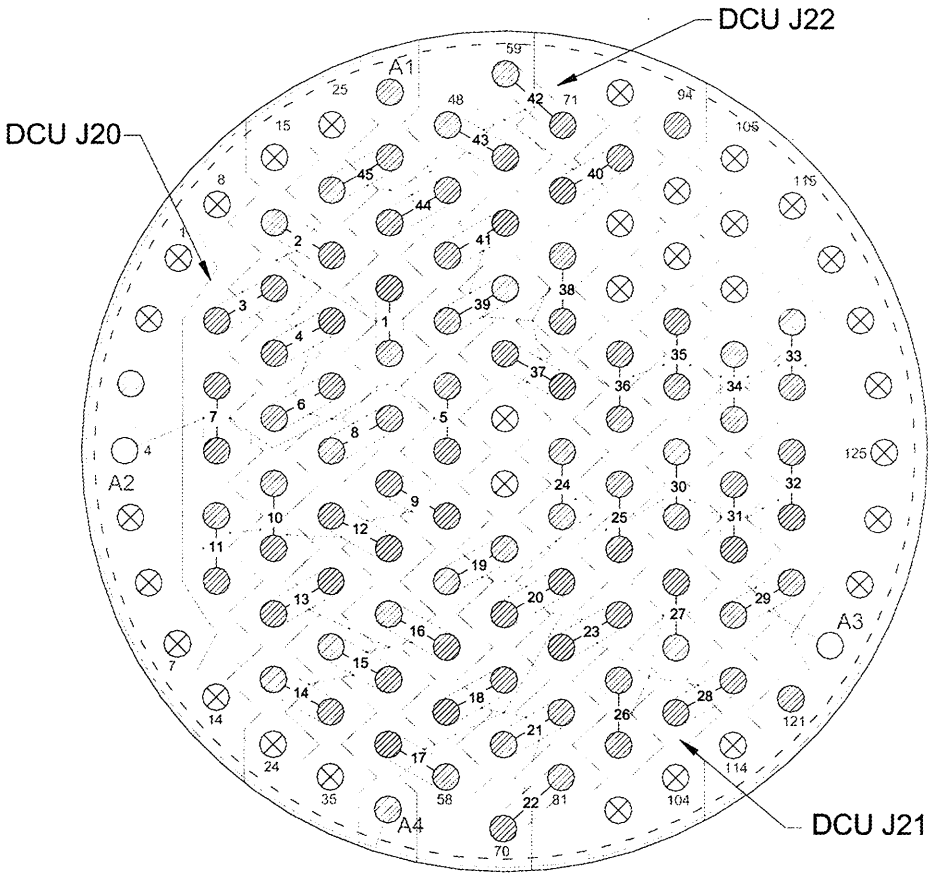
Type 1 DCU Tails

· This is the standard tail used for Photometer BDA readout (DCU J5 through to J21). Note that DCU J22 is different due to the incorporation of the 300-mK Thermal Control Hardware

· 16 Insulated STPs
· 2 Single insulated ground wires

· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the WE and the wall of the CVV.

· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.



- Signal Supply
- Signal Return
- Signal Ground
- FPU Faraday Shield Link
- No Connection

Harness Tails

Harness Overshield (Joined to connector chassis)

- Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.
- Pin 4 connected to Pins 47, 128, 36 (Ground wire links)

- 97 of 128 Contacts Used

Contact Details

Notes:

- The contacts are named as "channels 1-48" end-to-end, and mapping to specific detector position is only maintained internally to the instrument. The information is in the BDA ICDs.
- The shields of the STP cables carrying, the ground wires (GND_WIRE) and Pin 47 of the 128-way connector are all joined to form a ground reference plane. They are all denoted by an * in the table below.
- The Inline Connector is used only in the Flight Configuration in the I4 Harness. It is not present in I5-I9.

Name	128Way #4	DCU J20	DCU J21	DCU J22	Inline Connector
Ground Pin	47 (A4)				
Channel 1 +	40	1			
Channel 1 -	39	18			
Channel 1gnd shld	4 (A2)	34			
Channel 2 +	16	2			
Channel 2 -	27	19			
Channel 2gnd shld	4 (A2)	35			
Channel 3 +	9	3			
Channel 3 -	17	20			
Channel 3gnd shld	4 (A2)	36			
Channel 4 +	18	4			
Channel 4 -	28	21			
Channel 4gnd shld	4 (A2)	37			
Channel 5 +	50	5			
Channel 5 -	49	22			
Channel 5gnd shld	4 (A2)	38			
Channel 6 +	19	6			
Channel 6 -	29	23			
Channel 6gnd shld	4 (A2)	39			
Channel 7 +	10	7			
Channel 7 -	11	24			
Channel 7gnd shld	4 (A2)	40			
Channel 8 +	41	8			
Channel 8 -	30	25			
Channel 8gnd shld	4 (A2)	41			
GND WIRE	4 (A2)	9			
FPU Faraday Shield Link	3	42			
Channel 9 +	42	26			
Channel 9 -	54	10			
Channel 9gnd shld	4 (A2)	43			
Channel 10 +	21	27			
Channel 10 -	20	11			
Channel 10gnd shld	4 (A2)	44			
Channel 11 +	13	28			
Channel 11 -	12	12			
Channel 11gnd shld	4 (A2)	45			
Channel 12 +	31	29			
Channel 12 -	43	13			
Channel 12gnd shld	4 (A2)	46			
Channel 13 +	22	30			
Channel 13 -	32	14			
Channel 13gnd shld	4 (A2)	47			
Channel 14 +	23	31			
Channel 14 -	34	15			
Channel 14gnd shld	4 (A2)	48			
Channel 15 +	33	32			
Channel 15 -	45	16			
Channel 15gnd shld	4 (A2)	49			

Name	128Way #4	DCU J20	DCU J21	DCU J22	Inline Connector
Channel 16 +	44	33			
Channel 16 -	54	17			
Channel 16gnd shld	4 (A2)	50			
Channel 17 +	58		1		
Channel 17 -	46		18		
Channel 17gnd shld	128 (A3)		34		
Channel 18 +	68		2		
Channel 18 -	57		19		
Channel 18gnd shld	128 (A3)		35		
Channel 19 +	55		3		
Channel 19 -	66		20		
Channel 19gnd shld	128 (A3)		36		
Channel 20 +	67		4		
Channel 20 -	78		21		
Channel 20gnd shld	128 (A3)		37		
Channel 21 +	69		5		
Channel 21 -	80		22		
Channel 21gnd shld	128 (A3)		38		
Channel 22 +	70		6		
Channel 22 -	81		23		
Channel 22gnd shld	128 (A3)		39		
Channel 23 +	90		7		
Channel 23 -	79		24		
Channel 23gnd shld	128 (A3)		40		
Channel 24 +	76		8		
Channel 24 -	77		25		
Channel 24gnd shld	128 (A3)		41		
GND WIRE	128 (A3)		9		
FPU Faraday Shield Link	121		42		
Channel 25 +	88		26		
Channel 25 -	89		10		
Channel 25gnd shld	128 (A3)		43		
Channel 26 +	92		27		
Channel 26 -	91		11		
Channel 26gnd shld	128 (A3)		44		
Channel 27 +	102		28		
Channel 27 -	101		12		
Channel 27gnd shld	128 (A3)		45		
Channel 28 +	103		29		
Channel 28 -	113		13		
Channel 28gnd shld	128 (A3)		46		
Channel 29 +	112		30		
Channel 29 -	120		14		
Channel 29gnd shld	128 (A3)		47		
Channel 30 +	99		31		
Channel 30 -	100		15		
Channel 30gnd shld	128 (A3)		48		
Channel 31 +	110		32		
Channel 31 -	111		16		
Channel 31gnd shld	128 (A3)		49		
Channel 32 +	118		33		
Channel 32 -	119		17		
Channel 32gnd shld	128 (A3)		50		
Channel 33 +	116			1	
Channel 33 -	117			18	
Channel 33gnd shld	36 (A1)			34	
Channel 34 +				2	
Channel 34 -				19	
Channel 34gnd shld	36 (A1)			35	

J4 to J2

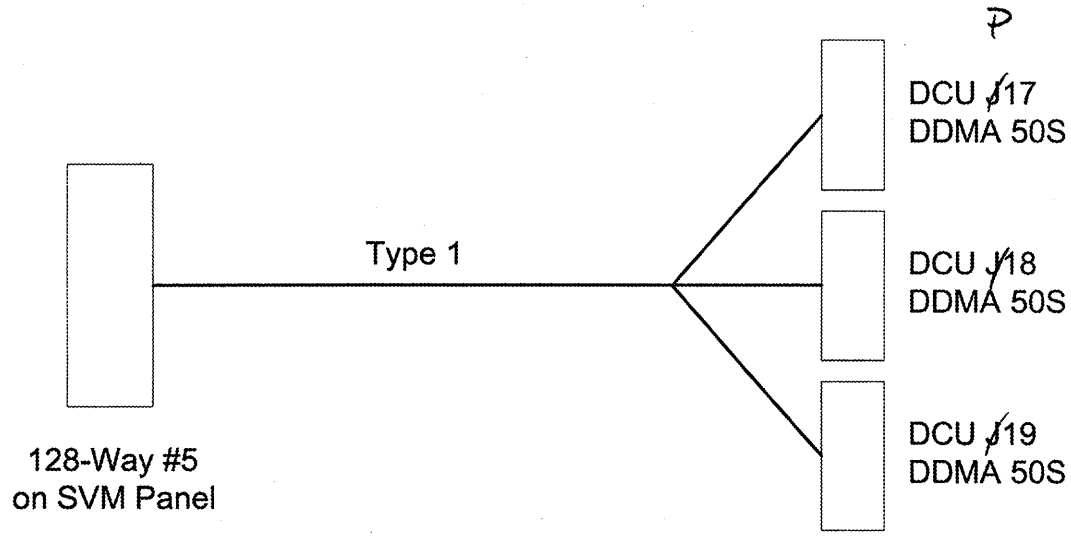
Name	128Way #4	DCU J20	DCU J21	DCU J22	Inline Connector
Channel 35 +	97			3	
Channel 35 -	98			20	
Channel 35gnd shld	36 (A1)			36	
Channel 36 +	86			4	
Channel 36 -	87			21	
Channel 36gnd shld	36 (A1)			37	
Channel 37 +	63			5	
Channel 37 -	75			22	
Channel 37gnd shld	36 (A1)			38	
Channel 38 +	74			6	
Channel 38 -	73			23	
Channel 38gnd shld	36 (A1)			39	
Channel 39 +	62			7	
Channel 39 -	51			24	
Channel 39gnd shld	36 (A1)			40	
Channel 40 +	83			8	
Channel 40 -	72			25	
Channel 40gnd shld	36 (A1)			41	
GND WIRE	36 (A1)			9	
FPU Faraday Shield Link	94			42	
Channel 41 +	50			26	
Channel 41 -	61			10	
Channel 41gnd shld	36 (A1)			43	
Channel 42 +	59			27	
Channel 42 -	71			11	
Channel 42gnd shld	36 (A1)			44	
Channel 43 +	48			28	
Channel 43 -	60			12	
Channel 43gnd shld	36 (A1)			45	
Channel 44 +	38			29	
Channel 44 -	49			13	
Channel 44gnd shld	36 (A1)			46	
Channel 45 +	25			30	
Channel 45 -	37			14	
Channel 45gnd shld	36 (A1)			47	
300-mK TC Ch. 1 +	N.C.			31	300-mK TC Ch. 1 +
300-mK TC Ch. 1 -	N.C.			15	300-mK TC Ch. 1 -
300-mK TC Ch. 1 Gnd Shld	N.C.			48	TBD
300-mK TC Ch. 2+	N.C.			32	300-mK TC Ch. 2+
300-mK TC Ch. 2 -	N.C.			16	300-mK TC Ch. 2 -
300-mK TC Ch. 2 Gnd Shld	N.C.			49	TBD
300-mK TC Ch. 3 +	N.C.			33	300-mK TC Ch. 3 +
300-mK TC Ch. 3 -	N.C.			17	300-mK TC Ch. 3 -
300-mK TC Ch. 3 Gnd Shld	N.C.			50	TBD
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	

9 pol.

Inline connector to SVM-CB or separate I/F-CB as S'pin

4.2.5 I5 SVM 5 – DRCU (Type 1) PMW

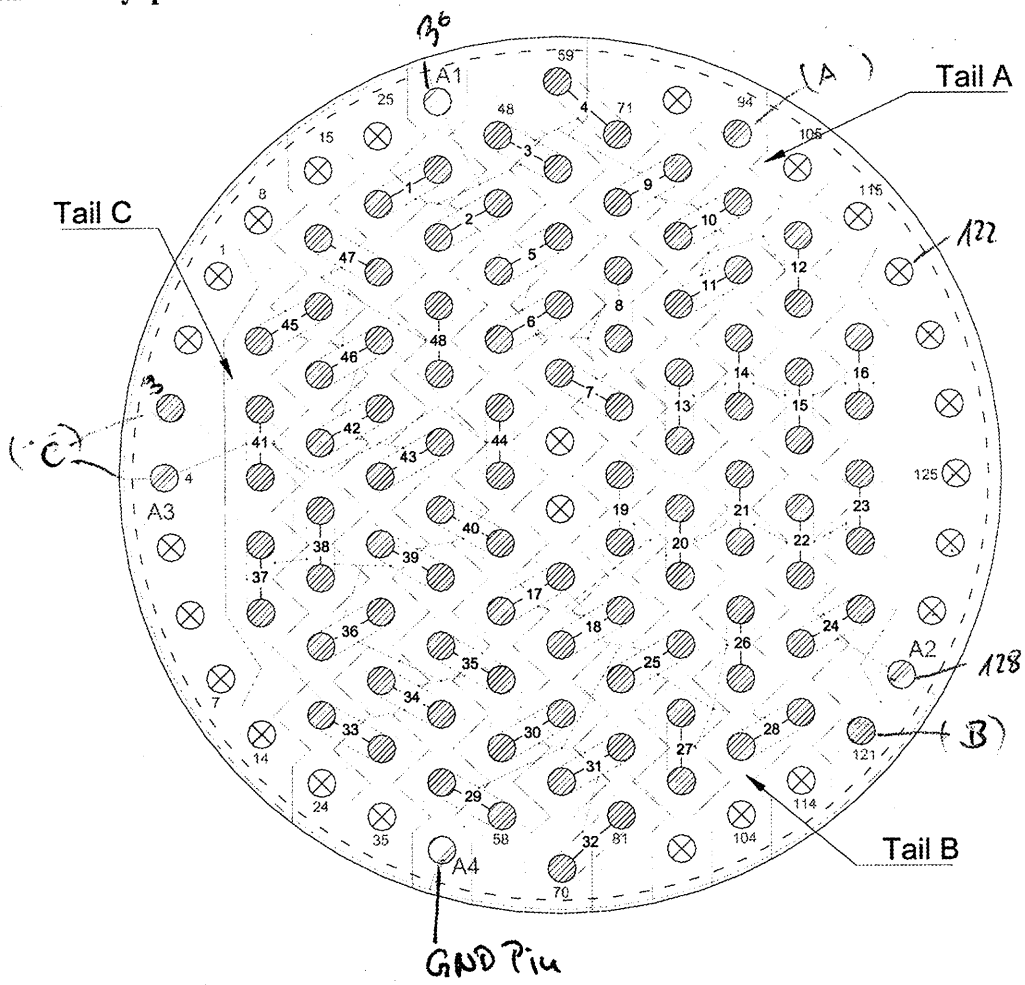
Overall Mechanical Drawing



Connector/Backshell Details

DDMA50S+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J17	DCU-JFP
DDMA50S+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J18	DCU-JFP
DDMA50S+Glenair550-T-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J19	DCU-JFP

Harness Layup



- Signal Supply
- Signal Return
- Signal Ground
- FPU Faraday Shield Link
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)

- Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.
- Pin 4 connected to Pin 47 (Ground wire link)

- 103 of 128 Contacts Used

Tail A connected to HSDCU J17 (A1)
Tail B connected to HSDCU J18 (A2)
Tail C connected to HSDCU J19 (A3)
> 128 pol.

Contact Details

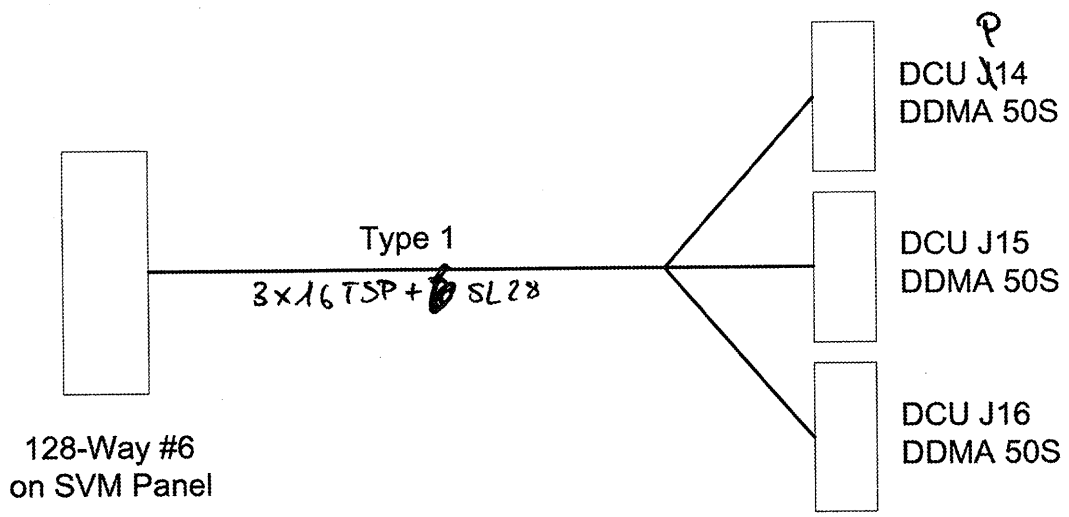
Name	128Way #5	50way A	50wayB	50way C
Ground Pin	47 (A4)			
Channel 1 +	26	1		
Channel 1 -	37	18		
Channel 1gnd shld	36 (A1)	34		
Channel 2 +	38	2		
Channel 2 -	49	19		
Channel 2gnd shld	36 (A1)	35		
Channel 3 +	48	3		
Channel 3 -	60	20		
Channel 3gnd shld	36 (A1)	36		
Channel 4 +	59	4		
Channel 4 -	71	21		
Channel 4gnd shld	36 (A1)	37		
Channel 5 +	50	5		
Channel 5 -	61	22		
Channel 5gnd shld	36 (A1)	38		
Channel 6 +	62	6		
Channel 6 -	51	23		
Channel 6gnd shld	36 (A1)	39		
Channel 7 +	63	7		
Channel 7 -	75	24		
Channel 7gnd shld	36 (A1)	40		
Channel 8 +	74	8		
Channel 8 -	73	25		
Channel 8gnd shld	36 (A1)	41		
GND WIRE	36 (A1)	9		
FPU Faraday Shield Link	94	42		
Channel 9 +	83	26		
Channel 9 -	72	10		
Channel 9gnd shld	36 (A1)	43		
Channel 10 +	95	27		
Channel 10 -	84	11		
Channel 10gnd shld	36 (A1)	44		
Channel 11 +	96	28		
Channel 11 -	85	12		
Channel 11gnd shld	36 (A1)	45		
Channel 12 +	36	29		
Channel 12 -	107	13		
Channel 12gnd shld	36 (A1)	46		
Channel 13 +	86	30		
Channel 13 -	87	14		
Channel 13gnd shld	36 (A1)	47		
Channel 14 +	97	31		
Channel 14 -	98	15		
Channel 14gnd shld	36 (A1)	48		
Channel 15 +	108	32		
Channel 15 -	109	16		
Channel 15gnd shld	36 (A1)	49		
Channel 16 +	116	33		
Channel 16 -	117	17		
Channel 16gnd shld	36 (A1)	50		
Channel 17 +	55		1	
Channel 17 -	66		18	
Channel 17gnd shld	128 (A2)		34	
Channel 18 +	67		2	
Channel 18 -	78		19	

Name	128Way #5	50way A	50wayB	50way C
Channel 18gnd shld	128 (A2)		35	
Channel 19 +	76		3	
Channel 19 -	77		20	
Channel 19gnd shld	128 (A2)		36	
Channel 20 +	88		4	
Channel 20 -	89		21	
Channel 20gnd shld	128 (A2)		37	
Channel 21 +	99		5	
Channel 21 -	100		22	
Channel 21gnd shld	128 (A2)		38	
Channel 22 +	110		6	
Channel 22 -	111		23	
Channel 22gnd shld	128 (A2)		39	
Channel 23 +	118		7	
Channel 23 -	119		24	
Channel 23gnd shld	128 (A2)		40	
Channel 24 +	112		8	
Channel 24 -	120		25	
Channel 24gnd shld	128 (A2)		41	
GND WIRE	128 (A2)		9	
FPU Faraday Shield Link	121		42	
Channel 25 +	90		26	
Channel 25 -	79		10	
Channel 25gnd shld	128 (A2)		43	
Channel 26 +	102		27	
Channel 26 -	101		11	
Channel 26gnd shld	128 (A2)		44	
Channel 27 +	92		28	
Channel 27 -	91		12	
Channel 27gnd shld	128 (A2)		45	
Channel 28 +	103		29	
Channel 28 -	113		13	
Channel 28gnd shld	128 (A2)		46	
Channel 29 +	58		30	
Channel 29 -	46		14	
Channel 29gnd shld	128 (A2)		47	
Channel 30 +	68		31	
Channel 30 -	57		15	
Channel 30gnd shld	128 (A2)		48	
Channel 31 +	69		32	
Channel 31 -	80		16	
Channel 31gnd shld	128 (A2)		49	
Channel 32 +	70		33	
Channel 32 -	81		17	
Channel 32gnd shld	128 (A2)		50	
Channel 33 +	23			1
Channel 33 -	34			18
Channel 33gnd shld	4 (A3)			34
Channel 34 +	33			2
Channel 34 -	45			19
Channel 34gnd shld	4 (A3)			35
Channel 35 +	44			3
Channel 35 -	56			20
Channel 35gnd shld	4 (A3)			36
Channel 36 +	22			4
Channel 36 -	32			21
Channel 36gnd shld	4 (A3)			37
Channel 37 +	13			5
Channel 37 -	12			22

Name	128Way #5	50way A	50wayB	50way C
Channel 37gnd shld	4 (A3)			38
Channel 38 +	21			6
Channel 38 -	20			23
Channel 38gnd shld	4 (A3)			39
Channel 39 +	31			7
Channel 39 -	43			24
Channel 39gnd shld	4 (A3)			40
Channel 40 +	42			8
Channel 40 -	54			25
Channel 40gnd shld	4 (A3)			41
GND WIRE	4 (A3)			9
FPU Faraday Shield Link	3			42
Channel 41 +	10			26
Channel 41 -	11			10
Channel 41gnd shld	4 (A3)			43
Channel 42 +	19			27
Channel 42 -	29			11
Channel 42gnd shld	4 (A3)			44
Channel 43 +	41			28
Channel 43 -	30			12
Channel 43gnd shld	4 (A3)			45
Channel 44 +	53			29
Channel 44 -	52			13
Channel 44gnd shld	4 (A3)			46
Channel 45 +	9			30
Channel 45 -	17			14
Channel 45gnd shld	4 (A3)			47
Channel 46 +	18			31
Channel 46 -	28			15
Channel 46gnd shld	4 (A3)			48
Channel 47 +	16			32
Channel 47 -	27			16
Channel 47gnd shld	4 (A3)			49
Channel 48 +	40			33
Channel 48 -	39			17
Channel 48gnd shld	4 (A3)			50
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

4.2.6 I6 SVM 6 – DRCU (Type 1) PLW

Overall Mechanical Drawing



Connector/Backshell Details

DDMA50S+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J14	DCU-JFP
DDMA50S+Glenair550-T-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J15	DCU-JFP
DDMA50S+Glenair550-T-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J16	DCU-JFP

Harness Layup

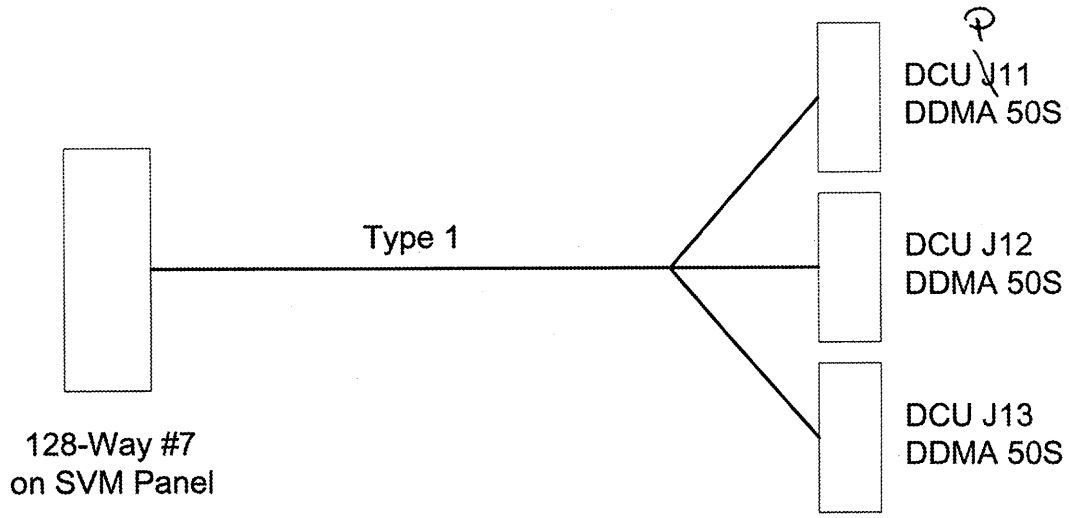
As I 5 except
Tail A connected to HSDCU J14
Tail B connected to HSDCU J15
Tail C connected to HSDCU J16

Contact Details

As I 5

4.2.7 I7 SVM 7 – DRCU (Type 1) PSW

Overall Mechanical Drawing



Connector/Backshell Details

DDMA 50 S + Glenair 550 - T - 039 - M - 5 -	TBD	-H-	TBD	-TBD	to DCU J11	DCU-JFP
DDMA 50 S + Glenair 550 - T - 039 - M - 5 -	TBD	-H-	TBD	-TBD	to DCU J12	DCU-JFP
DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	-H-	TBD	-TBD	to DCU J13	DCU-JFP

Harness Layup

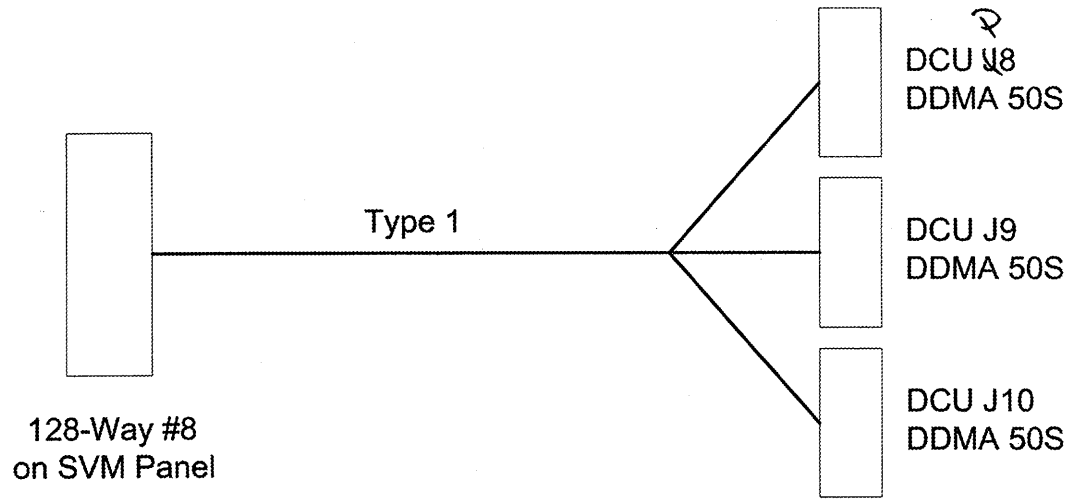
As I5 except
Tail A connected to HSDCU J11
Tail B connected to HSDCU J12
Tail C connected to HSDCU J13

Contact Details

As I 5

4.2.8 I8 SVM 8 – DRCU (Type 1) PSW

Overall Mechanical Drawing



Connector/Backshell Details

DDMA50S+Glenair550-T-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J8	DCU-JFP
DDMA50S+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J9	DCU-JFP
DDMA50S+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J10	DCU-JFP

Harness Layup

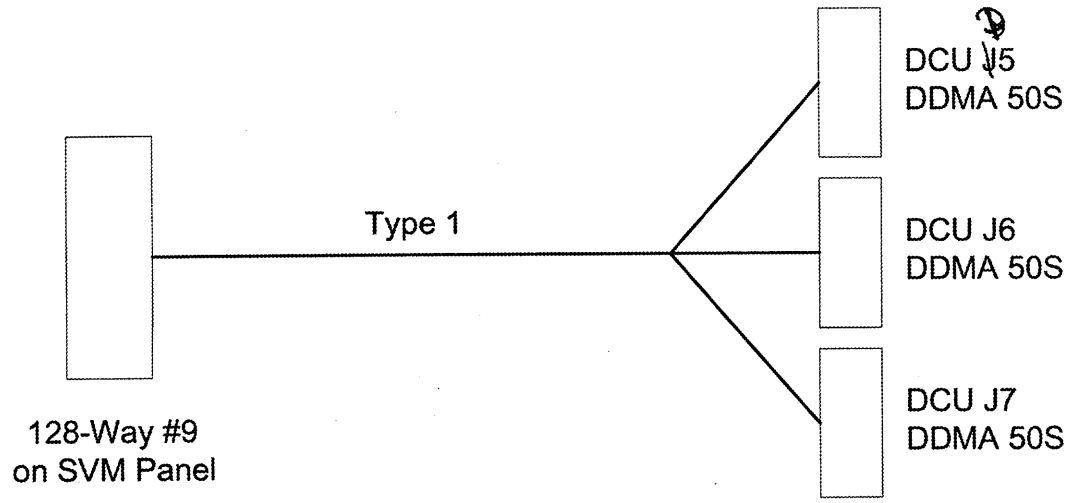
As I5 except
Tail A connected to HSDCU J8
Tail B connected to HSDCU J9
Tail C connected to HSDCU J10

Contact Details

As I 5

4.2.9 I9 SVM 9 – DRCU (Type 1) PSW

Overall Mechanical Drawing



Connector/Backshell Details

DDMA50S+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J5	DCU-JFP
DDMA50S+Glenair550-E-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J6	DCU-JFP
DDMA50S+Glenair550-T-039-M-5-	TBD	-H-	TBD	-TBD	to DCU J7	DCU-JFP

Harness Layup

As I 5 except
Tail A connected to HSDCU J5
Tail B connected to HSDCU J6
Tail C connected to HSDCU J7

Contact Details

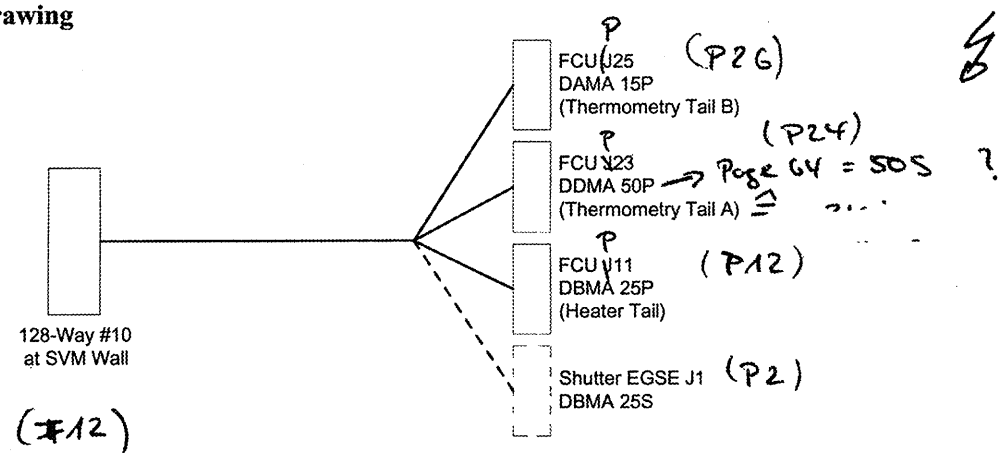
As I 5

4.2.10 I10 SVM10 – DRCU 10 AUX-P

Note: There are two configurations of this harness; Ground Test and Flight.

- Ground Test configuration: the Shutter EGSE Tail terminates near the FCU with the other tails.
- Flight Configuration: this Shutter EGSE cables are routed out through the CVV 128-Way connector #10 and terminate at a skin connector near the 128-Way connector in harness E10. (See Section 4.3.10) In the flight configuration of this harness therefore, this tail is not present in the "I-Harness" but in the "E-Harness."

Overall Mechanical Drawing

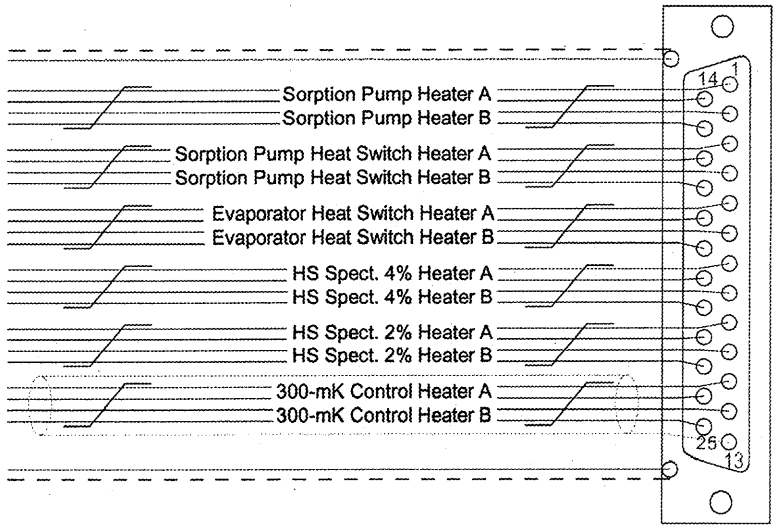


Connector/Backshell Details

Prime side harness

DBMA25P+Glenair550-E-039-M-3- TBD -H-0-TBD	to	FCU	J11	Heater Tail (Prime)
DBMA25P+Glenair550-E-039-M-3- TBD -H-0-TBD	to	Shutter EGSE	J1	Shutter EGSE (Prime)
DDMA50P+Glenair550-E-039-M-5- TBD -H-0-TBD	to	FCU	J23	FPU Thermometry Tail A (Prime)
DAMA15P+Glenair550-T-039-M-2- TBD -H-0-TBD	to	FCU	J25	FPU Thermometry Tail B (Prime)

Heater Tail Layup (FCU J11)



Heaters FCU J11 (P12) Red.

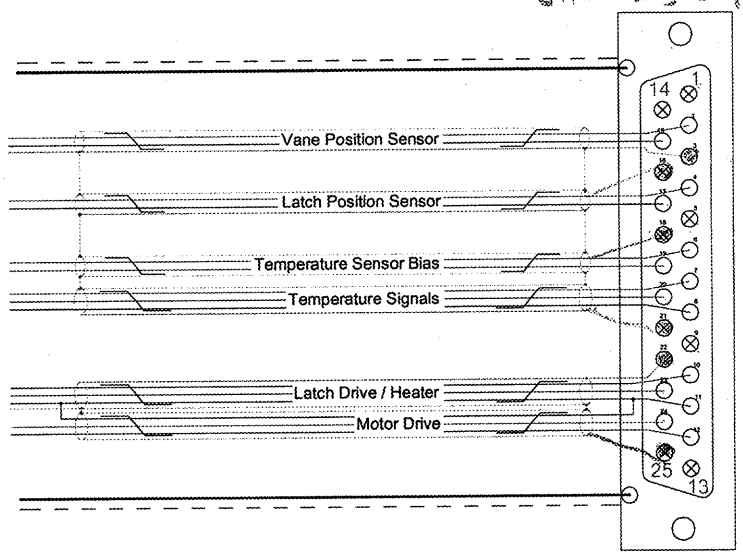
- 5 TQ
- 1 STQ

- The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the WE and the wall of the CVV.

- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

Shutter EGSE Tail Layup (EGSE J1)

J1 = 25S from CVV side to SUM-side
P1 on SUM-side 25P with shield - interconnect to



slot-rearside !

Shutter EGSE Tail
(J1/J2)
P14 / P15 (SUM

- 3 Insulated STPs
- 3 Insulated STTs

- The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the Shutter and at the wall of the CVV.

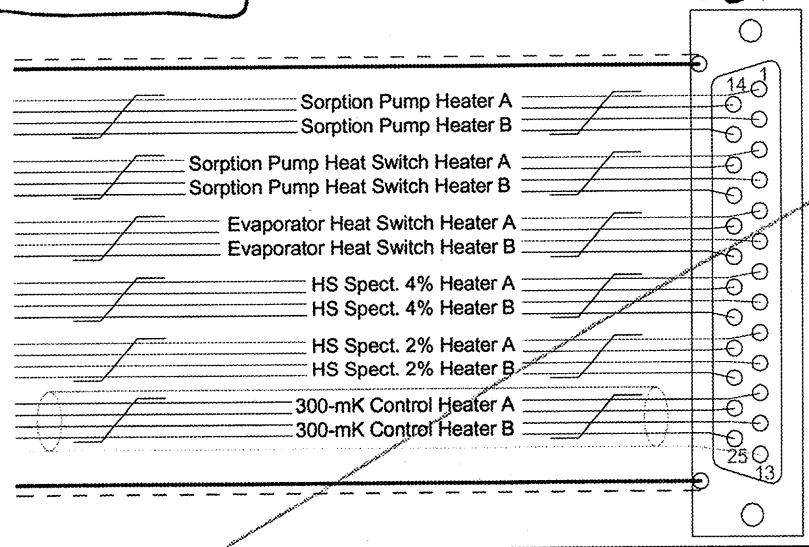
- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

- 16 Pins used on the 128-Way

20 Pins used
5 Nc

Heaters (FCU J11) ?

25P (Pin-conn. Frontside)
P



Heaters FCU J11

- 5 TQ
- 1 STQ

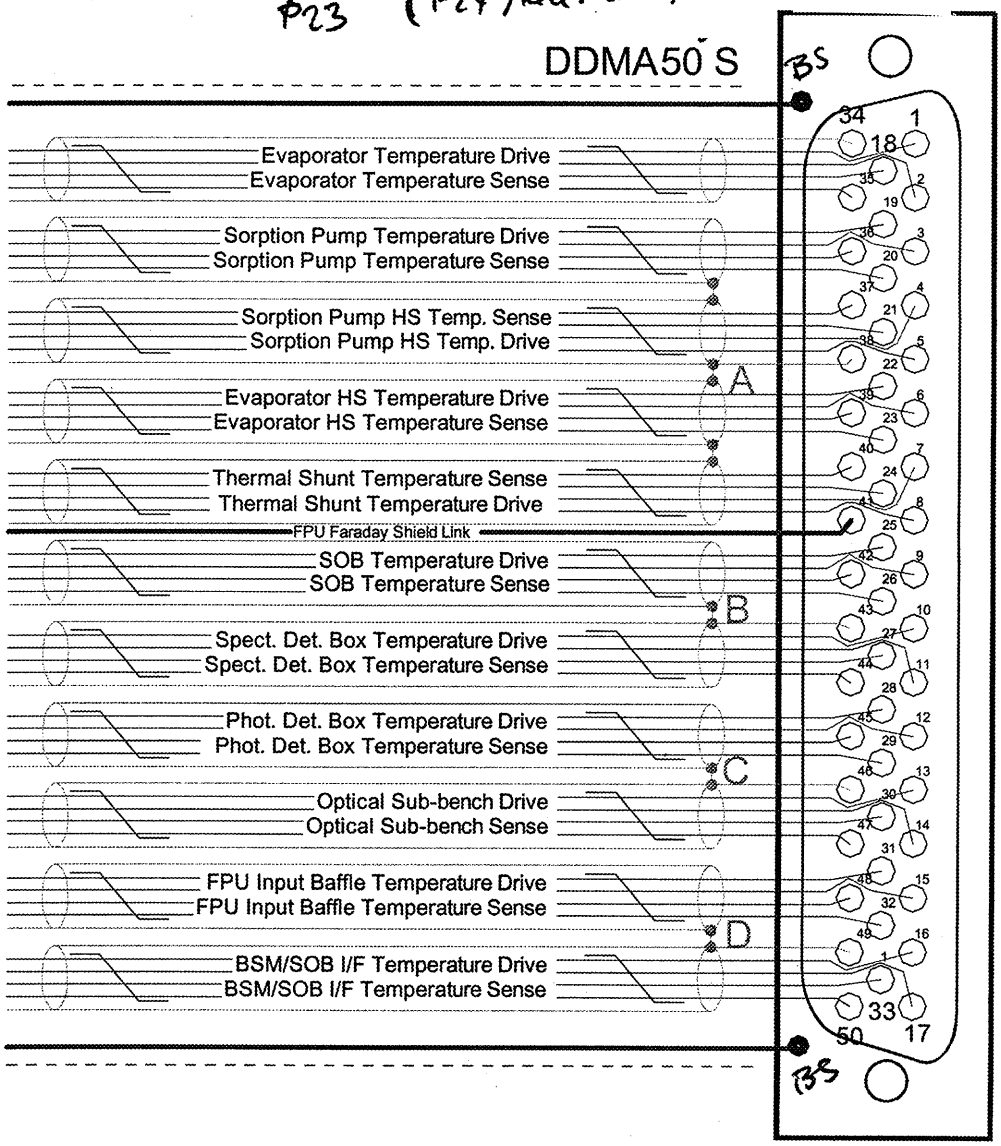
The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the WE and the wall of the CVV.

- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

duplicated to page 62

FPU Thermometry Tail A (FCU J23)

P23 (P24) Red. (I12)

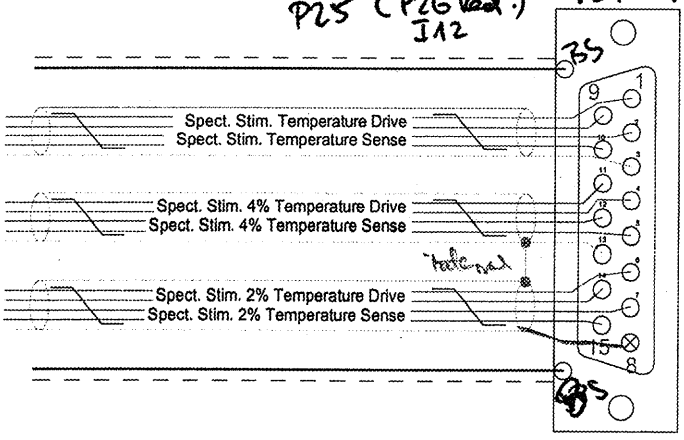


FPU Thermometry Tail B (FCU J25)

P25 (P26 Red.) J12

15P Pin-Out side Connector

Refer to I12 / Ref J26 D

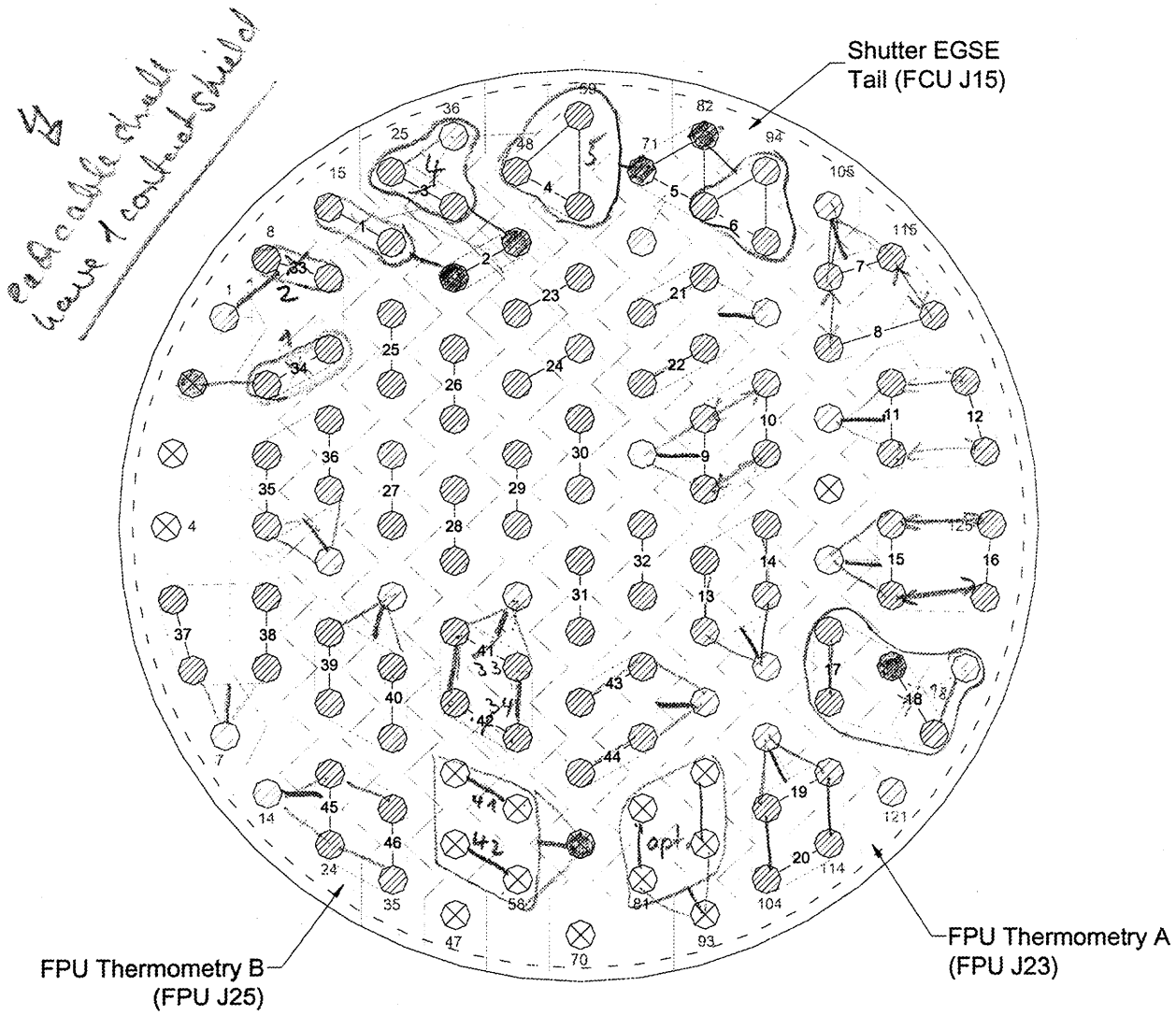


FPU Thermometry B (FCU J25/J26)

→ I12

- The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the Shutter and at the wall of the CVV.
- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

I10 128-Way Pin Allocation

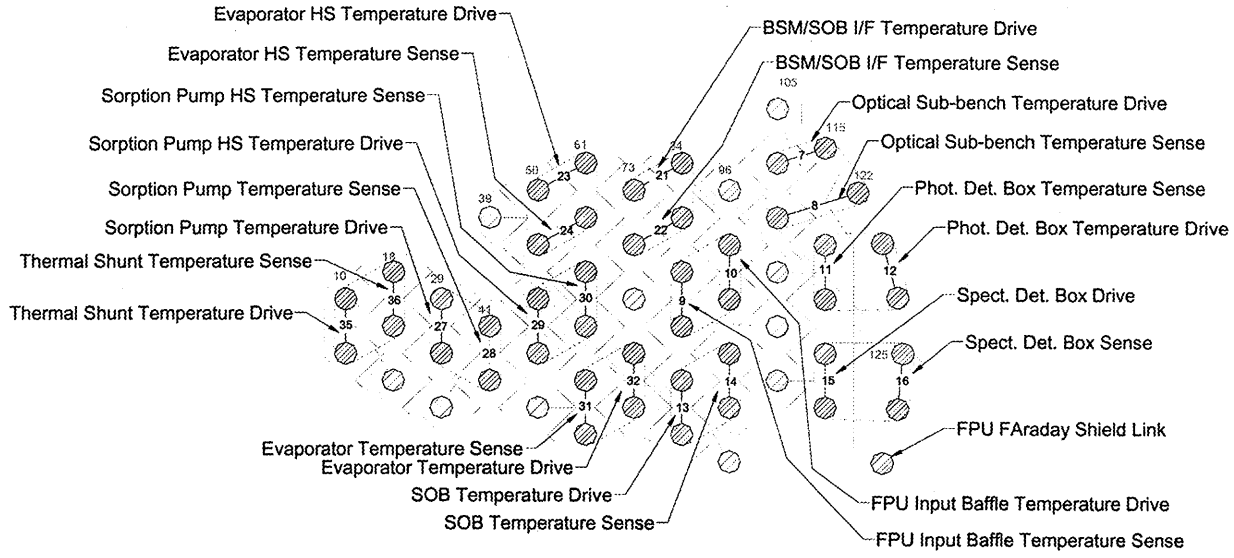


- Shields of STP and STQ are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

- 112 of 128 Contacts Used

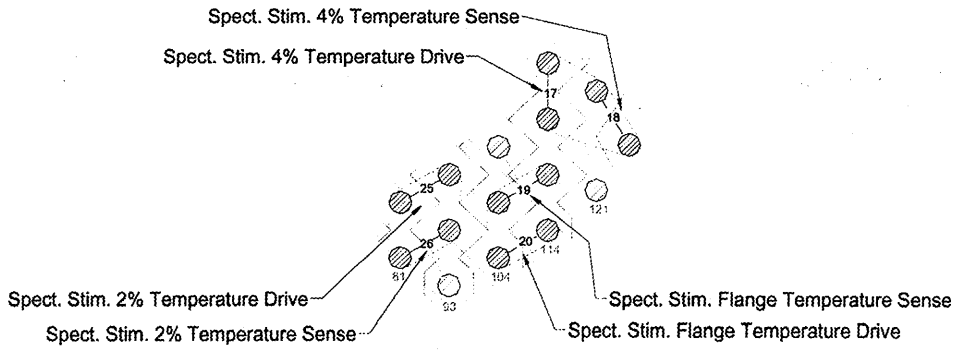
- Signal Supply
- Signal Return
- Signal Ground
- FPU Faraday Shield Link
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)

I10 128-Way FPU Thermometry Tail A Pin Allocation



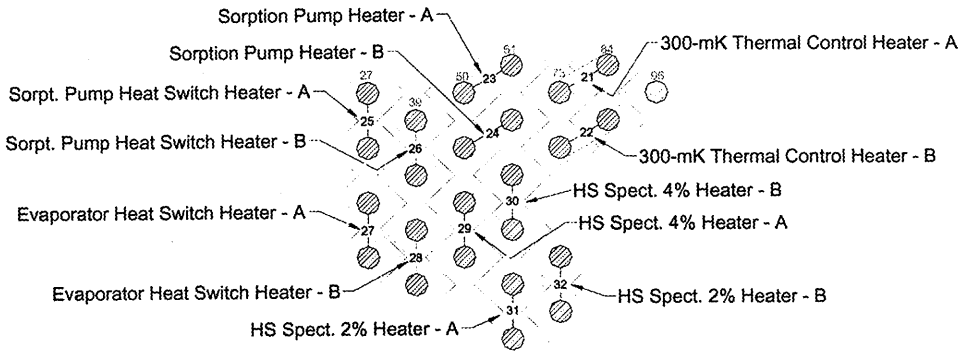
FPU Thermometry Tail A (FCU J23)

I10 128-Way FPU Thermometry Tail B Pin Allocation



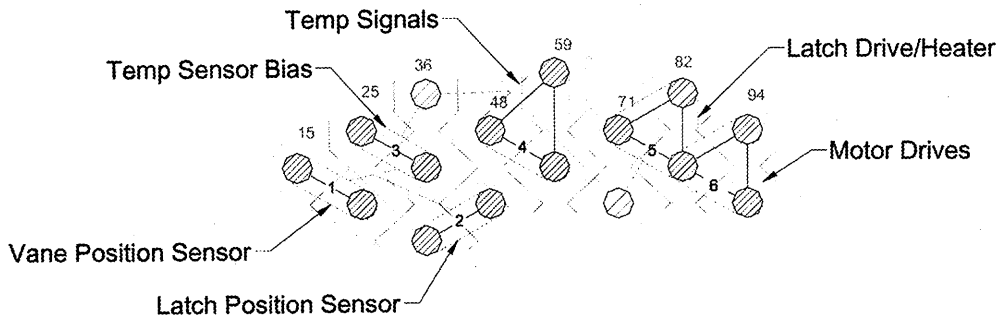
FPU Thermometry Tail B (FCU J25)

I10 128-Way Heater Tail Pin Allocation



Heater Tail (J11)

I10 128-Way Shutter EGSE Tail Pin Allocation



Shutter Tail (FCU J15)

Shutter EGSE Tail J1

Function	Pin # on J15	Max Current	Wire Lay-up	Max Ohms	128-Way #10 Pin Allocation
Vane Position Sensor +	2		Insulated STP	1000	15
Vane Position Sensor -	15			1000	26
Vane Position Sense Shield	3 (A)				36 (A)
Latch Position Sense +	4		Insulated STP	1000	38
Latch Position Sense -	17			1000	49
Sense Shld	3 (A)				36 (A)
Temperature Sensor Bias +	6		Insulated STP	1000	25
Temperature Sensor Bias -	19			1000	37
Temperature Sensor Shield	3 (A)				36 (A)
Vane Temperature Signal +	7		Insulated STT	1000	48
Common Temperature Signal	20			1000	60
Motor Temperature Signal +	8			1000	59
Temperature Signals Shield	3(A)				36 (A)
Latch Drive +	10		Insulated STT	10	71
Vane Heater+	23			10	82
Latch Drive and Vane Heater -	11 (B)			10	83 (C)
Latch Drive and Vane Heater Shield	22 (C)				72 (B)
Motor Phase A +	12		Insulated STT	10	94
Motor Phase B +	24			10	95
Motor Drive -	11 (B)			10	83 (C)
Motor Drive Shield	22 (C)				72 (B)
Harness Overshield	EMC Backshell				

16 Pins used

Cooler Tail Listing J11

Function	25way J11	Max. Current	Wire Lay-up	Max Ohms	128Way #10
Sorption Pump Heater I+_A	1	25 mA	Twisted quad	10	6
Sorption Pump Heater I+_B	2	25 mA		10	13
Sorption Pump Heater I-_A	14	25 mA		10	5
Sorption Pump Heater I-_B	15	25 mA		10	12
Sorption Pump Heat Switch Heater I+_A	3	1.5 mA	Twisted quad	50	22
Sorption Pump Heat Switch Heater I+_B	4	1.5 mA		50	33
Sorption Pump Heat Switch Heater I-_A	16	1.5 mA		50	21
Sorption Pump Heat Switch Heater I-_B	17	1.5 mA		50	32
Evaporator Heat Switch Heater I+_A	5	1.5 mA	Twisted quad	50	53
Evaporator Heat Switch Heater I+_B	6	1.5 mA		50	54
Evaporator Heat Switch Heater I-_A	18	1.5 mA		50	43
Evaporator Heat Switch Heater I-_B	19	1.5 mA		50	44
HS Spect. 4% Heater I+_A	7	9 mA	Twisted quad	30	35
HS Spect. 4% Heater I+_B	8	9 mA		30	24
HS Spect. 4% Heater I-_A	20	9 mA		30	34
HS Spect. 4% Heater I-_B	21	9 mA		30	23
HS Spect. 2% Heater I+_A	9	7 mA	Twisted quad	30	46
HS Spect. 2% Heater I+_B	10	7 mA		30	56
HS Spect. 2% Heater I-_A	22	7 mA		30	45
HS Spect. 2% Heater I-_B	23	7 mA		30	55
300-mK Thermal Control Heater I+_A	11	2mA	Insulated Screened Twisted quad	100	79
300-mK Thermal Control Heater I+_B	12	2 mA		100	78
300-mK Thermal Control Heater I-_A	24	2 mA		100	68
300-mK Thermal Control Heater I-_B	25	2 mA		100	67
300-mK Thermal Control Heater shld.	13			N/A	90
Harness Overshield	EMC Backshell				

25ways used

FPU Thermometry Tail A (FCU J23)

Function	50 way J23	Max. Current	Wire Lay-up	Max Ohms	128Way #10
Evaporator temperature I+	1	1 µA	Insulated screened twisted quad	1000	77
Evaporator temperature V+	18	N/A		1000	66
Evaporator temperature V-	35	N/A		1000	65
Evaporator temperature I-	2	1 µA		1000	76
Evaporator temperature shld	34	N/A		N/A	54
Sorption Pump temperature I+	3	1 µA	Insulated screened twisted quad	1000	29
Sorption Pump temperature V+	20	N/A		1000	41
Sorption Pump temperature V-	36	N/A		1000	42
Sorption Pump temperature I-	19	1 µA		1000	30
Sorption Pump temperature shld	38 (A)	N/A		N/A	31
Sorption Pump Heat Switch temperature I+	4	1 µA	Insulated screened twisted quad	1000	53
Sorption Pump Heat Switch temperature V+	21	N/A		1000	64
Sorption Pump Heat Switch temperature V-	37	N/A		1000	63
Sorption Pump Heat Switch temperature I-	5	1 µA		1000	52
Sorption Pump Heat Switch temperature shld	38 (A)	N/A		N/A	75
Evaporator Heat Switch temperature I+	6	1 µA	Insulated screened twisted quad	1000	50
Evaporator Heat Switch temperature V+	23	N/A		1000	62
Evaporator Heat Switch temperature V-	39	N/A		1000	51
Evaporator Heat Switch temperature I-	22	1 µA		1000	61
Evaporator Heat Switch temperature shld	38 (A)	N/A		N/A	39
Thermal Shunt temperature I+_A	7	1 µA	Insulated screened twisted quad	1000	11
Thermal Shunt temperature V+_B	24	N/A		1000	19
Thermal Shunt temperature V- _A	40	N/A		1000	18
Thermal Shunt temperature I- _B	8	1 µA		1000	10
Thermal Shunt temperature shld	38 (A)	N/A		N/A	20
FPU Faraday Shield Link	41	N.A.	Single Wire	50	127
SPIRE Opt. Bench temperature I+	9	1 µA	Insulated screened twisted quad	1000	89
SPIRE Opt. Bench temperature V+	26	N/A		1000	100
SPIRE Opt. Bench temperature V-	42	N/A		1000	99
SPIRE Opt. Bench temperature I-	25	1 µA		1000	88
SPIRE Opt. Bench temperature shld	43 (B)	N/A		N/A	101
Spectrometer Det. Box temperature I+	10	1 µA	Insulated screened twisted quad	1000	123
Spectrometer Det. Box temperature V+	27	N/A		1000	116
Spectrometer Det. Box temperature V-	44	N/A		1000	117
Spectrometer Det. Box temperature I-	11	1 µA		1000	124
Spectrometer Det. Box temperature shld	43 (B)	N/A		N/A	108
Photometer Det. Box temperature I+	12	1 µA	Insulated screened twisted quad	1000	118
Photometer Det. Box temperature V+	29	N/A		1000	125
Photometer Det. Box temperature V-	45	N/A		1000	126
Photometer Det. Box temperature I-	28	1 µA		1000	119
Photometer Det. Box temperature shld	46 (C)	N/A		N/A	110
Optical SubBench temperature I+	13	1 µA	Insulated screened twisted quad	1000	106
Optical SubBench temperature V+	30	N/A		1000	107
Optical SubBench temperature V-	47	N/A		1000	122
Optical SubBench temperature I-	14	1 µA		1000	115
Optical SubBench temperature shld	46 (C)	N/A		N/A	105
HSFPU Input Baffle temperature I+	15	1 µA	Insulated screened twisted quad	1000	97
HSFPU Input Baffle temperature V+	32	N/A		1000	86
HSFPU Input Baffle temperature V-	48	N/A		1000	87
HSFPU Input Baffle temperature I-	31	1 µA		1000	98

Function	50 way J23	Max. Current	Wire Lay-up	Max Ohms	128Way #10
HSFPU Input Baffle temperature shld	49 (D)	N/A		N/A	109
BSM/SOB I/F temperature I+	16	1 µA	Insulated screened twisted quad	1000	73
BSM/SOB I/F temperature V+	33	N/A		1000	74
BSM/SOB I/F temperature V-	50	N/A		1000	85
BSM/SOB I/F temperature I-	17	1 µA		1000	84
BSM/SOB I/F temperature shld	49 (D)	N/A		N/A	96
Harness Overshield	EMC Backshell				

FPU Thermometry Tail B (FCU J25)

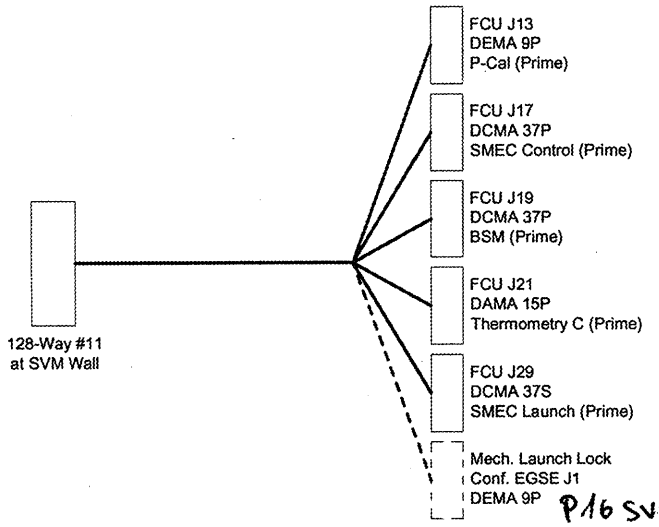
Function	15-Way J23	Max. Current	Wire Lay-up	Max Ohms	128Way #10
Spect. Stim. Flange temperature I+		1 µA	Insulated screened twisted quad	1000	114
Spect. Stim. Flange temperature V+		N/A		1000	113
Spect. Stim. Flange temperature V-		N/A		1000	103
Spect. Stim. Flange temperature I-		1 µA		1000	104
Spect. Stim. Flange temperature shld		N/A		N/A	102
SPECT. STIM. 4% temperature I+		1 µA	Insulated screened twisted quad	1000	111
SPECT. STIM. 4% temperature V+		N/A		1000	120
SPECT. STIM. 4% temperature V-		N/A		1000	128
SPECT. STIM. 4% temperature I-		1 µA		1000	112
SPECT. STIM. 4% temperature shld		N/A		N/A	121
Spect. Stim. 2% temperature I+		1 µA	Insulated screened twisted quad	1000	91
Spect. Stim. 2% temperature V+		N/A		1000	92
Spect. Stim. 2% temperature V-		N/A		1000	81
Spect. Stim. 2% temperature I-		1 µA		1000	80
Spect. Stim. 2% temperature shld		N/A		N/A	93
Harness Overshield	EMC Backshell				

4.2.11 I11 SVM11 – DRCU 11 DRV-P

Note: There are two configurations of this harness; Ground Test and Flight.

- Ground Test configuration: the SMEC and BSM launch lock confirm signals are routed to a Mechanisms Launch Lock EGSE Tail, which terminates near the FCU with the other tails.
- Flight Configuration: the SMEC and BSM launch lock confirm signals are routed out through the CVV 128-Way connector #11 and terminate at a skin connector near the 128-Way connector in harness E11. (See Section 4.3.11) In the flight configuration of this harness therefore, this tail is not present in the "I-Harness" but only in the "E-Harness."

Overall Mechanical Drawing

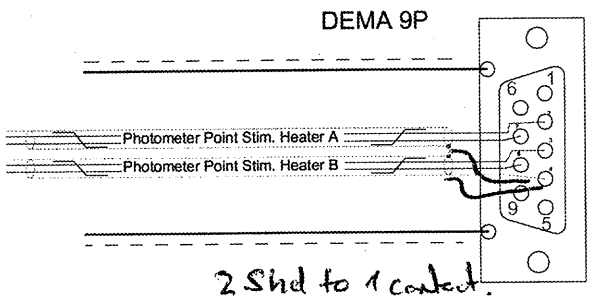


P16 SVM-CB
MS27497T 10F35P || MS27484T10F35SN Bridge EGSE

Connector/Backshell Details

DEMA 9 P+Glenair 550-E-039-M-1-	TBD	- H-0-TBD	to	FCU J13	P-Cal (Prime)
DCMA 37 P+Glenair 550-E-039-M-4-	TBD	- H-0-TBD	to	FCU J17	SMEC Control Module (Prime)
DCMA 37 P+Glenair 550-E-039-M-4-	TBD	- H-0-TBD	to	FCU J19	BSM Module (Prime)
DAMA 15 P+Glenair 550-E-039-M-2-	TBD	- H-0-TBD	to	FCU J21	Thermometry Tail C (Prime)
DCMA 37 S+Glenair 550-E-039-M-4-	TBD	- H-0-TBD	to	FCU J29	SMEC Launch (Prime)
DEMA 9 P+Glenair 550-E-039-M-1-	TBD	- H-0-TBD	to	Mech. Launch Lock Conf. J1 EGSE	Mech. Launch Lock Confirm

Photometer Stimulus J13

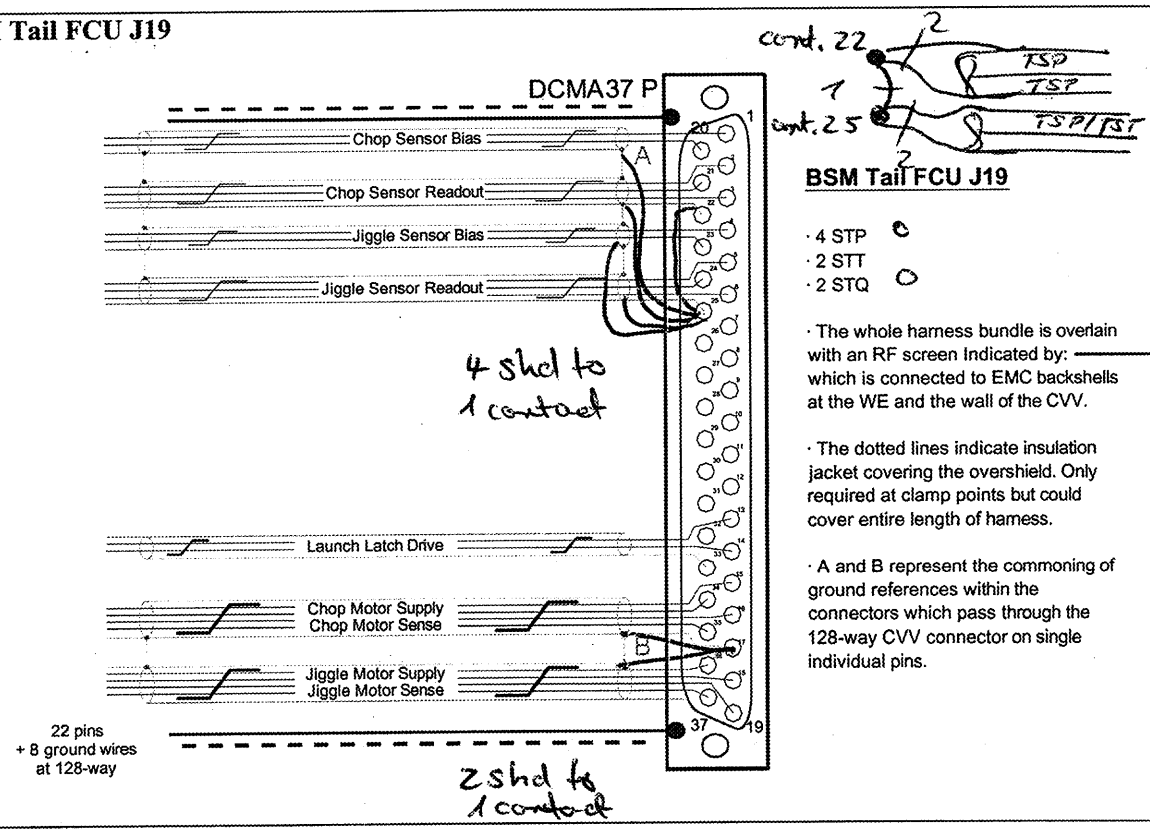


Phot. Stimulus (FCU J13/J14)

· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the FCU and at the wall of the CVV.

· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

BSM Tail FCU J19



BSM Tail FCU J19

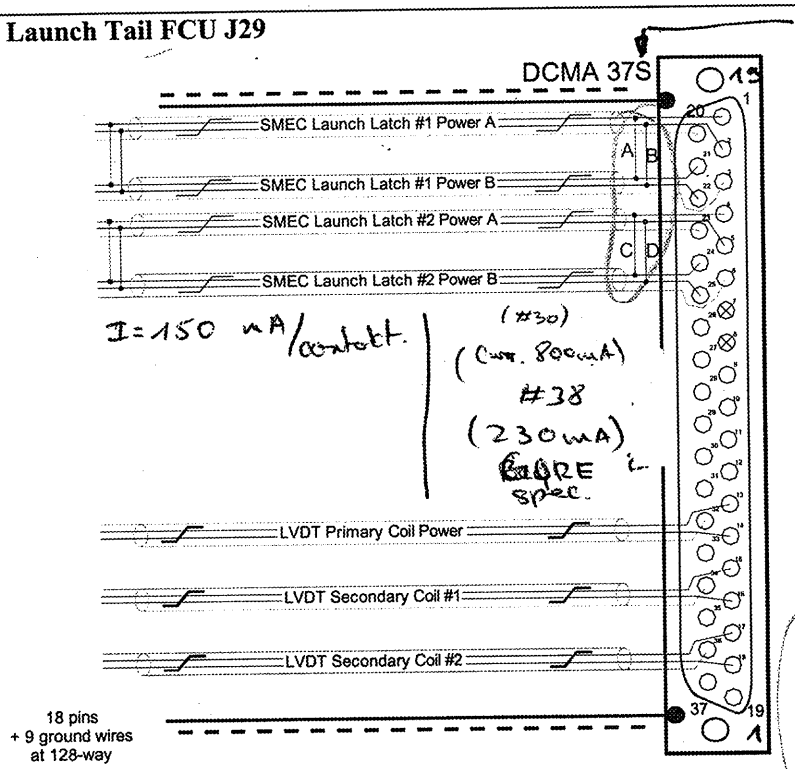
· 4 STP
· 2 STT
· 2 STQ

· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the WE and the wall of the CVV.

· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of hamess.

· A and B represent the commoning of ground references within the connectors which pass through the 128-way CVV connector on single individual pins.

SMEC Launch Tail FCU J29



I = 150 mA/contact. (#30) (Curr. 800mA) #38 (230mA) BORE spec.

wrong definition side ⇒ 1 = 19

SMEC Launch Tail FCU J29

· 7 STP

· The whole harness bundle is overlain with an RF screen Indicated by: ———— which is connected to EMC backshells at the WE and the wall of the CVV.

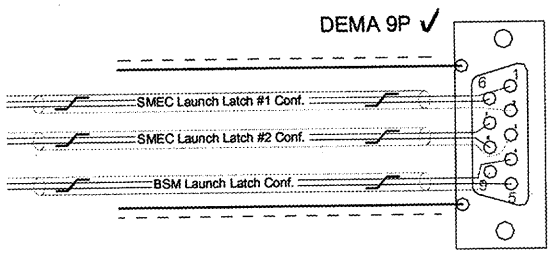
· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

· A, B, C and D represent the commoning of conductors in the harness.

AI SPIRE 06

Bridges Launch PWR A+B internal unit on J29 side / not C/H connector P29 !

see HN

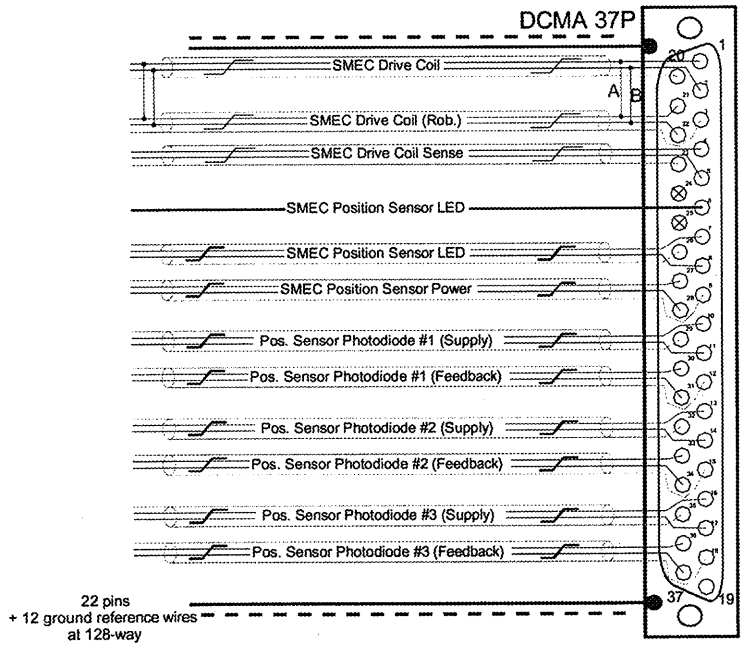


Mech. Launch Lock Confirm EGSE (EGSE J1/J2) (3 TOP28)

· The whole harness bundle is overlain with an RF screen Indicated by: ———— which is connected to EMC backshells at the EGSE and at the wall of the CVV.

· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

SMEC Control (FCU J17)



Bridges on unit connector internal not on C1H connect.

← see AIOG SPIRE HN.

SMEC Control Tail FCU J17

- 11 STP 28
- 1 Single

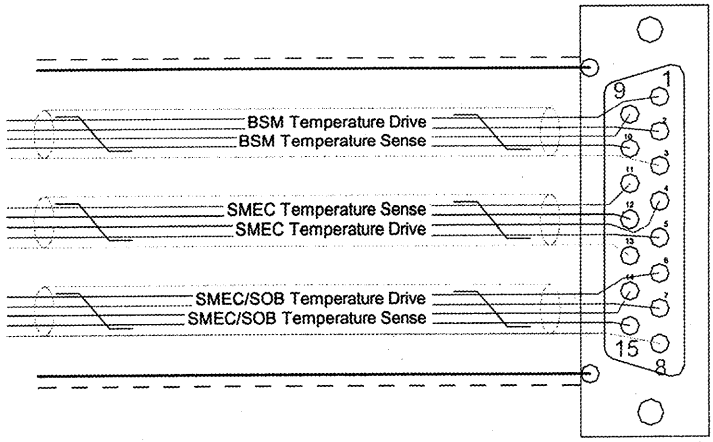
- The whole harness bundle is overlain with an RF screen Indicated by:——— which is connected to EMC backshells at the WE and the wall of the CVV.

- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

- A and B represent the commoning of conductors in the harness.

Thermometry C (FCU J21)

15P



Thermometry Tail C (FCU J21/J22)

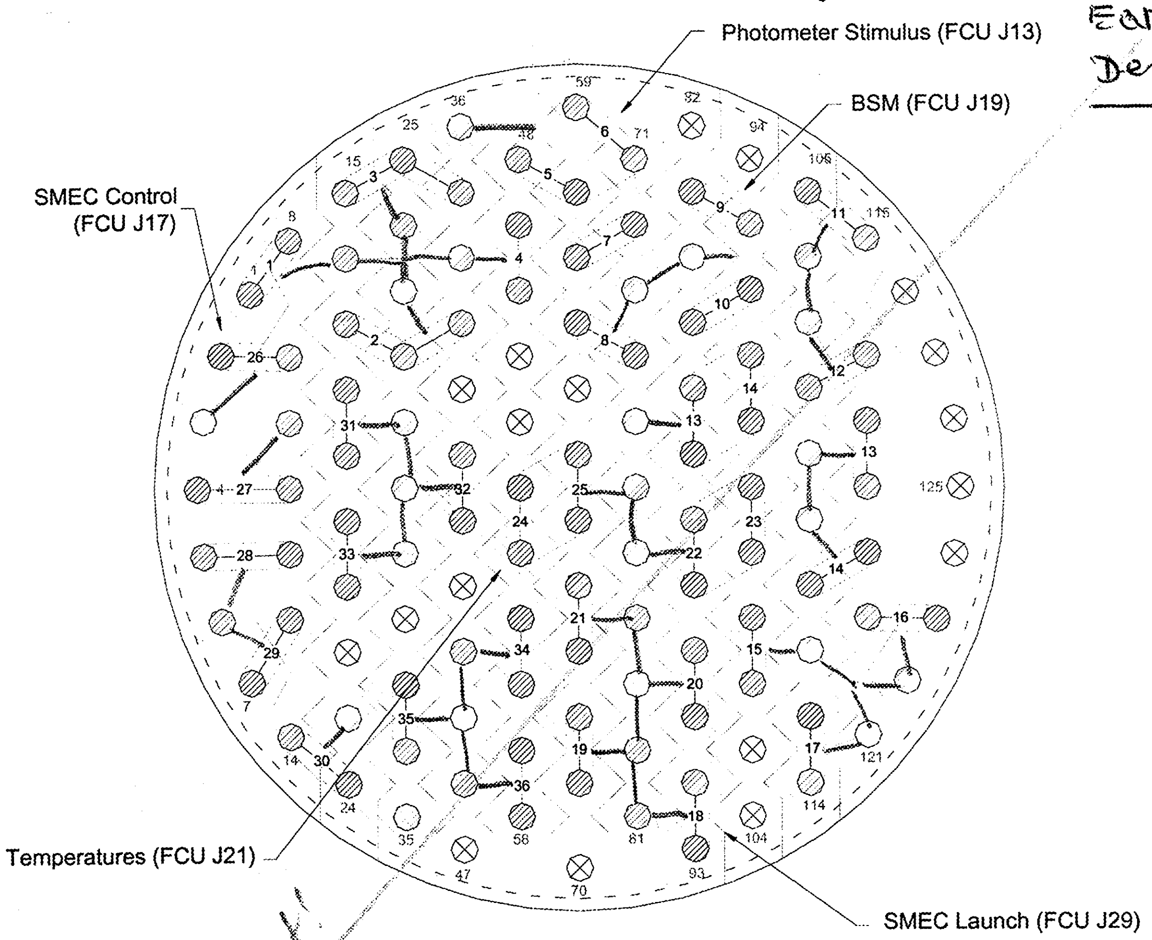
3TS4C28

- The whole harness bundle is overlain with an RF screen Indicated by:——— which is connected to EMC backshells at the Shutter and at the wall of the CVV.

- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

All contacts + shields ⇒ Σ = 112 contacts

I11 128-Way Pin Assignment (Ground Test Configuration)



- Bolometer Signal +
- Bolometer Signal -
- Signal Ground
- FPU Faraday Shield Link
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)

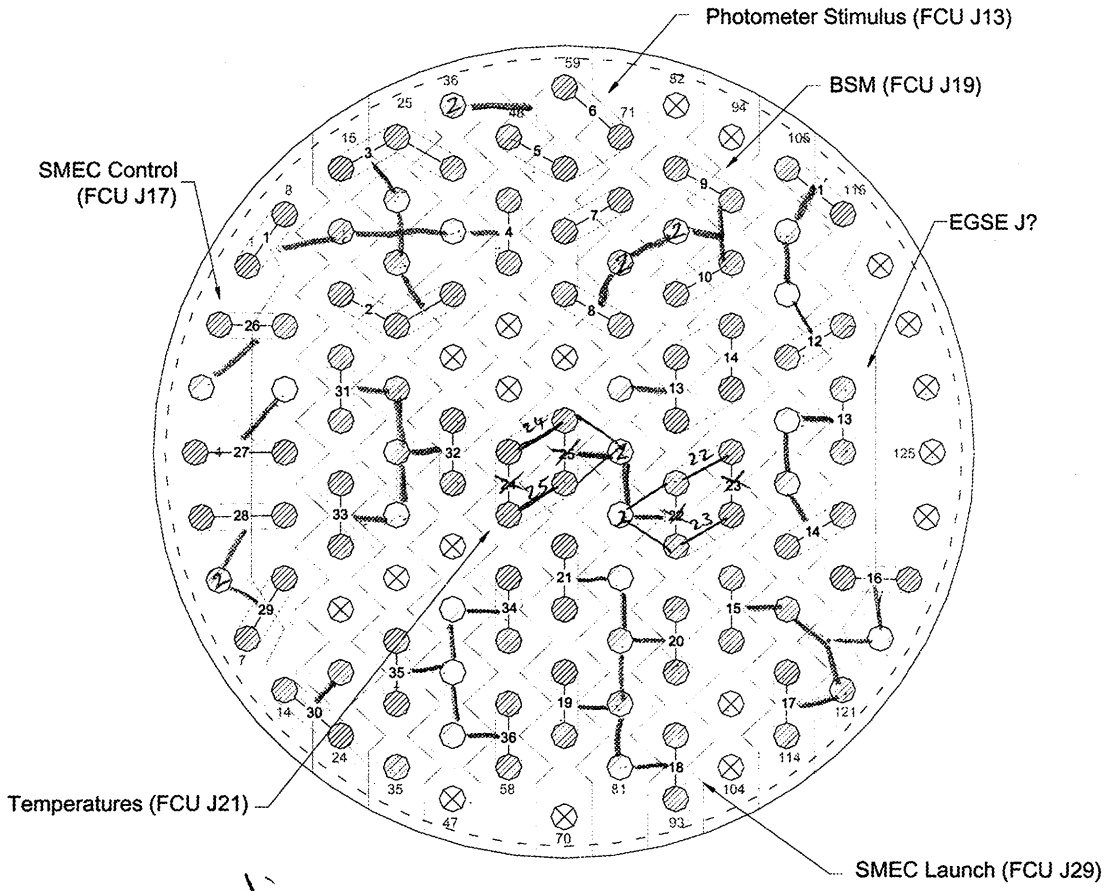
- Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

- 110 of 128 Contacts Used

All the "Ground Test Configuration" layouts specified are N/A for EQM + PFM Cryo c/H Design

18x NC! only Instrument!

I11 128-Way Pin Assignment (Flight Configuration)

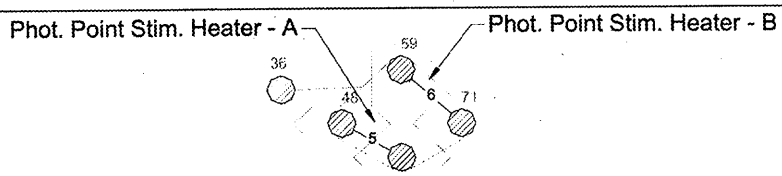


128-14 = 114 could wired

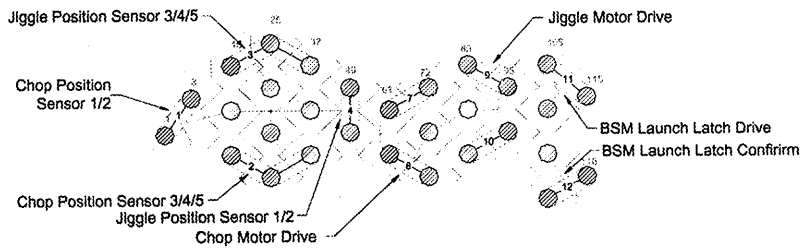
- Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

- 110 of 128 Contacts Used

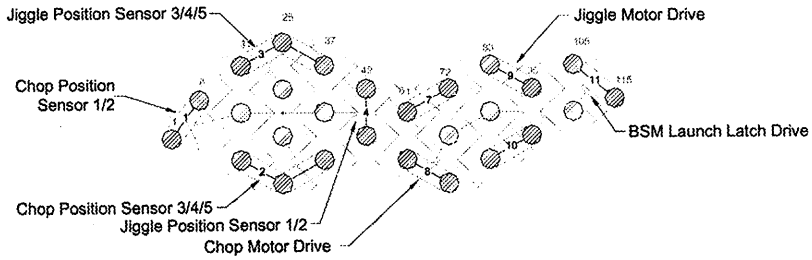
- Bolometer Signal +
- Bolometer Signal -
- Signal Ground
- FPU Faraday Shield Link
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)



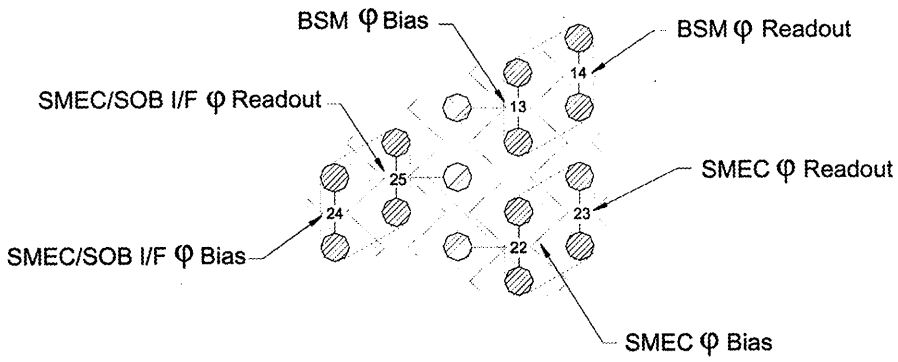
FCU Photometer Stimulus (FCU J13)
(Flight and Ground Test Configurations)



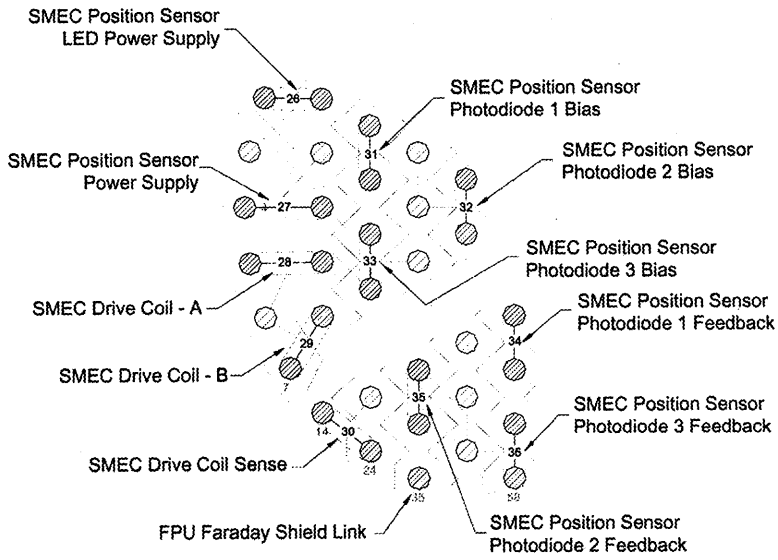
FCU BSM (J19)
Ground Test Configuration



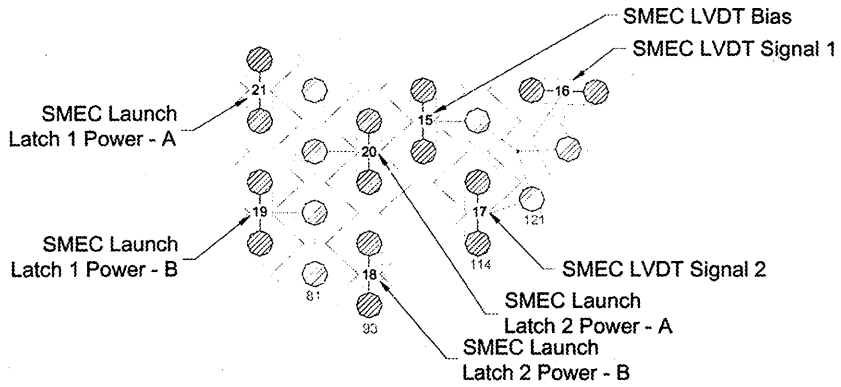
FCU BSM (J19) (Flight Configuration)



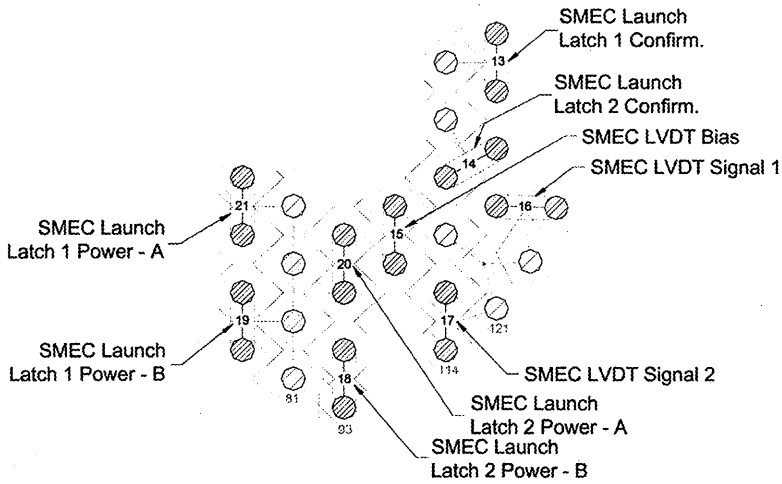
FCU Temperatures (J21)
(Flight and Ground Test Configuration)



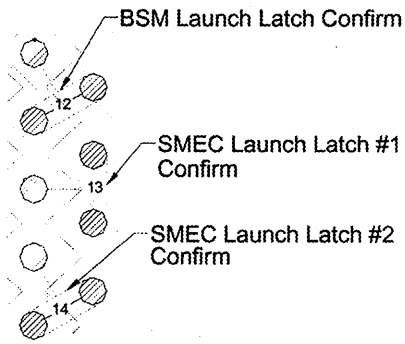
FCU SMEC Control (FCU J17)
(Flight and Ground Test Configurations)



SMEC Launch Tail (FCU J29)
(Flight Configuration)



SMEC Launch Tail (FCU J29)
(Ground Test Configuration)



?? EGSE J?
Launch Latch Confirm
Breakout Connector
(Flight only)

Temperature Tail Listing J21

Function	15way J21	Max. current	Wire lay-up	Max Ohms	128Way #11
BSM temperature I+	1	1 µA	Insulated screened twisted quad	1000	86
BSM temperature V+	9	N/A		1000	97
BSM temperature V-	10	N/A		1000	98
BSM temperature I-	2	1 µA		1000	87
BSM temperature shld	3	N/A		N/A	75
SMEC temperature I+	4	1 µA	Insulated screened twisted quad	1000	88
SMEC temperature V+	11	N/A		1000	99
SMEC temperature V-	12	N/A		1000	100
SMEC temperature I-	5	1 µA		1000	89
SMEC temperature shld	13	N/A		N/A	77
SMEC/SOB I/F temperature I+	6	1 µA	Insulated screened twisted quad	1000	54
SMEC/SOB I/F temperature V+	14	N/A		1000	65
SMEC/SOB I/F temperature V-	15	N/A		1000	64
SMEC/SOB I/F temperature I-	7	1 µA		1000	53
SMEC/SOB I/F temperature shld	8	N/A		N/A	76
Harness Overshield	EMC Backshell				

SMEC Control Tail Listing (FCU J17)

Function	37-Way J17	Max. Current	Wire Lay-up	Max Ohms	128Way #11
SMEC Drive Coil I+	1 (A)	100mA	Insulated screened twisted pair	5	12
SMEC Drive Coil I-	2 (B)	100mA		5	5
SMEC Drive Coil shld	20	N/A		N/A	6
SMEC Drive Coil (Rob) I+	21(A)	100mA	Insulated screened twisted pair	5	13
SMEC Drive Coil (Rob) I-	22 (B)	100mA		5	7
SMEC Drive Coil (Rob) shld	3	N/A		N/A	6
SMEC Drive Coil Sense+	4	10 µA	Insulated screened twisted pair	500	14
SMEC Drive Coil Sense-	5	10 µA		500	24
SMEC Drive Coil shld	23	N/A		N/A	23
SMEC position sensor Led power supply	7	1mA	Insulated screened twisted pair	100	9
SMEC position sensor Led power return	8	1mA		100	2
SMEC position sensor Led power Shield	26	N/A		N/A	3
SMEC position sensor power supply	27	1mA	Insulated screened twisted pair	100	4
SMEC position sensor power return	28	1mA		100	11
SMEC position sensor power Shield	9	N/A		N/A	10
SMEC position sensor photodiode #1 I+	10	20 µA	Insulated screened twisted pair	1000	18
SMEC position sensor photodiode #1 I-	11	20 µA		1000	19
SMEC position sensor photodiode Shield	29	N/A		N/A	29
SMEC pos. sensor photodiode #1 feedback +	30	10 µA	Insulated screened twisted pair	1000	56
SMEC pos. sensor photodiode #1 feedback -	31	10 µA		1000	55
SMEC pos. sensor photodiode feedback Shld	12	N/A		N/A	44
SMEC position sensor photodiode #2 I+	13	20 µA	Insulated screened twisted pair	1000	42
SMEC position sensor photodiode #2 I-	14	20 µA		1000	41
SMEC position sensor photodiode Shield	32	N/A		N/A	30
SMEC pos. sensor photodiode #2 feedback +	33	10 µA	Insulated	1000	34

SMEC pos. sensor photodiode #2 feedback -	34	10 µA	screened twisted pair	1000	33
SMEC pos. sensor photodiode feedback Shld	15	N/A		N/A	45
SMEC position sensor photodiode #3 I+	16	20 µA	Insulated screened twisted pair	1000	20
SMEC position sensor photodiode #3 I-	17	20 µA		1000	21
SMEC position sensor photodiode Shield	35	N/A		N/A	31
SMEC pos. sensor photodiode #3 feedback +	36	10 µA	Insulated screened twisted pair	1000	58
SMEC pos. sensor photodiode #3 feedback -	37	10 µA		1000	57
SMEC pos. sensor photodiode feedback Shld	18	N/A		N/A	46
FPU Faraday Shield Link	6	N/A	Single Wire	50	35
Harness Overshield	EMC Backshell				

Photometer Stimulus Heater J13

Function	9way J13	Max. Current	Wire Lay-up	Max Ohms	128Way #11
Photometer Point Stim. Heater I+_A	2	7 mA	Screened twisted quad	10	48
Photometer Point Stim.Heater I+_B	3	7 mA		10	71
Photometer Point Stim.Heater I-_A	7	7 mA		10	60
Photometer Point Stim.Heater I-_B	8	7 mA		10	59
Screen	4				36
Harness Overshield	EMC Backshell				

4 pins used

SMEC Launch Tail Listing (FCU J29)

The Ground Test Configuration of this tail contains the SMEC Launch Latch confirmation signals. These conductors are not present in the flight version of this tail. These conductors are shown as hatched in this table.

Function	37-Way J29	Max. Current	Wire lay-up	Max Ohms	128Way #11
SMEC launch latch #1 power supply A	1	400 mA / 50ms	Insulated screened twisted pair	5	67
SMEC launch latch #1 power return A	2	400 mA / 50ms		5	66
SMEC launch latch #1 power Shield A	20	N/A		N/A	78
SMEC launch latch #1 power supply B	21	400 mA / 50ms	Insulated screened twisted pair	5	69
SMEC launch latch #1 power return B	22	400 mA / 50ms		5	68
SMEC launch latch #1 power Shield B	3	N/A		N/A	80
SMEC launch latch #2 power supply A	4	400 mA / 50ms	Insulated screened twisted pair	5	90
SMEC launch latch #2 power return A	5	400 mA / 50ms		5	91
SMEC launch latch #2 power Shield A	3	N/A		N/A	79
SMEC launch latch #2 power supply B	24	400 mA / 50ms	Insulated screened twisted pair	5	92
SMEC launch latch #2 power return B	25	400 mA / 50ms		5	93
SMEC launch latch #2 power Shield B	6	N/A		N/A	81
~~SMEC launch latch #1 Confirmation +~~	~~30~~	~~1 mA~~	~~Insulated screened twisted pair~~	~~5~~	~~117~~
~~SMEC launch latch #1 Confirmation -~~	~~31~~	~~1 mA~~		~~5~~	~~118~~
~~SMEC launch latch #1 Shield~~	~~12~~	~~N/A~~		~~N/A~~	~~109~~
~~SMEC launch latch #2 Confirmation +~~	~~10~~	~~1 mA~~	~~Insulated screened twisted pair~~	~~5~~	~~111~~
~~SMEC launch latch #2 Confirmation -~~	~~11~~	~~1 mA~~		~~5~~	~~119~~
~~SMEC launch latch #2 Shield~~	~~29~~	~~N/A~~		~~N/A~~	~~110~~
SMEC LVDT primary coil power supply (P)	13	5 mA	Insulated screened twisted pair	5	101
SMEC LVDT primary coil power supply (N)	14	5 mA		5	102
SMEC LVDT primary coil power supply Shld	32	N/A		N/A	112
SMEC LVDT secondary coil # 1signal (P)	15	50 µA	Insulated screened twisted pair	5	127
SMEC LVDT secondary coil # 1 signal (N)	16	50 µA		5	120
SMEC LVDT secondary coil # 1 signal Shield	34	N/A		N/A	128
SMEC LVDT secondary coil # 2 signal (P)	17	50 µA	Insulated screened twisted pair	5	114
SMEC LVDT secondary coil # 2 signal (N)	18	50 µA		5	113
SMEC LVDT secondary coil # 2 signal Shield	36	N/A		N/A	121
Harness Overshield	EMC Backshell				

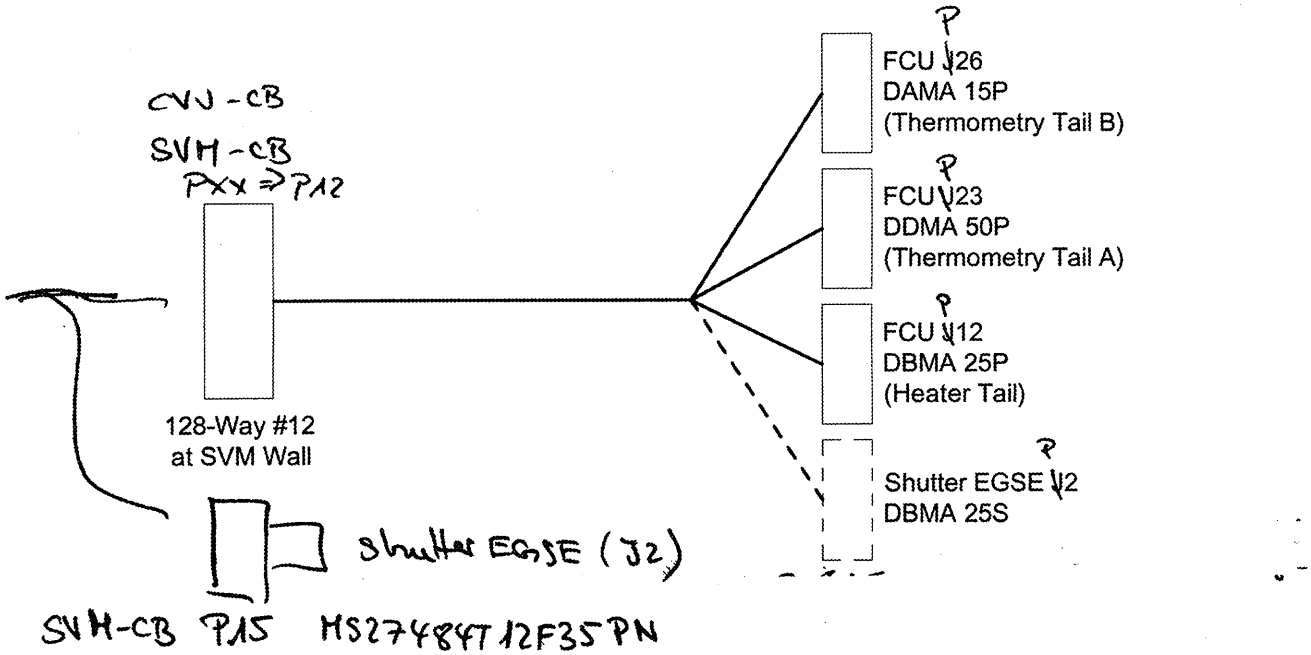
BSM Tail Listing (FCU J19)

The Ground Test Configuration of this tail contains the BSM Launch Latch confirmation signal. These conductors are not present in the flight version of this tail. These conductors are shown as hatched in this table.

Function	37way J19	Max. Current	Wire Lay-up	Max Ohms	128Way #11
Chop Position Sensor 1	1	1 mA	Insulated screened twisted pair	1000	8
Chop Position Sensor 2	20	1 mA		1000	1
Chop Position Sensor shld1	22 (A)	N/A		N/A	16 (A)
Chop Position Sensor 3	2	250 nA	Insulated screened twisted triple	1000	37
Chop Position Sensor 4	21	N/A		1000	25
Chop Position Sensor 5	3	N/A		1000	15
Chop Position Sensor shld2~~=A~~	22 (A)	N/A		N/A	26 (A)
Jiggle Position Sensor 1	4	1 mA	Insulated screened twisteed pair	1000	49
Jiggle Position Sensor 2	23	1 mA		1000	50
Jiggle Position Sensor shld1	22 (A)	N/A		N/A	38 (A)
Jiggle Position Sensor 3	5	250 nA	Insulated screened twisted triple	1000	39
Jiggle Position Sensor 4	24	N/A		1000	28
Jiggle Position Sensor 5	6	N/A		1000	17
Jiggle Position Sensor shld2~~=B~~	22 (A)	N/A		N/A	27 (A)
~~BSM Launch latch confirmation 1~~	~~30~~	~~1mA~~	~~Insulated screened twisteed pair~~	~~1000~~	~~105~~
~~BSM Launch latch confirmation 2~~	~~12~~	~~1mA~~		~~1000~~	~~115~~
~~Launch latch confirmation shld to platform gnc~~	~~31~~	~~N/A~~		~~N/A~~	~~106~~
BSM Launch latch drive +	13	35mA	Insulated screened twisted pair	10	108
BSM Launch latch drive -	14	35mA		10	116
BSM Launch latch drive shld	33	N/A		N/A	107
Chop Motor Drive 1	15	40 mA	Insulated screened twisted quad	10	72
Chop Motor Drive 2	34	40 mA		10	61
Chop Motor Drive 3	16	40 mA		10	62
Chop Motor Drive 4	35	40 mA		10	74
Chop Motor Drive shld	17 (B)	N/A		N/A	73 (B)
Jiggle Motor Drive 1	36	40 mA	Insulated screened twisted quad	10	83
Jiggle Motor Drive 2	18	40 mA		10	95
Jiggle Motor Drive 3	37	40 mA		10	96
Jiggle Motor Drive 4	19	40 mA		10	85
Jiggle Motor Drive shld	17 (B)	N/A		N/A	83 (B)
Harness Overshield	EMC Backshell				

4.2.12 I12 SVM12 – DRCU AUX-R

Overall Mechanical Drawing



Redundant version of I10, and the same as it

Connector/Backshell Details

Prime side harness

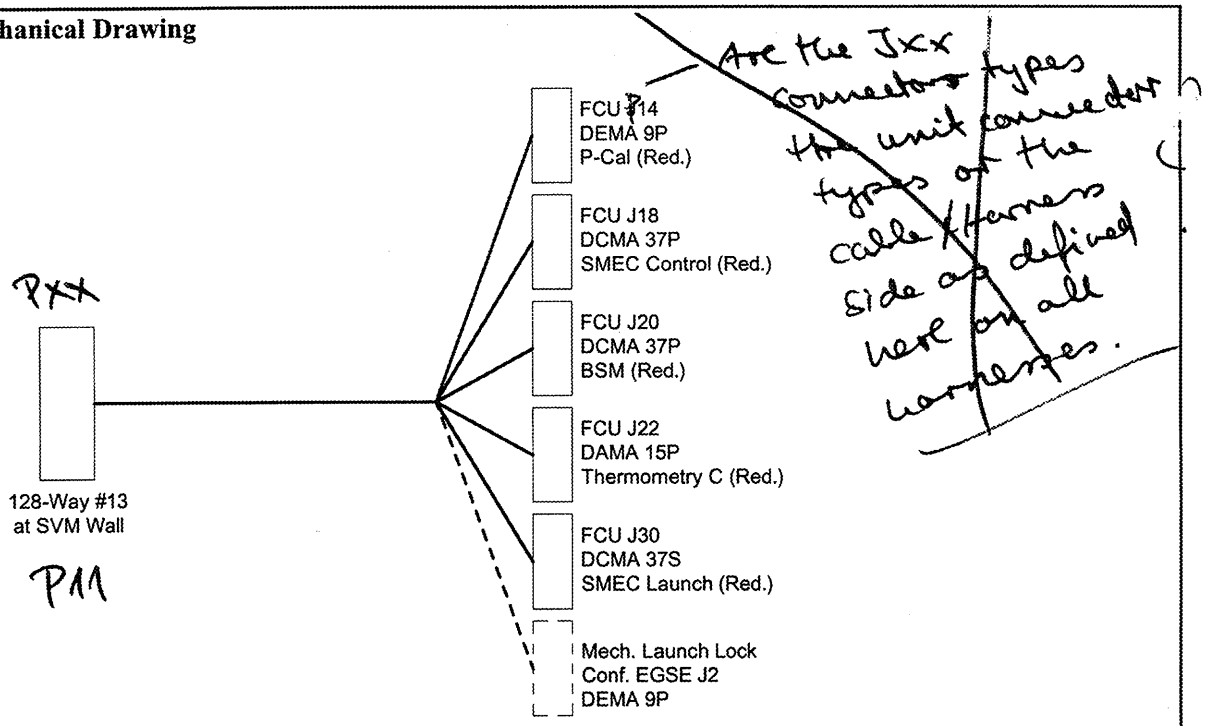
DBMA25P+Glenair550-E-039-M-3- TBD -H-0-TBD	to	FCU J12	Heater Tail (Red)
DBMA25P+Glenair550-E-039-M-3- TBD -H-0-TBD	to	Shutter EGSE J2	Shutter EGSE (Red.)
DDMA50P+Glenair550-E-039-M-5- TBD -H-0-TBD	to	FCU J24	FPU Thermometry Tail A (Red.)
DAMA15P+Glenair550-T-039-M-2- TBD -H-0-TBD	to	FCU J26	FPU Thermometry Tail B (Red.)

Harness Layup

As I10

4.2.13 I13 SVM13 – DRCU DRV-R

Overall Mechanical Drawing



Format as I11, maybe differing lengths.

all are PXX

Connector/Backshell Details

Redundant Side

DEMA 9 P+Glenair 550-E-039-M-1-	TBD	- H-0-TBD	to	FCU J14	P-Cal (Red.)
DCMA 37 P+Glenair 550-E-039-M-4-	TBD	- H-0-TBD	to	FCU J18	SMEC Control Module (Red.)
DCMA 37 P+Glenair 550-E-039-M-4-	TBD	- H-0-TBD	to	FCU J20	BSM Module (Red.)
DAMA 15 P+Glenair 550-E-039-M-2-	TBD	- H-0-TBD	to	FCU J22	Thermometry Tail C (Red.)
DCMA 37 S+Glenair 550-E-039-M-4-	TBD	- H-0-TBD	to	FCU J30	SMEC Launch (Red.)
DEMA 9 P+Glenair 550-E-039-M-1-	TBD	- H-0-TBD	to	Mech. Launch Lock Conf. J2 EGSE	Mech. Launch Lock Confirm

Harness Layup

As I11.

Contact Details

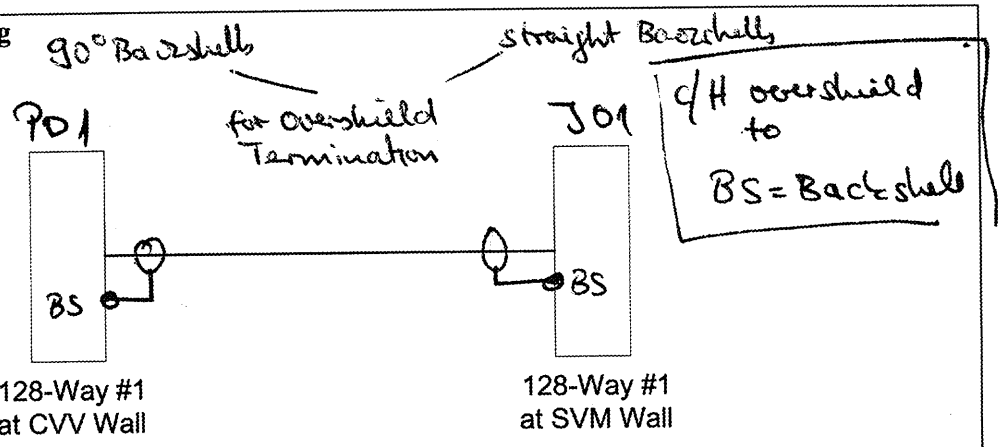
As I11

4.3 External Harnesses

These harnesses make the thermal jump between the SVM and the CVV wall. The overshields on the individual harnesses are connected to the SVM chassis and CVV chassis via the connector backshells.

4.3.1 ~~E1~~ I1 SVM 1 – CVV1 ~~Cloned~~

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

As per I1 – SVM Panel end

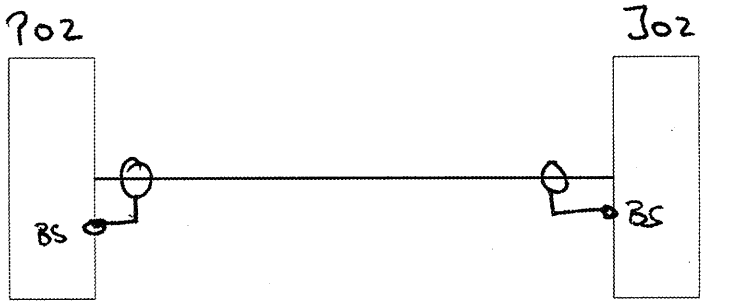
TBD Overshield

Contact Details

As per 128-way connector on I1

4.3.2 E2 SVM 2 – CVV2

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

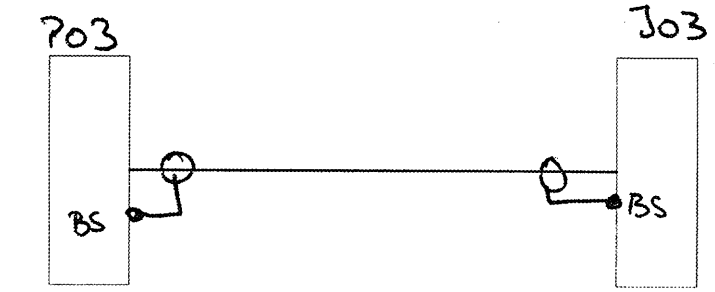
As per I2

Contact Details

As per 128-way connector on I2

4.3.3 E3 SVM 3 – CVV 3

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

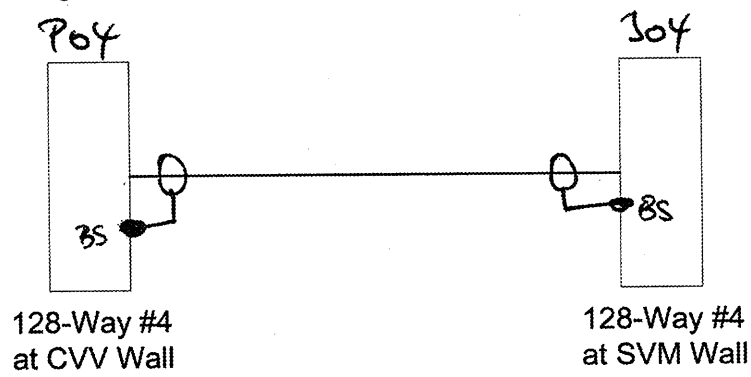
As per I3

Contact Details

As per 128-way connector on I3

4.3.4 E4 SVM 4 – CVV 4

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

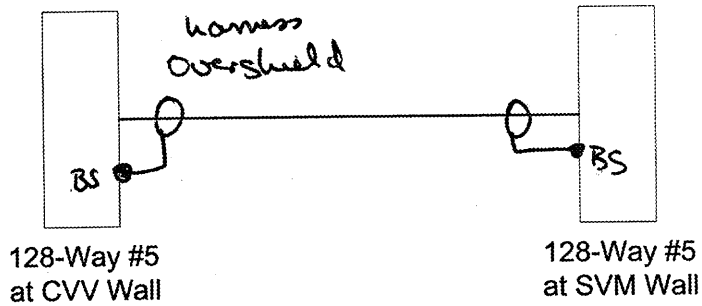
As per I4

Contact Details

As per 128-way connector on I4

4.3.5 E5 SVM 5 – CVV 5

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

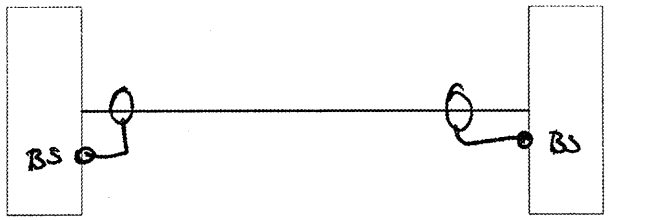
As per I5

Contact Details

As per 128-way connector on I5

4.3.6 E6 SVM 6 – CVV 6

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

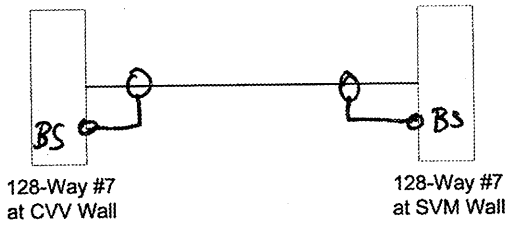
As per I6

Contact Details

As per 128-way connector on I6

4.3.7 E7 SVM 7 – CVV 7

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

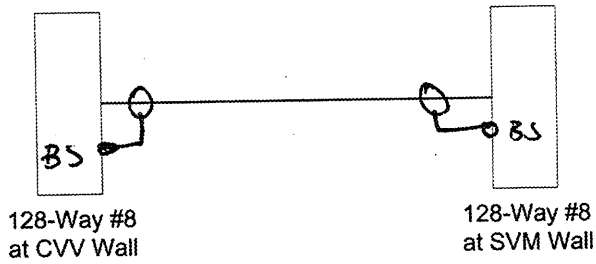
As per I7

Contact Details

As per 128-way connector on I7

4.3.8 E8 SVM 8 – CVV 8

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

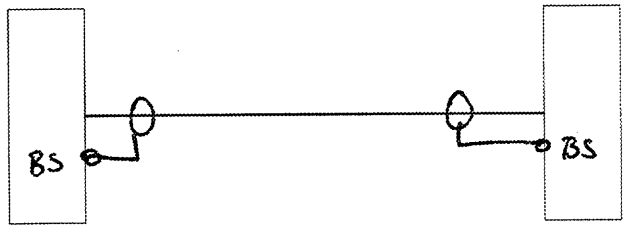
As per I8

Contact Details

As per 128-way connector on I8

4.3.9 E9 SVM 9 – CVV 9

Overall Mechanical Drawing



128-Way #9
at CVV Wall

128-Way #9
at SVM Wall

Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

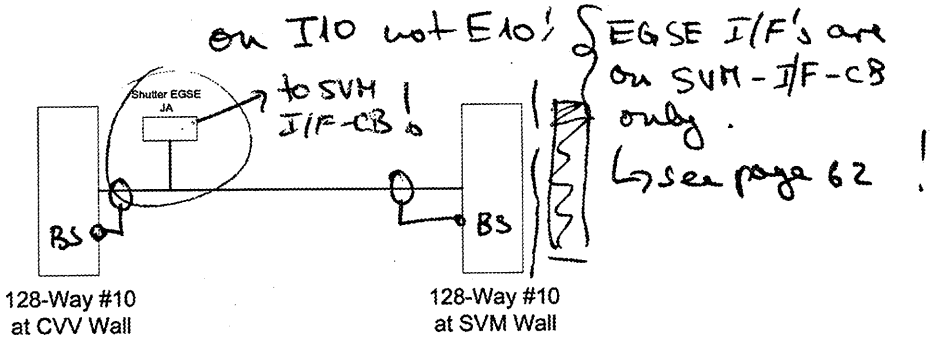
As per I9

Contact Details

As per 128-way connector on I9

4.3.10 I/E10 SVM 10 – CVV 10

Overall Mechanical Drawing



Connector/Backshell Details

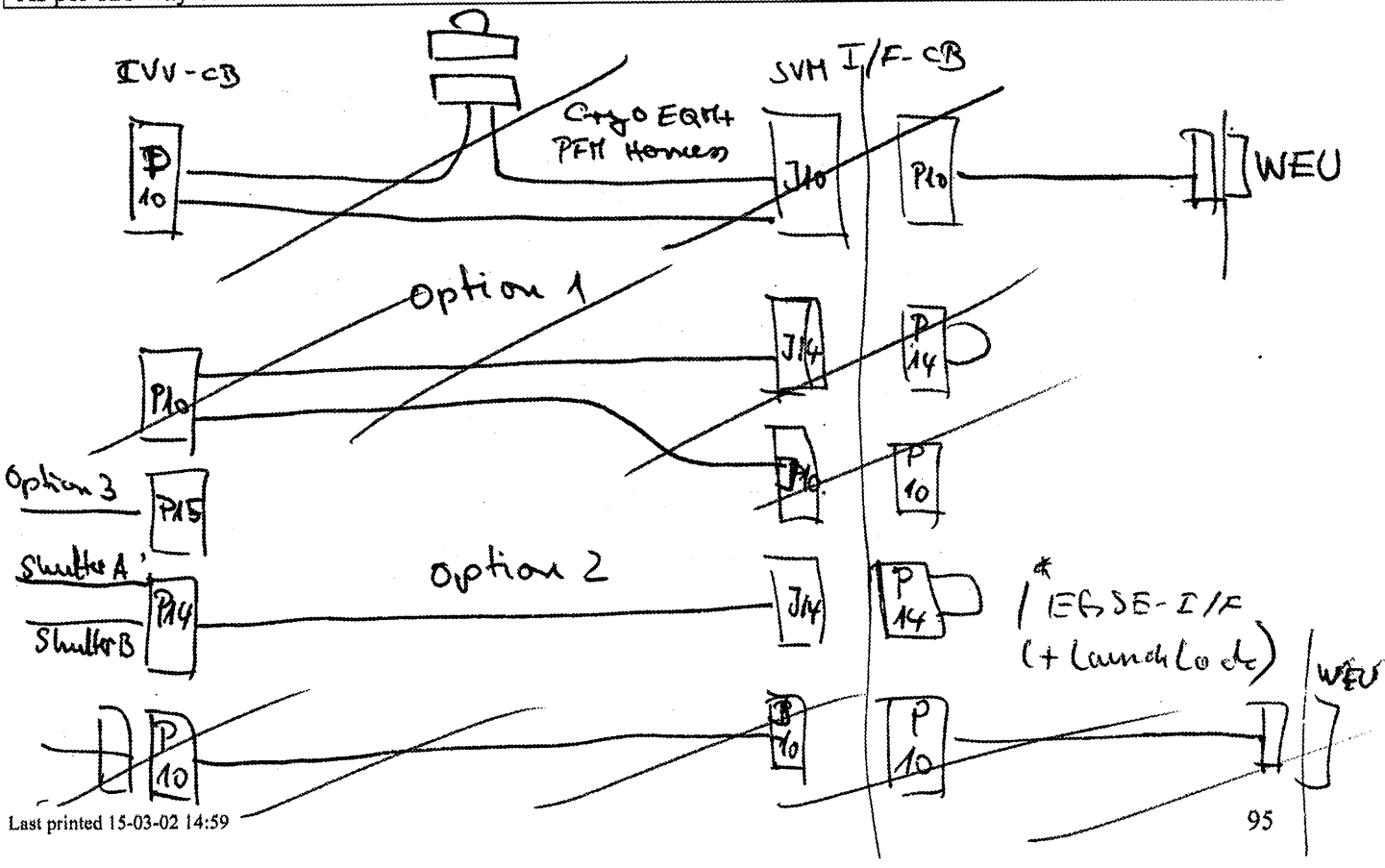
128-Way connectors at either end + TBD EMC Backshells.
TDB for connector JA

Harness Layup

As per I10

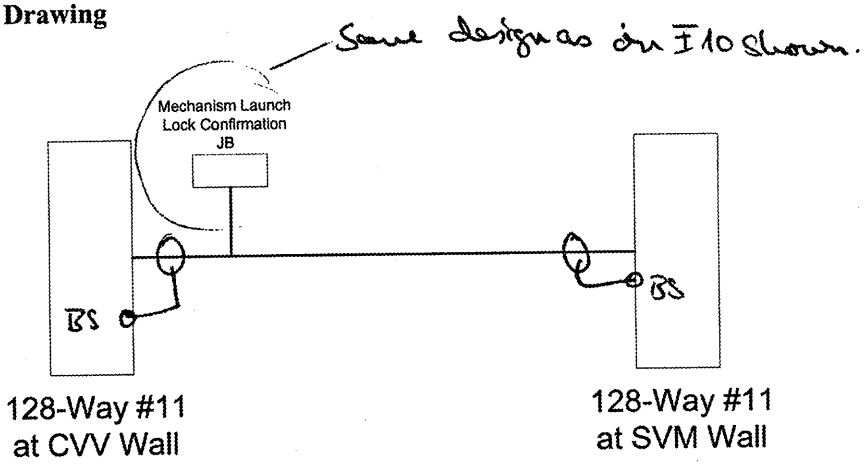
Contact Details

Skin connector as per FCU J
As per 128-way connector on I10



4.3.11 E11 SVM 11 – CVV 11

Overall Mechanical Drawing



Connector/Backshell Details

128-Way connectors at either end + TBD EMC Backshells.

Harness Layup

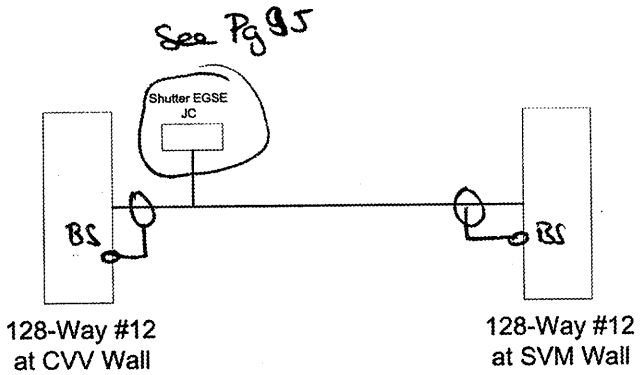
As per I11

Contact Details

As per 128-way connector on I11

4.3.12 E12 SVM 12 – CVV 12

Overall Mechanical Drawing



Connector/Backshell Details

As per E10

Harness Layup

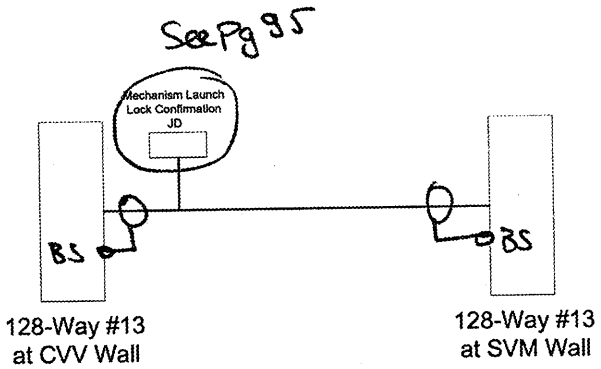
As per E10

Contact Details

As per E10

4.3.13 E13 SVM 13 – CVV 13

Overall Mechanical Drawing



Connector/Backshell Details

As per E11

Harness Layup

As per E11

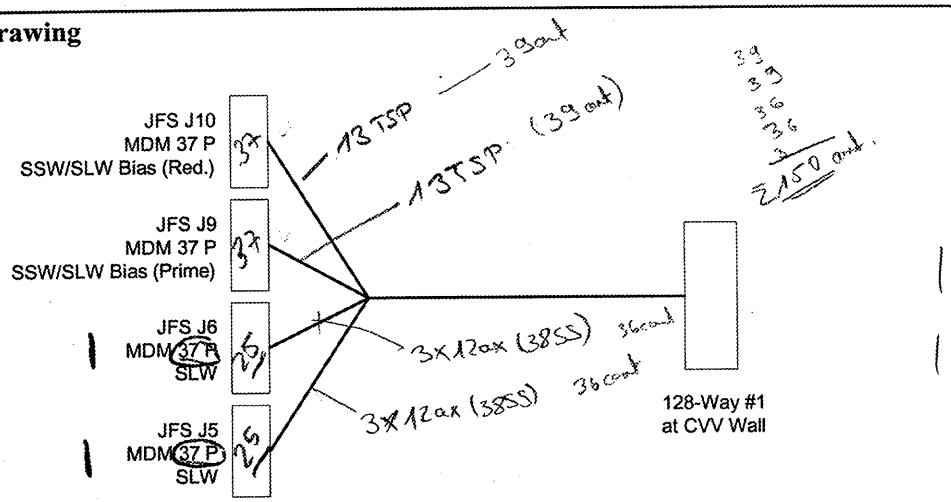
Contact Details

As per E11

4.4 Cryogenic Harnesses

4.4.1 C1 CVV1 to HSJFS Type3

Overall Mechanical Drawing

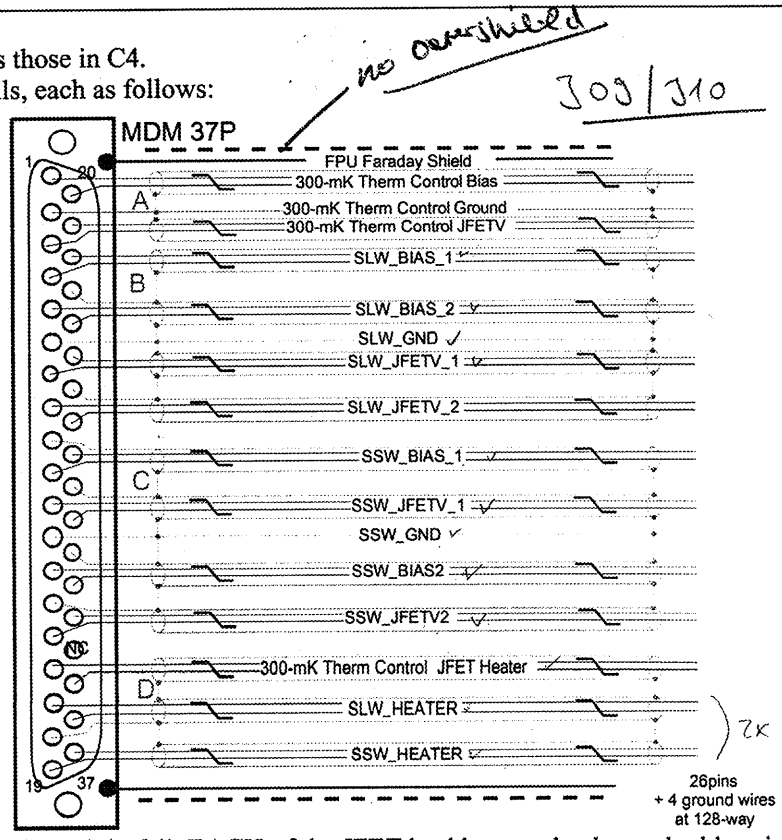


Connector/Backshell Details:

MDM 25 S	+	Glenair	500	-	T	-	010	-	M	-	25	-	F	-	TBD	to	JFSJ5	SLW JFET
MDM 25 S	+	Glenair	500	-	T	-	010	-	M	-	25	-	F	-	TBD	to	JFSJ6	SLW JFET
MDM 37 P	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to	JFSJ9	Spect. Bias
MDM 37 P	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to	JFSJ10	Spect. Bias

Harness Layup

Two 25way JFET bolometer tails, each as those in C4.
Two 37 way Spectrometer JFET Filter tails, each as follows:



Type 3 Bias Tails

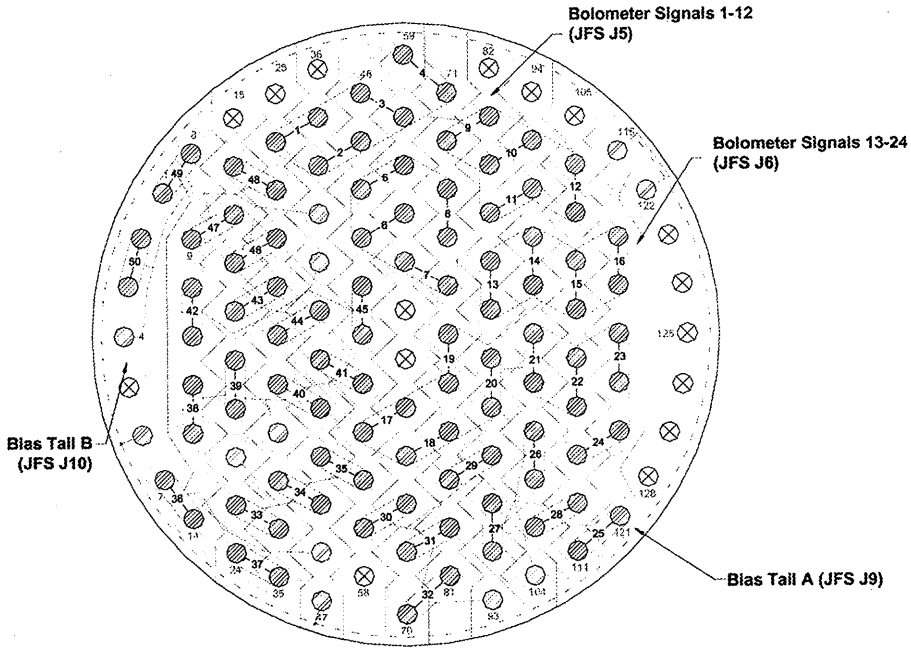
- 13 Insulated STPs
- 3 Single insulated ground wires
- Note SLW and SSW Ground Separation

- The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at JFS but isolated from the wall of the CVV.

- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

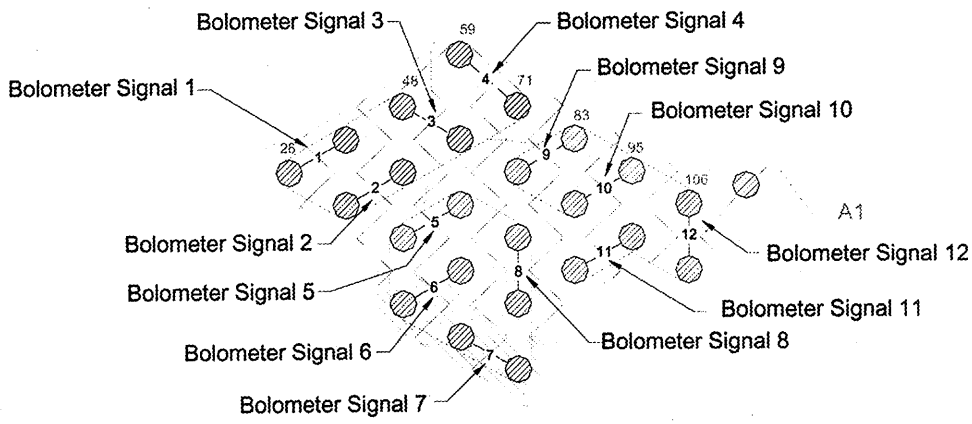
- A, B, C and D represent the commoning of ground references within the connectors which pass through the 128-way CVV connector on single individual pins.

Because the small SLW has no subgroups that might fail, EACH of the JFET backharness leads are double-wired in this cryoharness, requiring links across in the filters.

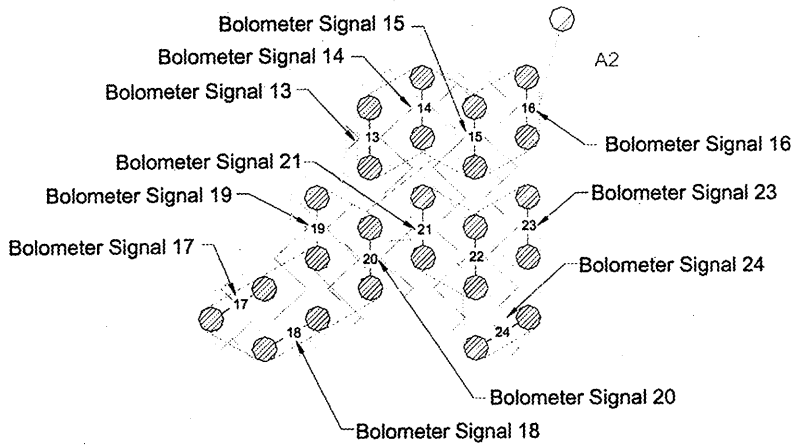


Overshields of the 12-ax and STP are commoned as indicated by signal ground connections and passed through the 128-way by dedicated ground pins.

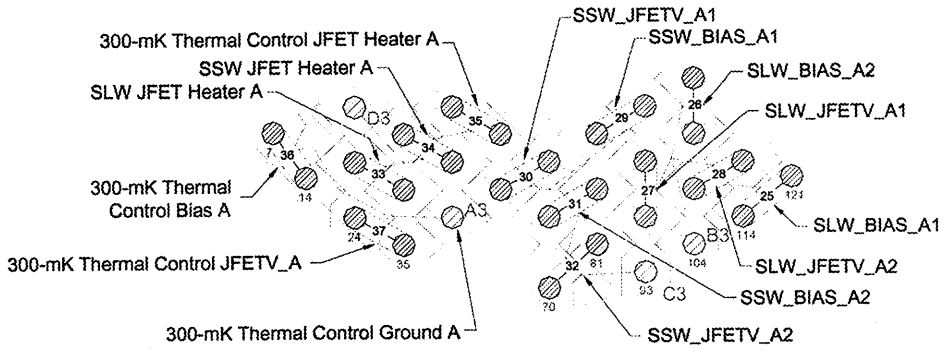
- Bolometer Signal +
- Bolometer Signal -
- Signal Ground
- FPU Faraday Shield Link
- No Connection
- Harness Tails
- Harness Overshield (Joined to FPU Faraday Shield Link Pins and isolated from connector chassis)
- Signal Ground Connection



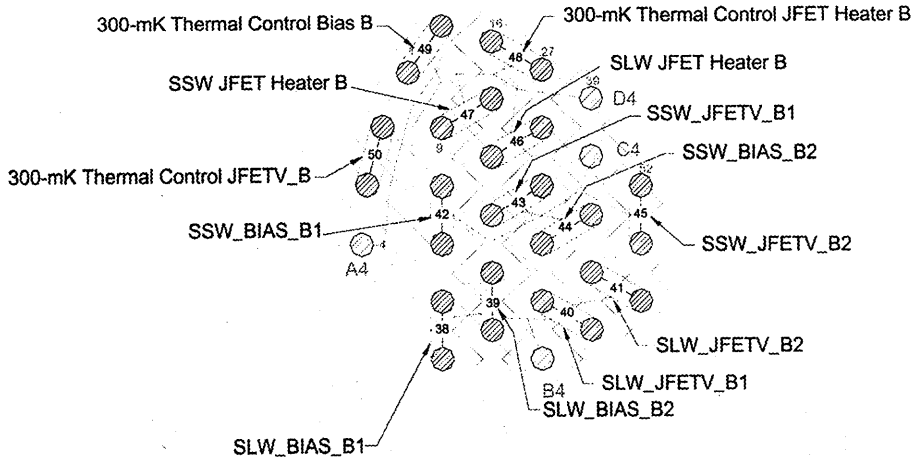
Bolometer Signals 1-12
(JFS J5)



Bolometer Signals 13-24
(JFS J6)



Bias Tail A
(JFS J9)



Bias Tail B
(JFS J10)

Contact details

Name	25-Way A J5	25-Way B J6	37-Way C J9	37-Way D J10	CVV 128-Way #1
Channel 1 +	1				26
Channel 1 -	14				37
Channel 1gnd shld	NC				115 (A1)
Channel 2 +	2				38
Channel 2 -	15				49
Channel 2gnd shld	NC				115 (A1)
Channel 3 +	3				48
Channel 3 -	16				60
Channel 3gnd shld	NC				115 (A1)
Channel 4 +	4				59
Channel 4 -	17				71
Channel 4gnd shld	NC				115 (A1)
Channel 5 +	5				50
Channel 5 -	18				61
Channel 5gnd shld	NC				115 (A1)
Channel 6 +	6				62
Channel 6 -	19				51
Channel 6gnd shld	NC				115 (A1)
Channel 7 +	20				115 (A1)
Channel 7 -	7				63
Channel 7gnd shld	NC				75
Channel 8 +	21				115 (A1)
Channel 8 -	8				74
Channel 8gnd shld	NC				73
Channel 9 +	22				115 (A1)
Channel 9 -	9				83
Channel 9gnd shld	NC				72
Channel 10 +	23				115 (A1)
Channel 10 -	10				95
Channel 10gnd shld	NC				84
Channel 11 +	24				115 (A1)
Channel 11 -	11				96
Channel 11gnd shld	NC				85
Channel 12 +	25				115 (A1)
Channel 12 -	12				106
Channel 12gnd shld	NC				107
SSW GND WIRE	13				115 (A1)
Channel 13 +		1			86
Channel 13 -		14			87
Channel 1gnd shld		NC			122 (A2)
Channel 14 +		2			97
Channel 14 -		15			98
Channel 1gnd shld		NC			122 (A2)
Channel 15 +		3			108
Channel 15 -		16			109
Channel 15gnd shld		NC			122 (A2)
Channel 16 +		4			116
Channel 16 -		17			117
Channel 16gnd shld		NC			122 (A2)
Channel 17 +		5			55
Channel 17 -		18			66
Channel 17gnd shld		NC			122 (A2)
Channel 18 +		6			67
Channel 18 -		19			78
Channel 18gnd shld		NC			122 (A2)

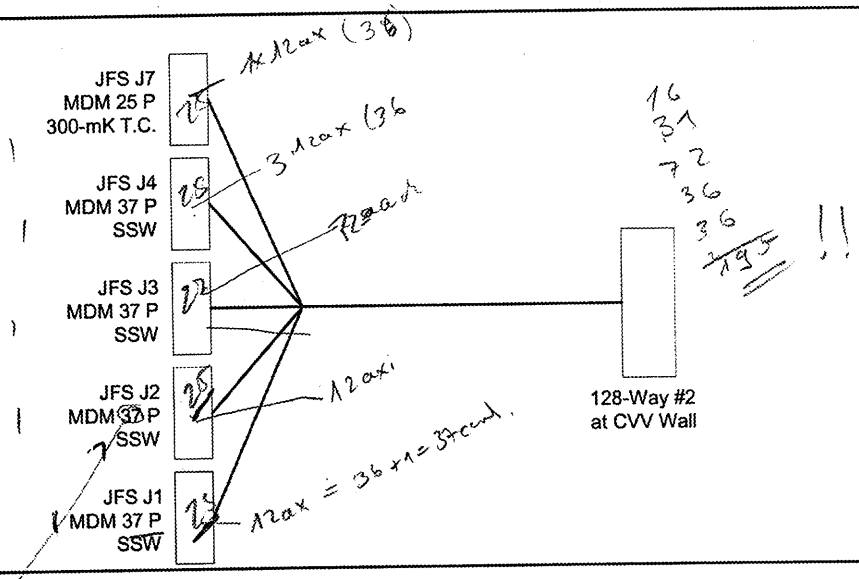
Name	25-Way A J5	25-Way B J6	37-Way C J9	37-Way D J10	CVV 128-Way #1
Channel 19 +		20			122 (A2)
Channel 19 -		7			76
Channel 19gnd shld		NC			77
Channel 20 +		21			122 (A2)
Channel 20 -		8			88
Channel 1gnd shld		NC			89
Channel 21 +		22			122 (A2)
Channel 21 -		9			99
Channel 21gnd shld		NC			100
Channel 22 +		23			122 (A2)
Channel 22 -		10			110
Channel 22gnd shld		NC			111
Channel 23 +		24			122 (A2)
Channel 23 -		11			118
Channel 23gnd shld		NC			119
Channel 24 +		25			122 (A2)
Channel 24 -		12			112
Channel 24gnd shld		NC			120
SSW GND WIRE		13			122 (A2)
300-mK TC Bias_A +ve			1		7
300-mK TC Bias_A –ve			20		14
300-mK TC Bias_A Shield			2 (A3)		46 (A3)
300-mK TC Ground_A			2 (A3)		46 (A3)
300-mK JFETV Bias_A +ve			21		24
300-mK JFETV Bias_A -ve			3		35
300-mK JFETV Bias_A Shield			2 (A3)		46 (A3)
SLW_BIAS_A1+ve			22		121
SLW_BIAS_A1-ve			4		114
SLW_BIAS_A1 shld			6(B3)		104(B3)
SLW_BIAS_A2 +ve			5		102
SLW_BIAS_A2 -ve			24		101
SLW_BIAS_A2 shld			23(B3)		104(B3)
SLW_JFETV_A1 +ve			25		92
SLW_JFETV_A1 -ve			7		91
SLW_JFETV_A1 shld			6(B3)		104(B3)
SLW_JFETV_A2 +ve			8		103
SLW_JFETV_A2 -ve			27		113
SLW_JFETV_A2 shld			6(B3)		104(B3)
SLW GND WIRE_A			6(B3)		104(B3)
FPU Faraday Shield Link_A			Note 1		47
SSW GND WIRE_A			12(C3)		93(C3)
SSW_BIAS1_A +ve			28		90
SSW_BIAS1_A –ve			10		79
SSW_BIAS1_A shld			9(C3)		93(C3)
SSW_JFETV1_A +ve			11		68
SSW_JFETV1_A -ve			30		57
SSW_JFETV1_A shld			29(C3)		93(C3)
SSW_BIAS2_A +ve			13		69
SSW_BIAS2_A –ve			32		80
SSW_BIAS2_A shld			31(C3)		93(C3)
SSW_JFETV2_A +ve			33		70
SSW_JFETV2_A -ve			15		81
SSW_JFETV2_A shld			14(C3)		93(C3)
S_HEATER GROUND WIRE_A			NC		22(D3)
SLW_JFET_HEATER_A +ve			17		23
SLW_JFET_HEATER_A -ve			36		34
SLW_JFET_HEATER_A shld			18(D3)		22(D3)
SSW_JFET_HEATER_A +ve			37		33

Name	25-Way A J5	25-Way B J6	37-Way C J9	37-Way D J10	CVV 128-Way #1
SSW_JFET_HEATER_A -ve			19		45
SSW_JFET_HEATER_A shld			18(D3)		22(D3)
300-mK_TC_JFET_HEATER_A +ve			16		44
300-mK_TC_JFET_HEATER_A -ve			35		56
300-mK_TC_JFET_HEATER_A shld			18(D3)		22(D3)
300-mK TC Bias_B +ve				1	1
300-mK TC Bias_B –ve				20	8
300-mK TC Bias_B Shield				2 (A4)	4(A4)
300-mK TC Ground_B				2 (A4)	4(A4)
300-mK JFETV Bias_B +ve				21	3
300-mK JFETV Bias_B –ve				3	2
300-mK JFETV Bias_B Shield				2 (A4)	4(A4)
SLW_BIAS_B1+ve				22	13
SLW_BIAS_B1-ve				4	12
SLW_BIAS_B1 shld				6(B4)	32(B4)
SLW_BIAS_B2 +ve				5	21
SLW_BIAS_B2 –ve				24	20
SLW_BIAS_B2 shld				23(B4)	32(B4)
SLW_JFETV_B1 +ve				25	31
SLW_JFETV_B1 –ve				7	43
SLW_JFETV_B1 shld				6(B4)	32(B4)
SLW_JFETV_B2 +ve				8	42
SLW_JFETV_B2 –ve				27	54
SLW_JFETV_B2 shld				6(B4)	32(B4)
SLW GND WIRE_B				6(B4)	32(B4)
FPU Faraday Shield Link_B				Note 1	6
SSW GND WIRE_B				12(C4)	40(C4)
SSW_BIAS1_B +ve				28	10
SSW_BIAS1_B –ve				10	11
SSW_BIAS1_B shld				9(C4)	40(C4)
SSW_JFETV1_B +ve				11	19
SSW_JFETV1_B -ve				30	29
SSW_JFETV1_B shld				29(C4)	40(C4)
SSW_BIAS2_B +ve				13	41
SSW_BIAS2_B –ve				32	30
SSW_BIAS2_B shld				31(C4)	40(C4)
SSW_JFETV2_B +ve				33	53
SSW_JFETV2_B -ve				15	52
SSW_JFETV2_B shld				14(C4)	40
S_HEATER GROUND WIRE_B				NC	39(D4)
SLW_HEATER_B +ve				17	18
SLW_HEATER_B -ve				36	28
SLW_HEATER_B shld				18(D4)	39(D4)
SSW_HEATER_B +ve				37	9
SSW_HEATER_B -ve				19	17
SSW_HEATER_B shld				18(D4)	39(D4)
300-mK_TC_JFET_HEATER_A +ve				16	16
300-mK_TC_JFET_HEATER_A -ve				35	27
300-mK_TC_JFET_HEATER_A shld				18(D4)	39(D4)
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	Via Pins 6&47

Note 1: FPU Faraday Shield Link Connected to harness bundle overshield.

4.4.2 C2 CVV2 to HSJFS Type4

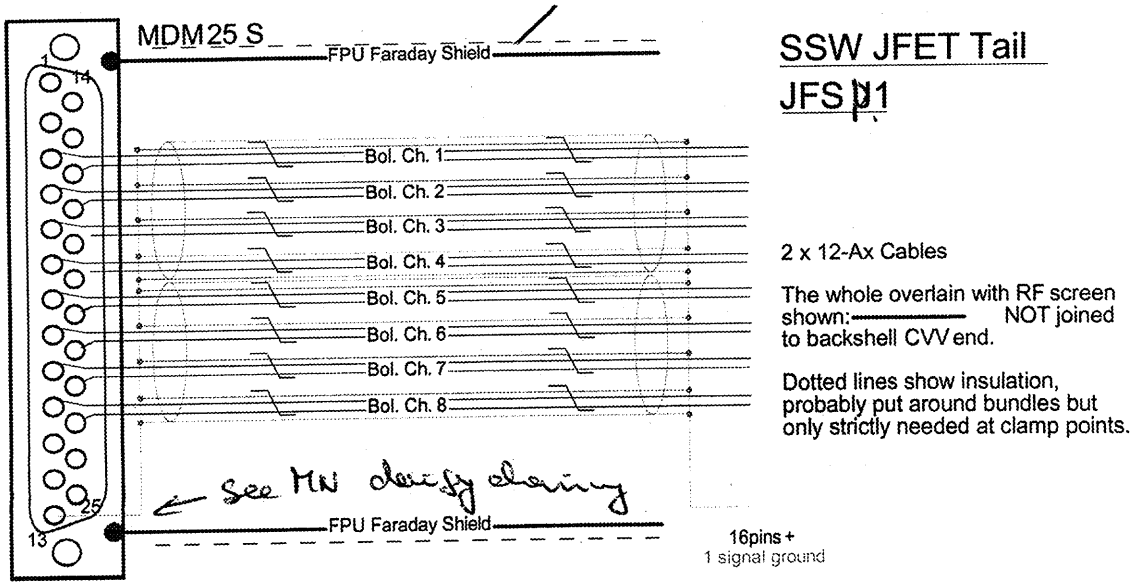
Overall Mechanical Drawing

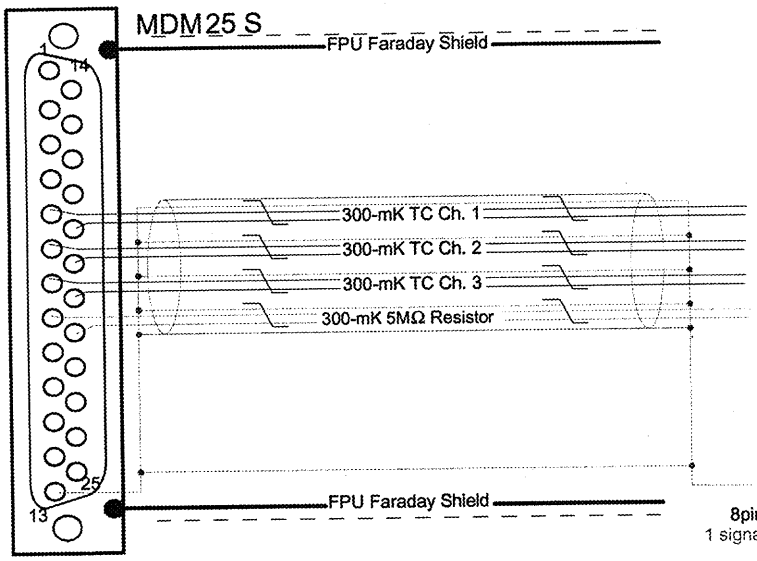


Connector/Backshell Details

MDM	25	S	+	Glenair	500	T	010	M-25-H-TBD	to	JFS J1	SSW JFET
MDM	25	S	+	Glenair	500	T	010	M-25-F-TBD	to	JFS J2	SSW JFET
MDM	25	S	+	Glenair	500	T	010	M-25-F-TBD	to	JFS J3	SSW JFET
MDM	25	S	+	Glenair	500	T	010	M-25-F-TBD	to	JFS J4	SSW JFET
MDM	25	S	+	Glenair	500	T	010	M-25-F-TBD	to	JFS J7	300-mK TC

Harness Layup



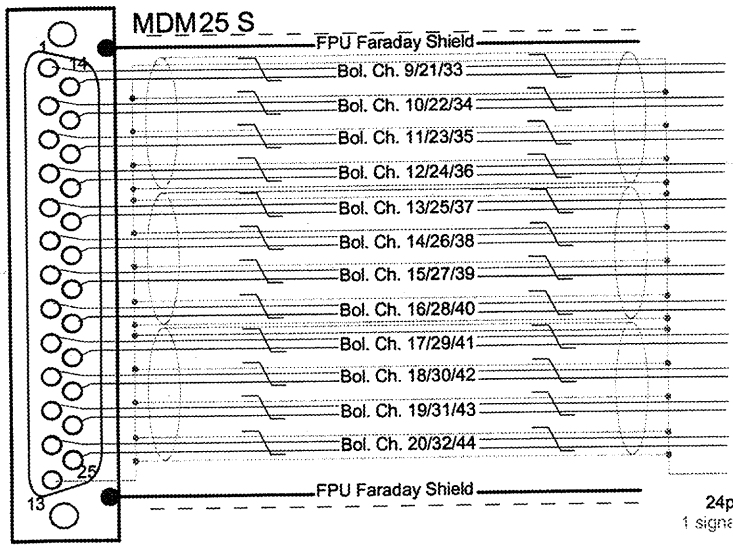


300-mK Thermal Control Signals JFS 07

12-Ax cable overlain with RF screen shown:———— NOT joined to backshell CVV end.

Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.

Note: The 5MΩ Resistor is wired to the CVV wall and shorted in the "E-Harness" CVV Connector



SSW JFET tails

Common to JFS Tails J2, J3 & J4
J2 carries Bolometer pairs 9-20
J3 carries Bolometer pairs 21-32
J4 carries Bolometer pairs 33/44

3 x 12-ax cables

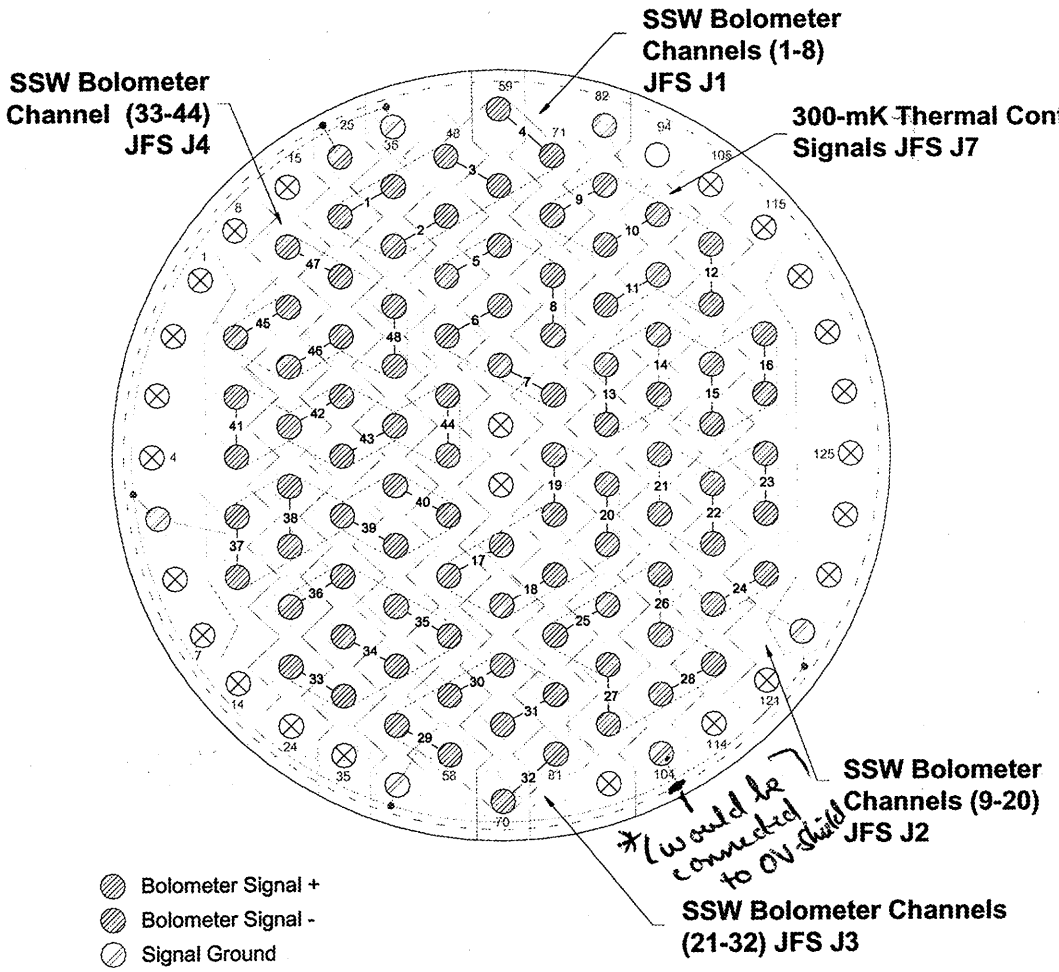
The whole overlain with RF screen shown:———— NOT joined to backshell CVV end.

Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.

12 wire core # 38 > to be fit to contact 13 !
3 - 12ax - shields

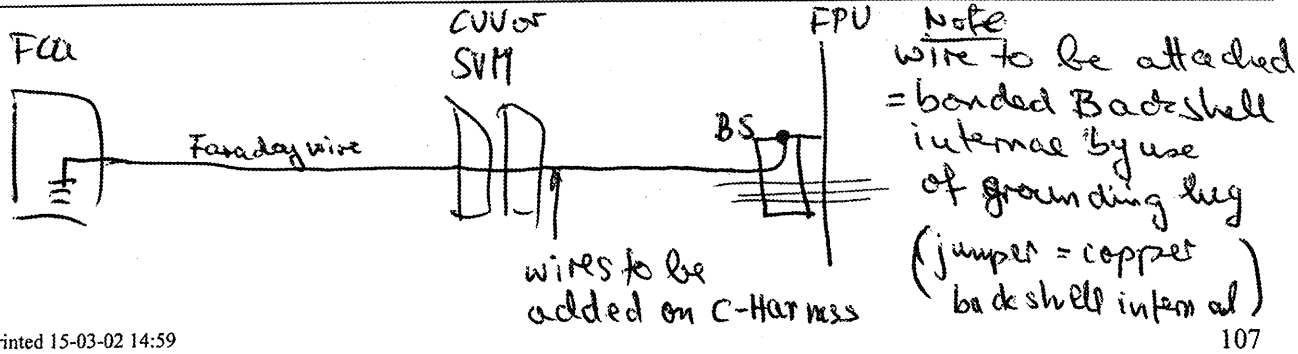
AI - ASED to investigate such an feasable wire interconnection methods, see MN 8.
(or to develop a special wider backshell)

128 Way Pin Allocations C2



Overshields of the 12-ax and STP are commoned as indicated by signal ground connections and passed through the 128-way by dedicated ground pins.

* conditionello of No-overallshied no connection of 104 to C/H overshield



Note: Pin numbers suffixed by a letter in parentheses indicated the commoning of pins within the 128-way connector. Note the separation of the SSW Ground reference and the 300-mK Ground Reference.

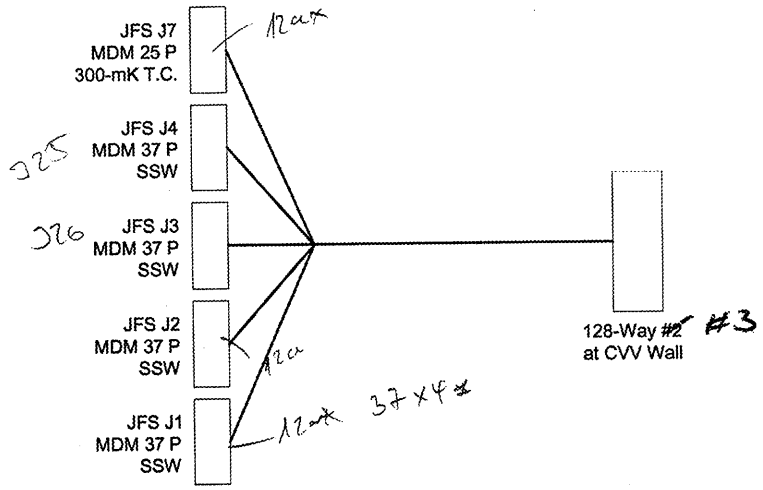
Name	25way A JFS J1	25wayB JFS J2	25Way C JFS J3	25way D JFS J4	25-Way E JFS J7	128Way #2
Bol. Channel 1 +	3					26
Bol. Channel 1 -	16					37
Bol. Channel 1gnd	13 (A)					36(A)
Bol. Channel 2 +	4					38
Bol. Channel 2 -	17					49
Bol. Channel 2gnd	13 (A)					36(A)
Bol. Channel 3 +	5					48
Bol. Channel 3 -	18					60
Bol. Channel 3gnd	13 (A)					36(A)
Bol. Channel 4 +	6					59
Bol. Channel 4 -	19					71
Bol. Channel 4gnd	13 (A)					36(A)
Bol. Channel 5 +	7					50
Bol. Channel 5 -	20					61
Bol. Channel 5gnd	13 (A)					36(A)
Bol. Channel 6 +	8					62
Bol. Channel 6 -	21					51
Bol. Channel 6gnd	13 (A)					36(A)
Bol. Channel 7 +	9					63
Bol. Channel 7 -	22					75
Bol. Channel 7gnd	13 (A)					36(A)
Bol. Channel 8 +	10					74
Bol. Channel 8 -	23					73
Bol. Channel 8gnd	13 (A)					36(A)
300-mK 5MW Resistor +					8	83
300-mK 5MW Resistor -					21	72
300-mK 5MW Resistor gnd					13 (A)	82(B)
300-mK TC Channel 1 +					5	95
300-mK TC Channel 1 -					18	84
300-mK TC Channel 1gnd					13 (A)	82(B)
300-mK TC Channel 2 +					6	96
300-mK TC Channel 2 -					19	85
300-mK TC Channel 2gnd					13 (A)	82(B)
300-mK TC Channel 3					7	36
300-mK TC Channel 3 -					20	107
300-mK TC Channel 3gnd					13 (A)	82(B)
GND WIRE					13 (A)	36(B)
Bol. Channel 9 +		1				86
Bol. Channel 9 -		14				87
Bol. Channel 9gnd		13 (A)				36(A)
Bol. Channel 10 +		2				97
Bol. Channel 10 -		15				98
Bol. Channel 10gnd		13 (A)				36(A)
Bol. Channel 11 +		3				108
Bol. Channel 11 -		16				109
Bol. Channel 11gnd		13 (A)				36(A)
Bol. Channel 12 +		4				116
Bol. Channel 12 -		17				117
Bol. Channel 12gnd		13 (A)				36(A)
Bol. Channel 13 +		5				55
Bol. Channel 13 -		18				66
Bol. Channel 1gnd		13 (A)				128(A)
Bol. Channel 14 +		6				67
Bol. Channel 14 -		19				78

Name	25way A JFS J1	25wayB JFS J2	25Way C JFS J3	25way D JFS J4	25-Way E JFS J7	128Way #2
Bol. Channel 1gnd		13 (A)				128(A)
Bol. Channel 15 +		20				76
Bol. Channel 15 -		7				77
Bol. Channel 15gnd		13 (A)				128(A)
Bol. Channel 16 +		21				88
Bol. Channel 16 -		8				89
Bol. Channel 16gnd		13 (A)				128(A)
Bol. Channel 17 +		22				99
Bol. Channel 17 -		9				100
Bol. Channel 17gnd		13 (A)				128(A)
Bol. Channel 18 +		23				110
Bol. Channel 18 -		10				111
Bol. Channel 18gnd		13 (A)				128(A)
Bol. Channel 19 +		24				118
Bol. Channel 19 -		11				119
Bol. Channel 19gnd		13 (A)				128(A)
Bol. Channel 20 +		25				112
Bol. Channel 20 -		12				120
Bol. Channel 20gnd		13 (A)				128(A)
GND WIRE		13				128(A)
Bol. Channel 21 +			1			90
Bol. Channel 21 -			14			79
Bol. Channel 21gnd			13 (A)			128(A)
Bol. Channel 22 +			2			102
Bol. Channel 22 -			15			101
Bol. Channel 22gnd			13 (A)			128(A)
Bol. Channel 23 +			3			92
Bol. Channel 23 -			16			91
Bol. Channel 23gnd			13 (A)			128(A)
Bol. Channel 24 +			4			103
Bol. Channel 24 -			17			113
Bol. Channel 24gnd			13 (A)			128(A)
Bol. Channel 25 +			5			58
Bol. Channel 25 -			18			46
Bol. Channel 25gnd			13 (A)			128(A)
Bol. Channel 26 +			6			68
Bol. Channel 26 -			19			57
Bol. Channel 26gnd			13 (A)			128(A)
Bol. Channel 27 +			20			69
Bol. Channel 27 -			7			80
Bol. Channel 27gnd			13 (A)			128(A)
Bol. Channel 28 +			21			70
Bol. Channel 28 -			8			81
Bol. Channel 28gnd			13 (A)			128(A)
Bol. Channel 29 +			22			23
Bol. Channel 29 -			9			34
Bol. Channel 29gnd			13 (A)			4(A)
Bol. Channel 30 +			23			33
Bol. Channel 30 -			10			45
Bol. Channel 30gnd			13 (A)			4(A)
Bol. Channel 31 +			24			44
Bol. Channel 31 -			11			56
Bol. Channel 31gnd			13 (A)			4(A)
Bol. Channel 32 +			25			22
Bol. Channel 32 -			12			32
Bol. Channel 32gnd			13 (A)			4(A)
GND WIRE			13			4(A)
Bol. Channel 33 +				1		13

Name	25way A JFS J1	25wayB JFS J2	25Way C JFS J3	25way D JFS J4	25-Way E JFS J7	128Way #2
Bol. Channel 33 -				14		12
Bol. Channel 33gnd				13 (A)		4(A)
Bol. Channel 34 +				2		21
Bol. Channel 34 -				15		20
Bol. Channel 34gnd				13 (A)		4(A)
Bol. Channel 35 +				3		31
Bol. Channel 35 -				16		43
Bol. Channel 35gnd				13 (A)		4(A)
Bol. Channel 36 +				4		42
Bol. Channel 36 -				17		54
Bol. Channel 36gnd				13 (A)		4(A)
Bol. Channel 37 +				5		10
Bol. Channel 37 -				18		11
Bol. Channel 37gnd				13 (A)		4(A)
Bol. Channel 38 +				6		19
Bol. Channel 38 -				19		29
Bol. Channel 38gnd				13 (A)		4(A)
Bol. Channel 39 +				20		41
Bol. Channel 39 -				7		30
Bol. Channel 39gnd				13 (A)		4(A)
Bol. Channel 40 +				21		53
Bol. Channel 40 -				8		52
Bol. Channel 40gnd				13 (A)		4(A)
Bol. Channel 41 +				22		9
Bol. Channel 41 -				9		17
Bol. Channel 41gnd				13 (A)		4(A)
Bol. Channel 42 +				23		18
Bol. Channel 42 -				10		28
Bol. Channel 42gnd				13 (A)		4(A)
Bol. Channel 43 +				24		16
Bol. Channel 43 -				11		27
Bol. Channel 43gnd				13 (A)		4(A)
Bol. Channel 44 +				25		40
Bol. Channel 44 -				12		39
Bol. Channel 44gnd				13 (A)		4(A)
GND WIRE				13		4*
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

4.4.3 C3 CVV3 to HSJFP Type2 (identifies the layout of CVV-pin layout)

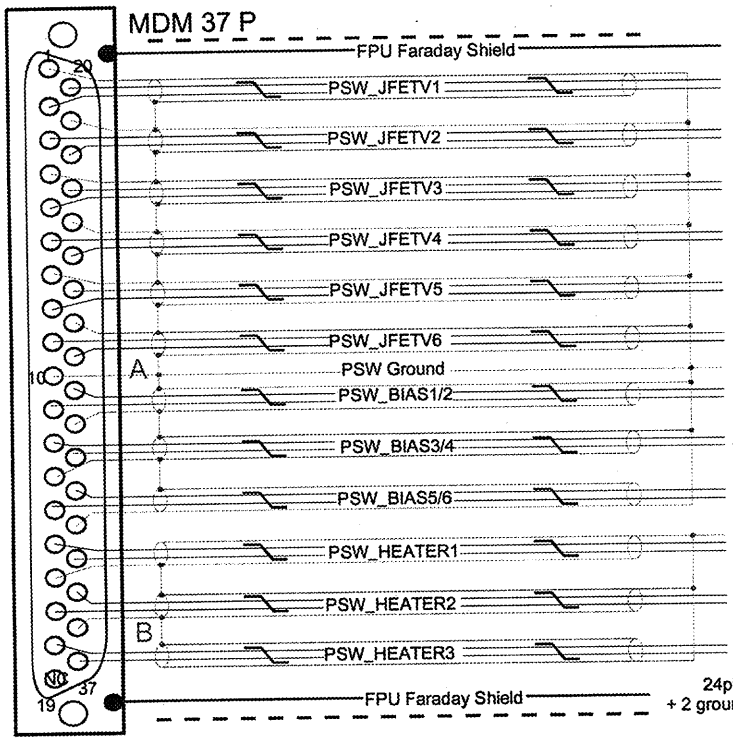
Overall Mechanical Drawing



Connector/Backshell Details

MDM	37	P+Glenair 500-T-010-M-37-F-TBD	to	JFPJ25	PSW Bias (P)	12ax
MDM	37	P+Glenair 500-T-010-M-37-F-TBD	to	JFPJ26	PSW Bias (R)	12ax
MDM	37	P+Glenair 500-T-010-M-37-F-TBD	to	JFPJ27	PMW/PLW Bias (P)	12a
MDM	37	P+Glenair 500-T-010-M-37-F-TBD	to	JFPJ28	PMW/PLW Bias (R)	12a

HARNESS LAYUP



Type 2A (PSW)
Bias Tails JFP J25/J26

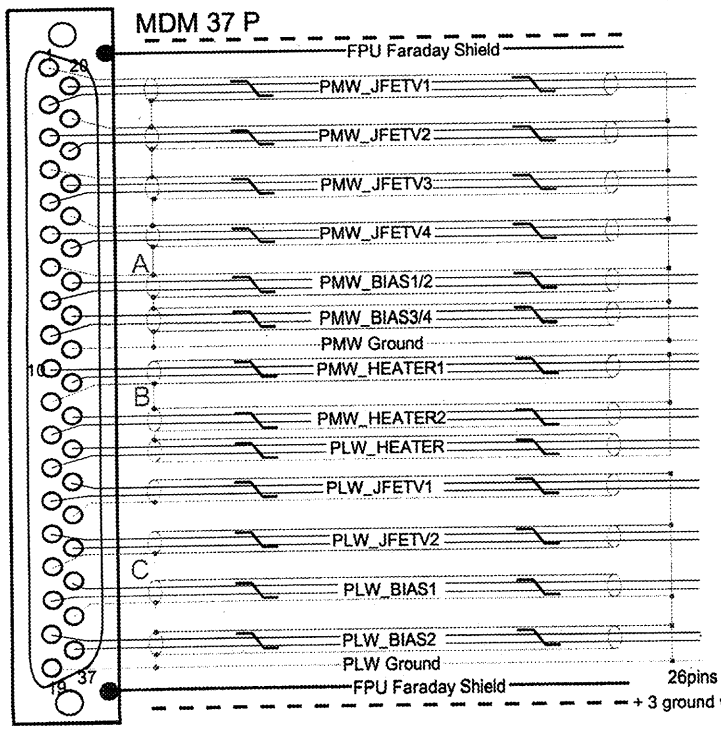
· 12 Insulated STPs
· 1 Single insulated ground wire

· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at JFP but isolated from the wall of the CVV.

· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

· A and B represent the commoning of ground references within the connectors which pass through the 128-way CVV connector on individual pins.

· There are A (J25) and B (J26) versions of this tail in order to implement redundancy



Type 2A (PMW/PLW)
Bias Tails JFP J27/J28

· 13 Insulated STPs
· 2 Single insulated ground wires

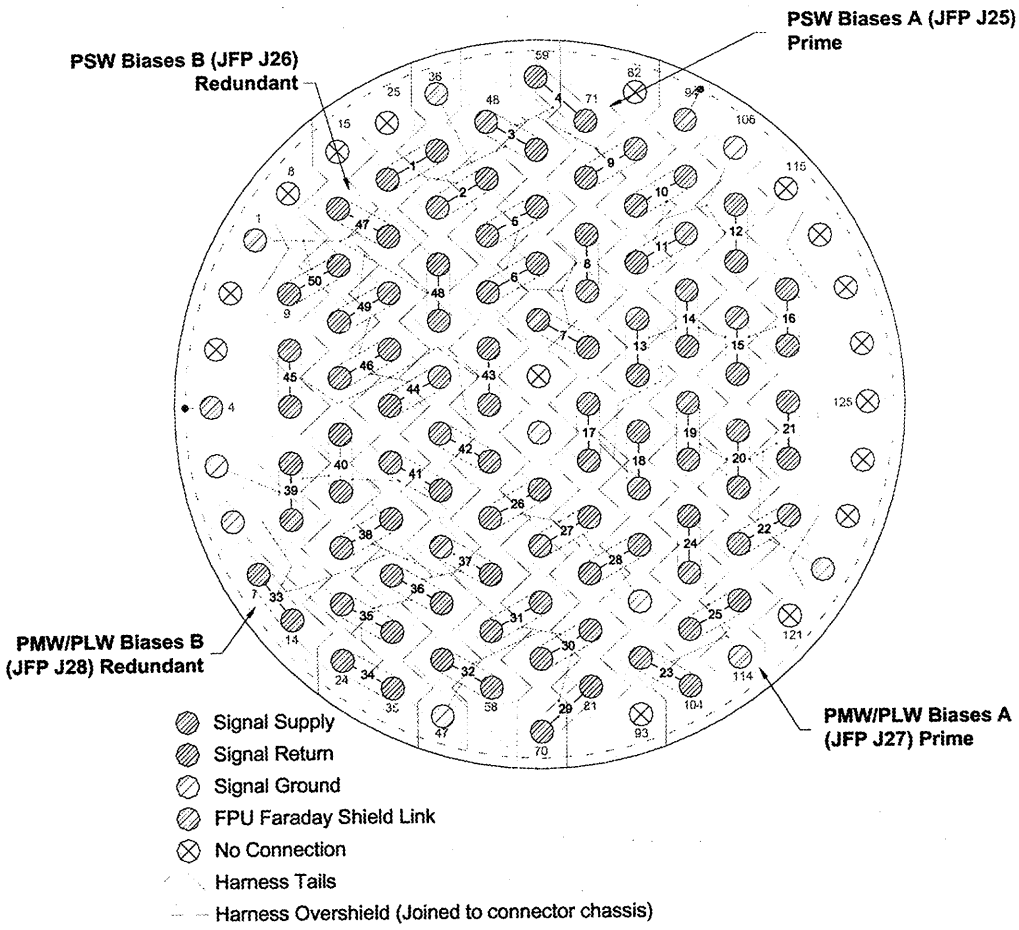
· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at JFP but isolated from the wall of the CVV.

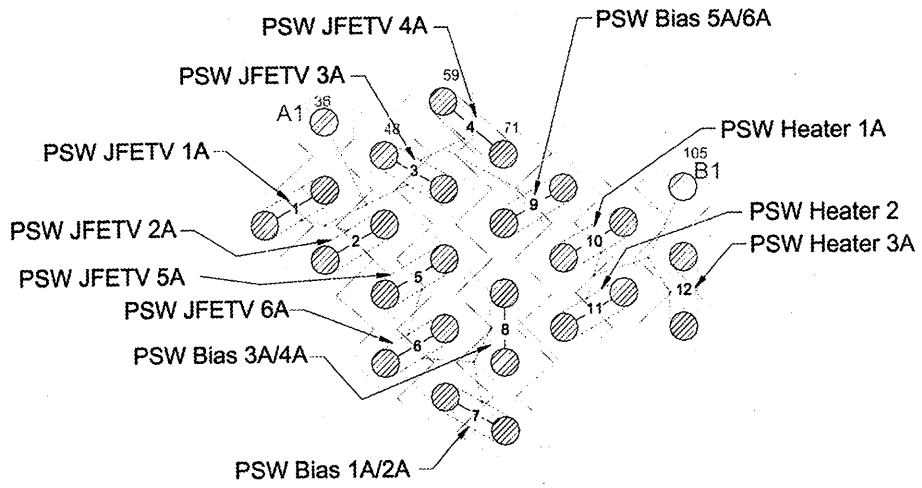
· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

· A and B represent the commoning of ground references within the connectors which pass through the 128-way CVV connector on individual pins.

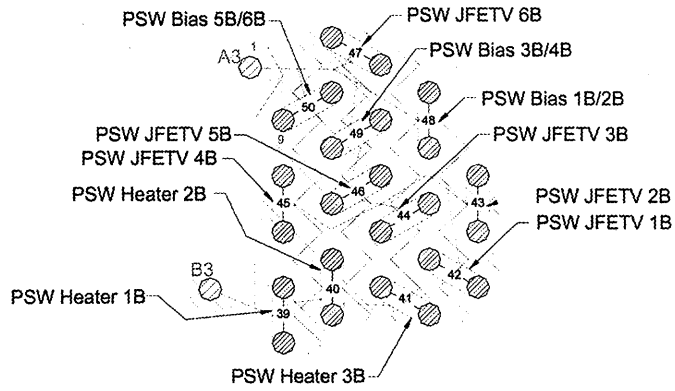
· There are A (J27) and B (J28) versions of this tail in order to implement redundancy

· Heater wires are rated for the same current as the JFET supplies they substitute

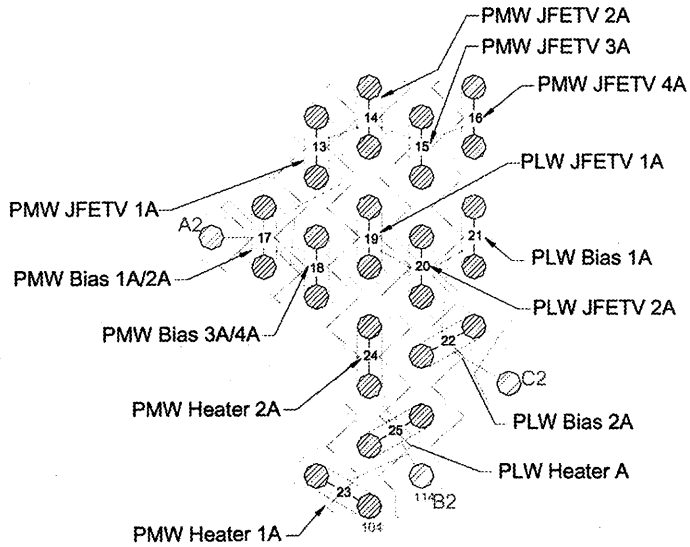




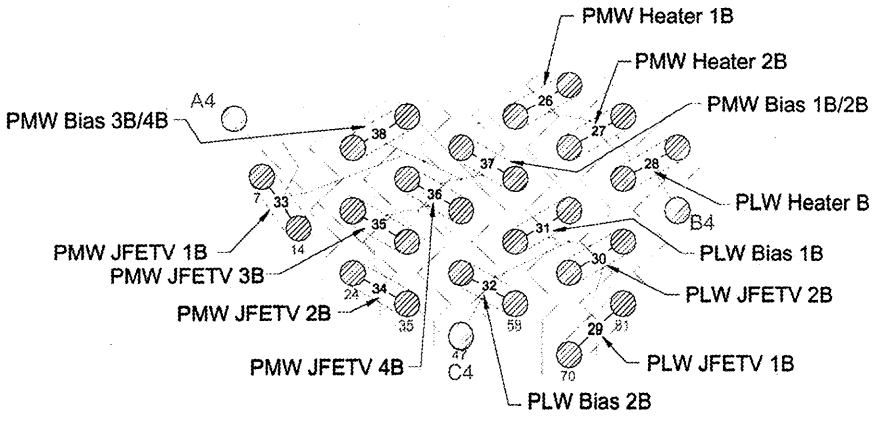
PSW Biases A (JFP J25)
Prime



PSW Biases B (JFP J26)
Redundant



PMW/PLW Biases A (JFP J27)
Prime



PMW/PLW Biases B (JFP J28)
Redundant

Contact Details

Name	37-way J25	37-way J27	37-Way J26	37-Way J28	128-Way #3
PSW_JFETV1_A +	20				26
PSW_JFETV1_A -	2				37
PSW_JFETV1_A shld	1 (A1)				36 (A1)
PSW_JFETV2_A +	3				38
PSW_JFETV2_A -	22				49
PSW_JFETV2_A shld	21 (A1)				36 (A1)
PSW_JFETV3_A +	23				48
PSW_JFETV3_A -	5				60
PSW_JFETV3_A shld	4 (A1)				36 (A1)
PSW_JFETV4_A +	6				59
PSW_JFETV4_A -	25				71
PSW_JFETV4_A shld	24 (A1)				36 (A1)
PSW_JFETV5_A +	26				50
PSW_JFETV5_A -	8				61
PSW_JFETV5_A shld	7 (A1)				36 (A1)
PSW_JFETV6_A +	9				62
PSW_JFETV6_A -	28				51
PSW_JFETV6_A shld	27 (A1)				36 (A1)
PSW GRND_A	10 (A1)				36 (A1)
PSW_BIAS1/2_A +	11				63
PSW_BIAS1/2_A -	29				75
PSW_BIAS1/2_A shld	30 (A1)				36 (A1)
PSW_BIAS3/4_A +	31				74
PSW_BIAS3/4_A -	12				73
PSW_BIAS3/4_A shld	13 (A1)				36 (A1)
PSW_BIAS5/6_A +	14				83
PSW_BIAS5/6_A -	32				72
PSW_BIAS5/6_A shld	33 (A1)				36 (A1)
PSW_HEATER_A1 +	34				95
PSW_HEATER_A1 -	15				84
PSW_HEATER_A1 shld	16 (B1)				105 (B1)
PSW_HEATER_A2 +	17				96
PSW_HEATER_A2 -	35				85
PSW_HEATER_A2 shld	36 (B1)				105 (B1)
PSW_HEATER_A3 +	37				106
PSW_HEATER_A3 -	18				107
PSW_HEATER_A3 shld	36 (B1)				105 (B1)
FPU Faraday Shield Link	NC				94
PMW_JFETV1_A +		20			86
PMW_JFETV1_A -		2			87
PMW_JFETV1_A shld		1 (A2)			65 (A2)
PMW_JFETV2_A +		3			97
PMW_JFETV2_A -		22			98
PMW_JFETV2_A shld		21 (A2)			65 (A2)
PMW_JFETV3_A +		23			108
PMW_JFETV3_A -		5			109
PMW_JFETV3_A shld		4 (A2)			65 (A2)
PMW_JFETV4_A +		6			116
PMW_JFETV4_A -		25			117
PMW_JFETV4_A shld		24 (A2)			65 (A2)
PMW_BIAS1/2_A +		26			76
PMW_BIAS1/2_A -		8			77
PMW_BIAS1/2_A shld		7 (A2)			65 (A2)
PMW_BIAS3/4_A +		27			88
PMW_BIAS3/4_A -		9			89
PMW_BIAS3/4_A shld		28 (A2)			65 (A2)

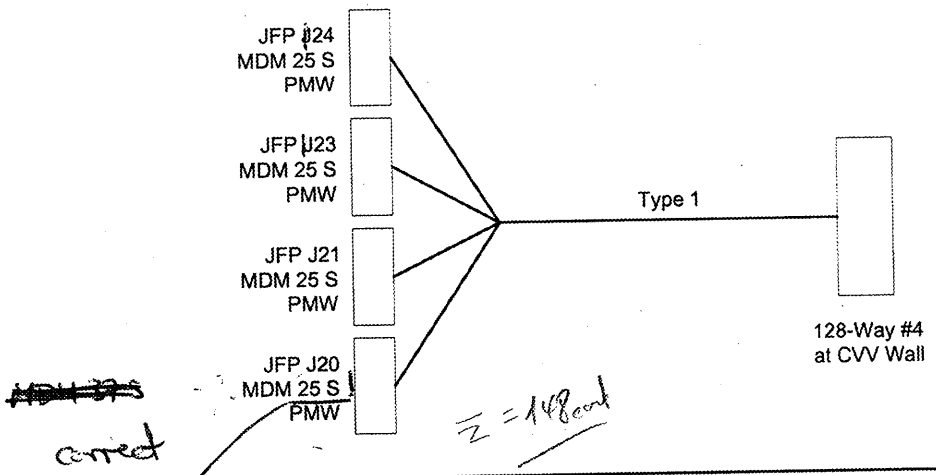
Name	37-way J25	37-way J27	37-Way J26	37-Way J28	128-Way #3
PMW GND WIRE_A		28 (A2)			65 (A2)
PMW HEATER A1 +		29			92
PMW HEATER A1 -		10			104
PMW HEATER A1 shld		11(B2)			114 (B2)
PMW HEATER A2 +		12			102
PMW HEATER A2 -		30			101
PMW HEATER A2 shld		11(B2)			114 (B2)
PLW HEATER A +		13			103
PLW HEATER A -		31			113
PLW HEATER A shld		11(B2)			114 (B2)
PLW_JFETV1_A +		14			99
PLW_JFETV1_A -		32			100
PLW_JFETV1_A shld		33 (C2)			128 (C2)
PLW_JFETV2_A +		34			110
PLW_JFETV2_A -		15			111
PLW_JFETV2_A shld		16 (C2)			128 (C2)
PLW_BIAS1_A +		17			118
PLW_BIAS1_A -		35			119
PLW_BIAS1_A shld		36 (C2)			128 (C2)
PLW_BIAS2_A +		37			112
PLW_BIAS2_A -		18			120
PLW_BIAS2_A shld		19 (C2)			128 (C2)
PLW GROUND WIRE A		19 (C2)			128 (C2)
PSW_JFETV1_B +			20		42
PSW_JFETV1_B -			2		54
PSW_JFETV1_B shld			1 (A3)		1 (A3)
PSW_JFETV2_B +			3		53
PSW_JFETV2_B -			22		52
PSW_JFETV2_B shld			21 (A3)		1 (A3)
PSW_JFETV3_B +			23		41
PSW_JFETV3_B -			5		30
PSW_JFETV3_B shld			4 (A3)		1 (A3)
PSW_JFETV4_B +			6		10
PSW_JFETV4_B -			25		11
PSW_JFETV4_B shld			24 (A3)		1 (A3)
PSW_JFETV5_B +			26		19
PSW_JFETV5_B -			8		29
PSW_JFETV5_B shld			7 (A3)		1 (A3)
PSW_JFETV6_B +			9		16
PSW_JFETV6_B -			28		27
PSW_JFETV6_B shld			27 (A3)		1 (A3)
PSW GRND_B			10 (A3)		1 (A3)
PSW_BIAS1/2_B +			11		40
PSW_BIAS1/2_B -			29		39
PSW_BIAS1/2_B shld			30 (A3)		1 (A3)
PSW_BIAS3/4_B +			31		18
PSW_BIAS3/4_B -			12		28
PSW_BIAS3/4_B shld			13 (A3)		1 (A3)
PSW_BIAS5/6_B +			14		9
PSW_BIAS5/6_B -			32		17
PSW_BIAS5/6_B shld			33 (A3)		1 (A3)
PSW_HEATER_B1 +			34		13
PSW_HEATER_B1 -			15		12
PSW_HEATER_B1 shld			16 (B3)		5 (B3)
PSW_HEATER_B2 +			17		21
PSW_HEATER_B2 -			35		20
PSW_HEATER_B2 shld			36 (B3)		5 (B3)
PSW_HEATER_B3 +			37		31
PSW_HEATER_B3 -			18		43

Name	37-way J25	37-way J27	37-Way J26	37-Way J28	128-Way #3
PSW_HEATER_B3 shld			36 (B3)		5 (B3)
FPU Faraday Shield Link			NC		4
PMW_JFETV1_B +				20	7
PMW_JFETV1_B -				2	14
PMW_JFETV1_B shld				1 (A4)	6 (A4)
PMW_JFETV2_B +				3	24
PMW_JFETV2_B -				22	35
PMW_JFETV2_B shld				21 (A4)	6 (A4)
PMW_JFETV3_B +				23	23
PMW_JFETV3_B -				5	34
PMW_JFETV3_B shld				4 (A4)	6 (A4)
PMW_JFETV4_B +				6	33
PMW_JFETV4_B -				25	45
PMW_JFETV4_B shld				24 (A4)	6 (A4)
PMW_BIAS1/2_B +				26	44
PMW_BIAS1/2_B -				8	56
PMW_BIAS1/2_B shld				7 (A4)	6 (A4)
PMW_BIAS3/4_B +				27	22
PMW_BIAS3/4_B -				9	32
PMW_BIAS3/4_B shld				28 (A4)	6 (A4)
PMW GND WIRE_B				28 (A4)	6 (A4)
PMW HEATER B1 +				29	55
PMW HEATER B1 -				10	66
PMW HEATER B1 shld				11 (B4)	91 (B4)
PMW HEATER B2 +				12	67
PMW HEATER B2 -				30	78
PMW HEATER B2 shld				11 (B4)	91 (B4)
PLW HEATER B +				13	90
PLW HEATER B -				31	79
PLW HEATER B shld				11 (B4)	91 (B4)
PLW_JFETV1_B +				14	70
PLW_JFETV1_B -				32	81
PLW_JFETV1_B shld				33 (C4)	47 (C4)
PLW_JFETV2_B +				34	69
PLW_JFETV2_B -				15	80
PLW_JFETV2_B shld				16 (C4)	47 (C4)
PLW_BIAS1_B +				17	68
PLW_BIAS1_B -				35	57
PLW_BIAS1_B shld				36 (C4)	47 (C4)
PLW_BIAS2_B +				37	58
PLW_BIAS2_B -				18	46
PLW_BIAS2_B shld				19 (C4)	47 (C4)
PLW GROUND WIRE B				19 (C4)	47 (C4)
Harness Over-shield	Via Pin 4& 94	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

37 37 37 41 = 162

4.4.4 C4 CVV4 to HSJFP Type1

Overall Mechanical Drawing

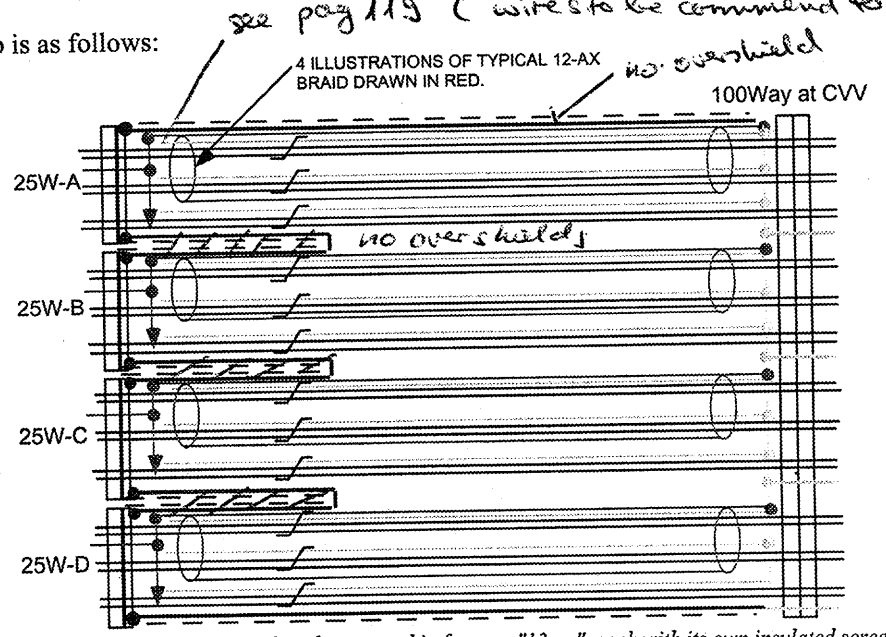


Connector Backshell Details

MDM	37	0	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to JFP J21 PMW Signals
MDM	37	0	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to JFP J22 PMW Signals
MDM	37	0	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to JFP J23 PMW Signals
MDM	37	0	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to JFP J24 PMW Signals

Harness Layup

The total harness layup is as follows:



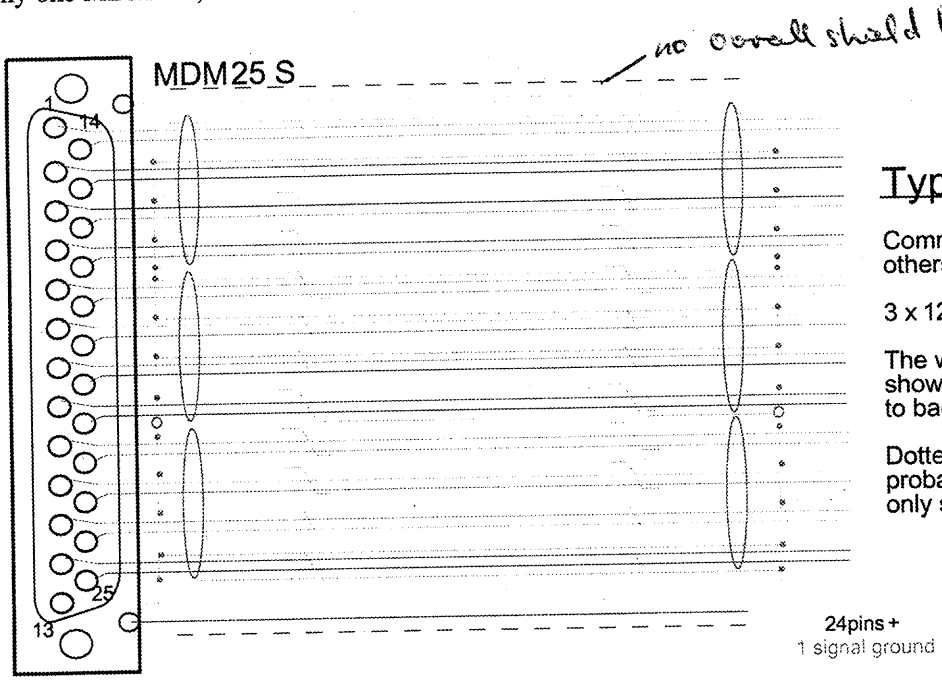
There are 48 channels each carried as a twisted triple, grouped in fours as "12-ax", each with its own insulated screen. So are 12 x 12-ax in all with three 12-ax to each 25 way MDM. The use of a third wire twisted with each channel's + & - wires minimises interchannel cross-talk inside each 12-

As for the intermediate harness, 4 pins carry ground through the 100 way and carry an isolated ground ring. All the third are made off to this, as are all the 12-ax

At the 25way MDMs, the three 12-ax braids (which have a much higher conductivity than that of the sum of all the third wires) are joined to the third wires and passed through the one non-signal

To keep RF screening distinct from low noise bolometer grounds, all of this harness is enclosed in separate outer r.f. screen, sealed to connector boots at the JFET end, overwrapped with insulation, and carried on a pin at the 100

Any one MDM tail, as drawn for the other harnesses, looks like: -



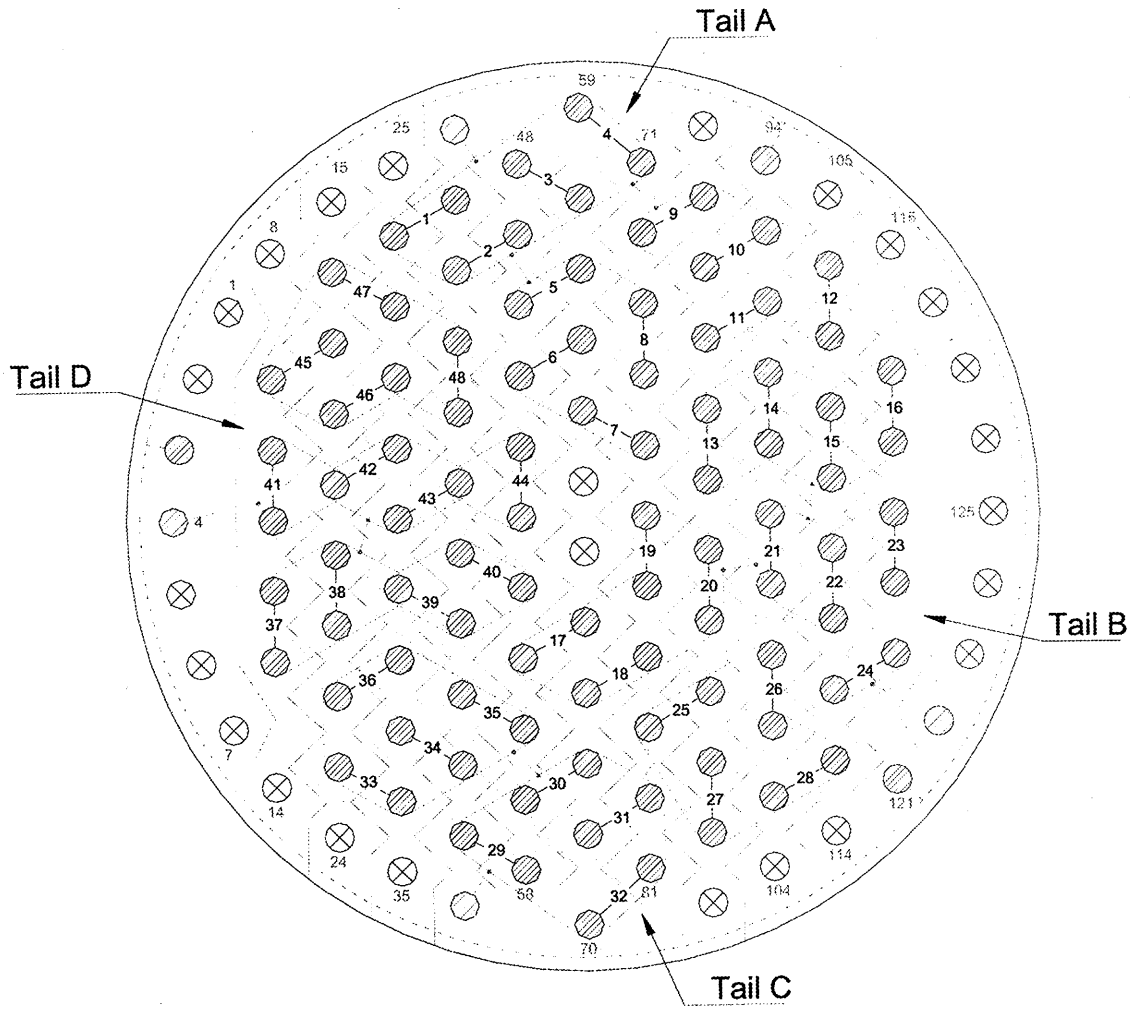
Type 1 JFET tails

Common to all 4 tails, although others have channels 12-24 etc..

3 x 12-ax cables

The whole overlain with RF screen shown:———— NOT joined to backshell CVV end.

Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.



- Bolometer Signal +
- Bolometer Signal -
- Signal Ground
- FPU Faraday Shield Link
- No Connection

Harness Tails

Harness Overshield (Joined to FPU Faraday Shield Link Pins and isolated from connector chassis)

- Shields of 12-ax are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

Contact Details....this assumes JPL re-pin PCB connectors, see note at end.
Note the contacts are named as "channels 1-48" end-end, and mapping to specific detector position is only maintained internal to the instrument.

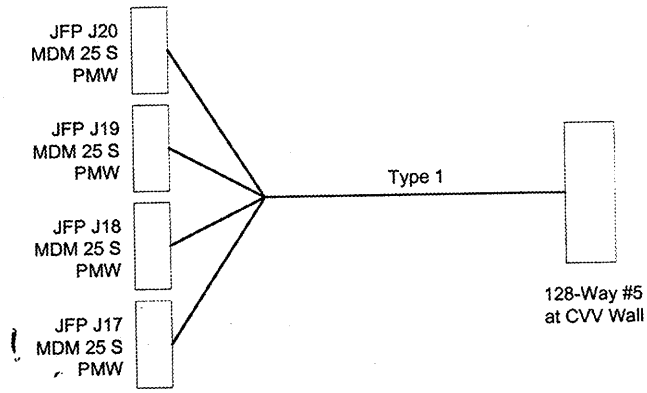
Name	25way A	25wayB	25Way C	25way D	128Way #4
Channel 1 +	1				26
Channel 1 -	14				37
Channel 1gnd	13 (A1)				36 (A1)
Channel 2 +	2				38
Channel 2 -	15				49
Channel 2gnd	13 (A1)				36 (A1)
Channel 3 +	3				48
Channel 3 -	16				60
Channel 3gnd	13 (A1)				36 (A1)
Channel 4 +	4				59
Channel 4 -	17				71
Channel 4gnd	13 (A1)				36 (A1)
Channel 5 +	5				50
Channel 5 -	18				61
Channel 5gnd	13 (A1)				36 (A1)
Channel 6 +	6				62
Channel 6 -	19				51
Channel 6gnd	13 (A1)				36 (A1)
Channel 7 +	20				63
Channel 7 -	7				75
Channel 7gnd	13 (A1)				36 (A1)
Channel 8 +	21				74
Channel 8 -	8				73
Channel 8gnd	13 (A1)				36 (A1)
Channel 9 +	22				83
Channel 9 -	9				72
Channel 9gnd	13 (A1)				36 (A1)
Channel 10 +	23				95
Channel 10 -	10				84
Channel 10gnd	13 (A1)				36 (A1)
Channel 11 +	24				96
Channel 11 -	11				85
Channel 11gnd	13 (A1)				36 (A1)
Channel 12 +	25				36
Channel 12 -	12				107
Channel 12gnd	13 (A1)				36 (A1)
GND WIRE	13 (A1)				36 (A1)
FPU Faraday Shield Link	NC				94
Channel 13 +		1			86
Channel 13 -		14			87
Channel 13gnd		13 (A2)			128 (A2)
Channel 14 +		2			97
Channel 14 -		15			98
Channel 1gnd		13 (A2)			128 (A2)
Channel 15 +		3			108
Channel 15 -		16			109
Channel 15gnd		13 (A2)			128 (A2)
Channel 16 +		4			116
Channel 16 -		17			117
Channel 16gnd		13 (A2)			128 (A2)
Channel 17 +		5			55
Channel 17 -		18			66
Channel 17gnd		13 (A2)			128 (A2)
Channel 18 +		6			67
Channel 18 -		19			78

Name	25way A	25wayB	25Way C	25way D	128Way #4
Channel 18gnd		13 (A2)			128 (A2)
Channel 19 +		20			76
Channel 19 -		7			77
Channel 19gnd		13 (A2)			128 (A2)
Channel 20 +		21			88
Channel 20 -		8			89
Channel 20gnd		13 (A2)			128 (A2)
Channel 21 +		22			99
Channel 21 -		9			100
Channel 21gnd		13 (A2)			128 (A2)
Channel 22 +		23			110
Channel 22 -		10			111
Channel 22gnd		13 (A2)			128 (A2)
Channel 23 +		24			118
Channel 23 -		11			119
Channel 23gnd		13 (A2)			128 (A2)
Channel 24 +		25			112
Channel 24 -		12			120
Channel 24gnd		13 (A2)			128 (A2)
GND WIRE		13 (A2)			128 (A2)
Channel 25 +			1		90
Channel 25 -			14		79
Channel 25gnd			13 (A3)		47 (A3)
Channel 26 +			2		102
Channel 26 -			15		101
Channel 26gnd			13 (A3)		47 (A3)
Channel 27 +			3		92
Channel 27 -			16		91
Channel 27gnd			13 (A3)		47 (A3)
Channel 28 +			4		103
Channel 28 -			17		113
Channel 28gnd			13 (A3)		47 (A3)
Channel 29 +			5		58
Channel 29 -			18		46
Channel 29gnd			13 (A3)		47 (A3)
Channel 30 +			6		68
Channel 30 -			19		57
Channel 30gnd			13 (A3)		47 (A3)
Channel 31 +			20		69
Channel 31 -			7		80
Channel 31gnd			13 (A3)		47 (A3)
Channel 32 +			21		70
Channel 32 -			8		81
Channel 32gnd			13 (A3)		47 (A3)
Channel 33 +			22		23
Channel 33 -			9		34
Channel 33gnd			13 (A3)		47 (A3)
Channel 34 +			23		33
Channel 34 -			10		45
Channel 34gnd			13 (A3)		47 (A3)
Channel 35 +			24		44
Channel 35 -			11		56
Channel 35gnd			13 (A3)		47 (A3)
Channel 36 +			25		22
Channel 36 -			12		32
Channel 36gnd			13 (A3)		47 (A3)
GND WIRE			13 (A3)		47 (A3)
FPU Faraday Shield Link			NC		104

Name	25way A	25wayB	25Way C	25way D	128Way #4
Channel 37 +				1	13
Channel 37 -				14	12
Channel 37gnd				13 (A4)	4 (A4)
Channel 38 +				2	21
Channel 38 -				15	20
Channel 38gnd				13 (A4)	4 (A4)
Channel 39 +				3	31
Channel 39 -				16	43
Channel 39gnd				13 (A4)	4 (A4)
Channel 40 +				4	42
Channel 40 -				17	54
Channel 40gnd				13 (A4)	4 (A4)
Channel 41 +				5	10
Channel 41 -				18	11
Channel 41gnd				13 (A4)	4 (A4)
Channel 42 +				6	19
Channel 42 -				19	29
Channel 42gnd				13 (A4)	4 (A4)
Channel 43 +				20	41
Channel 43 -				7	30
Channel 43gnd				13 (A4)	4 (A4)
Channel 44 +				21	53
Channel 44 -				8	52
Channel 44gnd				13 (A4)	4 (A4)
Channel 45 +				22	9
Channel 45 -				9	17
Channel 45gnd				13 (A4)	4 (A4)
Channel 46 +				23	18
Channel 46 -				10	28
Channel 46gnd				13 (A4)	4 (A4)
Channel 47 +				24	16
Channel 47 -				11	27
Channel 47gnd				13 (A4)	4 (A4)
Channel 48 +				25	40
Channel 48 -				12	39
Channel 48gnd				13 (A4)	4 (A4)
GND WIRE				13 (A4)	4 (A4)
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	Harness Overshield via Pins 3, 94, 121

4.4.5 C5 CVV5 to HSJFP Type1

Overall Mechanical Drawing



Connector/Backshell Details

MDM37 0+Glenair500-T-010-M-37-F-	TBD	to	JFP J17	PMW Signals
MDM37 0+Glenair500-T-010-M-37-F-	TBD	to	JFP J18	PMW Signals
MDM37 0+Glenair500-T-010-M-37-F-	TBD	to	JFP J19	PMW Signals
MDM37 0+Glenair500-T-010-M-37-F-	TBD	to	JFP J20	PMW Signals

Overall
BS type/size

Harness Layup

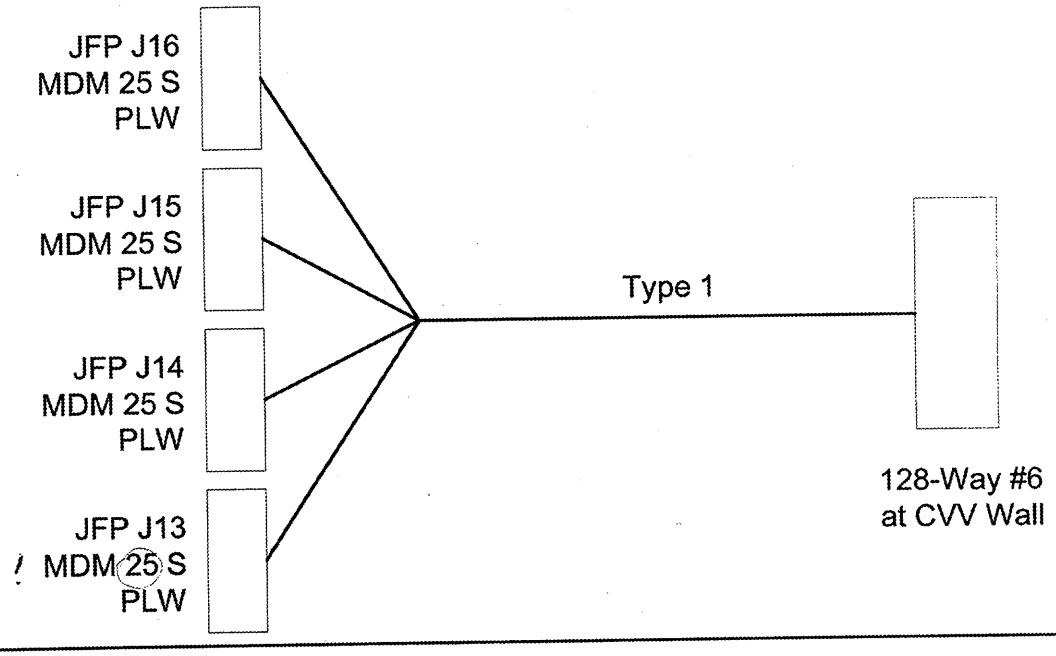
As C4.

Contact Details

As C4.

4.4.6 C6 CVV6 to HSJFP Type1

Overall Mechanical Drawing



Connector/Backshell Details

MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFPJ13	PLW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFPJ14	PLW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFPJ15	PLW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFPJ16	PLW Signals

Harness Layup

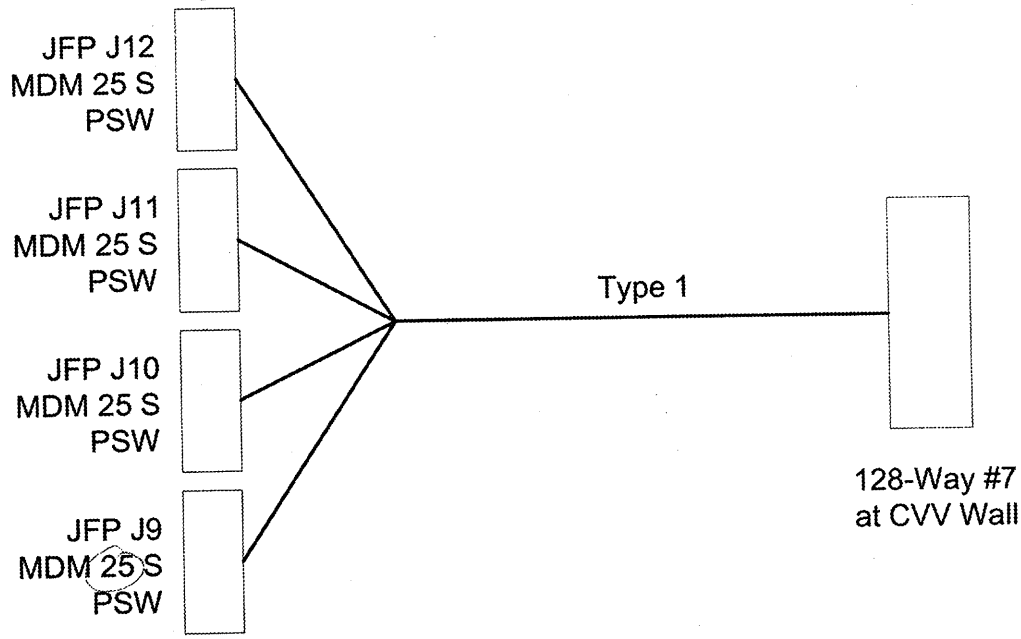
As C4.

Contact Details

As C4.

4.4.7 C7 CVV7 to HSJFP Type1

Overall Mechanical Drawing



Connector/Backshell Details

MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J9	PSW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J10	PSW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J11	PSW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J12	PSW Signals

Correct ⇒

Harness Layup

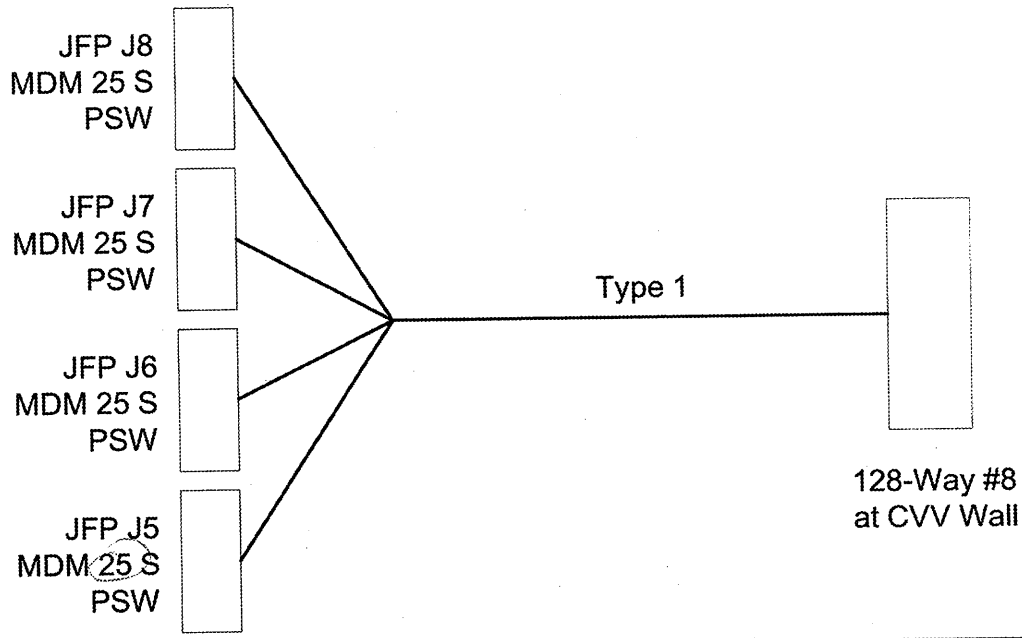
As C4.

Contact Details

As C4.

4.4.8 C8 CVV8 to HSJFP Type1

Overall Mechanical Drawing



Connector/Backshell Details

MDM 37 0 + Glenair 500-T-010-M-37-F-	TBD	to	JFP J5	PSW Signals
MDM 37 0 + Glenair 500-T-010-M-37-F-	TBD	to	JFP J6	PSW Signals
MDM 37 0 + Glenair 500-T-010-M-37-F-	TBD	to	JFP J7	PSW Signals
MDM 37 0 + Glenair 500-T-010-M-37-F-	TBD	to	JFP J8	PSW Signals

Correct. ⇒

Harness Layup

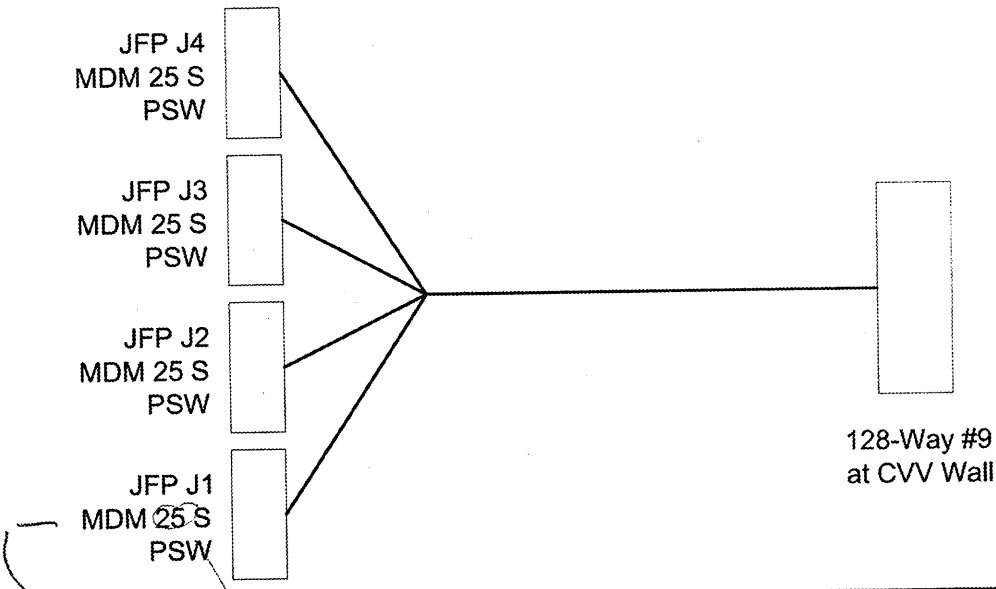
As C4.

Contact Details

As C4.

4.4.9 C9 CVV9 to HSJFP Type1

Overall Mechanical Drawing



Connector/Backshell Details

MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J1	PSW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J2	PSW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J3	PSW Signals
MDM370+Glenair500-T-010-M-37-F-	TBD	to	JFP J4	PSW Signals

Harness Layup

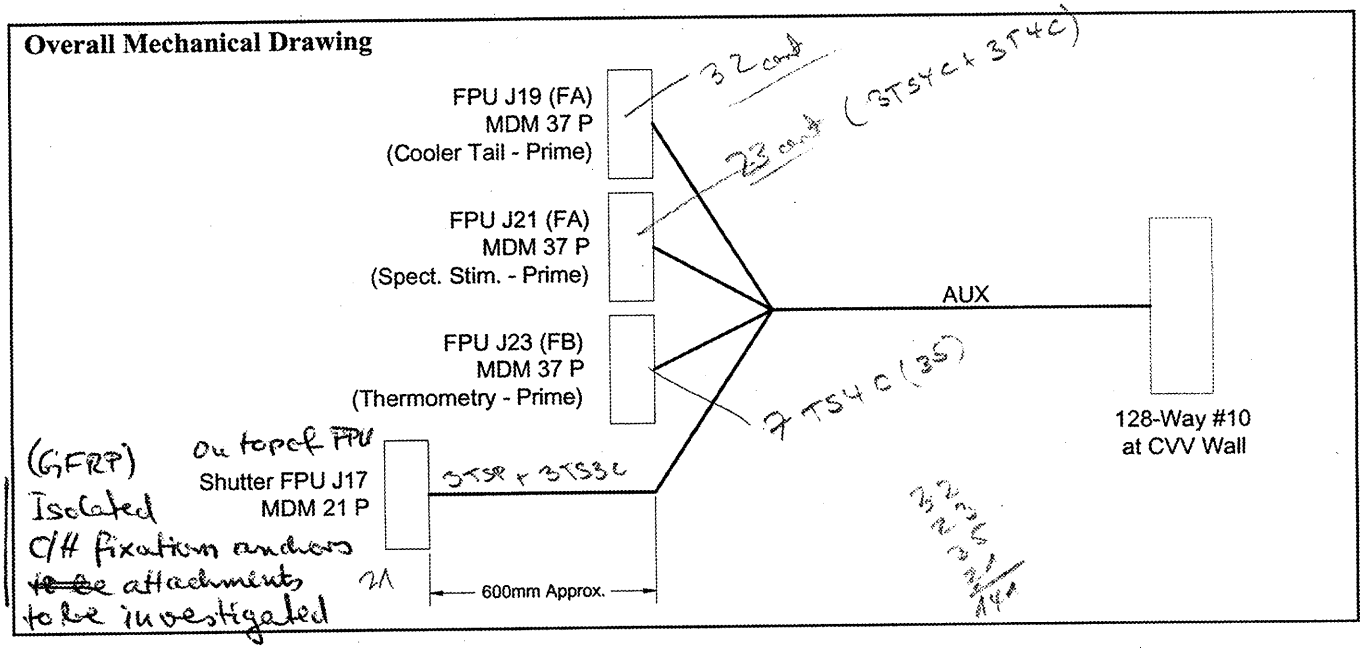
As C4.

Contact Details

As C4.

4.4.10 C10 CVV10 to HSFPU AUX-P

Overall Mechanical Drawing

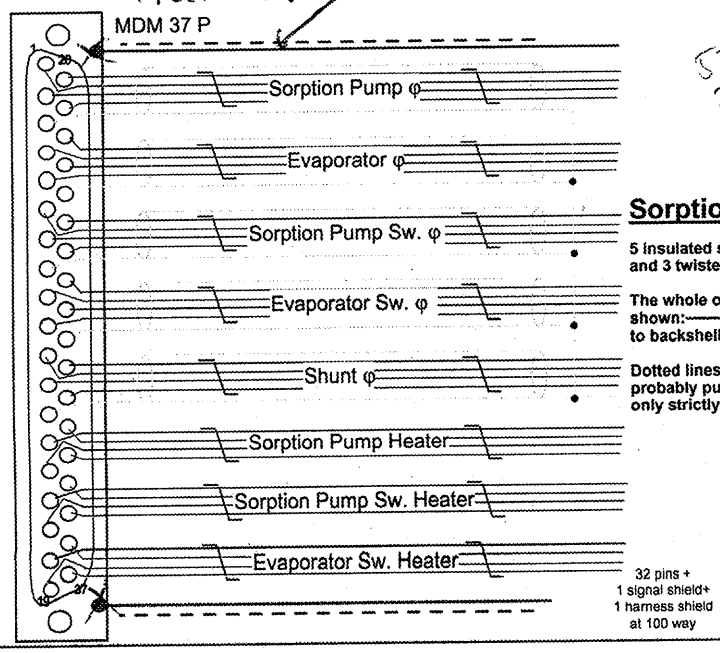


Connector/Backshell Details

Prime side harness

MDM37P+Glenair500-T-010-M-37-F-H	to	FPUJ19	FA - Cooler (P)
MDM37P+Glenair500-T-010-M-37-F-H	to	FPUJ21	FA – Spect. Stim. (P)
MDM37P+Glenair500-T-010-M-37-F-H	to	FPUJ23	FB – Therm. (P)
MDM21P+Glenair500-T-010-M-21-F-H	to	FPUJ17	Shutter (P)

Harness Layup
Cooler Tail (FPU J19)



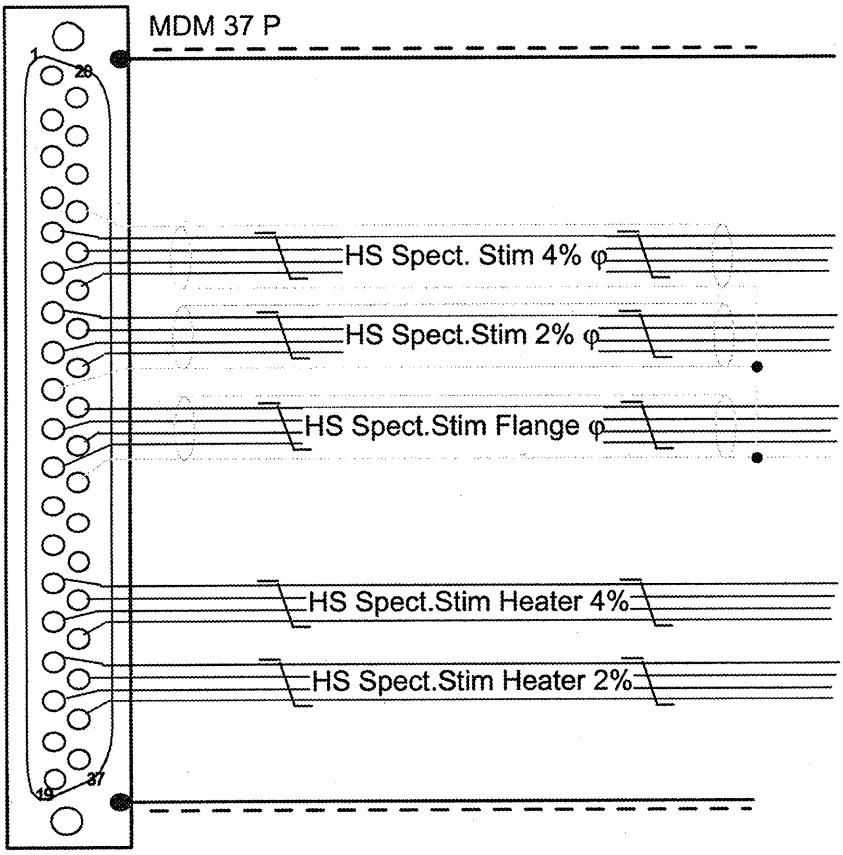
Sorption Cooler tails

5 insulated screened twisted quads and 3 twisted quads.

The whole overlain with RF screen shown:——— NOT joined to backshell CVV end.

Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.

Spect. Stimulus Tail



J21

Spectrometer Stimulus tails

3 insulated screened twisted quads and 2 insulated twisted quads.

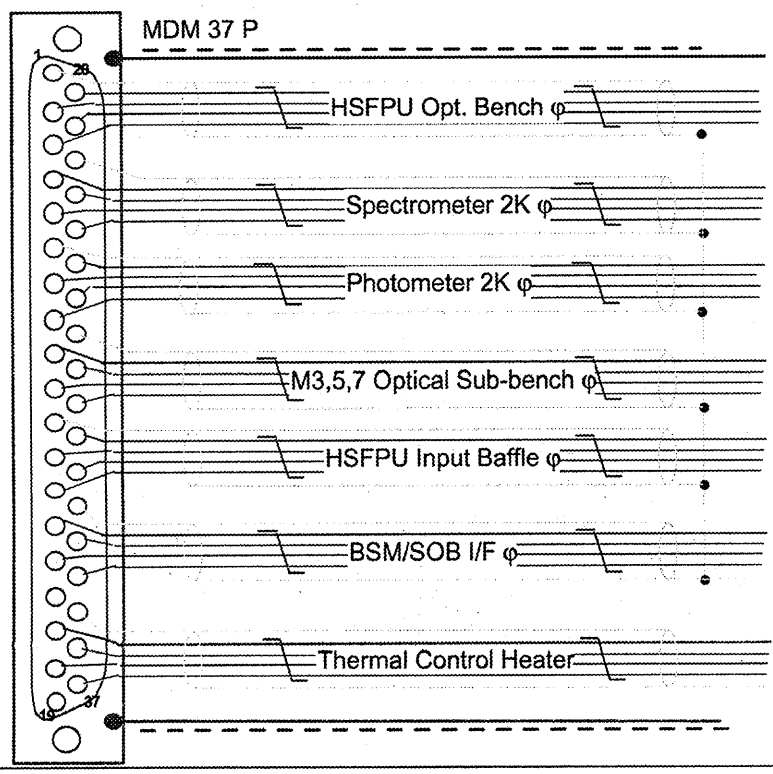
The whole overlain with RF screen shown:——— NOT joined to backshell CVV end.

Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.

3TS4C: 15 8
2T4C: 8 20

20 pins +
1 signal shield+
harness shield
at 100 way

HSFPU Thermometry Tail



J23

Thermometry tails

7 insulated screened twisted quads.

The whole overlain with RF screen shown: ——— NOT joined to backshell CVV end.

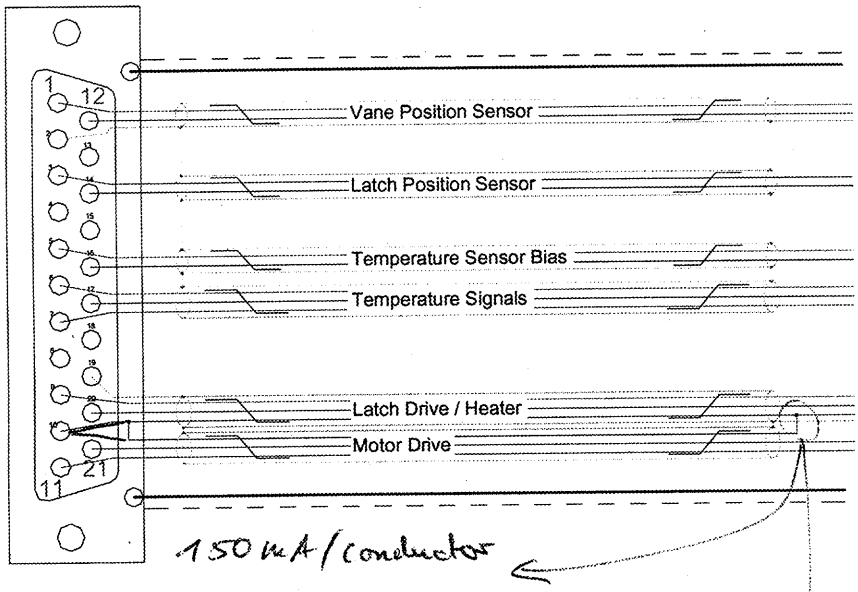
Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.

7TS4C = 28 ow

28 pins +
2signal grounds+
harness screeen
at 100way

Shutter Tail

This is a longer tail by about 600mm than those that terminate into HSFPU filters because it is routed outside HSFPU to the shutter unit itself.



Shutter Tail (FPU J17/J18)

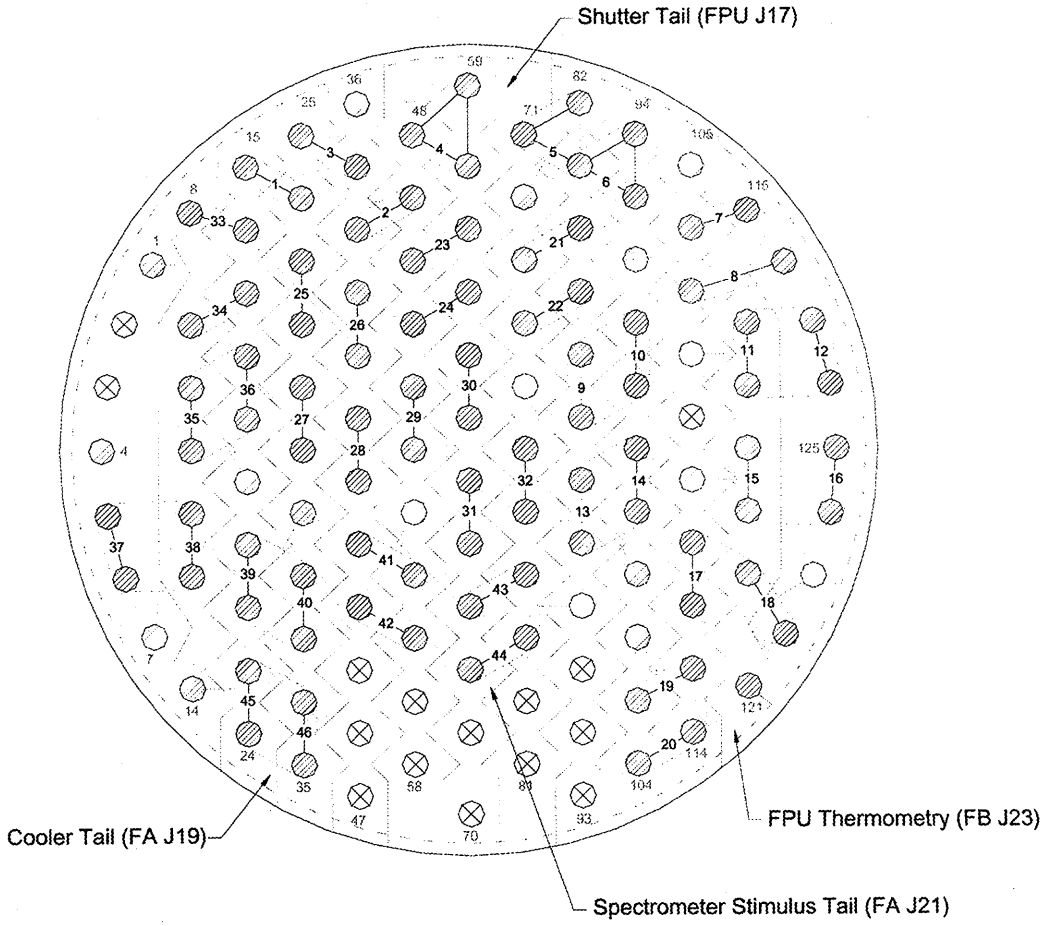
- 3 Insulated STPs
- 3 Insulated STTs

3 STP 3 STT 2 1 2 1 ad.

- The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the Shutter but NOT connected to the wall of the CVV.
- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.
- 16 Pins used on the 128-Way

ASED to investigate attachment of 2 # 30 to 1 connector contact.

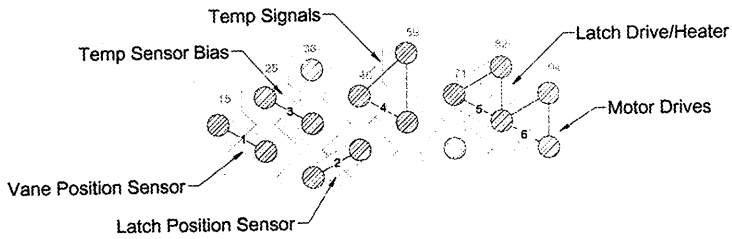
C10 128-Way Connector Pin Allocations



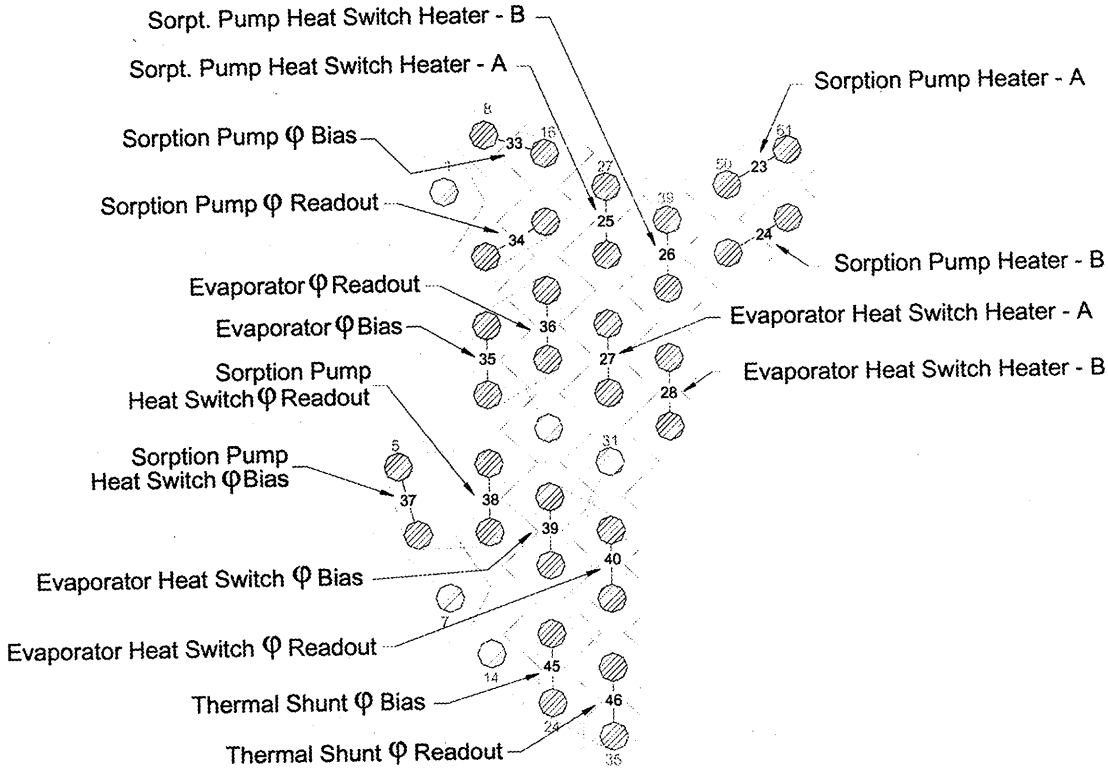
- Bolometer Signal +
- Bolometer Signal -
- Signal Ground
- FPU Faraday Shield Link
- No Connection

Harness Tails

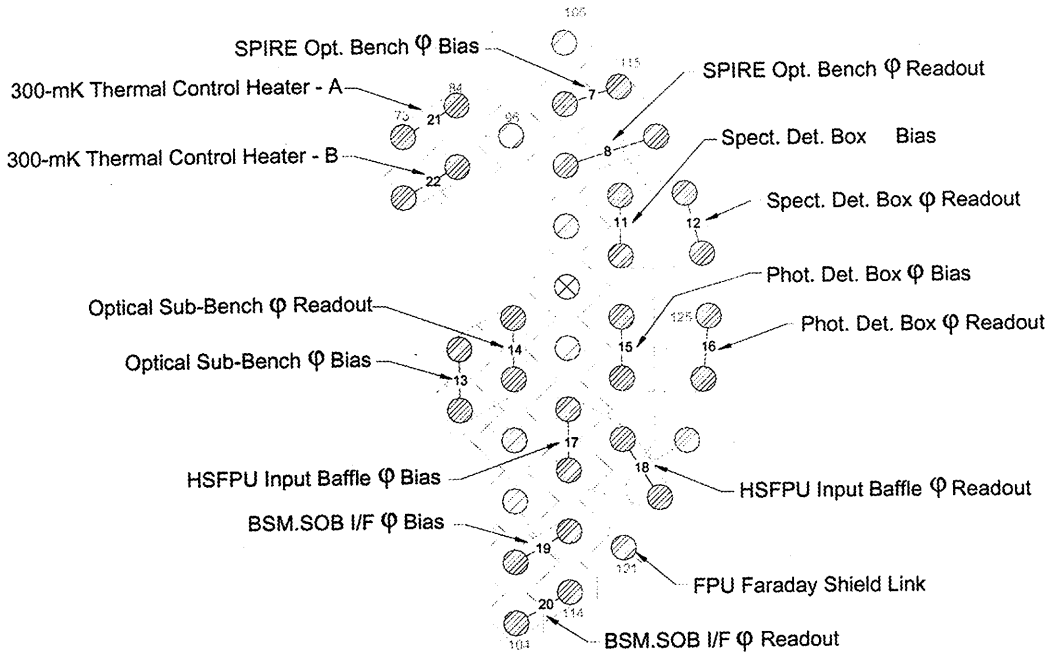
Harness Overshield (Isolated from connector chassis)



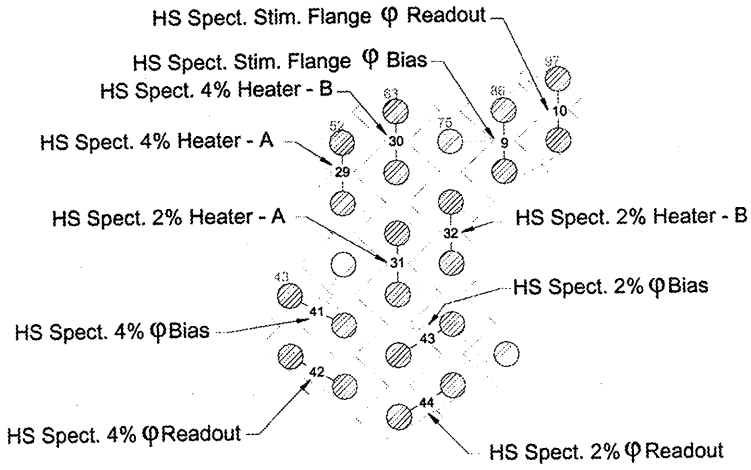
Shutter Tail (FPU J17)



Cooler Tail (FA J19)



FPU Thermometry (FB J23)



Spectrometer Stimulus Tail (FA J21)

Cooler Tail Listing (FPU J19)

Function	37way J19	Max. current	Wire lay-up	Max Ohms	128Way #10
Sorption Pump temperature I+	20	1 µA	Insulated screened twisted quad	1000	16
Sorption Pump temperature V+	1	N/A		1000	17
Sorption Pump temperature V-	2	N/A		1000	9
Sorption Pump temperature I-	21	1 µA		1000	8
Sorption Pump temperature shld	3	N/A		N/A	1
Evaporator temperature I+	22	250 nA	Insulated screened twisted quad	1000	11
Evaporator temperature V+	4	N/A		1000	19
Evaporator temperature V-	5	N/A		1000	18
Evaporator temperature I-	23	250 nA		1000	10
Evaporator temperature shld	24	N/A		N/A	20
Sorption Pump Heat Switch temperature I+	25	1 µA	Insulated screened twisted quad	1000	6
Sorption Pump Heat Switch temperature V+	6	N/A		1000	13
Sorption Pump Heat Switch temperature V-	7	N/A		1000	12
Sorption Pump Heat Switch temperature I-	26	1 µA		1000	5
Sorption Pump Heat Switch temperature shld	8	N/A		N/A	7
Evaporator Heat Switch temperature I+	27	1 µA	Insulated screened twisted quad	1000	22
Evaporator Heat Switch temperature V+	9	N/A		1000	33
Evaporator Heat Switch temperature V-	10	N/A		1000	32
Evaporator Heat Switch temperature I-	28	1 µA		1000	21
Evaporator Heat Switch temperature shld	29	N/A		N/A	31
Thermal Shunt temperature I+_A	30	1 µA	Insulated screened twisted quad	1000	24
Thermal Shunt temperature V+_B	11	N/A		1000	35
Thermal Shunt temperature V- _A	12	N/A		1000	34
Thermal Shunt temperature I- _B	31	1 µA		1000	23
Thermal Shunt temperature shld	13	N/A		N/A	14
Sorption Pump Heater I+_A	14	25 mA	twisted quad	10	50
Sorption Pump Heater I+_B	32	25 mA		10	62
Sorption Pump Heater I-_A	15	25 mA		10	61
Sorption Pump Heater I-_B	33	25 mA		10	51
Sorption Pump Heat Switch Heater I+_A	16	1.5 mA	twisted quad	50	27
Sorption Pump Heat Switch Heater I+_B	34	1.5 mA		50	39
Sorption Pump Heat Switch Heater I-_A	17	1.5 mA		50	28
Sorption Pump Heat Switch Heater I-_B	35	1.5 mA		50	40
Evaporator Heat Switch Heater I+_A	18	1.5 mA	twisted quad	50	29
Evaporator Heat Switch Heater I+_B	36	1.5 mA		50	41
Evaporator Heat Switch Heater I-_A	19	1.5 mA		50	30
Evaporator Heat Switch Heater I-_B	37	1.5 mA		50	42

32 wires and 5 temperature sensor signal shield

Spectrometer Stimulus Tail Listing (FPU J21)

Function	37way J21	Max. current	Wire lay-up	Max Ohms	128Way #10
HS Spect. 4% temperature I+	5	1 µA	Insulated screened twisted quad	1000	55
HS Spect. 4% temperature V+	6	N/A		1000	56
HS Spect. 4% temperature V-	24	N/A		1000	43
HS Spect. 4% temperature I-	25	1 µA		1000	44
HS Spect. 4% temperature shld*	23	N/A		N/A	54
HS Spect. 2% temperature I+	7	1 µA	Insulated screened twisted quad	1000	78
HS Spect. 2% temperature V+	8	N/A		1000	79
HS Spect. 2% temperature V-	26	N/A		1000	68
HS Spect. 2% temperature I-	27	1 µA		1000	67
HS Spect. 2% temperature shld*	9	N/A		N/A	90
HS Spect. Stim Flange temperature I+	10	1 µA	Insulated screened twisted quad	1000	86
HS Spect. Stim Flange temperature V+	11	N/A		1000	97
HS Spect. Stim Flange temperature V-	28	N/A		1000	98
HS Spect. Stim Flange temperature I-	29	1 µA		1000	87
HS Spect. Stim Flange temperature shld*	30	N/A		N/A	75
HS Spect. 4% Heater I+_A	14	9 mA	twisted quad	30	53
HS Spect. 4% Heater I+_B	15	9 mA		30	64
HS Spect. 4% Heater I-_A	33	9 mA		30	52
HS Spect. 4% Heater I-_B	34	9 mA		30	63
HS Spect. 2% Heater I+_A	16	7 mA	twisted quad	30	66
HS Spect. 2% Heater I+_B	17	7 mA		30	77
HS Spect. 2% Heater I-_A	35	7 mA		30	65
HS Spect. 2% Heater I-_B	36	7 mA		30	76

20 wires + 1 temperature sensor signal shield

Shutter tail (FPU J17)

Function	Pin # on J15	Max Current	Wire lay-up	Max Ohms	128-Way #10 Pin Allocation
Vane Position Sensor +	1		Insulated STP	1000	15
Vane Position Sensor -	12			1000	26
Vane Position Sense Shield	2 (A)				36(A)
Latch Position Sense +	3		Insulated STP	1000	38
Latch Position Sense -	14			1000	49
Sense Shld	2 (A)				36(A)
Temperature Sensor Bias +	5		Insulated STP	1000	25
Temperature Sensor Bias -	16			1000	37
Temperature Sensor Shield	2 (A)				36(A)
Vane Temperature Signal +	6		Insulated STT	1000	48
Common Temperature Signal	17			1000	60
Motor Temperature Signal +	7			1000	59
Temperature Signals Shield	2 (A)				36(A)
Latch Drive +	9		Insulated STT	10	71
Vane Heater+	20			10	82
Latch Drive and Vane Heater -	10 (B)			10	83 (B)
Latch Drive and Vane Heater Shield	19 (C)				72 (C)
Motor Phase A +	11		Insulated STT	10	94
Motor Phase B +	21			10	95
Motor Drive -	10 (B)			10	83 (B)
Motor Drive Shield	19 (C)			1000	72(C)
Harness Overshield	EMC Backshell				

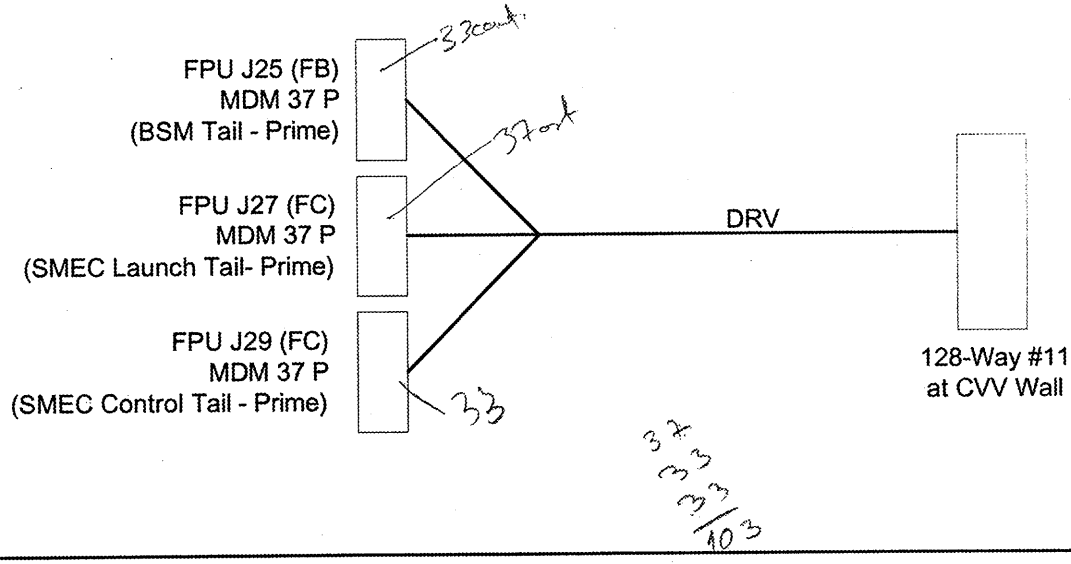
FPU Thermometry Listing

Function	37way J23	Max. current	Wire lay-up	Max Ohms	128Way #10
SPIRE Opt. Bench temperature I+	20	1 µA	Insulated screened twisted quad	1000	106
SPIRE Opt. Bench temperature V+	2	N/A		1000	107
SPIRE Opt. Bench temperature V-	3	N/A		1000	122
SPIRE Opt. Bench temperature I-	21	1 µA		1000	115
SPIRE Opt. Bench temperature shld	1	N/A		N/A	105
Spectrometer Det. Box temperature I+	4	1 µA	Insulated screened twisted quad	1000	116
Spectrometer Det. Box temperature V+	23	N/A		1000	123
Spectrometer Det. Box temperature V-	24	N/A		1000	124
Spectrometer Det. Box temperature I-	5	1 µA		1000	117
Spectrometer Det. Box temperature shld	22	N/A		N/A	108
Photometer Det. Box temperature I+	25	1 µA	Insulated screened twisted quad	1000	118
Photometer Det. Box temperature V+	7	N/A		1000	125
Photometer Det. Box temperature V-	8	N/A		1000	126
Photometer Det. Box temperature I-	26	1 µA		1000	119
Photometer Det. Box temperature shld	6	N/A		N/A	110
Otical Subench temperature I+	9	1 µA	Insulated screened twisted quad	1000	89
Optical Subench temperature V+	28	N/A		1000	100
Optical Subench temperature V-	29	N/A		1000	99
Optical Subench temperature I-	10	1 µA		1000	88
Optical Subench temperature shld	27	N/A		N/A	101
HSFPU Input Baffle temperature I+	30	1 µA	Insulated screened twisted quad	1000	111
HSFPU Input Baffle temperature V+	12	N/A		1000	120
HSFPU Input Baffle temperature V-	13	N/A		1000	128
HSFPU Input Baffle temperature I-	31	1 µA		1000	112
HSFPU Input Baffle temperature shld	11	N/A		N/A	127
BSM/SOB I/F temperature I+	14	1 µA	Insulated screened twisted quad	1000	113
BSM/SOB I/F temperature V+	33	N/A		1000	114
BSM/SOB I/F temperature V-	34	N/A		1000	104
BSM/SOB I/F temperature I-	15	1 µA		1000	103
BSM/SOB I/F temperature shld	32	N/A		N/A	102
Thermal Control Heater I+_A	17	2mA	Insulated screened twisted quad	100	73
Thermal Control Heater I+_B	18	2 mA		100	74
Thermal Control Heater I-_A	36	2 mA		100	84
Thermal Control Heater I-_B	37	2 mA		100	85
Thermal Control Heater shld.	35	N/A		N/A	96

Total contacts 28 wires and 7 shields

4.4.11 C11 CVV11 to HSFPU DRV-P

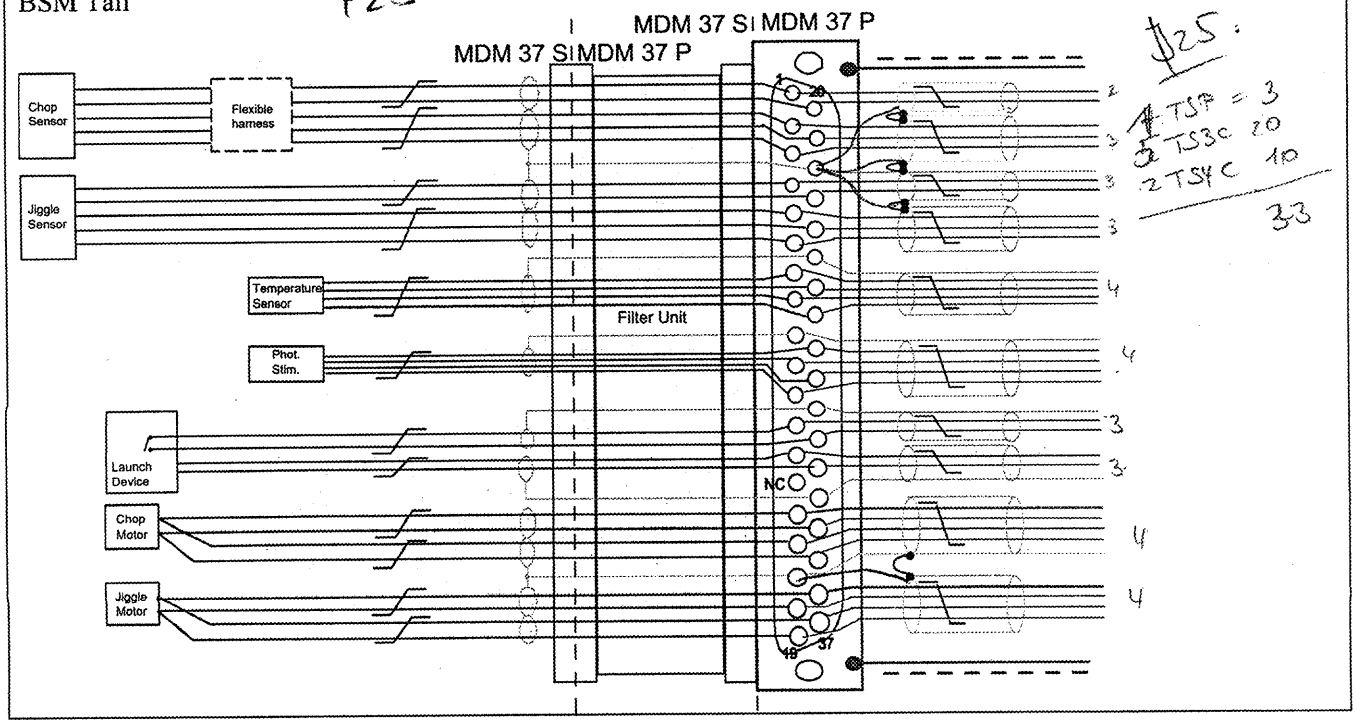
Overall Mechanical Drawing



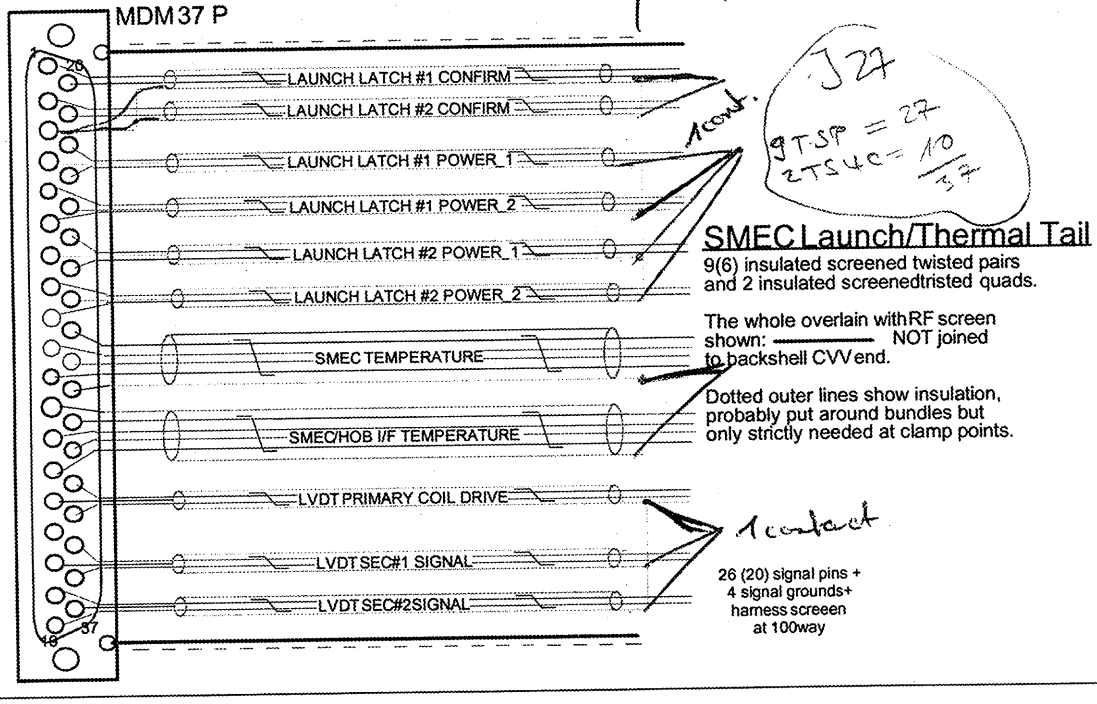
Connector/Backshell Details

MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J25	FB - BSM (P)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J27	FC - SMEC Launch (P)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J29	FC - SMEC Control (P)

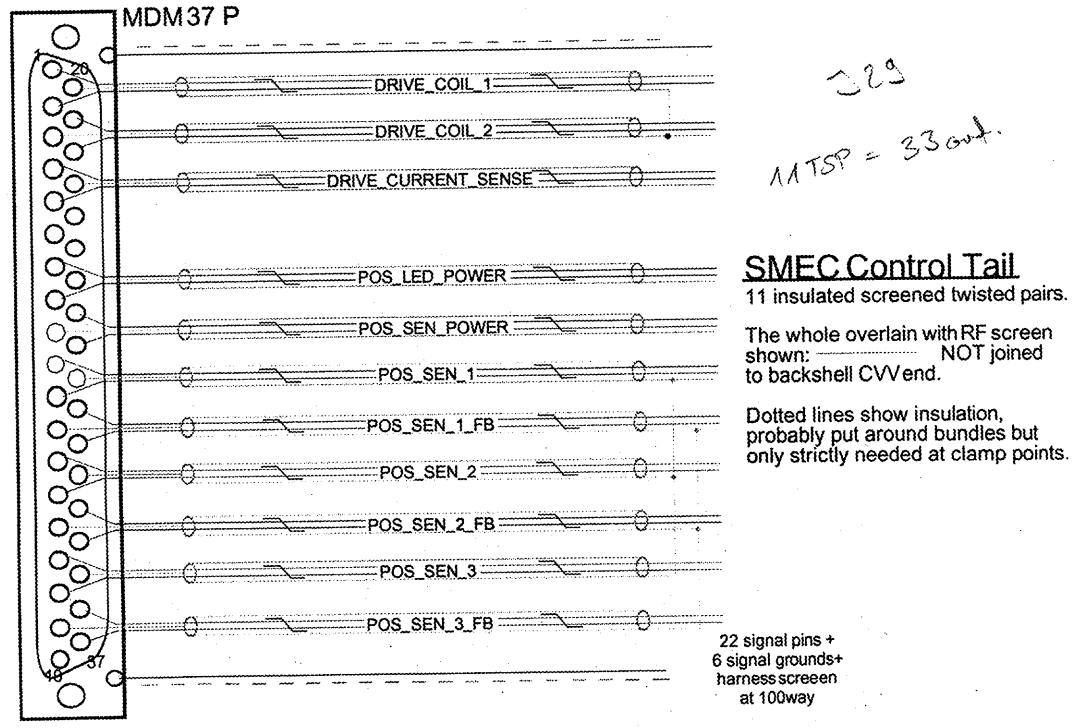
Harness Layup
BSM Tail

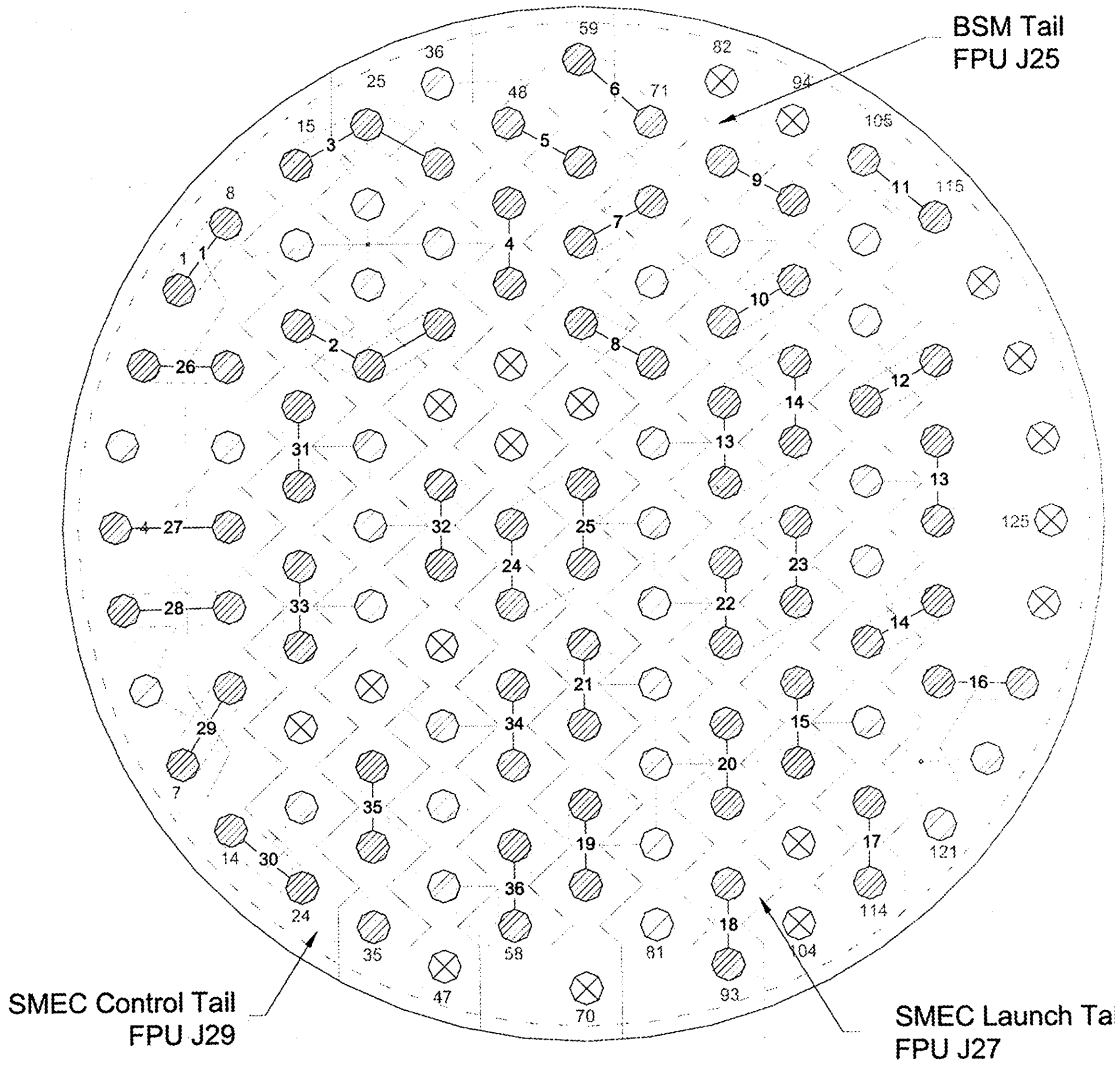


SMEC Launch/Thermal Tail



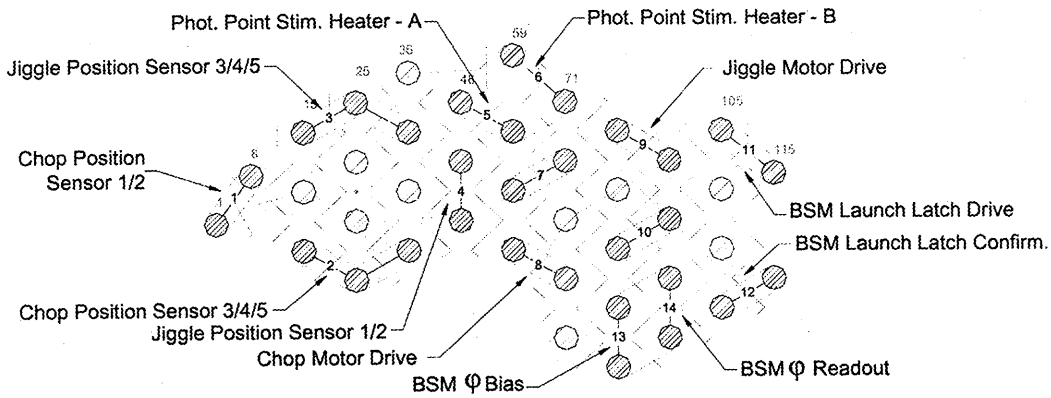
SMEC Control Tail



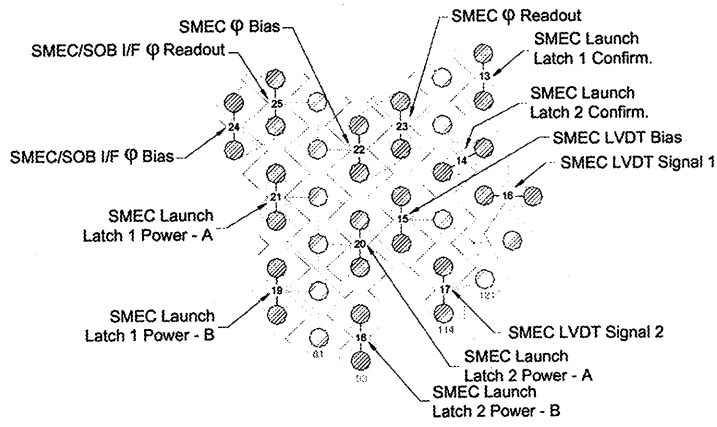


- Bolometer Signal +
- Bolometer Signal -
- Signal Ground
- FPU Faraday Shield Link
- No Connection

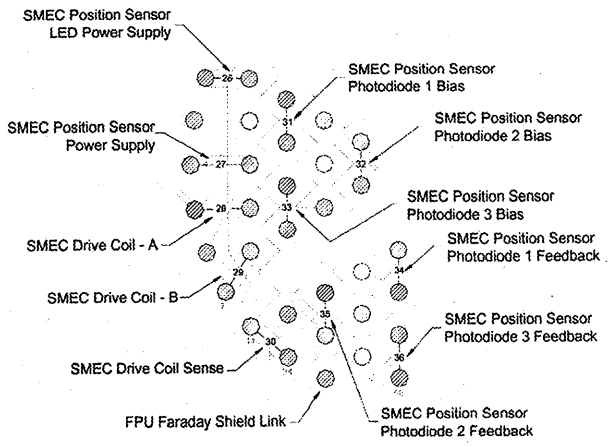
Harness Bundle



BSM Tail
FPU (J25)



SMEC Launch Tail
FPU (J27)



SMEC Control Tail
FPU (J29)

BSM Tail Listing (FPU J25)

Function	37way J25	Max. current	Wire lay-up	Max Ohms	128Way #11
Chop Position Sensor 1	1	1 µA	Insulated screened twisted pair	1000	
Chop Position Sensor 2	20	N/A		1000	
Chop Position Sensor shld1	to A	N/A		N/A	linked
Chop Position Sensor 3	2	250 nA	Insulated screened twisted triple	1000	
Chop Position Sensor 4	21	N/A		1000	
Chop Position Sensor 5	3	N/A		1000	
Chop Position Sensor shld2=A	22	N/A		N/A	
Jiggle Position Sensor 1	4	1 µA	Insulated screened twisteed pair	1000	
Jiggle Position Sensor 2	23	N/A		1000	
Jiggle Position Sensor shld1	to B	N/A		N/A	linked
Jiggle Position Sensor 3	5	250 nA	Insulated screened twisted triple	1000	
Jiggle Position Sensor 4	24	N/A		1000	
Jiggle Position Sensor 5	6	N/A		1000	
Jiggle Position Sensor shld2=B	22	N/A		N/A	
BSM temperature I+	7	1 µA	Insulated screened twisted quad	1000	
BSM temperature V+	26	N/A		1000	
BSM temperature V-	8	N/A		1000	
BSM temperature I-	27	1 µA		1000	
BSM temperature shld	25	N/A		N/A	
Photometer Point Stim. Heater I+_A	28	7 mA	Insulated screened twisted quad	10	
Photometer Point Stim.Heater I+_B	10	7 mA		10	
Photometer Point Stim.Heater I-_A	29	7 mA		10	
Photometer Point Stim.Heater I-_B	11	7 mA		10	
Photometer Point Stim.Heater shld	9	N/A		N/A	
BSM Launch latch confirmation 1	30	1mA	Insulated screened twisteed pair	1000	
BSM Launch latch confirmation 2	12	1mA		1000	
Launch latch confirmation shld to platform gnd	31	N/A		N/A	
BSM Launch latch drive +	13	35mA	Insulated screened twisted pair	10	
BSM Launch latch drive -	32	35mA		10	
BSM Launch latch drive shld	33	N/A		N/A	
Chop Motor Drive 1	15	40 mA	Insulated screened twisted quad	10	
Chop Motor Drive 2	34	40 mA		10	
Chop Motor Drive 3	16	40 mA		10	
Chop Motor Drive 4	35	40 mA		10	
Chop Motor Drive shld	17	N/A		N/A	
Jiggle Motor Drive 1	36	40 mA	Insulated screened twisted quad	10	
Jiggle Motor Drive 2	18	40 mA		10	
Jiggle Motor Drive 3	37	40 mA		10	
Jiggle Motor Drive 4	19	40 mA		10	
Jiggle Motor Drive shld	17	N/A		N/A	linked

This 37way connector is has 36 ways populated.

Commoning the Launch Latch Drive shield with that of the motor drives and reassigning launch latch drive 3 would give the BSM a slightly messy 2 wire cryoharness "contingency".

The photometer point stimulus Heater shield may be denied a contact on the 128Way depending on demand by the SMEC tails, TBC. In which case, and only this case, it would be grounded in the BSM.

SMEC Launch/Therm.Tail Listing (FPU J27)

Function	37way J27	Max. current	Wire lay-up	Max Ohms	128Way #11
SMEC launch latch # 1 confirmation +	1	1 mA	Insulated screened twisted pair	5	
SMEC launch latch # 1 confirmation -	20	1 mA		5	
SMEC launch latch # 1 confirmation Shield	3	N/A		N/A	A [noisy SVM]
SMEC launch latch # 2 confirmation + TBC	2	1 mA	Insulated screened twisted pair	5	
SMEC launch latch # 2 confirmation - TBC	21	1 mA		5	
SMEC launch latch # 2 confirmation Shld TBC	3	N/A		N/A	A[noisy SVM]
SMEC launch latch #1 power supply_1	21	400 mA / 50ms	Insulated screened twisted pair	5	
SMEC launch latch #1 power return_1	22	400 mA / 50ms		5	
SMEC launch latch #1 power Shield_1	4	N/A		N/A	B
SMEC launch latch #1 power supply_2	5	400 mA / 50ms	Insulated screened twisted pair	5	
SMEC launch latch #1 power return_2	6	400 mA / 50ms		5	
SMEC launch latch #1 power Shield_2	23	N/A		N/A	B
SMEC launch latch #2 power supply_1	24	400 mA / 50ms	Insulated screened twisted pair	5	
SMEC launch latch #2 power return_1	25	400 mA / 50ms		5	
SMEC launch latch #2 power Shield_1	7	N/A		N/A	B
SMEC launch latch #2 power supply_2 TBC	8	400 mA / 50ms	Insulated screened twisted pair	5	
SMEC launch latch #2 power return_2 TBC	9	400 mA / 50ms		5	
SMEC launch latch #2 power Shield_2 TBC	26	N/A		N/A	B
SMEC temperature I+	27	1 µA	Insulated screened twisted quad	1000	
SMEC temperature V+	10	N/A		1000	
SMEC temperature V-	28	N/A		1000	
SMEC temperature I-	11	1 µA		1000	
SMEC temperature shld	29	N/A		N/A	C
SMEC/SOB I/F temperature I+	30	1 µA	Insulated screened twisted quad	1000	
SMEC/SOB I/F temperature V+	13	N/A		1000	
SMEC/SOB I/F temperature V-	31	N/A		1000	
SMEC/SOB I/F temperature I-	14	1 µA		1000	
SMEC/SOB I/F temperature shld	12	N/A		N/A	C
SMEC LVDT primary coil power supply (P)	32	5 mA	Insulated screened twisted pair	5	
SMEC LVDT primary coil power supply (N)	33	5 mA		5	
SMEC LVDT primary coil power supply Shld	15	N/A		N/A	D
SMEC LVDT secondary coil # 1signal (P)	35	50 µA	Insulated screened twisted pair	5	
SMEC LVDT secondary coil # 1 signal (N)	36	50 µA		5	
SMEC LVDT secondary coil # 1 signal Shield	17	N/A		N/A	D
SMEC LVDT secondary coil # 2 signal (P)	18	50 µA	Insulated screened twisted pair	5	
SMEC LVDT secondary coil # 2 signal (N)	19	50 µA		5	
SMEC LVDT secondary coil # 2 signal Shield	37	N/A		N/A	D

31 contacts used

SMEC Control Tail Listing (FPU J29)

Function	37way J29	Max. current	Wire lay-up	Max Ohms	128Way #11
SMEC Drive Coil I+	1	100mA	Insulated screened twisted pair	5	
SMEC Drive Coil I-	2	100mA		5	
SMEC Drive Coil shld	20	N/A		N/A	A
SMEC Drive Coil (Rob) I+	21	100mA	Insulated screened twisted pair	5	
SMEC Drive Coil (Rob) I-	22	100mA		5	
SMEC Drive Coil (Rob) shld	3	N/A		N/A	A
SMEC Drive Coil Sense+	4	10 µA	Insulated screened twisted pair	500	
SMEC Drive Coil Sense-	5	10 µA		500	
SMEC Drive Coil shld	23	N/A		N/A	
SMEC position sensor Led power supply	7	1mA	Insulated screened twisted pair	100	
SMEC position sensor Led power return	8	1mA		100	
SMEC position sensor Led power Shield	26	N/A		N/A	
SMEC position sensor power supply	27	1mA	Insulated screened twisted pair	100	
SMEC position sensor power return	28	1mA		100	
SMEC position sensor power Shield	9	N/A		N/A	
SMEC position sensor photodiode #1 I+	10	20 µA	Insulated screened twisted pair	1000	
SMEC position sensor photodiode #1 I-	11	20 µA		1000	
SMEC position sensor photodiode Shield	29	N/A		N/A	B
SMEC pos. sensor photodiode #1 feedback +	30	10 µA	Insulated screened twisted pair	1000	
SMEC pos. sensor photodiode #1 feedback -	31	10 µA		1000	
SMEC pos. sensor photodiode feedback Shld	12	N/A		N/A	C
SMEC position sensor photodiode #2 I+	13	20 µA	Insulated screened twisted pair	1000	
SMEC position sensor photodiode #2 I-	14	20 µA		1000	
SMEC position sensor photodiode Shield	32	N/A		N/A	B
SMEC pos. sensor photodiode #2 feedback +	33	10 µA	Insulated screened twisted pair	1000	
SMEC pos. sensor photodiode #2 feedback -	34	10 µA		1000	
SMEC pos. sensor photodiode feedback Shld	15	N/A		N/A	C
SMEC position sensor photodiode #3 I+	16	20 µA	Insulated screened twisted pair	1000	
SMEC position sensor photodiode #3 I-	17	20 µA		1000	
SMEC position sensor photodiode Shield	35	N/A		N/A	B
SMEC pos. sensor photodiode #3 feedback +	36	10 µA	Insulated screened twisted pair	1000	
SMEC pos. sensor photodiode #3 feedback -	37	10 µA		1000	
SMEC pos. sensor photodiode feedback Shld	18	N/A		N/A	C

29 contacts used.

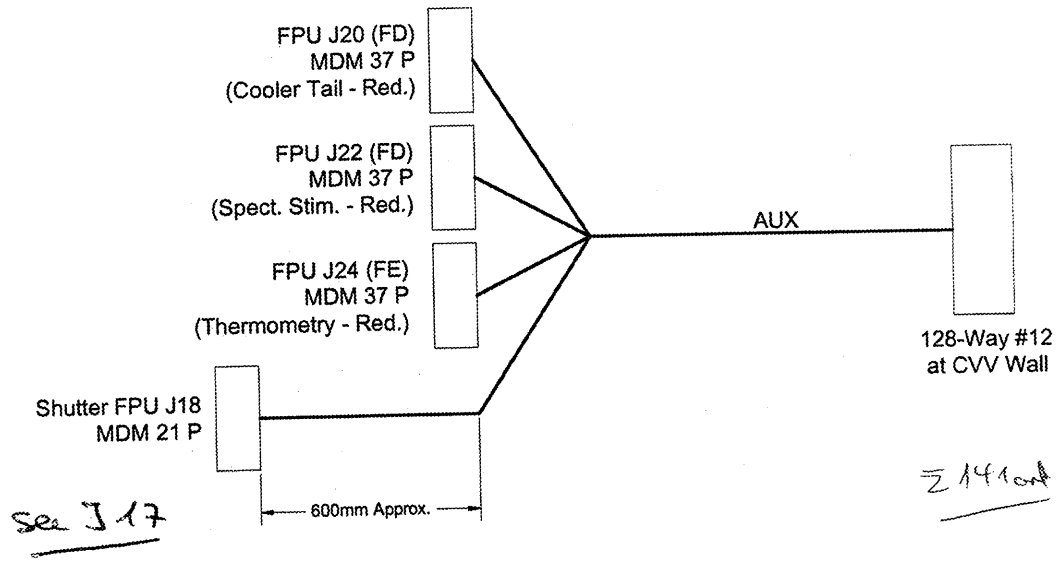
Total used through 128 Way = 36 + 31+ 29 = 96.

SMEC above based on "Cryo_harness_010906.doc".

4.4.12 C12 CVV12 to HSFPU AUX-R

Overall Mechanical Drawing

Redundant version of C10, and the same as it



Connector/Backshell Details

Redundant side harness

MDM 37 P	+Glenair 500-T-010-M-37-F-H to	FPUJ20	FD - Cooler (R)
MDM 37 P	+Glenair 500-T-010-M-37-F-H to	FPUJ22	FD - Spect. Stim (R)
MDM 37 P	+Glenair 500-T-010-M-37-F-H to	FPUJ24	FE - Therm. (R)
MDM 21 P	+Glenair 500-T-010-M-21-F-H to	FPUJ18	Shutter (R)

Harness Layup

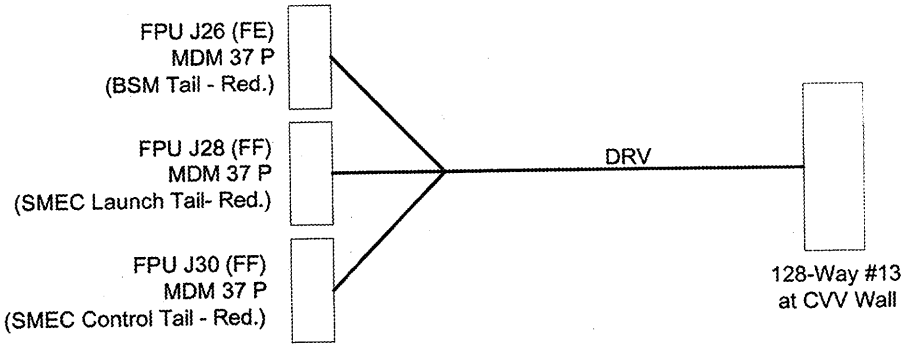
Redundant/identical version of C10

Add one to all the connector numbers compared to C10.

4.4.13 C13 CVV13 to HSFPU DRV-R

Overall Mechanical Drawing

Format as C11, maybe differing length.



Connector/Backshell Details

Redundant side harness

MDM37P+Glenair500-T-010-M-37-F-H to	FPUJ26	FE - BSM (R)
MDM37P+Glenair500-T-010-M-37-F-H to	FPUJ28	FF - SMEC Launch (R)
MDM37P+Glenair500-T-010-M-37-F-H to	FPUJ30	FF - SMEC Control (R)

Harness Layup

As C11.

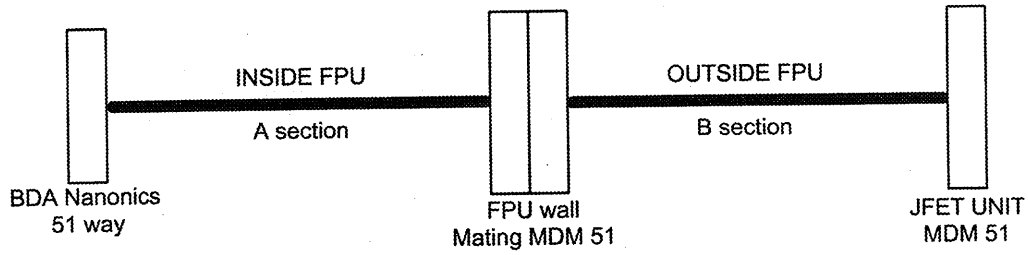
Contact Details

As C11, but add one to all the connector numbers compared to C11.

4.5 FPU Harnesses

4.5.1 F1[A&B] PSW-A BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details

A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup

B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

Length and tie-downs optimised to minimise capacitance and microphony.
Consists of 6 x 12-ax, each carrying 4 channels, making 24 channels in all plus a screened twisted pair for bias.
Careful control of those screens that cannot have their own contact assignment.

Contact Details

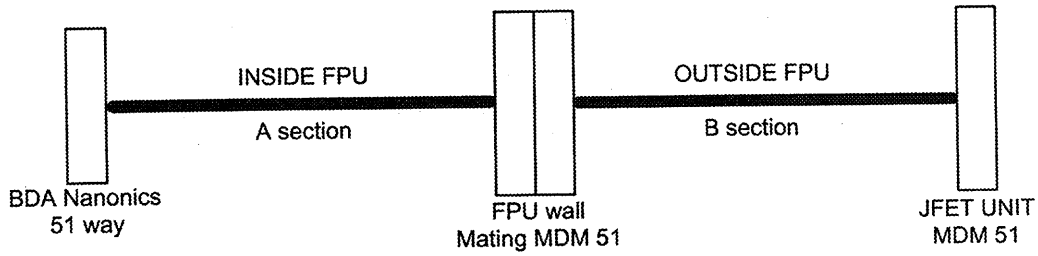
Function	MDM51 contact	Cable	Nanonics contact
Channel A +	35	12-ax	1
Channel A -	51		26
Channel Agnd	To 12-ax shield one end		To 12-ax shield one end
Channel B +	17		2
Channel B -	18		27
Channel Bgnd	To 12-ax shield one end		To 12-ax shield one end
Channel C +	15		3
Channel C -	16		28
Channel Cgnd	To 12-ax shield one end		To 12-ax shield one end
Channel D +	34		4
Channel D -	50		29
Channel Dgnd	To 12-ax shield one end		To 12-ax shield one end
Channel E +	33	12-ax	5
Channel E -	49		30
Channel Egnd	To 12-ax shield one end		To 12-ax shield one end
Channel F +	13		6
Channel F -	14		31
Channel Fgnd	To 12-ax shield one end		To 12-ax shield one end
Channel G +	32		7
Channel G -	48		32
Channel Ggnd	To 12-ax shield one end		To 12-ax shield one end
Channel H +	31		8
Channel H-	47		33
Channel Hgnd	To 12-ax shield one end		To 12-ax shield one end
Channel I +	30		9

Function	MDM51 contact	Cable	Nanonics contact
Channel I-	46	12-ax	34
Channel Ignd	To 12-ax shield one end		To 12-ax shield one end
Channel J +	29		10
Channel J-	45		35
Channel Jgnd	To 12-ax shield one end		To 12-ax shield one end
Channel K +	28		11
Channel K -	44		36
Channel Kgnd	To 12-ax shield one end		To 12-ax shield one end
Channel L +	11		12
Channel L -	12		37
Channel Lgnd	To 12-ax shield one end		To 12-ax shield one end
Channel M +	27	12-ax	13
Channel M-	43		38
Channel Mgnd	To 12-ax shield one end		To 12-ax shield one end
Channel N +	26		14
Channel N -	42		39
Channel Ngnd	To 12-ax shield one end		To 12-ax shield one end
Channel P +	9		15
Channel P -	10		40
Channel Pgnd	To 12-ax shield one end		To 12-ax shield one end
Channel R +	25		16
Channel R-	41		41
Channel Rgnd	To 12-ax shield one end		To 12-ax shield one end
Channel S+	24	12-ax	17
Channel S -	40		42
Channel Sgnd	To 12-ax shield one end		To 12-ax shield one end
Channel T+	7		18
Channel T -	8		43
Channel Tgnd	To 12-ax shield one end		To 12-ax shield one end
Channel U +	23		19
Channel U -	36		44
Channel Ugnd	To 12-ax shield one end		To 12-ax shield one end
Channel V +	22		20
Channel V-	38		45
Channel Vgnd	To 12-ax shield one end		To 12-ax shield one end
Channel W +	5	12-ax	21
Channel W -	6		46
Channel Wgnd	To 12-ax shield one end		To 12-ax shield one end
Channel X +	21		22
Channel X -	37		47
Channel Xgnd	To 12-ax shield one end		To 12-ax shield one end
Channel Y +	20		23
Channel Y -	38		48
Channel Ygnd	To 12-ax shield one end		To 12-ax shield one end
Channel Z+	3		24
Channel Z -	4		49
Channel Zgnd	To 12-ax shield one end		To 12-ax shield one end
Bias +	1	STT	25
Bias_	2		50
Bias gnd	19+commoned shlds		51+commoned shlds

N.B. None of the gnds./braids in the above shall be connected to backshell and hence chassis.

4.5.2 F2[A&B] PSW-B BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

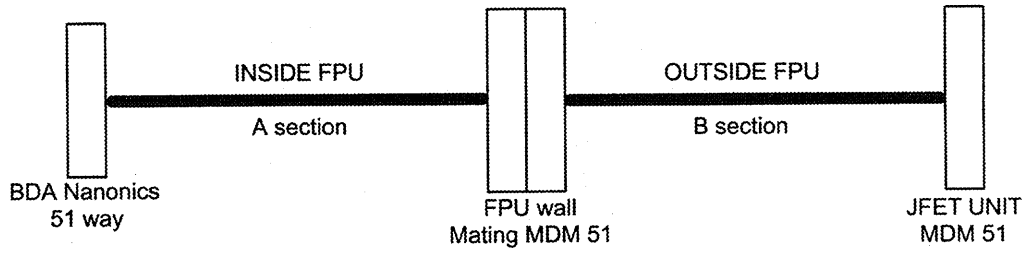
As F1, length a variable

Contact Details

as F1

4.5.3 F3[A&B] PSW-C BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

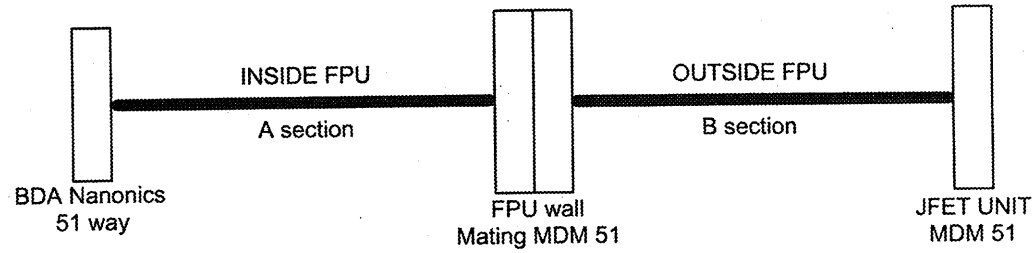
As F1, length a variable

Contact Details

as F1

4.5.4 F4[A&B] PSW-D BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

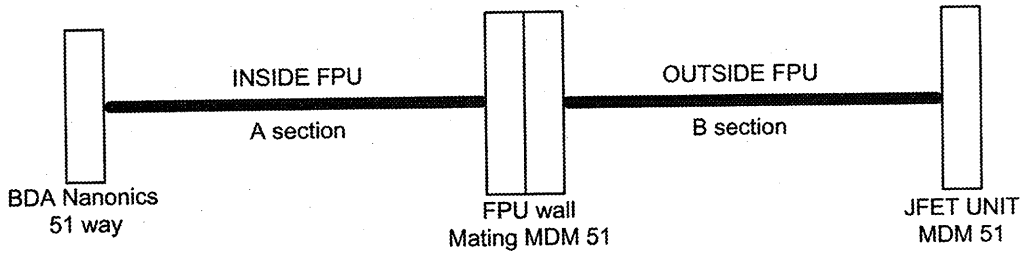
As F1, length a variable

Contact Details

as F1

4.5.5 F5[A&B] PSW-E BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

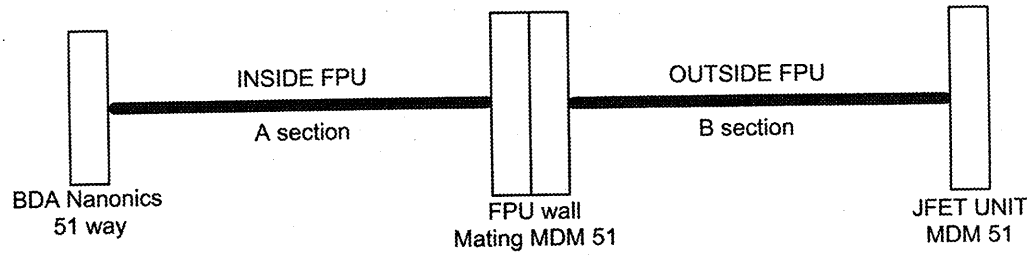
As F1, length a variable

Contact Details

as F1

4.5.6 F6[A&B] PSW-F BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

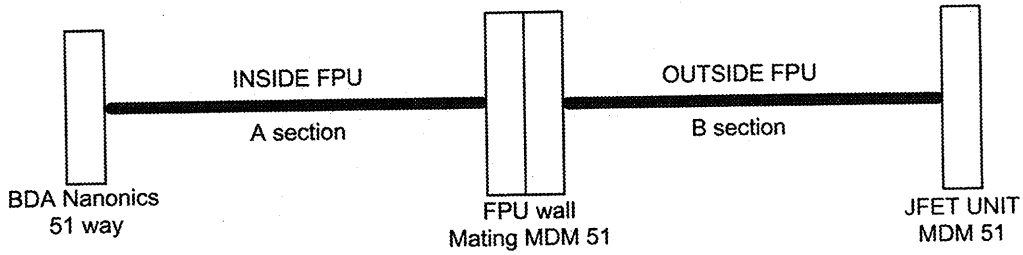
As F1, length a variable

Contact Details

as F1

4.5.7 F7[A&B] PMW-A BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

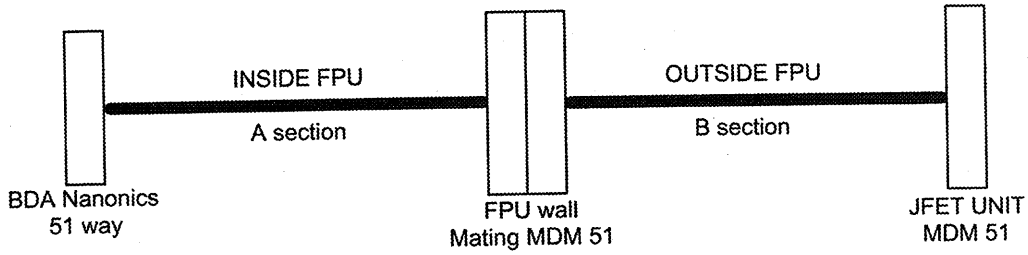
As F1, length a variable

Contact Details

as F1

4.5.8 F8[A&B] PMW-B BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

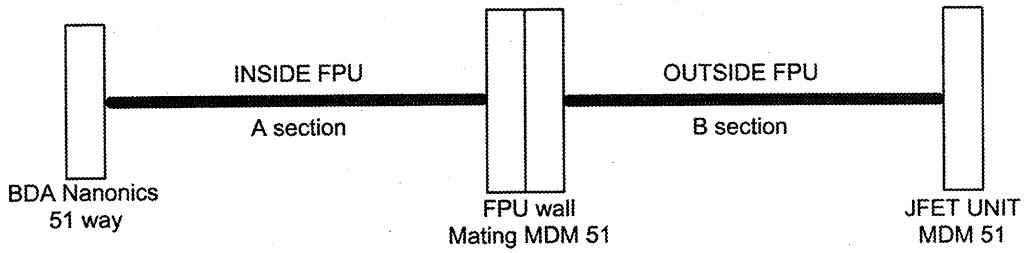
As F1, length a variable

Contact Details

as F1

4.5.9 F9[A&B] PMW-D BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

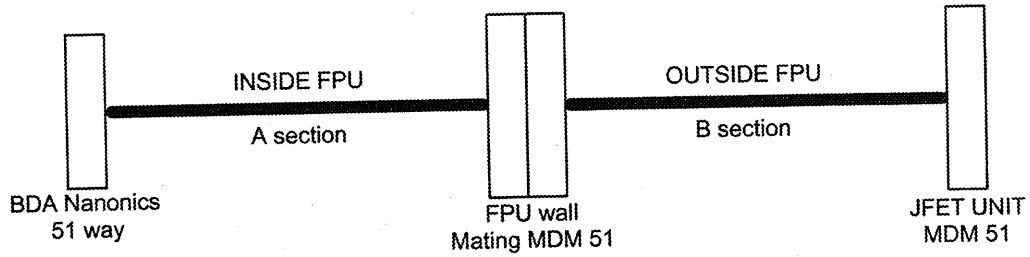
As F1, length a variable

Contact Details

as F1

4.5.10 F10[A&B] PMW-D BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

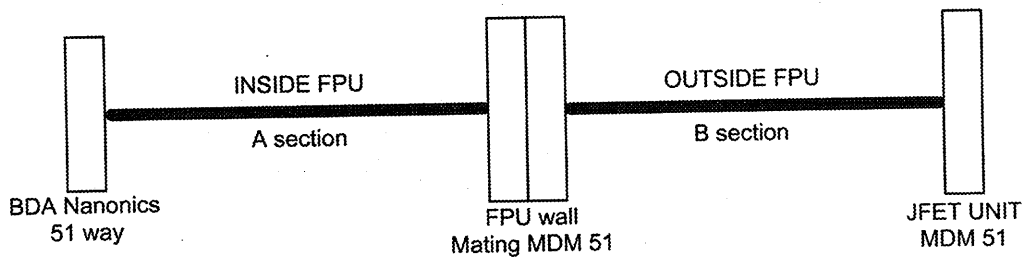
As F1, length a variable

Contact Details

as F1

4.5.11 F11[A&B] PLW-A BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

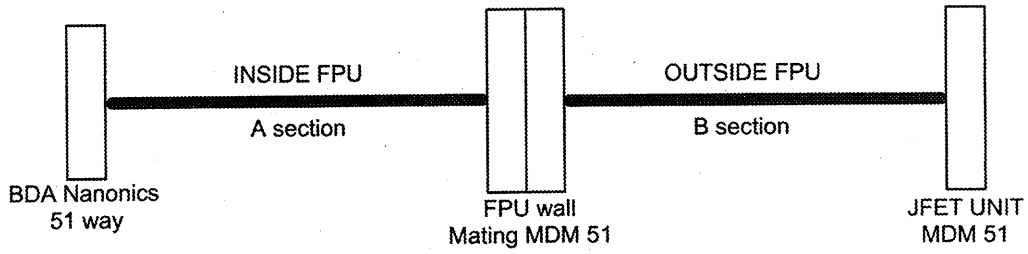
As F1, length a variable

Contact Details

as F1

4.5.12 F12[A&B] PLW-B BDA to HSJFP

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

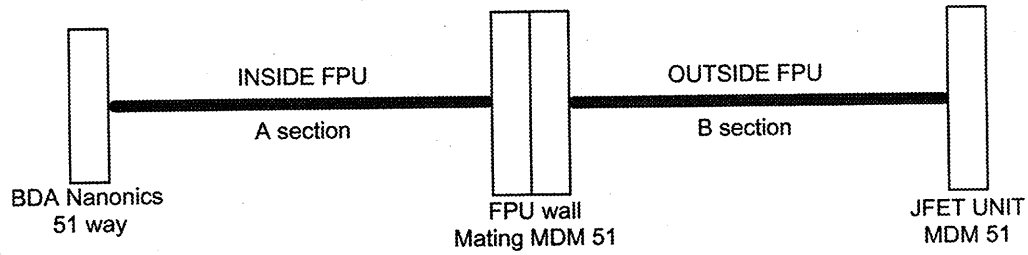
As F1, length a variable

Contact Details

as F1

4.5.13 F13[A&B] SSW-A BDA to HSJFS

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

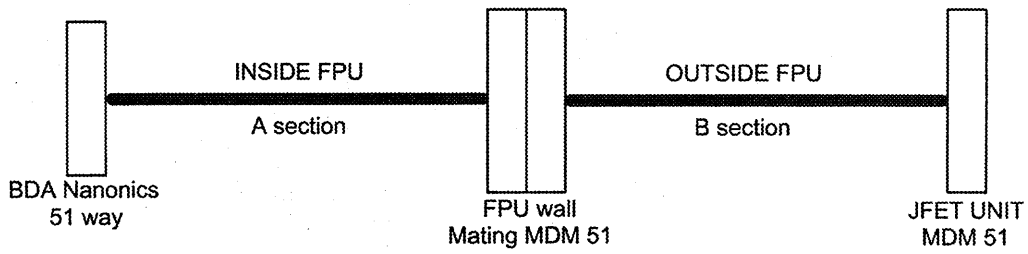
As F1, length a variable

Contact Details

as F1

4.5.14 F14[A&B] SSW-B BDA to HSJFS

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

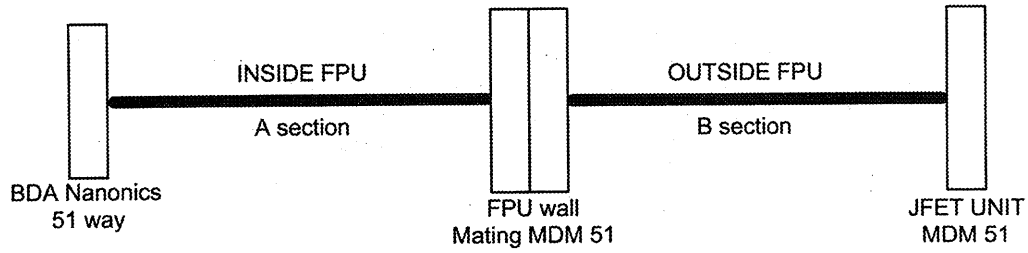
As F1, length a variable

Contact Details

as F1

4.5.15 F15[A&B] SLW-A BDA to HSJFS

Overall Mechanical Drawing



JPL configured Photometer BDA lead, maintaining Faraday cage HSJFP to FPU, and keeping signal ground separate from chassis ground.

Connector/Backshell Details
A section: Nanonics STM50PC2DC012N? to MDM51S mounted in wall
B section: MDM51P with Glenair 507-145 M 51 H to MDM51S with Glenair 507-145 M 51 H at JFET module.

Harness Layup
B section requires outer RF shield, **A** section does not.
B section may have thermal heatsink attachments, TBD.

As F1, length a variable

Contact Details

as F1

4.5.16 F16 COOLER-P to FA

Overall Mechanical Drawing

37 way MDM into Cooler prime J1 to 37 way MDM into HSFPU Filter FA J1

Connector/Backshell Details

Harness Layup

- As per C10 FPU J19
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.17 F17 COOLER-R to FD

Overall Mechanical Drawing

37 MDMway to Cooler redundant to 37 MDMway on HSFPU Filter FD J1

Connector/Backshell Details

Harness Layup

- As per C10 FPU J19
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.18 F18 SPECT_STIM-P to FA

Overall Mechanical Drawing

21way MDM to J1 Spectrometer Stim to 37way MDM at J2 on HSFPU Filter FA

Connector/Backshell Details

Harness Layup

- As per C10 FPU J21
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.19 F19 SPECT_STIM-R to FD

Overall Mechanical Drawing

21way MDM to J2 Spectrometer Stim to 37way MDM at J2 on HSFPU Filter FD

Connector/Backshell Details

Harness Layup

- As per C10 FPU J21
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.20 F20 THERM-P from FB

Overall Mechanical Drawing

Multiple TBD to 37way MDM at J1 on HSFPU Filter FB

Connector/Backshell Details

Harness Layup

- As per C10 FPU J23
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.21 F21 THERM-R from FE

Overall Mechanical Drawing

Multiple TBD to 37way MDM at J1 on HSFPU Filter FE

Connector/Backshell Details

Harness Layup

- As per C10 FPU J23
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.22 F22 BSM-P to FB

Overall Mechanical Drawing

Connector/Backshell Details

37 MDMway to BSM Prime to 37 MDMway on HSFPU Filter FB J2

Harness Layup

- As per C11 FPU J25
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.23 F23 BSM-R to FE

Overall Mechanical Drawing

Connector/Backshell Details

37 MDMway to BSM Redundant to 37 MDMway on HSFPU Filter FE J2

Harness Layup

- As per C11 FPU J23
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.24 F24 SMECSIG-P to FC

Overall Mechanical Drawing

Connector/Backshell Details

37-Way MDM to SMEC Signal Prime to 37-Way MDM on HSFPU Filter FC J1

Harness Layup

- As per C11 FPU J27
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.25 F25 SCECDRV-P to FC

Overall Mechanical Drawing

Connector/Backshell Details

37-Way MDM to SMEC Drive Prime to 37-Way MDM on HSFPU Filter FC J2

Harness Layup

- As per C11 FPU J27
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.26 F26 SMECSIG-R to FF

Overall Mechanical Drawing

Connector/Backshell Details

37-Way MDM to SMEC Signal Redundant to 37-Way MDM on HSFPU Filter FF J1

Harness Layup

- As per C11 FPU J27
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.27 F27 SMECDRV-P to FF

Overall Mechanical Drawing

Connector/Backshell Details

37-Way MDM to SMEC Drive Prime to 37-Way MDM on HSFPU Filter FF J2

Harness Layup

- As per C11 FPU J29
- EMI braid over harness bundle terminated at the backshells
- No overall harness insulation required

Contact Details

4.5.28 F28 300-mK Thermal Control Hardware to HSJFS

Overall Mechanical Drawing

Connector/Backshell Details

51 Way Nanonics to 51 Way MDM at JFS

Harness Layup

Contact Details

4.6 JFET unit Back-Harnesses

4.6.1 Overview

Updated to reflect removal of separate RF filter units from baseline as in Spire Instrument Block Diagram 3.1 and following.

The Bolometer Back Harness provides the routing of wires from the JFET membrane 15way "service" connectors into the 37way connectors on harnesses C3 and half of C1.

The JFET 15ways each provide 7 double-wired functions on 14 pins as follows, all DC isolated from ground in the JFET box chassis except for 1MOhm antistatic resistors:

Function	A-wire	B-wire	
JFET V +	10	14	These colour codes are carried through to the drawing below Values agree with 30/7/01 JPL review
JFET V-	1	8	
JFET Vgnd	9	15	
Bias +	2	7	
Bias -	4	5	
Heater +	3	6	
Heater -	11	13	

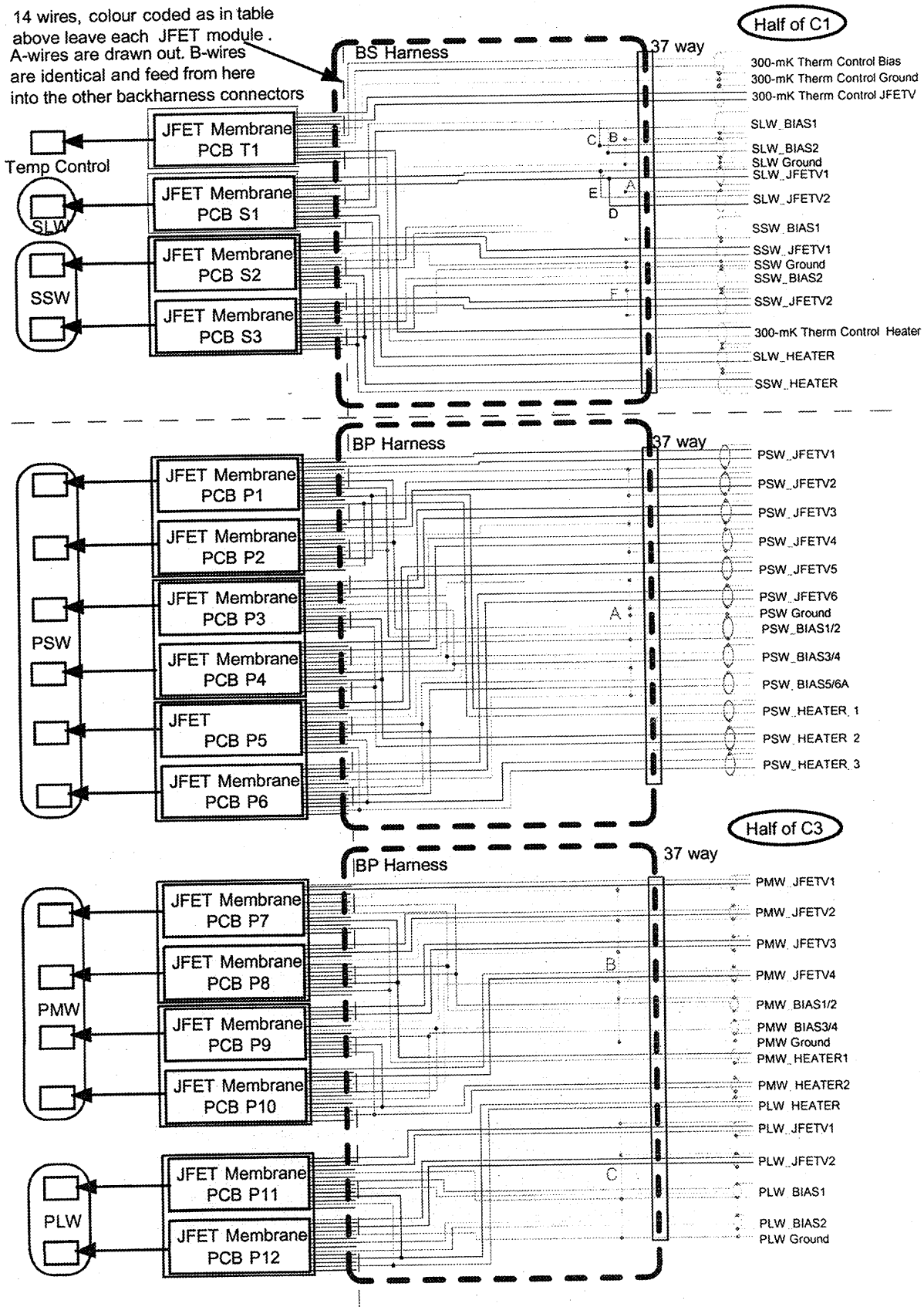
For the photometer, the 4 x 37 = 148 C3 harness contacts cannot accommodate all the 12 x 14 =168 contacts from the JFET boxes. However not all these possible 168 at the 37 way filters can proceed through the 100(128) ways available in the C3 harness. A similar situation applies for the spectrometer. Appropriate commoning is build into splices in the BS and BP harnesses as shown in the diagram that follows: JPL consider this acceptable in copper multistrand harness and it avoids adaptor modules.

There is no splicing of functionality in the C or I series cryoharnesses. [Note that as specified earlier herein inner screens are linked in groups to reduce noise and not every inner shield proceeds on to a contact].

The philosophy of deciding which how to common up the functions in these harnesses was decided in issue 0.3 of this document with a view to failure control. If the supposedly impossible happened and both the A and B wires of a particular function were to break, that function should not take out a complete BDA array. This is accomplished on 4 BDAs by allocating them more than a single function, whilst on the 5th, one, the small SLW BDA, there is enough spare pin capacity to double up the wiring again. This provides the HSDCU with as many separately wired a.c. bias generator wires as can be fitted through the harnesses C/I3 and half of C/I1. Bias generator wiring may be paralleled on entry to the HSDCU, and the present baseline of just one powered bias generator scalar / O/P for each bolometer array results in just this.

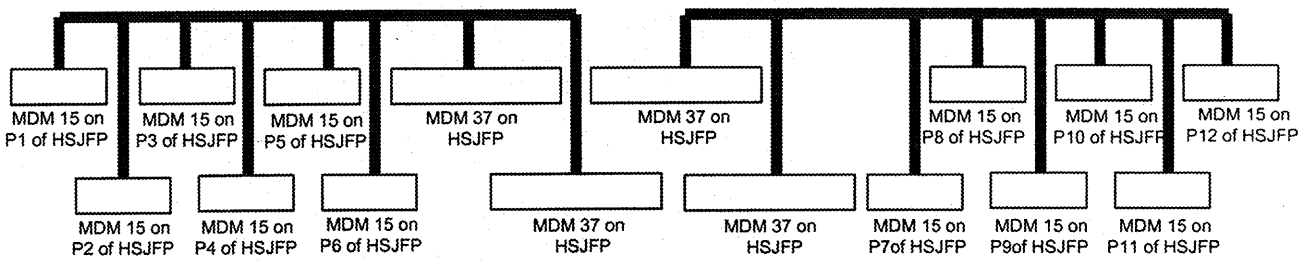
Looking at the table above*, note that the A and B wires for each of these functions must be linked in the HSDCU to maintain cryoharness robustness against single wire breakage, *whether or not* they then split into two again and feed into Prime and Redundant DCU electronics functions. The A and B wires do not follow each other in the same harness tail and get linked inside the harness itself at the HSDCU because any mechanical distress to the cryoharness is likely to be on a tail-by-tail (connector-by-connector) basis and one does not want both the A and B wires of any function broken. They are bundled close together as shown in the Spire Instrument Block Diagram to minimise loop areas.

*Strictly speaking this paragraph applies to the grouped functions that get through the 37way linking, but it remains true for any particular BDA looking into the wiring.


14 wires, colour coded as in table above leave each JFET module . A-wires are drawn out. B-wires are identical and feed from here into the other backharness connectors
Half of C1
BS Harness
37 way
300-mK Therm Control Bias
300-mK Therm Control Ground
300-mK Therm Control JFETV
SLW_BIAS1
SLW_BIAS2
SLW Ground
SLW_JFETV1
SLW_JFETV2
SSW_BIAS1
SSW_JFETV1
SSW Ground
SSW_BIAS2
SSW_JFETV2
300-mK Therm Control Heater
SLW_HEATER
SSW_HEATER
Temp Control
SLW
SSW
JFET Membrane PCB T1
JFET Membrane PCB S1
JFET Membrane PCB S2
JFET Membrane PCB S3
BP Harness
37 way
PSW_JFETV1
PSW_JFETV2
PSW_JFETV3
PSW_JFETV4
PSW_JFETV5
PSW_JFETV6
PSW Ground
PSW_BIAS1/2
PSW_BIAS3/4
PSW_BIAS5/6A
PSW_HEATER_1
PSW_HEATER_2
PSW_HEATER_3
PSW
JFET Membrane PCB P1
JFET Membrane PCB P2
JFET Membrane PCB P3
JFET Membrane PCB P4
JFET PCB P5
JFET Membrane PCB P6
Half of C3
BP Harness
37 way
PMW_JFETV1
PMW_JFETV2
PMW_JFETV3
PMW_JFETV4
PMW_BIAS1/2
PMW_BIAS3/4
PMW Ground
PMW_HEATER1
PMW_HEATER2
PLW_HEATER
PLW_JFETV1
PLW_JFETV2
PLW_BIAS1
PLW_BIAS2
PLW Ground
PMW
JFET Membrane PCB P7
JFET Membrane PCB P8
JFET Membrane PCB P9
JFET Membrane PCB P10
PLW
JFET Membrane PCB P11
JFET Membrane PCB P12

4.6.2 BP-Photometer

Overall Mechanical Drawing



Connector/Backshell Details

JPL to specify.

Harness Layup

The BS harness is all at one temperature. Crimped 28AWG or 30AWG stranded copper MDM.

Pairs of wires should at least be twisted, and some inter-function screens may be appropriate, JPL to specify.

This is definitely a harness to build on a dimensionally accurate horse!

Contact Details

Assigning grounds end to end in this harness is somewhat arbitary because

i. Within the PSW Backplane Harness pins 1, 21, 4, 24, 7, 27, 10, 30, 13, 33 on the 37 Way connectors J25 are commoned as a PSW ground. These contactes are donoted by A in the table below.

ii. Within the PMW/PLW Backplane Harness pins 1, 22, 4, 24, 7, 28 on the 37 Way connectors J26 are commoned as a PMW ground. These contactes are donoted by B in the table below.

iii. Within the PMW/PLW Backplane Harness pins 33, 16, 36, 19 on the 37 Way connectors J26 are commoned as a PLW ground. These contactes are donoted by C in the table below.

iv. This wires within these harnesses are doubled up to improve the system robustness. The same pattern of commoning the pins in the J27/J28 harnesses for the PSW, PMW and PLW grounds is adopted and are denoted by A`, B` and C`

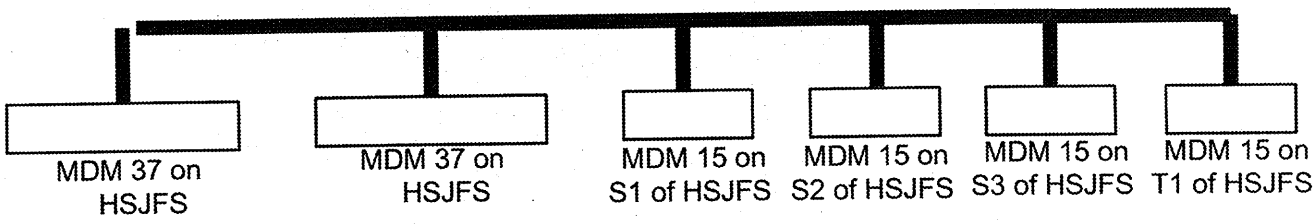
	HSJFP				PSW Backplane Harness						PMW/PLW Backplane Harness					
Name	J25 37way	J26 37way	J27 37way	J28 37way	P1 15 way	P2 15 way	P3 15 way	P4 15 way	P5 15 way	P6 15 way	P7 15way	P8 15way	P9 15way	P10 15way	P11 15way	P12 15way
PSW_JFETV1_A +	20				10											
PSW_JFETV1_A -	2				1											
PSW_JFETV1_A shld	1				9 (A)											
PSW_JFETV2_A +	3					10										
PSW_JFETV2_A -	22					1										
PSW_JFETV2_A shld	21				A											
PSW_JFETV3_A +	23						10									
PSW_JFETV3_A -	5						1									
PSW_JFETV3_A shld	4					9(A)										
PSW_JFETV4_A +	6							10								
PSW_JFETV4_A -	25							1								
PSW_JFETV4_A shld	24				A											
PSW_JFETV5_A +	26								10							
PSW_JFETV5_A -	8								1							
PSW_JFETV5_A shld	7						9(A)									
PSW_JFETV6_A +	9									10						
PSW_JFETV6_A -	28									1						
PSW_JFETV6_A shld	27				A											
PSW GRND_A	10				A											
PSW_BIAS1/2_A +	11				2	2										
PSW_BIAS1/2_A -	29				4	4										
PSW_BIAS1/2_A shld	30							9(A)								
PSW_BIAS3/4_A +	31						2	2								
PSW_BIAS3/4_A -	12						4	4								
PSW_BIAS3/4_A shld	13								9(A)							
PSW_BIAS5/6_A +	14								2	2						
PSW_BIAS5/6_A -	32								4	4						
PSW_BIAS5/6_A shld	33									9(A)						
PSW_HEATER_A1 +	34				3	3										
PSW_HEATER_A1 -	15				11	11										
PSW_HEATER_A1 shld	16				No Connection											
PSW_HEATER_A2 +	17						3	3								
PSW_HEATER_A2 -	35						11	11								
PSW_HEATER_A2 shld	36				No Connection											
PSW_HEATER_A3 +	37								3	3						
PSW_HEATER_A3 -	18								11	11						
PSW_HEATER_A3 shld	36				No Connection											
PMW_JFETV1_A +		20									10					
PMW_JFETV1_A -		2									1					
PMW_JFETV1_A shld		1									9(B)					
PMW_JFETV2_A +		3										10				
PMW_JFETV2_A -		22										1				
PMW_JFETV2_A shld		21										9(B)				
PMW_JFETV3_A +		23											10			
PMW_JFETV3_A -		5											1			
PMW_JFETV3_A shld		4											9(B)			
PMW_JFETV4_A +		6												10		
PMW_JFETV4_A -		25												1		
PMW_JFETV4_A shld		24												9(B)		
PMW_BIAS1/2_A +		26									2	2				
PMW_BIAS1/2_A -		8									4	4				
PMW_BIAS1/2_A shld		7									B					
PMW_BIAS3/4_A +		27											2	2		
PMW_BIAS3/4_A -		9											4	4		
PMW_BIAS3/4_A shld		28									No Connection					
PMW GND WIRE_A		28									B					
PMW HEATER A1 +		29									3	3				
PMW HEATER A1 -		10									11	11				
PMW HEATER A1 shld		11									No Connection					

	HSJFP				PSW Backplane Harness						PMW/PLW Backplane Harness					
Name	J25 37way	J26 37way	J27 37way	J28 37way	P1 15 way	P2 15 way	P3 15 way	P4 15 way	P5 15 way	P6 15 way	P7 15way	P8 15way	P9 15way	P10 15way	P11 15way	P12 15way
PMW HEATER A2 +		12											3	3		
PMW HEATER A2 -		30											11	11		
PMW HEATER A2 shld		11									No Connection					
PLW HEATER A +		13													3	3
PLW HEATER A -		31													11	11
PLW HEATER A shld		11									No Connection					
PLW_JFETV1_A +		14													10	
PLW_JFETV1_A -		32													1	
PLW_JFETV1_A shld		33									C					
PLW_JFETV2_A +		34														10
PLW_JFETV2_A -		15														1
PLW_JFETV2_A shld		16									C					
PLW_BIAS1_A +		17													2	
PLW_BIAS1_A -		35													4	
PLW_BIAS1_A shld		36													9(C)	
PLW_BIAS2_A +		37														2
PLW_BIAS2_A -		18														4
PLW_BIAS2_A shld		19									C					
PLW GROUND WIRE A		19														9(C)
PSW_JFETV1_B +			20		14											
PSW_JFETV1_B -			2		8											
PSW_JFETV1_B shld			1		15(A`)											
PSW_JFETV2_B +			3			14										
PSW_JFETV2_B -			22			8										
PSW_JFETV2_B shld			21		A											
PSW_JFETV3_B +			23				14									
PSW_JFETV3_B -			5				8									
PSW_JFETV3_B shld			4			15(A`)										
PSW_JFETV4_B +			6					14								
PSW_JFETV4_B -			25					8								
PSW_JFETV4_B shld			24		A											
PSW_JFETV5_B +			26						14							
PSW_JFETV5_B -			8						8							
PSW_JFETV5_B shld			7				15(A`)									
PSW_JFETV6_B +			9							14						
PSW_JFETV6_B -			28							8						
PSW_JFETV6_B shld			27		A											
PSW GRND_B			10		A											
PSW_BIAS1/2_B +			11		7	7										
PSW_BIAS1/2_B -			29		5	5										
PSW_BIAS1/2_B shld			30					15(A`)								
PSW_BIAS3/4_B +			31				7	7								
PSW_BIAS3/4_B -			12				5	5								
PSW_BIAS3/4_B shld			13						15(A`)							
PSW_BIAS5/6_B +			14						7	7						
PSW_BIAS5/6_B -			32						5	5						
PSW_BIAS5/6_B shld			33							15(A`)						
PSW_HEATER_B1 +			34		6	6										
PSW_HEATER_B1 -			15		13	13										
PSW_HEATER_B1 shld			16		No Connection											
PSW_HEATER_B2 +			17				6	6								
PSW_HEATER_B2 -			35				13	13								
PSW_HEATER_B2 shld			36		No Connection											
PSW_HEATER_B3 +			37						6	6						
PSW_HEATER_B3 -			18						13	13						
PSW_HEATER_B3 shld			36		No Connection											
PMW_JFETV1_B +				20							14					
PMW_JFETV1_B -				2							8					
PMW_JFETV1_B shld				1							15(B`)					
PMW_JFETV2_B +				3								14				

	HSJFP				PSW Backplane Harness						PMW/PLW Backplane Harness					
Name	J25 37way	J26 37way	J27 37way	J28 37way	P1 15 way	P2 15 way	P3 15 way	P4 15 way	P5 15 way	P6 15 way	P7 15way	P8 15way	P9 15way	P10 15way	P11 15way	P12 15way
PMW_JFETV2_B -				22								8				
PMW_JFETV2_B shld				21								15(B`)				
PMW_JFETV3_B +				23									14			
PMW_JFETV3_B -				5									8			
PMW_JFETV3_B shld				4									15(B`)			
PMW_JFETV4_B +				6										14		
PMW_JFETV4_B -				25										8		
PMW_JFETV4_B shld				24										15(B`)		
PMW_BIAS1/2_B +				26							7	7				
PMW_BIAS1/2_B -				8							5	5				
PMW_BIAS1/2_B shld				7							B`					
PMW_BIAS3/4_B +				27									7	7		
PMW_BIAS3/4_B -				9									5	5		
PMW_BIAS3/4_B shld				28							No Connection					
PMW GND WIRE_B				28							B`					
PMW HEATER B1 +				29							6	6				
PMW HEATER B1 -				10							13	13				
PMW HEATER B1 shld				11							No Connection					
PMW HEATER B2 +				12									6	6		
PMW HEATER B2 -				30									13	13		
PMW HEATER B2 shld				11							No Connection					
PLW HEATER B +				13											6	6
PLW HEATER B -				31											13	13
PLW HEATER B shld				11							No Connection					
PLW_JFETV1_B +				14											14	
PLW_JFETV1_B -				32											8	
PLW_JFETV1_B shld				33							C`					
PLW_JFETV2_B +				34												14
PLW_JFETV2_B -				15												8
PLW_JFETV2_B shld				16							C`					
PSW_BIAS1_B +				17											7	
PSW_BIAS1_B -				35											5	
PSW_BIAS1_B shld				36											15(C`)	
PSW_BIAS2_B +				37												7
PSW_BIAS2_B -				18												5
PSW_BIAS2_B shld				19							C`					
PLW GROUND WIRE B				19												15(C`)

4.6.3 BS-Spectrometer (To be updated)

Overall Mechanical Drawing



Connector/Backshell Details

JPL to specify.

Harness Layup

The BS harness is all at one temperature. Crimped 28AWG or 30AWG stranded copper MDM.

Pairs of wires should at least be twisted, and some inter-function screens may be appropriate, JPL to specify.

The whole harness must be very well RF screened to all its backshells: not only does it form part of a Faraday cage but it forms part of one that is on the detector side of the Murata filter system.

Contact Details

	HSJFS		SSW/SLW Backplane Harness			
Function	**J9 37way**	**J10 37wayB**	**SLW S1 15way**	**SSW S2 15way**	**SSW S3 15way**	**T.C. T1 15way**
300-mK TC Bias_A +ve	1					2
300-mK TC Bias_A –ve	20					4
300-mK TC Bias_A Shield	2		No Connection			
300-mK JFETV Bias_A +ve	21					10
300-mK JFETV Bias_A -ve	3					1
300-mK JFETV Bias_A Shield	2		No Connection			
300-mK Ground A	2					9
SLW_BIAS_A1+ve	22		2			
SLW_BIAS_A1-ve	4		4			
SLW_BIAS_A1 shld	6		A			
SLW_BIAS_A2 +ve	5		C			
SLW_BIAS_A2 -ve	24		B			
SLW_BIAS_A2 shld	23		No Connection			
SLW Ground A			9			
SLW_JFETV_A1 +ve	25		10			
SLW_JFETV_A1 -ve	7		1			
SLW_JFETV_A1 shld	6		A			
SLW_JFETV_A2 +ve	8		E			
SLW_JFETV_A2 -ve	27		D			
SLW_JFETV_A2 shld	6		No Connection			
SSW_BIAS1_A +ve	28			2		
SSW_BIAS1_A –ve	10			4		

Function	HSJFS		SSW/SLW Backplane Harness			
	J9 37way	J10 37wayB	SLW S1 15way	SSW S2 15way	SSW S3 15way	T.C. T1 15way
SSW_BIAS1_A shld	9		F			
SSW_JFETV1_A +ve	11			10		
SSW_JFETV1_A -ve	30			1		
SSW_JFETV1_A shld	29			9		
SSW Ground A	12				9	
SSW_BIAS2_A +ve	13				2	
SSW_BIAS2_A –ve	32				4	
SSW_BIAS2_A shld	31		F			
SSW_JFETV2_A +ve	33				10	
SSW_JFETV2_A -ve	15				1	
SSW_JFETV2_A shld	14		F			
SLW_JFET_HEATER_A +ve	17		3			
SLW_JFET_HEATER_A -ve	36		11			
SLW_JFET_HEATER_A shld	18		No Connection			
SSW_JFET_HEATER_A +ve	37			3	3	
SSW_JFET_HEATER_A -ve	19			11	11	
SSW_JFET_HEATER_A shld	NC		No Connection			
300-mK_TC_JFET_HTR_A +ve	16					3
300-mK_TC_JFET_HTR_A -ve	35					11
300-mK_TC_JFET_HTR_A shld	NC		No Connection			
300-mK TC Bias_B +ve		1				7
300-mK TC Bias_B –ve		20				5
300-mK TC Bias_B Shield		2	No Connection			
300-mK JFETV Bias_B +ve		21				14
300-mK JFETV Bias_B –ve		3				8
300-mK JFETV Bias_B Shield		2	No Connection			
300-mK Ground B						15
SLW_BIAS_B1+ve		22	7			
SLW_BIAS_B1-ve		4	5			
SLW_BIAS_B1 shld		6	A			
SLW_BIAS_B2 +ve		5	C			
SLW_BIAS_B2 –ve		24	B			
SLW_BIAS_B2 shld		23	No Connection			
SLW Ground B			15			
SLW_JFETV_B1 +ve		25	14			
SLW_JFETV_B1 –ve		7	8			
SLW_JFETV_B1 shld		6	A			
SLW_JFETV_B2 +ve		8	E			
SLW_JFETV_B2 –ve		27	D			
SLW_JFETV_B2 shld		6	No Connection			
SSW_BIAS1_B +ve		28		7		
SSW_BIAS1_B –ve		10		5		
SSW_BIAS1_B shld		9	F			
SSW_JFETV1_B +ve		11		8		
SSW_JFETV1_B -ve		30		14		
SSW_JFETV1_B shld		29		15		
SSW Ground B					15	
SSW_BIAS2_B +ve		13			7	
SSW_BIAS2_B –ve		32			5	
SSW_BIAS2_B shld		31	F			
SSW_JFETV2_B +ve		33			14	
SSW_JFETV2_B -ve		15			8	
SSW_JFETV2_B shld		14	F			
SLW_HEATER_B +ve		17	6			
SLW_HEATER_B -ve		36	13			
SLW_HEATER_B shld		18	No Connection			
SSW_HEATER_B +ve		37		6	6	
SSW_HEATER_B -ve		19		13	13	

	HSJFS		SSW/SLW Backplane Harness			
Function	**J9 37way**	**J10 37wayB**	**SLW S1 15way**	**SSW S2 15way**	**SSW S3 15way**	**T.C. T1 15way**
SSW_HEATER_B shld		NC	No Connection			
300-mK_TC_JFET_HTR_A +ve		16				6
300-mK_TC_JFET_HTR_A -ve		35				13
300-mK_TC_JFET_HTR_A shld		NC	No Connection			

Notes:

A – These wires are spliced within the SSW/SLW Backplane Harness to the SLW ground (i.e. Pins XXX on the 37 Way connector J9/J10)

B – This wire is spliced within the SSW/SLW Backplane Harness to the SLW_BIAS_1 -ve (i.e. Pin 24 (TBC) is spliced with pin 4 (TBC) on the 37 Way connector J9/J10)

C – This wire is spliced within the SSW/SLW Backplane Harness to the SLW_BIAS_1 +ve (i.e. Pin 5 (TBC) is spliced with pin 22 (TBC) on the 37 Way connector J9/J10)

D – This wire is spliced within the SSW/SLW Backplane Harness to the SLW_JFETV_1 -ve (i.e. Pin 24 (TBC) is spliced with pin 4 (TBC) on the 37 Way connector J9/J10)

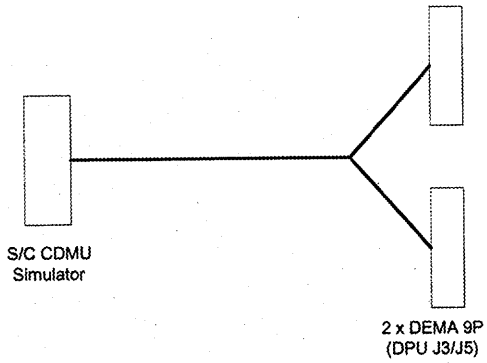
E – This wire is spliced within the SSW/SLW Backplane Harness to the SLW_JFETV_1 +ve (i.e. Pin 5 (TBC) is spliced with pin 22 (TBC) on the 37 Way connector J9/J10)

F – These wires are spliced within the SSW/SLW Backplane Harness to the SSW ground (i.e. Pins XXX on the 37 Way connector J9/J10)

4.7 Test Harnesses

4.7.1 T1 1553 Bus A

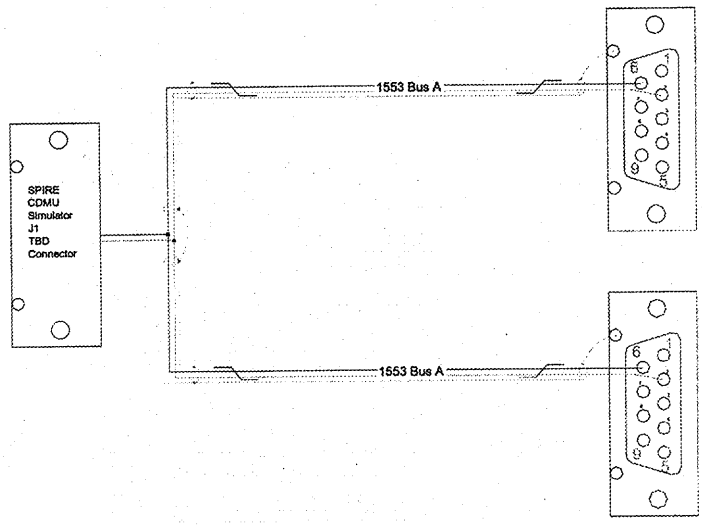
Overall Mechanical Drawing



Connector/Backshell Details

DEMA 9 P + Glenair 550 - T - 039 - M - 1 - TBD - H - 0 - TBD to DPUJ3
DEMA 9 P + Glenair 550 - T - 039 - M - 1 - TBD - H - 0 - TBD to DPUJ5

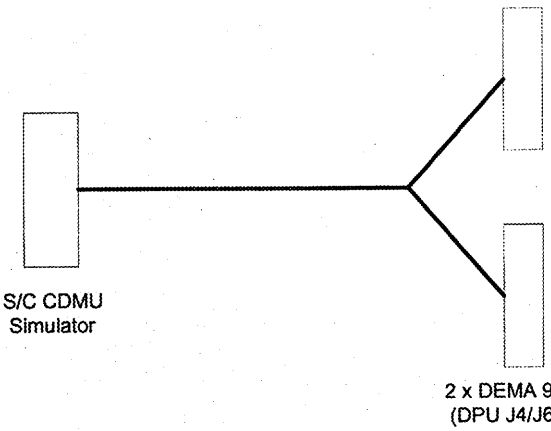
Harness Layup



Contact Details

4.7.2 T2 1553 Bus B

Overall Mechanical Drawing

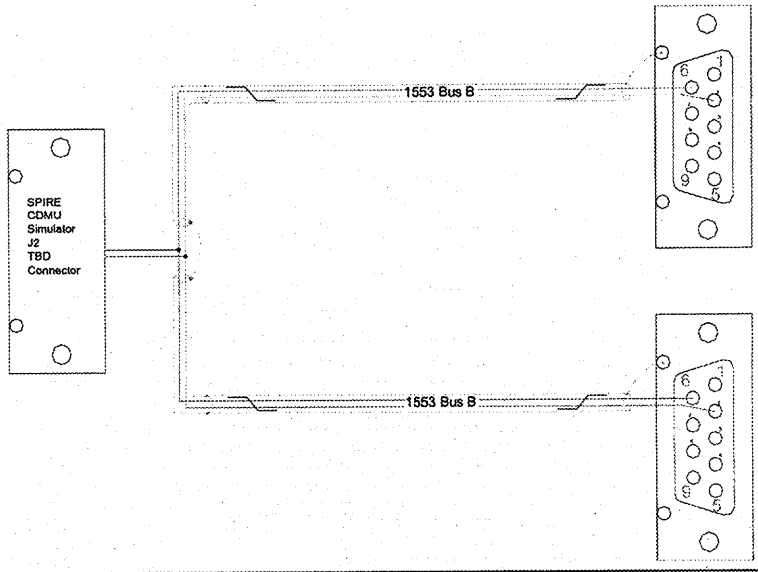


Connector/Backshell Details

DEMA 9 P + Glenair 550 - T - 039 - M - 1 - TBD - H - 0 - TBD to DPU J4
DEMA 9 P + Glenair 550 - T - 039 - M - 1 - TBD - H - 0 - TBD to DPU J6

Contact Details

Harness Layup



4.7.3 T3 DPU-P Power

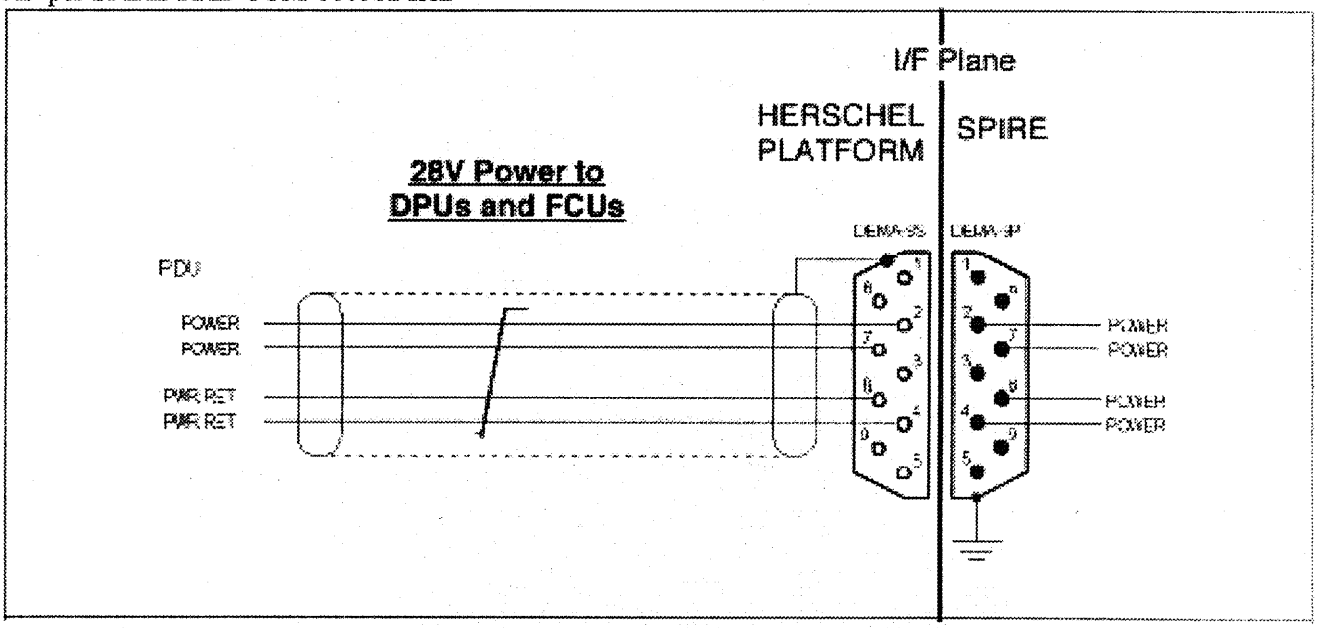
Overall Mechanical Drawing

Connector/Backshell Details

To HSDPU J1

Harness Layup

Contact Details
As per SPIRE-RAL-COM-000562 Iss2



4.7.4 T4 DPU-R Power

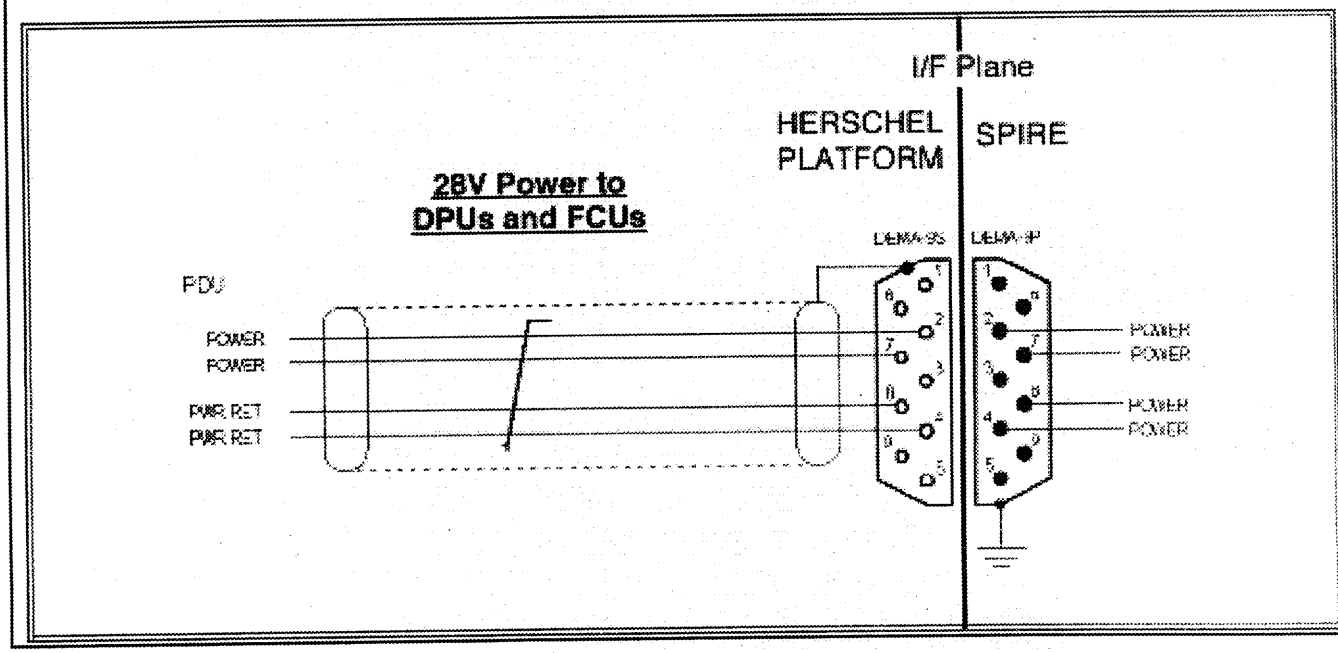
Overall Mechanical Drawing

Connector/Backshell Details

To HSDPU J2

Harness Layup

Contact Details
As per SPIRE-RAL-COM-000562 Iss2



4.7.5 T5 FCU-P Power

Overall Mechanical Drawing

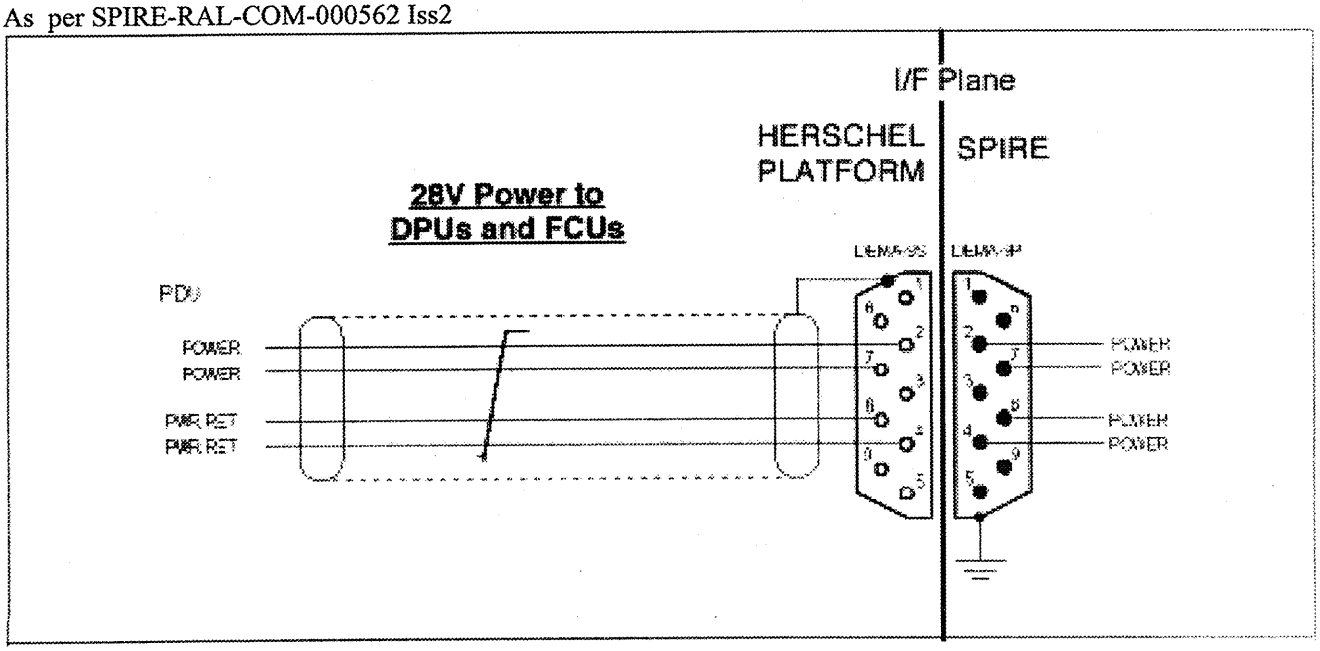
1:1

Connector/Backshell Details

To HSFCU J5

Harness Layup

Contact Details
As per SPIRE-RAL-COM-000562 Iss2



4.7.6 T6 FCU-R Power

Overall Mechanical Drawing

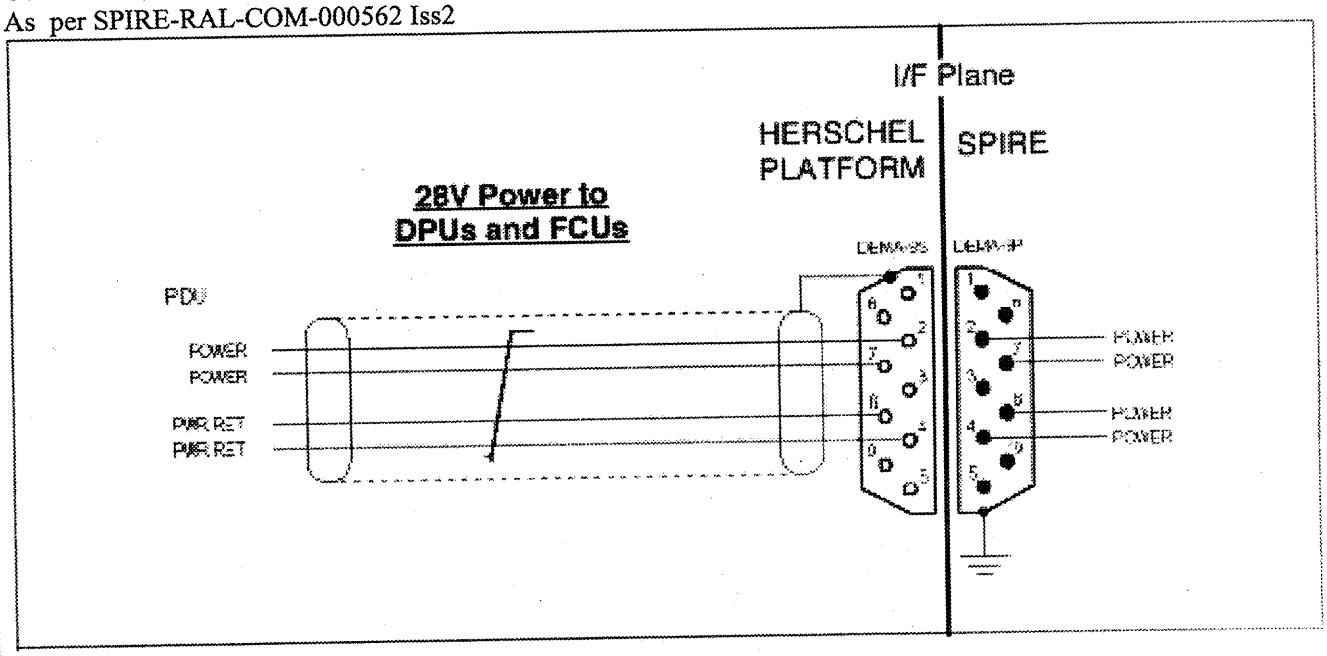
1:1

Connector/Backshell Details

To HSFCU J6

Harness Layup

Contact Details
As per SPIRE-RAL-COM-000562 Iss2

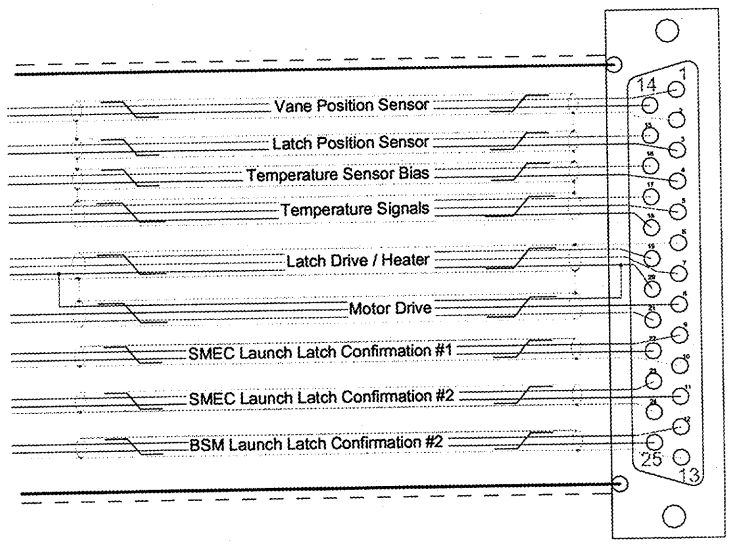


4.7.7 T7 SHT via FCU-P

Overall Mechanical Drawing

Connector/Backshell Details

Harness Layup



Mechanisms Launch Confirm (FCU J27/J28)

- The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the Shutter and at the wall of the CVV.
- The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

Contact Details

This is a prime function cable

Not finished, table only half complete

Function	Pin #
Shutter Vane Position Sensor +	1
Shutter Vane Position Sensor -	14
Shutter Vane Position Shield	2
Shutter Latch Position Sense +	15
Shutter Latch Position Sense -	3
Shutter Temperature Sensor Bias +	16
Shutter Temperature Sensor Bias -	4
Shutter Vane Temperature Sig	17
Shutter Common Temperature Signal	5
Shutter Motor Temperature Sig	18
Shutter Latch Srive and Vane Heater Shield	6
Shutter Vane Heater +	19
Shutter Latch Drive + V	7

Shutter Actuator Temp V-	20
Shutter Temp Sensor Bias -/Shld	8
	21
SMEC launch latch # 1 confirmation +	9
SMEC launch latch # 1 confirmation -	22
SMEC launch latch # 1 confirmation Shield	10
SMEC launch latch # 2 confirmation +	23
SMEC launch latch # 2 confirmation -	11
SMEC launch latch # 2 confirmation Shield	24
BSM Launch latch confirmation +	12
BSM Launch latch confirmation -	25
BSM Launch latch confirmation Shield	13

4.7.8 T8 SHT via FCU-R

Overall Mechanical Drawing

Connector/Backshell Details

Harness Layup

Contact Details

This is a redundant function cable

Function	Pin #
Shutter Actuator Position Sensor +	1
Shutter Actuator Position Sensor -	14
Shutter Latch Sense +	2
Shutter Latch Sense -	15
Shutter Sense Shld	3
Shutter Latch Drive +	16
Shutter Shutter Vane Heater+	4
Shutter Stepper Drive Phase A +	17
Shutter Stepper Drive Phase B +	5
Shutter Power Ground / Rtn. as shld	18
Shutter Temp Sensor Bias+	6
Shutter Vane Temp V+	19
Shutter Common Temp V	7
Shutter Actuator Temp V-	20
Shutter Temp Sensor Bias -/Shld	8
SMEC launch latch # 1 confirmation +	21
SMEC launch latch # 1 confirmation -	9
SMEC launch latch # 1 confirmation Shield	22
SMEC launch latch # 2 confirmation +	10
SMEC launch latch # 2 confirmation -	23
SMEC launch latch # 2 confirmation Shield	11
BSM Launch latch confirmation +	24
BSM Launch latch confirmation -	12
BSM Launch latch confirmation Shield	25

Annex 5-1
17.04.02

Cold redundant

ANNEX. 1 – Internal Cryostat Wiring List

Notes:

- The column headed "Implementation" is intended to indicate the screening configuration around functions necessary for the SPIRE instrument. The terms used are as if each function were implemented as a single conductor (STP="Screened Twisted Pair") but this is not a requirement on the number of conductors used for the actual physical construction. Thus, individual functions can in principle be multiple wires if the harness fabricator so requires.
- 12-ax is a particular implementation as shown in Annex 4
- The resistance value for each individual function is to be considered as the starting point for the design and can be optimised by negotiation on a case-by-case basis.
- The resistance values are assumed to be the values applicable to normal operation in flight.

o 200 Ω Bias ⇒ 500 Ω CVV inkl. cold + Extrem

Name	128 Way Connector	FPU/JFS/JFP Connector	C Harness Connector Type	Description	Number of Conductors excl. shields	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max. Current per Conductor	Average Current (see note 9)	Duty Cycle t	T	(t x T)	Max. Volts
C1 Type 3	CVV 1	HSJFS J5	MDM 25 S	Bolometer signals from JFS (SLW 1-12)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	0%	0%	0.1
		HSJFS J6	MDM 25S	Bolometer signals from JFS (SLW 13-24)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	0%	0%	0%	0.1
		HSJFS J9	MDM 37P	300-mK TC Bias	2	1	STP	200	1000pF	0.08	3.2E-08	8.0E-09	50%	33%	17%	10
				300-mK Ground wire	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				300-mK JFET Bias	2	1	STP	100	1000pF	0.08uH	5.0E-03	2.0E-04	50%	33%	17%	10
				SLW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	9.6E-08	2.4E-08	50%	33%	17%	10
				SLW JFET Bias	4	2	STP	100	1000pF	0.08uH	2.5E-03	6.0E-04	50%	33%	17%	10
				SLW Ground wire	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				SSW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	1.2E-03	4.8E-08	50%	33%	17%	10
				SSW JFET Bias	4	2	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				SSW Ground Wire	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				300-mK TC JFET Heater	2	1	STP	200	1000pF	0.08uH	1.9E-03	4.8E-04	0.2%	33%	0%	10
				SLW JFET Heater	2	1	STP	200	1000pF	0.08uH	3.3E-03	8.3E-04	0.2%	33%	0%	10
				SSW JFET Heater	2	1	STP	200	1000pF	0.08uH	6.7E-03	1.7E-03	0.2%	33%	0%	10
		HSJFS J10	MDM 37P	300-mK TC Bias	2	1	STP	200	1000pF	0.08	3.2E-08	8.0E-09	50%	33%	17%	10
				300-mK Ground wire	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				300-mK JFET Bias	2	1	STP	100	1000pF	0.08uH	5.0E-03	2.0E-04	50%	33%	17%	10
				SLW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	9.6E-08	2.4E-08	50%	33%	17%	10
				SLW JFET Bias	4	2	STP	100	1000pF	0.08uH	2.5E-03	6.0E-04	50%	33%	17%	10
				SLW Ground wire	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				SSW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	1.2E-03	4.8E-08	50%	33%	17%	10
				SSW JFET Bias	4	2	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				SSW Ground Wire	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				300-mK TC JFET Heater	2	1	STP	200	1000pF	0.08uH	1.9E-03	4.8E-04	0.2%	33%	0%	10
				SLW JFET Heater	2	1	STP	200	1000pF	0.08uH	3.3E-03	8.3E-04	0.2%	33%	0%	10
				SSW JFET Heater	2	1	STP	200	1000pF	0.08uH	6.7E-03	1.7E-03	0.2%	33%	0%	10
		Shield		RF Overshield terminated at JFS; not connected to CVV connector		Outer	>93%									no
C2 Type4	CVV 2	JFS 7	MDM 25S	Bolometer signals from JFS (300-mK TC 1-3)	8	1	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	4	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFS 1	MDM 25S	Bolometer signals from JFS (SSW 1-8)	16	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	8	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFS J2	MDM 25S	Bolometer signals from JFS (SSW 9-20)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFS J3	MDM 25S	Bolometer signals from JFS (SSW 21-32)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFS J4	MDM 25S	Bolometer signals from JFS (SSW 33-44)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		Shield		RF Overshield terminated at JFS; not connected to CVV connector		Outer	>93%			0.01						no

Name	128 Way Connector	FPU/JFS/JFP Connector	C Harness Connector Type	Description	Number of Conductors excl. shlds	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max. Current per Conductor	Average Current (see note 9)	Duty Cycle t	T	(t x T)	Max. Volts
C3		JFP PF1 J25	MDM 37P	PSW JFET Bias	12	6	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				PSW Ground	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				PSW Bolometer Bias	6	3	STP	200	1000pF	0.08uH	3.8E-07	9.6E-08	50%	33%	17%	10
				PSW Heater	6	3	STP	200	1000pF	0.08uH	3.8E-03	9.6E-04	0.2%	33%	0%	10
		JFP PF1 J27	MDM 37P	PMW JFET Bias	8	4	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				PMW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	3.8E-07	9.6E-08	50%	33%	17%	10
				PMW Ground	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
				PMW JFET Heater	4	2	STP	200	1000pF	0.08uH	3.8E-03	9.6E-04	0.2%	33%	0%	10
				PLW JFET Heater	2	1	STP	200	1000pF	0.08uH	3.8E-03	9.6E-04	0.2%	33%	0%	10
				PLW JFET Bias	4	2	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				PLW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	1.9E-07	4.8E-08	50%	33%	17%	10
				PLW Ground	1	0	S	50	1000pF	0.08uH	0	0	50%	33%	17%	10
		JFP PF2 J26	MDM 37P	PSW JFET Bias	12	6	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				PSW Ground	1	0	S	50	1000pF	0.08uH	0	0.0E+00	50%	33%	17%	10
				PSW Bolometer Bias	6	3	STP	200	1000pF	0.08uH	3.8E-07	9.6E-08	50%	33%	17%	10
				PSW Heater	6	3	STP	200	1000pF	0.08uH	3.8E-03	9.6E-04	0.2%	33%	0%	10
		JFP PF2 J28	MDM 37P	PMW JFET Bias	8	4	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				PMW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	3.8E-07	9.6E-08	50%	33%	17%	10
				PMW Ground	1	0	S	50	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	10
				PMW JFET Heater	4	2	STP	200	1000pF	0.08uH	3.8E-03	9.6E-04	0%	33%	0%	10
				PLW JFET Heater	2	1	STP	200	1000pF	0.08uH	3.8E-03	9.6E-04	0%	33%	0%	10
				PLW JFET Bias	4	2	STP	100	1000pF	0.08uH	5.0E-03	1.2E-03	50%	33%	17%	10
				PLW Bolometer Bias	4	2	STP	200	1000pF	0.08uH	1.9E-07	4.8E-08	50%	33%	17%	10
				PLW Ground	1	0	S	50	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	10
		Shield		RF Overshield terminated at JFP; not connected to CVV connector		Outer	>93%			0.01						no
C4	CVV 4	JFP11 J21	MDM 25S	Bolometer signals from JFP (PMW 1-12)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
Type1		JFP11 J22	MDM 25S	Bolometer signals from JFP (PMW 13-24)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP12 J23	MDM 25S	Bolometer signals from JFP (PMW 25-36)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP12 J24	MDM 25S	Bolometer signals from JFP (PMW 37-48)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		Shield		RF Overshield terminated at JFP; not connected to CVV connector		Outer	>93%			0.01						no
C5	CVV 5	JFP9 J17	MDM 25S	Bolometer signals from JFP (PMW 49-60)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
Type1		JFP9 J18	MDM 25S	Bolometer signals from JFP (PMW 61-72)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP10 J19	MDM 25S	Bolometer signals from JFP (PMW 73-84)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP10 J20	MDM 25S	Bolometer signals from JFP (PMW 85-96)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		Shield		RF Overshield terminated at JFP; not connected to CVV connector		Outer	>93%			0.01						no

Name	128 Way Connector	FPU/JFS/JFP Connector	C Harness Connector Type	Description	Number of Conductors excl. shids	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max.Current per Conductor	Average Current (see note 9)	Duty Cycle t	T	(t x T)	Max. Volts
C6	CVV 6	JFP7 J13	MDM 25S	Bolometer signals from JFP (PLW 1-12)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
Type1		JFP7 J14	MDM 25S	Bolometer signals from JFP (PLW 13-24)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP7 J15	MDM 25S	Bolometer signals from JFP (PLW 25-36)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP7 J16	MDM 25S	Bolometer signals from JFP (PLW 37-48)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		Shield		RF Overshield terminated at JFP; not connected to CVV connector		Outer	>93%			0.01						no
C7	CVV 7	JFP5 J9	MDM 25S	Bolometer signals from JFP (PSW 1-12)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
Type1		JFP5 J10	MDM 25S	Bolometer signals from JFP (PSW 13-24)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP6 J11	MDM 25S	Bolometer signals from JFP (PSW 25-36)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP6 J12	MDM 25S	Bolometer signals from JFP (PSW 37-48)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		Shield		RF Overshield terminated at JFP; not connected to CVV connector		Outer	>93%			0.01						no
C8	CVV 8	JFP3 J5	MDM 25S	Bolometer signals from JFP (PSW 49-60)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
Type1		JFP3 J6	MDM 25S	Bolometer signals from JFP (PSW 61-72)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP4 J7	MDM 25S	Bolometer signals from JFP (PSW 73-84)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP4 J8	MDM 25S	Bolometer signals from JFP (PSW 85-96)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		Shield		RF Overshield terminated at JFP; not connected to CVV connector		Outer	>93%			0.01						no
C9	CVV 9	JFP1 J1	MDM 25S	Bolometer signals from JFP (PSW 97-108)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
Type1		JFP1 J2	MDM 25S	Bolometer signals from JFP (PSW 109-120)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP2 J3	MDM 25S	Bolometer signals from JFP (PSW 121-132)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		JFP2 J4	MDM 25S	Bolometer signals from JFP (PSW 133-144)	24	3	12-ax	200	1000pF	0.08uH	1.0E-09	5.0E-10	50%	33%	17%	0.1
				Anti-cross talk ground wires.	12	NA		200	1000pF	0.08uH	0.0E+00	0.0E+00	50%	33%	17%	0.1
		Shield		RF Overshield terminated at JFP; not connected to CVV connector		Outer	>93%			0.01						no

Name	128-Way Connector	FPU/JFS/JFP Connector	C Harness Connector Type	Description	Number of Functions excl. shlds	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max. Current per Conductor	Average Current (see note 9)	Duty Cycle t	T	(t x T)	Max. Volts
C10 Aux-P	CVV 10	FPU J19	MDM 37P	Sorption Pump Heater	4	0	TQ	10			2.5E-02	6.3E-03	2%	33%	1%	
				Heat switch heaters	8	0	TQ	50			1.5E-03	3.8E-04	2%	33%	1%	
		FPU J21	MDM 37P	Various cooler thermistors	20	5	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
				Spectrometer Stimulus Thermistors	12	3	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
				Spectrometer Stimulus Heater 4%	4	0	TQ	30			9.0E-03	2.3E-03	50%	33%	0.1665	
				Spectrometer Stimulus Heater 2%	4	0	TQ	30			7.0E-03	1.8E-03	50%	33%	17%	
		FPU J23	MDM 37P	FPU Thermometry	24	6	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
				300mK Thermal Control Heater	4	1	STQ	30			2.0E-03	5.0E-04	50%	33%	17%	
		FPU J17	MDM21P	Vane Position Sensor	2	1	STP	1000			1.0E-02	0	0%	0%	0%	
				Latch Position Sense	2	1	STP	1000			1.0E-02					
				Temperature Sensor Bias	2	1	STP	1000			1.0E-05					
				Temperature Signals	3	1	STT	1000			1.0E-06	0	0%	0%	0%	10
				Latch Drive/Heaters	3	1	STT	10			1.5E-01	0	0%	0%	0%	
				Motor Drive	3	1	STT	10			1.5E-01	0				
		Shield		RF Overshield terminated at FPU; not connected to CVV connector		Outer	>93%			0.01						no
C11 Drive-P	CVV 11	FPU J25	MDM 37P	BSM Chopper Sensors	3	1	STT	1000			1.0E-06	1.0E-06	40%	33%	13%	0.4
					2	1	STP	1000			1.0E-06	1.0E-06	40%	33%	13%	
				BSM Jiggle Sensors	3	1	STT	1000			1.0E-06	1.0E-06	40%	33%	13%	
					2	1	STP	1000			1.0E-06	1.0E-06	40%	33%	13%	
				BSM Temperature	4	1	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
				Photometer Stimulus Heater	4	1	STQ	10			7.0E-03	1.8E-03	5%	33%	2%	
				BSM Launch latch sense	2	1	STP	1000			1.00E-03	0	0%	0%	0%	
				BSM Launch latch solenoid	2	1	STT	10			3.5E-02	0	0%	0%	0%	
				BSM Chop motor drive	4	1	STQ	10			4.0E-02	2.0E-02	40%	33%	13%	
				BSM Jiggle motor drive	4	1	STQ	10			4.0E-02	5.0E-03	40%	33%	13%	
		FPU J27	MDM 37P	SMEC Thermometry	8	2	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
				SMEC LVDT Primary	2	1	STP	5			5.0E-03	2.5E-03	50%	33%	17%	5
				SMEC LVDT Secondary	4	2	STP	5			5.0E-05	5.0E-02	50%	33%	17%	15
				SMEC Launch Latch	4	2	STP	5			4.0E-01	0.0E+00	0%	0%	0%	15
				SMEC Launch Latch (Rob.)	4	2	STP	5			4.0E-01	0.0E+00	0%	0%	0%	15
				SMEC Launch Latch Confirm	4	2	STP	5			1.0E-03	0.0E+00	0%	0%	0%	15
		FPU J29	MDM 37P	SMEC Drive Coil	2	1	STP	5			1.0E-01	8.0E-02	50%	33%	17%	15
				SMEC Drive (Rob.)	2	1	STP	5			1.0E-01	0.0E+00	50%	33%	17%	15
				SMEC Drive coil voltage sensor	2	1	STP	500			1.0E-05	1.0E-05	50%	33%	17%	15
				SMEC Position sensor supplies	2	1	STP	100			1.0E-03	1.0E-03	50%	33%	17%	5
				SMEC LED Power	2	1	STP	100			1.0E-03	8.0E-04	50%	33%	17%	5
				SMEC Position sensor photodiodes	6	3	STP	1000			2.0E-05	2.0E-05	50%	33%	17%	5
				SMEC Position sensor photodiodes FB	6	3	STP	1000			1.0E-05	1.0E-05	50%	33%	17%	5
		Shield		RF Overshield terminated at FPU; not connected to CVV connector		Outer	>93%			0.01						no

Ground use only : duty cycle = 0.

Name	128-Way Connector	FPU/JFS/JFP Connector	C Harness Connector Type	Description	Number of Functions excl. shlds	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max. Current per Conductor	Average Current (see note 9)	Duty Cycle t	T	(t x T)	Max. Volts
C12 Aux-R	CVV 12	FPU J20	MDM 37P	Sorption Pump Heater	4	0	TQ	10			2.5E-02	0.0E+00	2%	33%	1%	
				Heat switch heaters	8	0	TQ	50			1.5E-03	0.0E+00	2%	33%	1%	
				Various cooler thermistors	20	5	STQ	1000			1.0E-06	0.0E+00	100%	33%	33%	
		FPU J22	MDM 37P	Spectrometer Stimulus Thermistors	12	3	STQ	1000			1.0E-06	0.0E+00	100%	33%	33%	
				Spectrometer Stimulus Heater 4%	4	0	TQ	30			9.0E-03	0.0E+00	50%	33%	0.1665	
				Spectrometer Stimulus Heater 2%	4	0	TQ	30			7.0E-03	0.0E+00	50%	33%	17%	
		FPU J24	MDM 37P	FPU Thermometry	24	6	STQ	1000			1.0E-06	0.0E+00	100%	33%	33%	
				300mK Thermal Control Heater	4	1	STQ	30			2.0E-03	0.0E+00	50%	33%	17%	
		FPU J18	MDM21P	Vane Position Sensor	2	1	STP	1000			1.0E-02	0	0%	0%	0%	
				Latch Position Sense	2	1	STP	1000			1.0E-02					
				Temperature Sensor Bias	2	1	STP	1000			1.0E-05					
See C10				Temperature Signals	3	1	STT	1000			1.0E-06	0	0%	0%	0%	10
				Latch Drive/Heaters	3	1	STT	10			1.5E-01	0	0%	0%	0%	
				Motor Drive	3	1	STT	10			1.5E-01	0				
		Shield		RF Overshield terminated at FPU; not connected to CVV connector		Outer	>93%			0.01						no
C13 Drive-R	CVV13	FPU J26	MDM 37P	BSM Chopper Sensors	3	1	STT	1000			1.0E-06	1.0E-06	40%	33%	13%	0.4
					2	1	STP	1000			1.0E-06	1.0E-06	40%	33%	13%	
				BSM Jiggle Sensors	3	1	STT	1000			1.0E-06	1.0E-06	40%	33%	13%	
					2	1	STP	1000			1.0E-06	1.0E-06	40%	33%	13%	
				BSM Temperature	4	1	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
				Photometer Stimulus Heater	4	1	STQ	10			7.0E-03	1.8E-03	5%	33%	2%	
				BSM Launch latch sense	2	1	STP	1000			1.00E-03	0	0%	0%	0%	
				BSM Launch latch solenoid	2	1	STT	10			3.5E-02	0	0%	0%	0%	
				BSM Chop motor drive	4	1	STQ	10			4.0E-02	2.0E-02	40%	33%	13%	
				BSM Jiggle motor drive	4	1	STQ	10			4.0E-02	5.0E-03	40%	33%	13%	
		FPU J28	MDM 37P	SMEC Thermometry	8	2	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
				SMEC LVDT Primary	2	1	STP	5			5.0E-03	2.5E-03	50%	33%	17%	5
				SMEC LVDT Secondary	4	2	STP	5			5.0E-05	0.0E+00	50%	33%	17%	15
				SMEC Launch Latch	4	2	STP	5			4.0E-01	0.0E+00	0%	0%	0%	15
				SMEC Launch Latch (Rob.)	4	2	STP	5			4.0E-01	0.0E+00	0%	0%	0%	15
		FPU J30	MDM 37P	SMEC Launch Latch Confirm	4	2	STP	5			1.0E-03	0.0E+00	0%	0%	0%	15
				SMEC Drive Coil	2	1	STP	5			1.0E-01	8.0E-02	50%	33%	17%	15
				SMEC Drive (Rob.)	2	1	STP	5			1.0E-01	0.0E+00	50%	33%	17%	15
				SMEC Drive coil voltage sensor	2	1	STP	500			1.0E-05	1.0E-05	50%	33%	17%	15
				SMEC Position sensor supplies	2	1	STP	100			1.0E-03	1.0E-03	50%	33%	17%	5
				SMEC LED Power	2	1	STP	100			1.0E-03	8.0E-04	50%	33%	17%	5
				SMEC Position sensor photodiodes	6	3	STP	1000			2.0E-05	2.0E-05	50%	33%	17%	5
				SMEC Position sensor photodiodes FB	6	3	STP	1000			1.0E-05	1.0E-05	50%	33%	17%	5
				RF Overshield terminated at FPU; not connected to CVV connector		Outer	>93%			0.01						no

Zero (redundant)

ANNEX 2 – External Cryostat Wiring List

- The impedance values quoted in the tables refer to the total impedance for the "I-Harness" between the SVM Connector Panel and the Warm Electronics units and the "E-Harness" between the CVV 128-Way Connector and the SVM Connector Panel. The "I-Harness" is to be constructed from 28 AWG stranded Copper conductors as specified in §4.1.
- The BSM and SMEC Launch lock confirm cables and the Shutter tails terminate at skin connectors near the CVV 128-Way connectors. Shading indicates these functions.

Name	128 Way Connector	DRCU Connector	DRCU Connector Type	Description	Number of Conductors excl. shids	Number of Inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max.Current per Conductor	Average	Duty Cycle t	T	(t x T)	Max. Volts
I1/E1 Type3	CVV 1	DCU J27	DCMA37 S	Bolometer signals from JFS (SLW 1-12)	24	12	STP	100	1500pF	0.08uH	1.00E-09	5.00E-10	50%	33%	17%	0.1
				SLW Ground	1	0	S	50	1500pF	0.08uH	0	0	50%	0%	0%	0.1
		DCU J28	DCMA37 S	Bolometer signals from JFS (SLW 13-24)	24	12	STP	100	1500pF	0.08uH	1.00E-09	5.00E-10	50%	33%	17%	0.1
				SLW Ground	1	0	S	50	1500pF	0.08uH	0	0	0%	0%	0%	0.1
		DCU J33	DCMA37P	300-mK TC Bias	2	1	STP	100	1500pF	0.08uH	3.20E-08	8.00E-09	50%	33%	17%	10
				300-mK Ground wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				300-mK JFET Bias	2	1	STP	1000	1500pF	0.08uH	5.00E-03	2.00E-04	50%	33%	17%	10
				SLW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	9.60E-08	2.40E-08	50%	33%	17%	10
				SLW JFET Bias	4	2	STP	1000	1500pF	0.08uH	2.50E-03	6.00E-04	50%	33%	17%	10
				SLW Ground wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				SSW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	1.20E-03	4.80E-08	50%	33%	17%	10
				SSW JFET Bias	4	2	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				SSW Ground Wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				FPU Faraday Shield Link	1	9	S	50	1500pF	0.08uH	0	0	0.2%	33%	0%	10
				300-mK TC JFET Heater	2	1	STP	200	1500pF	0.08uH	1.92E-03	4.81E-04	0.2%	33%	0%	10
				SLW JFET Heater	2	1	STP	200	1500pF	0.08uH	3.33E-03	8.33E-04	0.2%	33%	0%	10
				SSW JFET Heater	2	1	STP	200	1500pF	0.08uH	6.67E-03	1.67E-03	0.2%	33%	0%	10
		DCU J34	DCMA37P	300-mK TC Bias	2	1	STP	100	1500pF	0.08uH	3.20E-08	8.00E-09	50%	33%	17%	10
				300-mK Ground wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				300-mK JFET Bias	2	1	STP	1000	1500pF	0.08uH	5.00E-03	2.00E-04	50%	33%	17%	10
				SLW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	9.60E-08	2.40E-08	50%	33%	17%	10
				SLW JFET Bias	4	2	STP	1000	1500pF	0.08uH	2.50E-03	6.00E-04	50%	33%	17%	10
				SLW Ground wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				SSW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	1.20E-03	4.80E-08	50%	33%	17%	10
				SSW JFET Bias	4	2	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				SSW Ground Wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				FPU Faraday Shield Link	1	9	S	50	1500pF	0.08uH	0	0	0.2%	33%	0%	10
				300-mK TC JFET Heater	2	1	STP	200	1500pF	0.08uH	1.92E-03	4.81E-04	0.2%	33%	0%	10
				SLW JFET Heater	2	1	STP	200	1500pF	0.08uH	3.33E-03	8.33E-04	0.2%	33%	0%	10
				SSW JFET Heater	2	1	STP	200	1500pF	0.08uH	6.67E-03	1.67E-03	0.2%	33%	0%	10
		Shield		RF Overshield connected to EMC Backshell at each end of the harness			>93%			0.01						
I2/E2 Type4	CVV 2	DCU J23	DCMA37 S	Bolometer signals from JFS (300-mK TC 1-3, SSW 1-8)	24	12	STP	100	1500pF	0.08uH	1.00E-09	5.00E-10	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	Single	50	1500pF	0.08uH	0.0	0.0	50%	33%	17%	0.1
		DCU J24	DCMA37 S	Bolometer signals from JFS (SSW 9-20)	24	12	STP	100	1500pF	0.08uH	1.00E-09	5.00E-10	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	Single	50	1500pF	0.08uH	0.0	0.0	50%	33%	17%	0.1
		DCU J25	DCMA37 S	Bolometer signals from JFS (SSW 21-32)	24	12	STP	100	1500pF	0.08uH	1.00E-09	5.00E-10	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	Single	50	1500pF	0.08uH	0.0	0.0	50%	33%	17%	0.1
		DCU J26	DCMA37 S	Bolometer signals from JFS (SSW 33-44)	24	12	STP	100	1500pF	0.08uH	1.00E-09	5.00E-10	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	Single	50	1500pF	0.08uH	0.0	0.0	50%	33%	17%	0.1
		Shield		RF Overshield connected to EMC Backshell at each end of the harness			>93%			0.01						

Zero

Name	128 Way Connector	DRCU Connector	DRCU Connector Type	Description	Number of Conductors excl. shlds	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max.Current per Conductor	Average	Duty Cycle t	T	(t x T)	Max. Volts
I3/E3 Type2	CVV 3	DCU J29	DCMA37P	PSW JFET Bias	12	6	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				PSW Ground	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				PSW Bolometer Bias	6	3	STP	100	1500pF	0.08uH	3.84E-07	9.60E-08	50%	33%	17%	10
				PSW Heater	6	3	STP	200	1500pF	0.08uH	3.85E-03	9.62E-04	0.2%	33%	0%	10
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
		DCU J31	DCMA37P	PMW JFET Bias	8	4	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				PMW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	3.84E-07	9.60E-08	50%	33%	17%	10
				PMW Ground	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				PMW JFET Heater	4	2	STP	200	1500pF	0.08uH	3.85E-03	9.62E-04	0.2%	33%	0%	10
				PLW JFET Heater	2	1	STP	200	1500pF	0.08uH	3.85E-03	9.62E-04	0.2%	33%	0%	10
				PLW JFET Bias	4	2	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				PLW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	1.92E-07	4.80E-08	50%	33%	17%	10
				PLW Ground	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
		DCU J30	DCMA37P	PSW JFET Bias	12	6	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				PSW Ground	1	0	S	50	1500pF	0.08uH	0.00E+00	0.00E+00	50%	33%	17%	10
				PSW Bolometer Bias	6	3	STP	100	1500pF	0.08uH	0.0	0.0	50%	33%	17%	10
				PSW Heater	6	3	STP	200	1500pF	0.08uH	3.85E-03	9.62E-04	0%	33%	0%	10
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0.0	0.0	50%	33%	17%	10
		DCU J32	DCMA37P	PMW JFET Bias	8	4	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				PMW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	3.84E-07	9.60E-08	50%	33%	17%	10
				PMW Ground	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
				PMW JFET Heater	4	2	STP	200	1500pF	0.08uH	3.85E-03	9.62E-04	0%	33%	0%	10
				PLW JFET Heater	2	1	STP	200	1500pF	0.08uH	3.85E-03	9.62E-04	0%	33%	0%	10
				PLW JFET Bias	4	2	STP	1000	1500pF	0.08uH	5.00E-03	1.20E-03	50%	33%	17%	10
				PLW Bolometer Bias	4	2	STP	100	1500pF	0.08uH	1.92E-07	4.80E-08	50%	33%	17%	10
				PLW Ground	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	10
		Shield		RF Overshield connected to EMC Backshell at each end of the harness			>93%			0.01						
I4/E4 Type1	CVV 4	DCU J20	DDMA 50S	16 ch. PMW (1-16)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J21	DDMA 50S	16 ch. PMW (17-32)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J22	DDMA 50S	16 ch. PMW (33-48)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						
I5/E5 Type1	CVV 5	DCU J17	DDMA 50S	16 ch. PMW (49-64)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J18	DDMA 50S	16 ch. PMW (65-80)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J19	DDMA 50S	16 ch. PMW (81-96)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						

Name	128 Way Connector	DRCU Connector	DRCU Connector Type	Description	Number of Conductors excl. shlds	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max.Current per Conductor	Average	Duty Cycle t	T	(t x T)	Max. Volts
I6/E6 Type1	CVV 6	DCU J14	DDMA 50S	16 ch. PLW (1-16)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J15	DDMA 50S	16 ch. PLW (17-32)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J16	DDMA 50S	16 ch. PLW (33-48)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
					2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						
I7/E7 Type1	CVV 7	DCU J11	DDMA 50S	16 ch. PSW (1-16)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J12	DDMA 50S	16 ch. PSW (17-32)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J13	DDMA 50S	16 ch. PSW (33-48)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						
I8/E8 Type1	CVV 8	DCU J8	DDMA 50S	16 ch. PSW (49-64)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J9	DDMA 50S	16 ch. PSW (65-80)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J10	DDMA 50S	16 ch. PSW (81-96)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						
I9/E9 Type1	CVV 9	DCU 5	DDMA 50S	16 ch. PMW (97-112)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J6	DDMA 50S	16 ch. PMW (113-128)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1
				Ground Wire	2	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	0.1
		DCU J7	DDMA 50S	16 ch. PMW (129-144)	32	16	STP	100	1500pF	0.08uH	1.00E-09	5E-10	50%	33%	17%	0.1

Name	128 Way Connector	DRCU Connector	DRCU Connector Type	Description	Number of Conductors excl. shlds	Number of Inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max.Current per Conductor	Average	Duty Cycle t	T	(t x T)	Max. Volts
I10/E10 Aux-P	CVV 10	Shutter EGSE	DBMA 25P	Vane Position Sensor	2	1	STP	1000			1.0E-02	0	0%	0%	0%	
				Latch Position Sense	2	1	STP	1000			1.0E-02	0	0%	0%	0%	10
				Temperature Sensor Bias	2	1	STP	1000			1.0E-05					
				Temperature Signals	3	1	STT	1000			1.0E-06					
				Latch Drive/Heaters	3	1	STT	10			1.5E-01	0	0%	0%	0%	
				Motor Drive	3	1	STT	10			1.5E-01	0	0%	0%	0%	
		FCU J11	DAMA 15P	Sorption Pump Heater	4	0	TQ	10			2.50E-02	6.25E-03	2%	1/3	1%	
				Heat switch heaters	8	0	TQ	50			1.50E-03	3.75E-04	2%	1/3	1%	
				300mK Thermal Control Heater	4	1	STQ	100			2.00E-03	5.00E-04	50%	33.30%	17%	
				Spectrometer Stimulus Heater 4%	4	0	TQ	30			9.00E-03	2.25E-03	50%	33.30%	17%	
				Spectrometer Stimulus Heater 2%	4	0	TQ	30			7.00E-03	1.75E-03	50%	33.30%	17%	
		FCUJ23	DDMA 50P	FPU Thermometry A	44	11	STQ	1000			1.00E-06	1.00E-06	100%	33%	33%	
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	0%	0%	0
		FCUJ25	DAMA 15P	FPU Thermometry B	12	3	STQ	1000			1.00E-06	1.00E-06	100%	33%	33%	
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						
I11/E11 Drive-P	CVV 11	FCU J21	DAMA 15P	FPU Thermometry C	12	3	STQ	1000			1.00E-06	0.000001	100%	33%	33%	
		FCU J19	DCMA 37P	BSM Chop/Jiggle Sensors	4	2	STP	1000			1.00E-06	1.00E-06	100%	33%	33%	0.4
				BSM Chop/Jiggle Sensors	6	2	STT	1000			1.00E-06	1.00E-06	100%	33%	33%	
				BSM Launch latch sense	2	1	STP	1000			0.001	0	0%	0%	0%	
				BSM Launch latch solenoid	2	1	STP	10			0.035	0	0%	0%	0%	
				BSM Chop motor drive	4	1	STQ	10			0.04	0.02	50%	33%	17%	
				BSM Jiggle motor drive	4	1	STQ	10			0.04	0.005	50%	33%	17%	
		FCU J29	MDM 37P	SMEC LVDT Primary	2	1	STP	5			0.005	0.0025	50%	33%	17%	0
				SMEC LVDT Secondary	4	2	STP	5			0.00005	0.00005	50%	33%	17%	0
				SMEC Launch Latch1	4	2	STP	5			0.4		0%	0%	0%	0
				SMEC Launch Latch1 Confirm	2	1	STP	5			0.001		0%	0%	0%	0
				SMEC Launch Latch2	4	2	STP	5			0.4		0%	0%	0%	0
				SMEC Launch Latch2 Confirm	2	1	STP	5			0.001		0%	0%	0%	0
		FCU J17	MDM 37P	SMEC Drive Coil	2	1	STP	5			0.1	0.08	50%	33%	17%	0
				SMEC Drive Coil (Rob.)	2	1	STP	5			0.1	0	50%	33%	17%	0
				SMEC Drive coil voltage sensor	2	1	STP	500			0.00001		0%	33%	0%	
				SMEC Position sensor supplies	4	2	STP	100			0.001		50%	33%	17%	
				SMEC Position sensor photodiodes	6	3	STP	1000			0.00002		50%	33%	17%	
				SMEC Position sensor photodiodes FB	6	3	STP	1000			0.00001		50%	33%	17%	
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	5
		EGSE		Mechanisms Launch Lock Confirm	6	3	STP	1000			0	0	0%	0%	0%	
		FCU J13	DEMA 9P	P-Cal Heater	4	1	STQ	10			0.007	0.00175	5%	33%	2%	
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						

Annex 5
17.7.02

Name	128 Way Connector	DRCU Connector	DRCU Connector Type	Description	Number of Conductors excl. shlds	Number of inner Shields	Implementation	Max. Impedance Requirements R (W)	C(pF)	L(uH)	Max.Current per Conductor	Average	Duty Cycle t	T	(t x T)	Max. Volts
I12/E12 Aux-R	CVV 12	Shutter EGSE	DBMA 25P	Vane Position Sensor	2	1	STP	1000			1.0E-02	0	0%	0%	0%	
				Latch Position Sense	2	1	STP	1000			1.0E-02	0	0%	0%	0%	10
				Temperature Sensor Bias	2	1	STP	1000			1.0E-05					
				Temperature Signals	3	1	STT	1000			1.0E-06					
				Latch Drive/Heaters	3	1	STT	10			1.5E-01	0	0%	0%	0%	
				Motor Drive	3	1	STT	10			1.5E-01	0	0%	0%	0%	
		FCU J12	DAMA 15P	Sorption Pump Heater	4	0	TQ	10			2.50E-02	0.00E+00	2%	1/3	1%	
				Heat switch heaters	8	0	TQ	50			1.50E-03	0.00E+00	2%	1/3	1%	
				300mK Thermal Control Heater	4	1	STQ	100			2.00E-03	0.00E+00	50%	33.30%	17%	
				Spectrometer Stimulus Heater 4%	4	0	TQ	30			9.00E-03	0.00E+00	50%	33.30%	17%	
				Spectrometer Stimulus Heater 2%	4	0	TQ	30			7.00E-03	0.00E+00	50%	33.30%	17%	
		FCUJ24	DCMA 37P	FPU Thermometry A	44	11	STQ	1000			1.00E-06	0.00E+00	100%	33%	33%	
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	0%	0%	10
		FCUJ26	DCMS 37P	FPU Thermometry B	12	3	STQ	1000			1.00E-06	0.00E+00	100%	33%	33%	
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01		0				
I13/E13 Drive-R	CVV 13	FCU J22	DAMA 15P	FPU Thermometry C	12	3	STQ	1000			1.00E-06	0	100%	33%	33%	
		FCU J20	DCMA 37P	BSM Chop/Jiggle Sensors	4	2	STP	1000			1.00E-06	0.00E+00	100%	33%	33%	0.4
				BSM Chop/Jiggle Sensors	6	2	STT	1000			1.00E-06	0.00E+00	100%	33%	33%	
				BSM Launch latch sense	2	1	STP	1000			0.001	0	0%	0%	0%	
				BSM Launch latch solenoid	2	1	STP	10			0.035	0	0%	0%	0%	
				BSM Chop motor drive	4	1	STQ	10			0.04	0	50%	33%	17%	
				BSM Jiggle motor drive	4	1	STQ	10			0.04	0	50%	33%	17%	
		FCU J30	MDM 37P	SMEC LVDT Primary	2	1	STP	5			0.005	0	50%	33%	17%	0
				SMEC LVDT Secondary	4	2	STP	5			0.00005	0	50%	33%	17%	0
				SMEC Launch Latch1	4	2	STP	5			0.4	0	0%	0%	0%	0
				SMEC Launch Latch1 Confirm	2	1	STP	5			0.001	0	0%	0%	0%	0
				SMEC Launch Latch2	4	2	STP	5			0.4	0	0%	0%	0%	0
				SMEC Launch Latch2 Confirm	2	1	STP	5			0.001	0	0%	0%	0%	0
		FCU J18	MDM 37P	SMEC Drive Coil	2	1	STP	5			0.1	0	50%	33%	17%	0
				SMEC Drive Coil (Rob.)	2	1	STP	5			0.1	0	50%	33%	17%	0
				SMEC Drive coil voltage sensor	2	1	STP	500			0.00001	0	0%	33%	0%	
				SMEC Position sensor supplies	4	2	STP	100			0.001	0	50%	33%	17%	
				SMEC Position sensor photodiodes	6	3	STP	1000			0.00002	0	50%	33%	17%	
				SMEC Position sensor photodiodes FB	6	3	STP	1000			0.00001	0	50%	33%	17%	
				FPU Faraday Shield Link	1	0	S	50	1500pF	0.08uH	0	0	50%	33%	17%	15
		EGSE		Mechanisms Launch Lock Confirm	6	3	STP	1000			0	0	0%	0%	0%	
		FCU J14	DEMA 9P	P-Cal Heater	4	1	STQ	10			0.007	0	5%	33%	2%	
		Shield		RF Overshield connected to EMC Backshell at each end of the harness		self	>93%			0.01						

Annex 3. - BDA Channels

CROSS-REFERENCE OF SPIRE CHANNELS TO HARNESSING NAMES

Most of this information can be worked out by following the Spire block diagram but it is included here for ease of reference.

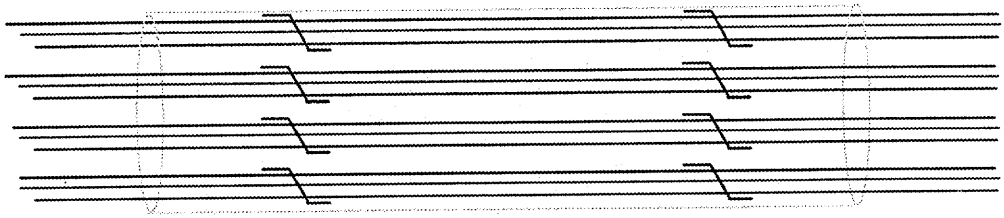
BDA	PLW		PMW				PSW						SLW	SSW	
JPL BDA #	10209800-1		10209800-2				10209800-3						1...00-4	10209800-5	
C/I Harness	6		5		4		9		8		7		half 1	2	
Nanonics # / Channel	J05	J06	J01	J02	J03	J04	J01	J02	J03	J04	J05	J06	J05	J05	J06
A	1	25	1	25	49	73	1	25	49	73	97	121	1	1	25
B	2	26	2	26	50	74	2	26	50	74	98	122	2	2	26
C	3	27	3	27	51	75	3	27	51	75	99	123	3	3	27
D	4	28	4	28	52	76	4	28	52	76	100	124	4	4	28
E	5	29	5	29	53	77	5	29	53	77	101	125	5	5	29
F	6	30	6	30	54	78	6	30	54	78	102	126	6	6	30
G	7	31	7	31	55	79	7	31	55	79	103	127	7	7	31
H	8	32	8	32	56	80	8	32	56	80	104	128	8	8	32
I	9	33	9	33	57	81	9	33	57	81	105	129	9	9	33
J	10	34	10	34	58	82	10	34	58	82	106	130	10	10	34
K	11	35	11	35	59	83	11	35	59	83	107	131	11	11	35
L	12	36	12	36	60	84	12	36	60	84	108	132	12	12	36
M	13	37	13	37	61	85	13	37	61	85	109	133	13	13	37
N	14	38	14	38	62	86	14	38	62	86	110	134	14	14	38
P	15	39	15	39	63	87	15	39	63	87	111	135	15	15	39
R	16	40	16	40	64	88	16	40	64	88	112	136	16	16	40
S	17	41	17	41	65	89	17	41	65	89	113	137	17	17	41
T	18	42	18	42	66	90	18	42	66	90	114	138	18	18	42
U	19	43	19	43	67	91	19	43	67	91	115	139	19	19	43
V	20	44	20	44	68	92	20	44	68	92	116	140	20	20	44
W	21	45	21	45	69	93	21	45	69	93	117	141	21	21	45
X	22	46	22	46	70	94	22	46	70	94	118	142	22	22	46
Y	23	47	23	47	71	95	23	47	71	95	119	143	23	23	47
Z	24	48	24	48	72	96	24	48	72	96	120	144	24	24	48

Within the C/I harness listings, channel numbers are shown in modulo 48

Annex 4 - What is 12-ax?

This cableform is maybe not self-explanatory in the same way as the others in this document. A rather specific format of 12-ax is intended.

It is drawn in diagrams as:



This consists of 4 twisted triples, each triple being three insulated multicore wires, inside one braided shield, all inside an outer insulator.

The material, identified by JPL, uses stainless steel for all conductors, nominally 38AWG.

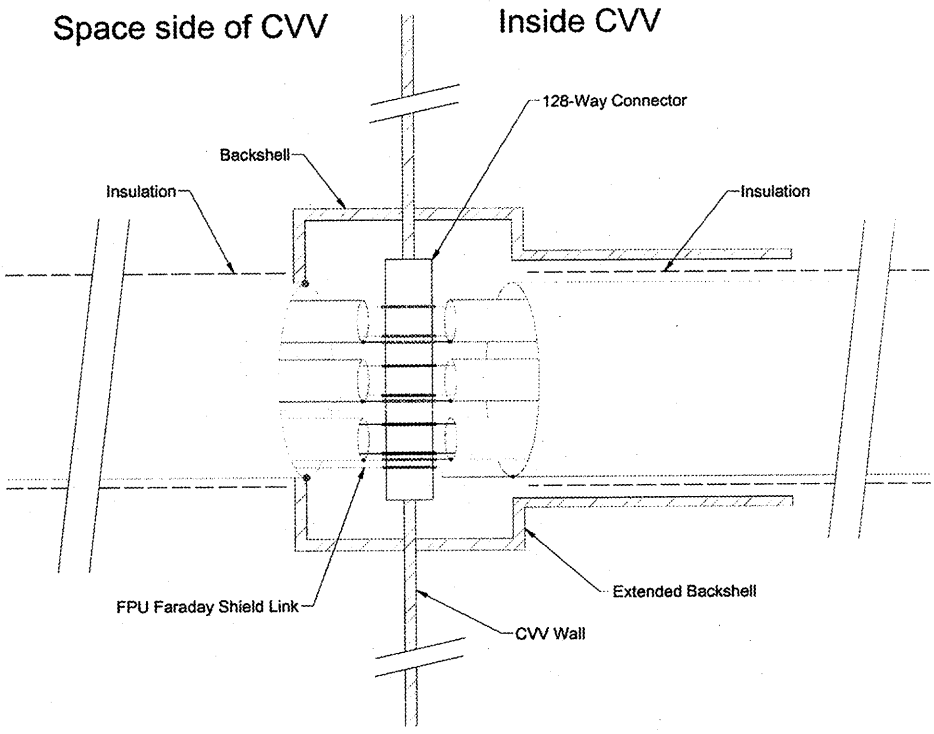
Using the black wires as screens for twisted pairs (red and blue), capacitance and thermal conductivity are low compared to four screened twisted pairs and cross-talk is apparently acceptable.

Note that the outer screen is also quite light-weight, and for this reason it is not used as the main *RF shield* on harnesses in Spire.

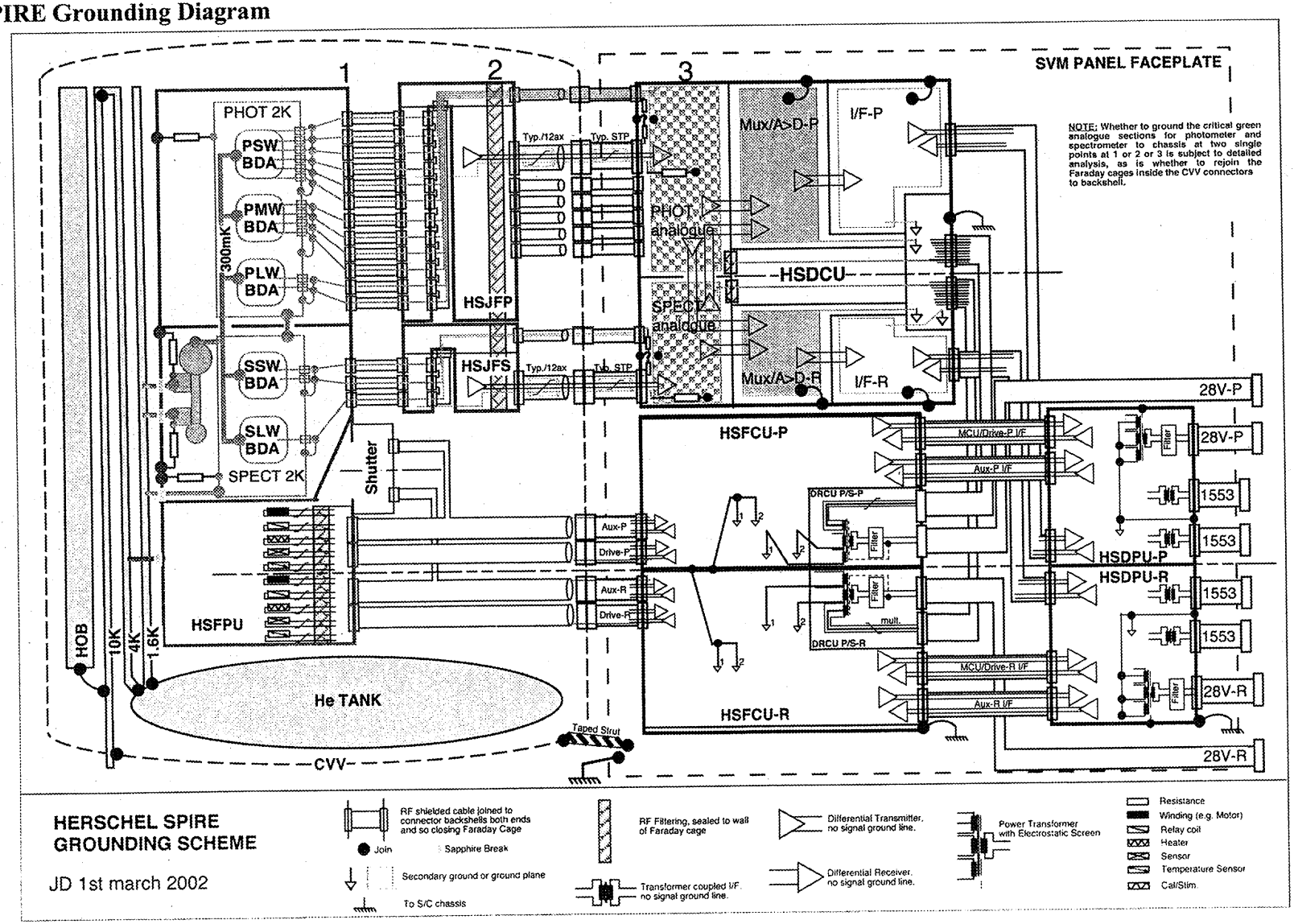
Annex 5 – CVV Bulkhead EMI Backshells

Space Side: The overshields of the cryoharnesses I1-I13 between the DRCU and the 128-way connectors in the wall of the cryostat are terminated at the EMI backshell as shown below. Links to the overshields of the C1-13 harnesses pass through contacts in the 128-way connectors and are carried as wires to the DRCU connectors.

Inside Cryostat: The overshields of the C1-13 harnesses from the 128-way connectors to the FPU /JFP/JFS are isolated from the connector body and have pig tails to contacts. This overshield remains electrically isolated from the cryostat chassis by the insulation shown. An extended backshell, possibly composed of a normal backshell connected to wire braid, passes a TBD distance back along the harness to close off the Faraday shield.



Annex 6 - SPIRE Grounding Diagram



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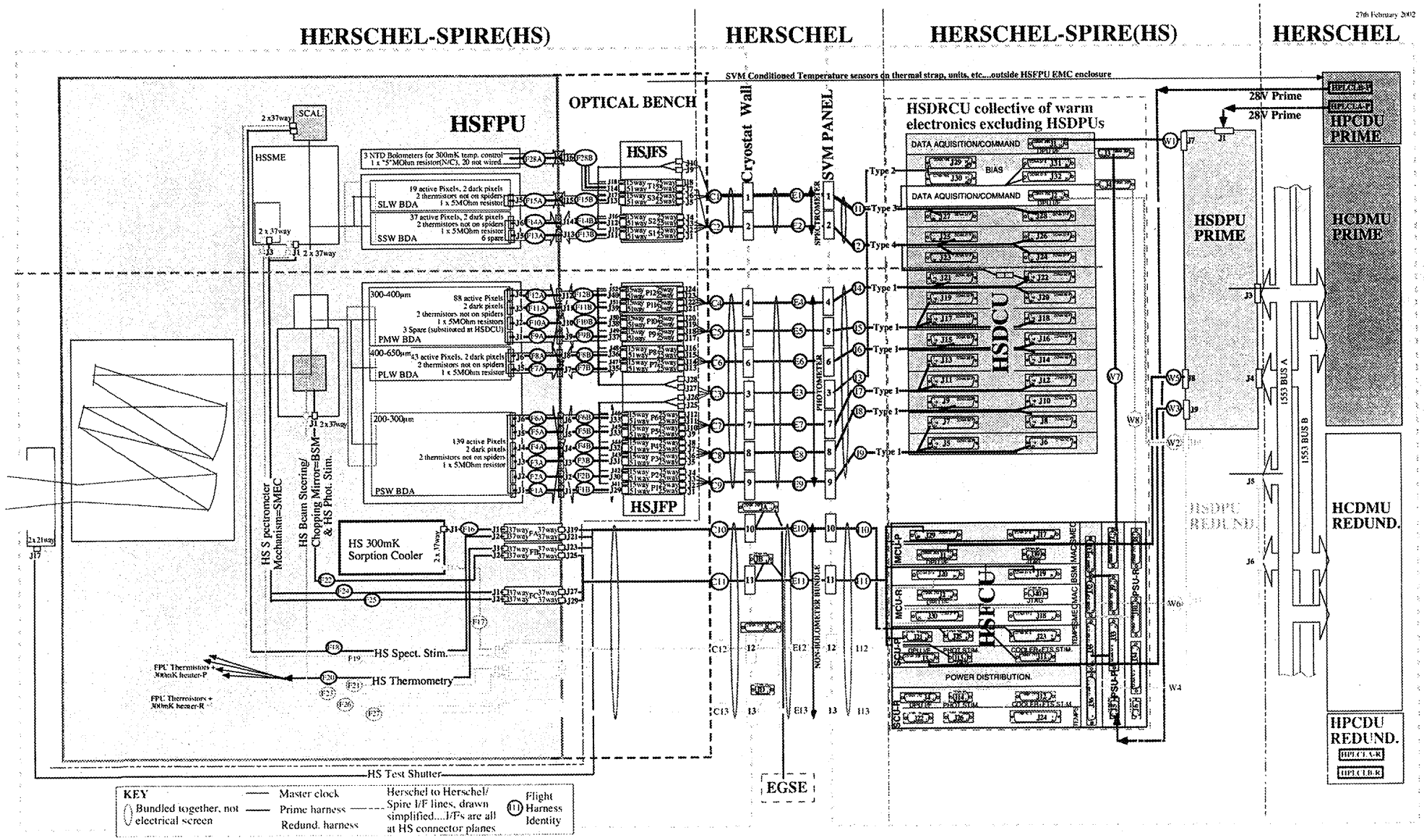
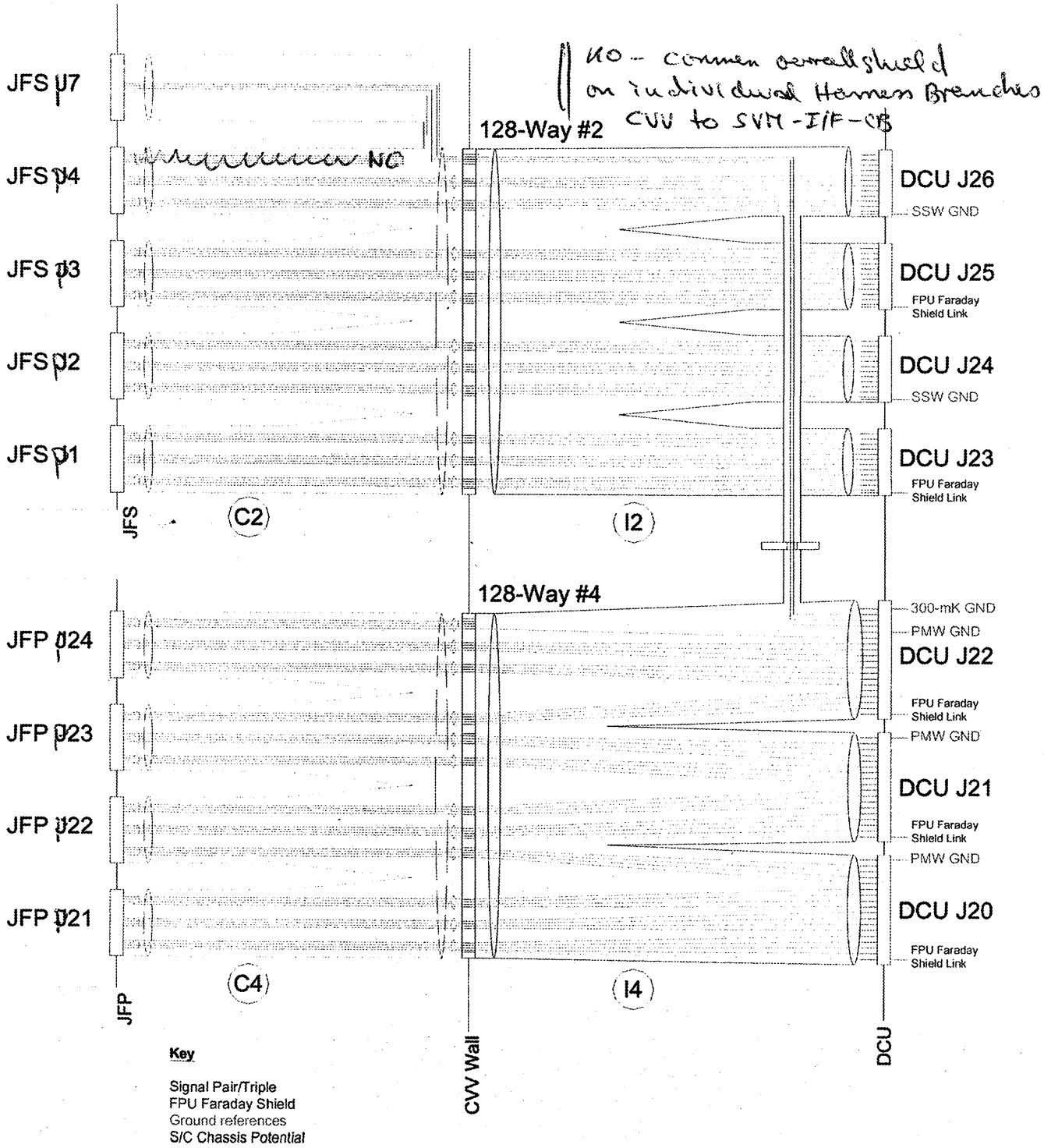


Annex 7 – 300-mK Thermal Control Cryoharnessing

The three channels from the 300-mK Thermal Control thermistors are conditioned in the Spectrometer JFET module (JFS). The signals are readout by the Photometer LIAs



Note: E2 and E4 harnesses are omitted for clarity in this drawing.

End of Doc.

Annex 5-1

Cable_n	Description	Location	no_of_wires	no_of_shd's	angle (conn. Location)	R_max_(Ohm) at 300 K	I_nominal (A)	Duty_Cycle		Duty_Cycle (T * t)	no_of_cable	cable_types	condu.	R_core Ohm/m at 300° K	R_cable Ohm/m at 300° K	SST [mm²]	Brass [mm²]	Insulation [mm²]	Harness lth (mm) from CVV I/F Connect.internal to Opt. Bench	R_max (Ohm) from CVV I/F Connect.internal to Opt. Bench at 300 K	Harness lth (mm) on Opt. Bench	R_max (Ohm) on Opt. Bench at 300 K	Harness lth (mm) total	R_max (Ohm) total at 300 K	delta R (Ohm)	P,el (mW/m)
C1	Bolometer signals from JFS	JFS P05	38	2	318	500	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1495	17.94	300	3.6	1795	21.54	-178.46	1.94E-14
C1	Bolometer signals from JFS	JFS P05	7	1	318	500	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1495	17.94	300	3.6	1795	21.54	-178.46	3.57E-15
C1	Bolometer signals from JFS	JFS P05	3	1	318	500	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1495	17.94	300	3.6	1795	21.54	-178.46	1.53E-15
C1	Bolometer signals from JFS	JFS P06	38	2	318	500	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1495	17.94	300	3.6	1795	21.54	-178.46	1.94E-14
C1	Bolometer signals from JFS	JFS P06	7	1	318	500	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1495	17.94	300	3.6	1795	21.54	-178.46	3.57E-15
C1	Bolometer signals from JFS	JFS P06	3	1	318	500	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1495	17.94	300	3.6	1795	21.54	-178.46	1.53E-15
C1	Spectrometer Bias	JFS P07	6	2	318	1000	1.0E-03	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1495	209.3	300	42	1795	251.3	-748.7	1.43E-01
C1	Spectrometer JFET Power	JFS P07	6	2	318	100	1.0E-06	0.5	0.33	0.17	2	1ST3C	BRASS	12	72.0	0.14	0.048	1.712	1495	17.94	300	3.6	1795	21.54	-78.46	1.22E-08
C1	Spectrometer Bias	JFS P07	6	2	318	1000	1.0E-03	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1495	209.3	300	42	1795	251.3	-748.7	1.43E-01
C1	Spectrometer JFET Power	JFS P07	6	2	318	100	1.0E-06	0.5	0.33	0.17	2	1ST3C	BRASS	12	72.0	0.14	0.048	1.712	1495	17.94	300	3.6	1795	21.54	-78.46	1.22E-08
C1	TC Bias	JFS P07	6	2	318	1000	1.0E-03	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1495	209.3	300	42	1795	251.3	-748.7	1.43E-01
C1	JFET Heaters	JFS P07	6	2	318	100	1.0E-06	0.5	0.33	0.17	2	1ST3C	BRASS	12	72.0	0.14	0.048	1.712	1495	17.94	300	3.6	1795	21.54	-78.46	1.22E-08
C1	Spectrometer Bias	JFS P08	6	2	318	1000	1.0E-03	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1495	209.3	300	42	1795	251.3	-748.7	1.43E-01
C1	Spectrometer JFET Power	JFS P08	6	2	318	100	1.0E-06	0.5	0.33	0.17	2	1ST3C	BRASS	12	72.0	0.14	0.048	1.712	1495	17.94	300	3.6	1795	21.54	-78.46	1.22E-08
C1	Spectrometer Bias	JFS P08	6	2	318	1000	1.0E-03	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1495	209.3	300	42	1795	251.3	-748.7	1.43E-01
C1	Spectrometer JFET Power	JFS P08	6	2	318	100	1.0E-06	0.5	0.33	0.17	2	1ST3C	BRASS	12	72.0	0.14	0.048	1.712	1495	17.94	300	3.6	1795	21.54	-78.46	1.22E-08
C1	TC Bias	JFS P08	6	2	318	1000	1.0E-03	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1495	209.3	300	42	1795	251.3	-748.7	1.43E-01
C1	JFET Heaters	JFS P08	6	2	318	100	1.0E-06	0.5	0.33	0.17	2	1ST3C	BRASS	12	72.0	0.14	0.048	1.712	1495	17.94	300	3.6	1795	21.54	-78.46	1.22E-08
C2	Bolometer signals from JFS	JFS P01	38	2	324	500	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1595	19.14	300	3.6	1895	22.74	-177.26	1.94E-14
C2	Bolometer signals from JFS	JFS P01	7	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1595	19.14	300	3.6	1895	22.74	-177.26	3.57E-15
C2	Bolometer signals from JFS	JFS P01	3	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1595	19.14	300	3.6	1895	22.74	-177.26	1.53E-15
C2	Bolometer signals from JFS	JFS P02	38	2	324	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1595	19.14	300	3.6	1895	22.74	-177.26	1.94E-14
C2	Bolometer signals from JFS	JFS P02	7	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1595	19.14	300	3.6	1895	22.74	-177.26	3.57E-15
C2	Bolometer signals from JFS	JFS P02	3	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1595	19.14	300	3.6	1895	22.74	-177.26	1.53E-15
C2	Bolometer signals from JFS	JFS P03	38	2	324	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1595	19.14	300	3.6	1895	22.74	-177.26	1.94E-14
C2	Bolometer signals from JFS	JFS P03	7	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1595	19.14	300	3.6	1895	22.74	-177.26	3.57E-15
C2	Bolometer signals from JFS	JFS P03	3	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1595	19.14	300	3.6	1895	22.74	-177.26	1.53E-15
C2	Bolometer signals from JFS	JFS P04	38	2	324	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1595	19.14	300	3.6	1895	22.74	-177.26	1.94E-14
C2	Bolometer signals from JFS	JFS P04	7	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1595	19.14	300	3.6	1895	22.74	-177.26	3.57E-15
C2	Bolometer signals from JFS	JFS P04	3	1	324	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1595	19.14	300	3.6	1895	22.74	-177.26	1.53E-15
C3	Bolometer bias, JFET Power, Heater	JFS P25	16	4	252	1000	1.0E-03	0.5	0.33	0.17	4	1ST4C	SST	140	2240.0	0.408	0	3.804	1353	189.42	300	42	1653	231.42	-768.58	3.81E-01
C3	Bolometer bias, JFET Power, Heater	JFS P25	16	4	252	200	5.0E-03	0.5	0.33	0.17	4	1ST4C	BRASS	12	192.0	0.28	0.128	3.804	1353	16.236	300	3.6	1653	19.836	-180.164	8.16E-01
C3	Bolometer bias, JFET Power, Heater	JFS P25	16	4	252	100	6.0E-03	0.5	0.33	0.17	4	1ST4C	BRASS	12	192.0	0.28	0.128	3.804	1353	16.236	300	3.6	1653	19.836	-80.164	1.18E+00
C3	Bolometer bias, JFET Power, Heater	JFS P26	12	3	252	1000	1.0E-03	0.5	0.33	0.17	3	1ST4C	SST	140	1680.0	0.306	0	2.853	1353	189.42	300	42	1653	231.42	-768.58	2.86E-01
C3	Bolometer bias, JFET Power, Heater	JFS P26	12	3	252	200	5.0E-03	0.5	0.33	0.17	3	1ST4C	BRASS	12	144.0	0.21	0.096	2.853	1353	16.236	300	3.6	1653	19.836	-180.164	6.12E-01
C3	Bolometer bias, JFET Power, Heater	JFS P26	12	3	252	100	6.0E-03	0.5	0.33	0.17	3	1ST4C	BRASS	12	144.0	0.21	0.096	2.853	1353	16.236	300	3.6	1653	19.836	-80.164	8.81E-01
C3	Bolometer bias, JFET Power, Heater	JFS P27	16	4	252	1000	1.0E-03	0.5	0.33	0.17	4	1ST4C	SST	140	2240.0	0.408	0	3.804	1353	189.42	300	42	1653	231.42	-768.58	3.81E-01
C3	Bolometer bias, JFET Power, Heater	JFS P27	16	4	252	200	5.0E-03	0.5	0.33	0.17	4	1ST4C	BRASS	12	192.0	0.28	0.128	3.804	1353	16.236	300	3.6	1653	19.836	-180.164	8.16E-01
C3	Bolometer bias, JFET Power, Heater	JFS P27	16	4	252	100	6.0E-03	0.5	0.33	0.17	4	1ST4C	BRASS	12	192.0	0.28	0.128	3.804	1353	16.236	300	3.6	1653	19.836	-80.164	1.18E+00
C3	Bolometer bias, JFET Power, Heater	JFS P28	12	3	252	1000	1.0E-03	0.5	0.33	0.17	3	1ST4C	SST	140	1680.0	0.306	0	2.853	1353	189.42	300	42	1653	231.42	-768.58	2.86E-01
C3	Bolometer bias, JFET Power, Heater	JFS P28	12	3	252	200	5.0E-03	0.5	0.33	0.17	3	1ST4C	BRASS	12	144.0	0.21	0.096	2.853	1353	16.236	300	3.6	1653	19.836	-180.164	6.12E-01
C3	Bolometer bias, JFET Power, Heater	JFS P28	12	3	252	100	6.0E-03	0.5	0.33	0.17	3	1ST4C	BRASS	12	144.0	0.21	0.096	2.853	1353	16.236	300	3.6	1653	19.836	-80.164	8.81E-01
C4	Bolometer signals from JFP	JFP P21	38	2	258	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1370	16.44	300	3.6	1670	20.04	-179.96	1.94E-14
C4	Bolometer signals from JFP	JFP P21	7	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1370	16.44	300	3.6	1670	20.04	-179.96	3.57E-15
C4	Bolometer signals from JFP	JFP P21	3	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1370	16.44	300	3.6	1670	20.04	-179.96	1.53E-15
C4	Bolometer signals from JFP	JFP P22	38	2	258	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1370	16.44	300	3.6	1670	20.04	-179.96	1.94E-14
C4	Bolometer signals from JFP	JFP P22	7	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1370	16.44	300	3.6	1670	20.04	-179.96	3.57E-15
C4	Bolometer signals from JFP	JFP P22	3	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1370	16.44	300	3.6	1670	20.04	-179.96	1.53E-15
C4	Bolometer signals from JFP	JFP P23	38	2	258	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1370	16.44	300	3.6	1670	20.04	-179.96	1.94E-14
C4	Bolometer signals from JFP	JFP P23	7	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1370	16.44	300	3.6	1670	20.04	-179.96	3.57E-15
C4	Bolometer signals from JFP	JFP P23	3	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1370	16.44	300	3.6	1670	20.04	-179.96	1.53E-15
C4	Bolometer signals from JFP	JFP P24	38	2	258	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1370	16.44	300	3.6	1670	20.04	-179.96	1.94E-14
C4	Bolometer signals from JFP	JFP P24	7	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1370	16.44	300	3.6	1670	20.04	-179.96	3.57E-15
C4	Bolometer signals from JFP	JFP P24	3	1	258	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1370	16.44	300	3.6	1670	20.04	-179.96	1.53E-15
C5	Bolometer signals from JFP	JFP P17	38	2	264	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1446	17.352	300	3.6	1746	20.952	-179.048	1.94E-14
C5	Bolometer signals from JFP	JFP P17	7	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1446	17.352	300	3.6	1746	20.952	-179.048	3.57E-15
C5	Bolometer signals from JFP	JFP P17	3	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1446	17.352	300	3.6	1746	20.952	-179.048	1.53E-15
C5	Bolometer signals from JFP	JFP P18	38	2	264	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1446	17.352	300	3.6	1746	20.952	-179.048	1.94E-14
C5	Bolometer signals from JFP	JFP P18	7	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1446	17.352	300	3.6	1746	20.952	-179.048	3.57E-15
C5	Bolometer signals from JFP	JFP P18	3	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1446	17.352	300	3.6	1746	20.952	-179.048	1.53E-15

500Ω

CW inkt. + ext.
I=0 (Red)

SPEC
each of 500Ω

T=0
(Red)

PLW 500Ω

Cable_n	Description	Location	no_of_wires	no_of_shd's	angle (conn. Location)	R_max_(Ohm) at 300 K	I_nominal (A)	Duty_Cycle		Duty_Cycle (T * t)	no_of_cable	cable_types	condu.	R_core Ohm/m at 300° K	R_cable Ohm/m at 300° K	SST [mm²]	Brass [mm²]	Insulation [mm²]	Harness lth (mm) from CVV I/F Connect.internal to Opt. Bench	R_max (Ohm) from CVV I/F Connect.internal to Opt. Bench at 300 K	Harness lth (mm) on Opt. Bench	R_max (Ohm) on Opt. Bench at 300 K	Harness lth (mm) total	R_max (Ohm) total at 300 K	delta R (Ohm)	P,el (mW/m)
C5	Bolometer signals from JFP	JFP P19	38	2	264	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1446	17.352	300	3.6	1746	20.952	-179.048	1.94E-14
C5	Bolometer signals from JFP	JFP P19	7	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1446	17.352	300	3.6	1746	20.952	-179.048	3.57E-15
C5	Bolometer signals from JFP	JFP P19	3	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1446	17.352	300	3.6	1746	20.952	-179.048	1.53E-15
C5	Bolometer signals from JFP	JFP P20	38	2	264	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1446	17.352	300	3.6	1746	20.952	-179.048	1.94E-14
C5	Bolometer signals from JFP	JFP P20	7	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1446	17.352	300	3.6	1746	20.952	-179.048	3.57E-15
C5	Bolometer signals from JFP	JFP P20	3	1	264	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1446	17.352	300	3.6	1746	20.952	-179.048	1.53E-15
C6	Bolometer signals from JFP	JFP P13	38	2	282	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1747	20.964	300	3.6	2047	24.564	-175.436	1.94E-14
C6	Bolometer signals from JFP	JFP P13	7	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1747	20.964	300	3.6	2047	24.564	-175.436	3.57E-15
C6	Bolometer signals from JFP	JFP P13	3	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1747	20.964	300	3.6	2047	24.564	-175.436	1.53E-15
C6	Bolometer signals from JFP	JFP P14	38	2	282	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1747	20.964	300	3.6	2047	24.564	-175.436	1.94E-14
C6	Bolometer signals from JFP	JFP P14	7	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1747	20.964	300	3.6	2047	24.564	-175.436	3.57E-15
C6	Bolometer signals from JFP	JFP P14	3	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1747	20.964	300	3.6	2047	24.564	-175.436	1.53E-15
C6	Bolometer signals from JFP	JFP P15	38	2	282	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1747	20.964	300	3.6	2047	24.564	-175.436	1.94E-14
C6	Bolometer signals from JFP	JFP P15	7	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1747	20.964	300	3.6	2047	24.564	-175.436	3.57E-15
C6	Bolometer signals from JFP	JFP P15	3	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1747	20.964	300	3.6	2047	24.564	-175.436	1.53E-15
C6	Bolometer signals from JFP	JFP P16	38	2	282	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1747	20.964	300	3.6	2047	24.564	-175.436	1.94E-14
C6	Bolometer signals from JFP	JFP P16	7	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1747	20.964	300	3.6	2047	24.564	-175.436	3.57E-15
C6	Bolometer signals from JFP	JFP P16	3	1	282	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1747	20.964	300	3.6	2047	24.564	-175.436	1.53E-15
C7	Bolometer signals from JFP	JFP P09	38	2	288	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1861	22.332	300	3.6	2161	25.932	-174.068	1.94E-14
C7	Bolometer signals from JFP	JFP P09	7	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1861	22.332	300	3.6	2161	25.932	-174.068	3.57E-15
C7	Bolometer signals from JFP	JFP P09	3	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1861	22.332	300	3.6	2161	25.932	-174.068	1.53E-15
C7	Bolometer signals from JFP	JFP P10	38	2	288	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1861	22.332	300	3.6	2161	25.932	-174.068	1.94E-14
C7	Bolometer signals from JFP	JFP P10	7	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1861	22.332	300	3.6	2161	25.932	-174.068	3.57E-15
C7	Bolometer signals from JFP	JFP P10	3	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1861	22.332	300	3.6	2161	25.932	-174.068	1.53E-15
C7	Bolometer signals from JFP	JFP P11	38	2	288	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1861	22.332	300	3.6	2161	25.932	-174.068	1.94E-14
C7	Bolometer signals from JFP	JFP P11	7	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1861	22.332	300	3.6	2161	25.932	-174.068	3.57E-15
C7	Bolometer signals from JFP	JFP P11	3	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1861	22.332	300	3.6	2161	25.932	-174.068	1.53E-15
C7	Bolometer signals from JFP	JFP P12	38	2	288	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	1861	22.332	300	3.6	2161	25.932	-174.068	1.94E-14
C7	Bolometer signals from JFP	JFP P12	7	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	1861	22.332	300	3.6	2161	25.932	-174.068	3.57E-15
C7	Bolometer signals from JFP	JFP P12	3	1	288	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	1861	22.332	300	3.6	2161	25.932	-174.068	1.53E-15
C8	Bolometer signals from JFP	JFP P05	38	2	306	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2049	24.588	300	3.6	2349	28.188	-171.812	1.94E-14
C8	Bolometer signals from JFP	JFP P05	7	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2049	24.588	300	3.6	2349	28.188	-171.812	3.57E-15
C8	Bolometer signals from JFP	JFP P05	3	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2049	24.588	300	3.6	2349	28.188	-171.812	1.53E-15
C8	Bolometer signals from JFP	JFP P06	38	2	306	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2049	24.588	300	3.6	2349	28.188	-171.812	1.94E-14
C8	Bolometer signals from JFP	JFP P06	7	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2049	24.588	300	3.6	2349	28.188	-171.812	3.57E-15
C8	Bolometer signals from JFP	JFP P06	3	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2049	24.588	300	3.6	2349	28.188	-171.812	1.53E-15
C8	Bolometer signals from JFP	JFP P07	38	2	306	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2049	24.588	300	3.6	2349	28.188	-171.812	1.94E-14
C8	Bolometer signals from JFP	JFP P07	7	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2049	24.588	300	3.6	2349	28.188	-171.812	3.57E-15
C8	Bolometer signals from JFP	JFP P07	3	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2049	24.588	300	3.6	2349	28.188	-171.812	1.53E-15
C8	Bolometer signals from JFP	JFP P08	38	2	306	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2049	24.588	300	3.6	2349	28.188	-171.812	1.94E-14
C8	Bolometer signals from JFP	JFP P08	7	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2049	24.588	300	3.6	2349	28.188	-171.812	3.57E-15
C8	Bolometer signals from JFP	JFP P08	3	1	306	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2049	24.588	300	3.6	2349	28.188	-171.812	1.53E-15
C9	Bolometer signals from JFP	JFP P01	38	2	312	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2219	26.628	300	3.6	2519	30.228	-169.772	1.94E-14
C9	Bolometer signals from JFP	JFP P01	7	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2219	26.628	300	3.6	2519	30.228	-169.772	3.57E-15
C9	Bolometer signals from JFP	JFP P01	3	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2219	26.628	300	3.6	2519	30.228	-169.772	1.53E-15
C9	Bolometer signals from JFP	JFP P02	38	2	312	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2219	26.628	300	3.6	2519	30.228	-169.772	1.94E-14
C9	Bolometer signals from JFP	JFP P02	7	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2219	26.628	300	3.6	2519	30.228	-169.772	3.57E-15
C9	Bolometer signals from JFP	JFP P02	3	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2219	26.628	300	3.6	2519	30.228	-169.772	1.53E-15
C9	Bolometer signals from JFP	JFP P03	38	2	312	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2219	26.628	300	3.6	2519	30.228	-169.772	1.94E-14
C9	Bolometer signals from JFP	JFP P03	7	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2219	26.628	300	3.6	2519	30.228	-169.772	3.57E-15
C9	Bolometer signals from JFP	JFP P03	3	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2219	26.628	300	3.6	2519	30.228	-169.772	1.53E-15
C9	Bolometer signals from JFP	JFP P04	38	2	312	200	5.0E-10	0.5	0.33	0.17	2	1ST19C	BRASS	12	456.0	0.268	0.304	4.290	2219	26.628	300	3.6	2519	30.228	-169.772	1.94E-14
C9	Bolometer signals from JFP	JFP P04	7	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST7C	BRASS	12	84.0	0.085	0.056	1.208	2219	26.628	300	3.6	2519	30.228	-169.772	3.57E-15
C9	Bolometer signals from JFP	JFP P04	3	1	312	200	5.0E-10	0.5	0.33	0.17	1	1ST3C	BRASS	12	36.0	0.07	0.024	0.856	2219	26.628	300	3.6	2519	30.228	-169.772	1.53E-15
C10	Shutter (position and latch sense)	FPU P17	4	1	342	1000	1.0E-09	NA	NA	0.33	1	1ST4C	SST	140	560.0	0.102	0	0.951	1530	214.2	300	42	1830	256.2	-743.8	1.85E-13
C10	Vane drive, solenoid and heater	FPU P17	4	1	342	10	1.0E-01	0.06	0.33	0.02	1	1ST4C	BRASS	2.2	8.8	0.085	0.204	1.208	1530	3.366	300	0.66	1830	4.026	-5.974	
C10	Vane thermistor bias and readout	FPU P17	4	1	342	1000	1.0E-03	NA	NA	0.02	1	1ST4C	SST	140	560.0	0.102	0	0.951	1530	214.2	300	42	1830	256.2	-743.8	1.12E-02
C10	Cooler heaters	FPU P19	4	0	342	10	2.5E-02			0.02	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	1530	3.366	300	0.66	1830	4.026	-5.974	1.10E-01
C10	Sorption pump her switch heaters	FPU P19	4	0	342	50	1.5E-03	1	0.33	0.33	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	1530	3.366	300	0.66	1830	4.026	-45.974	6.53E-03

Cable_n	Description	Location	no_of_wires	no_of_shd's	angle (conn. Location)	R_max_(Ohm) at 300 K	I_nominal (A)	Duty_Cycle		Duty_Cycle (T * t)	no_of_cable	cable_types	condu.	R_core Ohm/m at 300° K	R_cable Ohm/m at 300° K	SST [mm²]	Brass [mm²]	Insulation [mm²]	Harness lth (mm) from CVV I/F Connect.internal to Opt. Bench	R_max (Ohm) from CVV I/F Connect.internal to Opt. Bench at 300 K	Harness lth (mm) on Opt. Bench	R_max (Ohm) on Opt. Bench at 300 K	Harness lth (mm) total	R_max (Ohm) total at 300 K	delta R (Ohm)	P,el (mW/m)
C10	Evaporator heat switch heaters	FPU P19	4	0	342	50	1.5E-03	1	0.33	0.33	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	1530	3.366	300	0.66	1830	4.026	-45.974	6.53E-03
C10	FTS Stimulator	FPU P21	4	0	342	30	9.0E-03	0.5	0.33	0.17	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	1530	3.366	300	0.66	1830	4.026	-25.974	1.21E-01
C10	FPU Thermomtry A	FPU P23	32	8	342	1000	1.0E-09	NA	NA	0.33	8	1ST4C	SST	140	4480.0	0.816	0	7.608	1530	214.2	300	42	1830	256.2	-743.8	1.48E-12
C10	FPU Thermomtry B	FPU P19 / P21	28	7	342	1000	1.0E-09	NA	NA	0.33	7	1ST4C	SST	140	3920.0	0.714	0	6.657	1530	214.2	300	42	1830	256.2	-743.8	1.29E-12
C11	FPU Thermomtry C	FPU P27 / P29	12	3	345	1000	1.0E-09	NA	NA	0.33	3	1ST4C	SST	140	1680.0	0.306	0	2.853	1817	254.38	300	42	2117	296.38	-703.62	5.54E-13
C11	SMEC Drive Coil	FPU P29	4	2	345	5	8.0E-03	0.5	0.33	0.17	2	1ST2C	BRASS	2.2	8.8	0.12	0.204	1.542	1817	3.9974	300	0.66	2117	4.6574	-0.3426	9.57E-02
C11	SEMC Drive coil Voltage	FPU P29	2	1	345	500	1.0E-03	0.5	0.33	0.17	1	1ST2C	SST	140	280.0	0.076	0	0.771	1817	254.38	300	42	2117	296.38	-203.62	4.76E-02
C11	SMEC LVDT	FPU P29	6	3	345	500	1.0E-02	0.5	0.33	0.17	3	1ST2C	SST	140	840.0	0.228	0	2.313	1817	254.38	300	42	2117	296.38	-203.62	1.43E+01
C11	SEMC Launch Latch	FPU P29	2	1	345	10	3.5E-02	0	0	0	1	1ST2C	BRASS	2.2	4.4	0.06	0.102	0.771	1817	3.9974	300	0.66	2117	4.6574	-5.3426	0.00E+00
C11	SEMC Launch Latch Confirm	FPU P29	2	1	345	100	1.0E-09	0	0	0	1	1ST2C	BRASS	12	24.0	0.06	0.016	0.771	1817	21.804	300	3.6	2117	25.404	-74.596	0.00E+00
C11	SEMC Moire Sensor	FPU P27	19	9	345	1000	2.0E-02	0.5	0.33	0.17	8	1ST2C	SST	140	2660.0	0.608	0	6.168	1817	254.38	300	42	2117	296.38	-703.62	1.81E+02
C11	SEMC Moire Sensor	FPU P27	19	9	345	1000	1.0E-02	0.5	0.33	0.17	1	1ST3C	SST	140	2660.0	0.094	0	0.856	1817	254.38	300	42	2117	296.38	-703.62	4.52E+01
C11	BSM Chop and Jiggle Sensor	FPU P25	6	2	345	1000	1.0E-02	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1817	254.38	300	42	2117	296.38	-703.62	1.43E+01
C11	BSM Chop and Jiggle Bias	FPU P25	4	2	345	100	1.0E-03	0.5	0.33	0.17	2	1ST2C	BRASS	12	48.0	0.12	0.032	1.542	1817	21.804	300	3.6	2117	25.404	-74.596	8.16E-03
C11	P-Cal Temperature	FPU P25	4	1	345	1000	2.5E-09	1	0.33	0.33	1	1ST4C	SST	140	560.0	0.102	0	0.951	1817	254.38	300	42	2117	296.38	-703.62	1.16E-12
C12	Shutter (position and latch sense)	FPU P18	4	1	348	1000	1.0E-09	NA	NA	0.33	1	1ST4C	SST	140	560.0	0.102	0	0.951	2224	311.36	300	42	2524	353.36	-646.64	1.85E-13
C12	Vane drive, solenoid and heater	FPU P18	4	1	348	1000	1.0E-01	0.06	0.33	0.02	1	1ST4C	BRASS	2.2	8.8	0.085	0.204	1.208	2224	4.8928	300	0.66	2524	5.5528	-994.447	
C12	Vane thermistor bias and readout	FPU P18	4	1	348	1000	1.0E-08	NA	NA	0.02	1	1ST4C	SST	140	560.0	0.102	0	0.951	2224	311.36	300	42	2524	353.36	-646.64	1.12E-02
C12	Cooler heaters	FPU P20	4	0	348	10	2.5E-02			0.02	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	2224	4.8928	300	0.66	2524	5.5528	-4.4472	1.10E-01
C12	Sorption pump her switch heaters	FPU P20	4	0	348	50	1.5E-03	1	0.33	0.33	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	2224	4.8928	300	0.66	2524	5.5528	-44.4472	6.53E-03
C12	Evaporator heat switch heaters	FPU P20	4	0	348	50	1.5E-03	1	0.33	0.33	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	2224	4.8928	300	0.66	2524	5.5528	-44.4472	6.53E-03
C12	FTS Stimulator	FPU P22	4	0	348	30	9.0E-03	0.5	0.33	0.17	1	T4C	BRASS	2.2	8.8	0	0.204	0.309	2224	4.8928	300	0.66	2524	5.5528	-24.4472	1.21E-01
C12	FPU Thermomtry A	FPU P24	32	8	348	1000	1.0E-09	NA	NA	0.33	8	1ST4C	SST	140	4480.0	0.816	0	7.608	2224	311.36	300	42	2524	353.36	-646.64	1.48E-12
C12	FPU Thermomtry B	FPU P20 / P22	28	7	348	1000	1.0E-09	NA	NA	0.33	7	1ST4C	SST	140	3920.0	0.714	0	6.657	2224	311.36	300	42	2524	353.36	-646.64	1.29E-12
C13	FPU Thermomtry C	FPU P28 / P30	12	3	351	1000	1.0E-09	NA	NA	0.33	3	1S4C	SST	140	1680.0	0.306	0	2.853	1884	263.76	300	42	2184	305.76	-694.24	5.54E-13
C13	SMEC Drive Coil	FPU P30	4	2	351	5	8.0E-03	0.5	0.33	0.17	2	1ST2C	BRASS	2.2	8.8	0.12	0.204	1.542	1884	4.1448	300	0.66	2184	4.8048	-0.1952	9.57E-02
C13	SEMC Drive coil Voltage	FPU P30	2	1	351	500	1.0E-03	0.5	0.33	0.17	1	1ST2C	SST	140	280.0	0.076	0	0.771	1884	263.76	300	42	2184	305.76	-194.24	4.76E-02
C13	SMEC LVDT	FPU P30	6	3	351	500	1.0E-02	0.5	0.33	0.17	3	1ST2C	SST	140	840.0	0.228	0	2.313	1884	263.76	300	42	2184	305.76	-194.24	1.43E+01
C13	SEMC Launch Latch	FPU P30	2	1	351	10	3.5E-02	0	0	0	1	1ST2C	BRASS	2.2	4.4	0.06	0.102	0.771	1884	4.1448	300	0.66	2184	4.8048	-5.1952	0.00E+00
C13	SEMC Launch Latch Confirm	FPU P30	2	1	351	100	1.0E-09	0	0	0	1	1ST2C	BRASS	12	24.0	0.06	0.016	0.771	1884	22.608	300	3.6	2184	26.208	-73.792	0.00E+00
C13	SEMC Moire Sensor	FPU P28	19	9	351	1000	2.0E-02			0.17	8	1ST2C	SST	140	2660.0	0.608	0	6.168	1884	263.76	300	42	2184	305.76	-694.24	1.81E+02
C13	SEMC Moire Sensor	FPU P28	19	9	351	1000	1.0E-02			0.17	1	1ST3C	SST	140	2660.0	0.094	0	0.856	1884	263.76	300	42	2184	305.76	-694.24	4.52E+01
C13	BSM Chop and Jiggle Sensor	FPU P26	6	2	351	1000	1.0E-02	0.5	0.33	0.17	2	1ST3C	SST	140	840.0	0.188	0	1.712	1884	263.76	300	42	2184	305.76	-694.24	1.43E+01
C13	BSM Chop and Jiggle Bias	FPU P26	4	2	351	100	1.0E-03	0.5	0.33	0.17	2	1ST2C	BRASS	12	48.0	0.12	0.032	1.542	1884	22.608	300	3.6	2184	26.208	-73.792	8.16E-03
C13	P-Cal Temperature	FPU P26	4	1	351	1000	2.5E-09	1	0.33	0.33	1	1ST4C	SST	140	560.0	0.102	0	0.951	1884	263.76	300	42	2184	305.76	-694.24	1.16E-12
																										5.19E+02

I = 0

I = 0 [A]

- 12 + 13 = Cold Redundant

HP-2-ASED-MN-112 Annex 6

CLRC	SPIRE INSTRUMENT BLOCK DIAGRAM	Doc #: SPIRE-RAL-DWG-000646 Issue: 3.9 Date: 26/2/02 9:05 AM Page 1 of 7

Update

Cold redundant c/I 12 and 13
c/I c1/c3 (RED ; Current=0)

Subject: **SPIRE BLOCK DIAGRAM**

PREPARED BY: J. DELDERFIELD ..... **Date:** .....

APPROVED BY: K. KING..... **Date:** .....

CHANGE RECORD

ISSUE	DATE	CHANGE(S) MADE
2.0	7/6/01	First Controlled Issue after IIDR
2.1	18/6/01	Deleted S/C Synchronisation. Added Master Clock Lines Split FCU into Modules, avoiding mixing Prime and Redundant connections via same motherboard, and requiring BSM module to be split Prime/Redundant, TBC. Re-ordered signal channels into harnesses to get breaks between BDAs to better align with LIA divisions. Removed last vestages of showing Fast and Slow I/Fs separately as they are linked by W1-W6. Fix FCU J26 duplication.
2.2	29/6/01	Put BDA connector numbers in line with JPL's that indicate which of the six geometric positions are used. Bundle back-harness wires as per JPL diagram. Define LCL names.
2.3	7/7/01	Rearrange JFETs to stress "modularity"
2.4	7/8/01	Increase FCU J21 and J22 to 25way…to take calibrator heater wires that were omitted. Swop JFETs to using 37way filters with partially populated contacts.
2.5	8/8/01	Put in FPU clamshell connectors as harness name "breaks". Delete TBD.
2.6	7/9/01	Update SMEC connectors on FPU from 50 way to 2x37way each side.
2.7	9/10/01	Put in fully updated HSFCU
2.8	12/10/01	Correct way I harness tails split on to FCU…in error in version 2.7
		Remove branch from F12A and route 300mK temperature "detectors" via HSJFS J7 AND J8 and new F 28. Correct PMW BDA Allocation. Add note to F20 and F21 so clear that each has one "Cernox" that is actually a 300Mk heater.
		Put in HSDCU with connectors drawn to scale.
2.9	18/10/01	Correct errors with W3-6 labels that crept into issue 2.8
3.0	30/10/01	Swop numbers on connector lines for DCU redundant bias generator so they fit with harness definition document, and connectors 29-34 remain if generators were to be put on one module or otherwise reconfigured.
3.1	31/10/01	Remove Filter Modules from JFET racks, thus adopting JPL's intention to use filter connectors and spliced harness.
3.2	9/11/01	Reduce HSDCU Bias module front panel sizes and house them in one double sided module. Call S4 T1 as per Doug's drawings.
3.3	21/11/01	Add last few connector IDs to JFET racks.
3.4	11/12/01	Got J1-J4 on FCU the correct way around [SCU to MCU!]
3.5	18/12/01	Move Connectors around on HSFPU to match CEA's v0.5 HSFPU ICD. Keep JTAG connectors shown elsewhere in DRCU ICD/Spec..but renumber as J37 and J38 Combine HSFCU SCU's DPU I/F and Cooler/Stimulus Modules Re-jig Shutter DRCU connectors to not be wired via HSFCU Modules

		Reduce J25/J26 Connector sizes as moving shutter wiring removes some pins from them. Change 1553 buses to A & B rather than Prime & Redundant Change J23 and J24 sizes because of HSFCU PCB frame restrictions. Move HSFCU Connectors to be in correct physical layout. Add J29 and J30 to shutter wiring to accommodate non-shutter launch latch confirm inputs. Change J15 and J16 to 25way as Doug's given the shutter more wires. Change HSFPU Shutter J17 and J18 to 21way MDM to match. Show power links on DRCU unit because these are not internal. Update HSDCU Bias connectors J29/32 to use 78-way HD triple row connectors after their acceptance by ESA.
3.6	20/12/01	Frederic's comments on J22 and 3TCs implemented.
3.7	1/1/02	HSFCU Duplicate J29/30 Fixed, bumping numbers for JTAGs
3.8	1/2/02	Change SCAL 21 ways to 37 ways.
3.9	25/2/02	As per Passvogel decision, put four "skin" connectors on cryostat associated with cryoharnesses 10-13, to act as access points for EGSE for shutter operation and latch confirmations. Bracket on side of HSFCU deleted, and links to HCDMU's RTUs.
		As HERSCHEL latest accommodation, add connector plate on top of SVM and change cryoharness to include extra/extended/external "E" sections, which are all 1:1 with CVV wall connectors to minimise external RF. loops (except skin connector functions as per above change). "I" harnesses become copper for flight.
		Rationalise sex/sizes of HSFCU internal power connectors

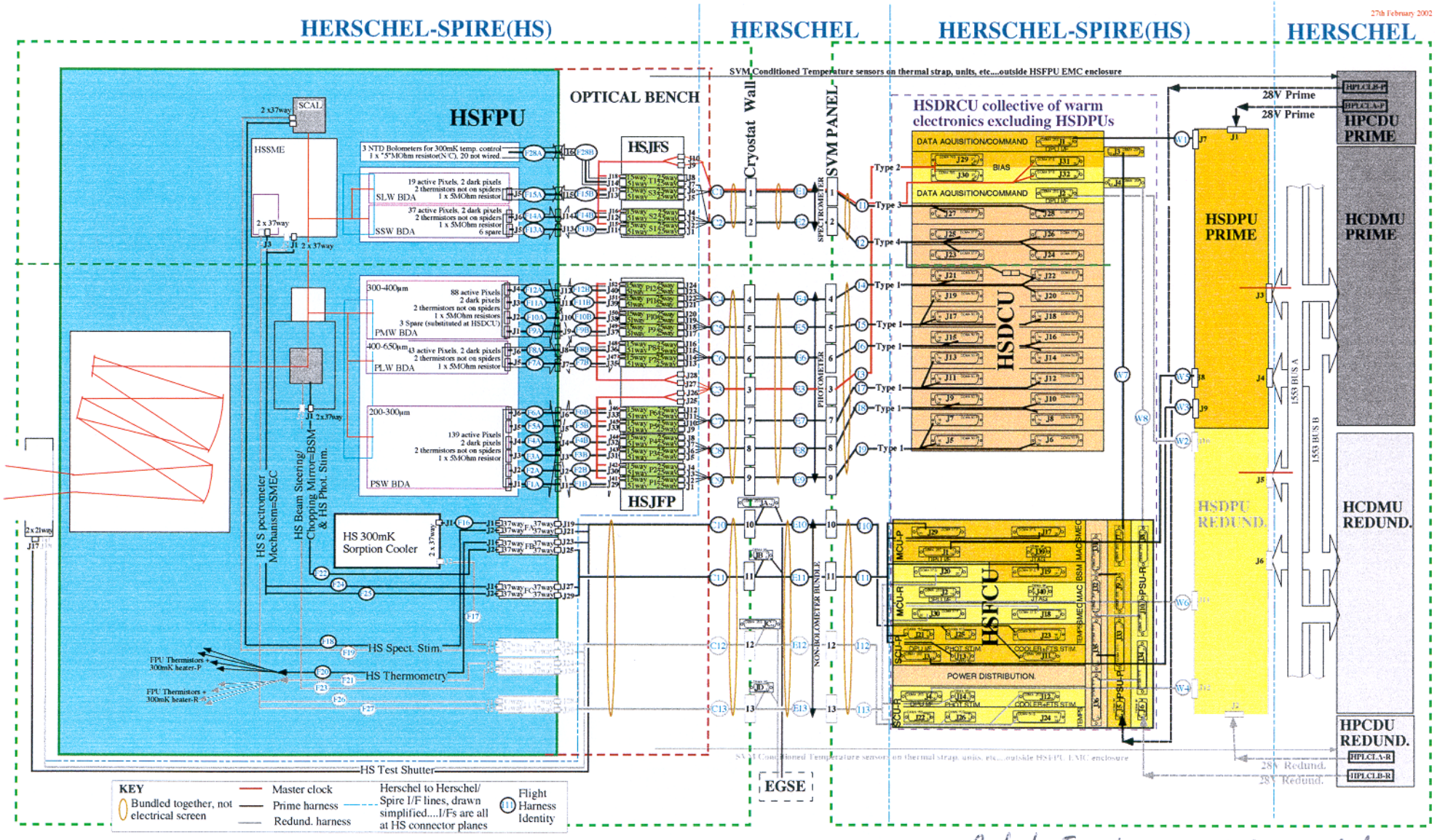
ACRONYM LIST

Term	Meaning
ADC	Analogue to Digital Converter
AIV	Assembly, Integration and Verification
AME	Absolute Measurement Error
AOCS	Attitude and Orbit Control System
APART	Arizona's Program for the Analysis of Radiation Transfer
APE	Absolute Pointing Error
ASAP	Advanced Systems Analysis Program
AVM	Avionics Model
BDA	Bolometer Detector Array
BFL	Back Focal Length
BRO	Breault Research Organization
BSM	Beam Steering Mirror
CDMS	Command and Data Management System
CDMU	Command and Data Management Unit
CDR	Critical Design Review
CMOS	Complimentary Metal Oxide Silicon
CPU	Central Processing Unit
CVV	Cryostat Vacuum Vessel
DAC	Digital to Analogue Converter
DAQ	Data Acquisition
DCU	Detector Control Unit = HSDCU
DPU	Digital Processing Unit = HSDPU
DSP	Digital Signal Processor
DQE	Detective Quantum Efficiency
EDAC	Error Detection and Correction
EGSE	Electrical Ground Support Equipment
EMC	Electro-magnetic Compatibility
EMI	Electro-magnetic Interference
ESA	European Space Agency
FCU	FCU Control Unit = HSFCU
FIR	Far Infrared
FIRST	Far Infra-Red and Submillimetre Telescope
FOV	Field of View
F-P	Fabry-Perot
FPGA	Field Programmable Gate Array
FPU	Focal Plane Unit
FTS	Fourier Transform Spectrometer
FWHM	Full Width Half maximum
GSFC	Goddard Space Flight Center
HK	House Keeping
HOB	Herschel Optical Bench
HPDU	Herschel Power Distribution Unit
HSDCU	Herschel-SPIRE Detector Control Unit
HSDPU	Herschel-SPIRE Digital Processing Unit
HSFCU	Herschel-SPIRE FPU Control Unit
HSO	Herschel Space Observatory
IF	Interface
IID-A	Instrument Interface Document - Part A

Term	Meaning
IID-B	Instrument Interface Document - Part B
IMF	Initial Mass Function
IR	Infrared
IRD	Instrument Requirements Document
IRTS	Infrared Telescope in Space
ISM	Interstellar Medium
JFET	Junction Field Effect Transistor
ISO	Infrared Space Observatory
LCL	Latching Current Limiter
LIA	Lock-In Amplifier
LVDT	Linear Variable Differential Transformer
MAC	Multi Axis Controller
LWS	Long Wave Spectrometer (an instrument used on ISO)
MCU	Mechanism Control Unit = HSMCU
M-P	Martin-Puplett
NEP	Noise Equivalent Power
NTD	Neutron Transmutation Doped
OBS	On-Board Software
OMD	Observing Modes Document
OPD	Optical Path Difference
PACS	Photodetector Array Camera and Spectrometer
PCAL	Photometer Calibration source
PID	Proportional, Integral and Differential (used in the context of feedback control loop architecture)
PLW	Photometer, Long Wavelength
PMW	Photometer, Medium Wavelength
POF	Photometer Observatory Function
PROM	Programmable Read Only Memory
PSW	Photometer, Short Wavelength
PUS	Packet Utilisation Standard
RMS	Root Mean Squared
SCAL	Spectrometer Calibration Source
SCUBA	Submillimetre Common User Bolometer Array
SED	Spectral Energy Distribution
SMEC	Spectrometer Mechanics
SMPS	Switch Mode Power Supply
SOF	Spectrometer Observatory Function
SPIRE	Spectral and Photometric Imaging Receiver
SRAM	Static Random Access Memory
SSSD	SubSystem Specification Document
STP	Standard Temperature and Pressure
SVM	Service Module
TBC	To Be Confirmed
TBD	To Be Determined
TC	Telecommand
URD	User Requirements Document
UV	Ultra Violet
WE	Warm Electronics
ZPD	Zero Path Difference

DISTRIBUTION LIST

Institute	Holder	Issue/ Revision and Distribution Date							
		3.2 9/11/01	3.3 21/11/01	3.4 11/12/01	3.5 18/12/01	3.6 20/12/01	3.7 1/1/02	3.8 1/2/02	3.9 26/2/02
RAL	Delderfield	x	x	x	x	x	x	x	x
	Swinyard	x	x	x	x	x	x	x	x
	Griffin	x	x	x	x	x	x	x	x
	Parker	x	x	x	x	x	x	x	x
	King	x	x	x	x	x	x	x	x
	Smith	x	x	x	x	x	x	x	x
Cardiff	Griffin	x	x	x	x	x	x	x	x
	Hargrave	x	x	x	x	x	x	x	x
ATC	Cunningham	x	x	x	x	x	x	x	x
	Stobie	x	x	x	x	x	x	x	x
MSSL	Brockley Blatt	x	x	x	x	x	x	x	x
CEA-SBT	Duband	x	x	x	x	x	x	x	x
CEA-SAP	Cara	x	x	x	x	x	x	x	x
	Augueres	x	x	x	x	x	x	x	x
	Pinsard	x	x	x	x	x	x	x	x
JPL	Bock	x	x	x	x	x	x	x	x
	Lilienthal	x	x	x	x	x	x	x	x
	Hristov	x	x	x	x	x	x	x	x
LAM	Pouliquen	x	x	x	x	x	x	x	x
Can.	Taylor	x	x	x	x	x	x	x	x
	Peterson	x	x	x	x	x	x	x	x
ESA	Jackson	x	x	x	x	x	x	x	x
	Heske	x	x	x	x	x	x	x	x
	Bruston	x	x	x	x	x	x	x	x
CESR	Pons								
IFSI	Giorgio	x	x	x	x	x	x	x	x
	Orfei	x	x	x	x	x	x	x	x
	Cerulli-Irelli	x	x	x	x	x	x	x	x
ALCATEL	Lund	x	x	x	x	x	x	x	x
	Hibberd	x	x	x	x	x	x	x	x
PA	Clark	x	x	x	x	x	x	x	x



latest Iss. 4.2 contains updates discussed and decided during the meeting and will be send to ASED on 22.4.02

Meeting: HP-2-ASED-MN-0112
Harness Interface Meeting
Date: 18/04/02

Action Item List

Herschel

No.:	Description:	Due Date	Originator Comp./Pers.	Actionee Comp./Pers.	Source	Completion
AI#1:	Updated SPIRE I/F drawings containing the following information shall be supplied by SPIRE by 30 April 2002: • Position of all connector, • Orientation • Type, size and sex • Pin-1 position	30/04/02	ASED / HF	RAL / J. Delderfield		
AI#2:	SPIRE will sent Astrium the updated Excel spreadsheet. Due date: 06/05/02 (based on Photometer, Spectrometer, Recycling and Standby Mode). Astrium stated that delivery before 30/04/02 is required to fulfil the PDR constraints.	6/05/02	ASED / HF	RAL / J. Delderfield		
AI#3	SPIRE/ES to estimate the effort to change from 128 to 100 pin feed through connector.		ASED/R. Hohn	RAL/ E. Saywer		
AI#4	ASED will analysis the impact of changing the feed through connectors from 100 to 128 pin connectors.		RAL/E. Saywer	ASED / J.Long		
AI5	Astrium to investigate doing chamfering of ES wires reducing single TSPs		RAL / D. Griffin	ASED / J. Long		
AI6	Spire to investigate commoning of power lines to be performed inside unit internally		ASED / J. Long	Spire / D. Griffin		
AI7	Provide standoff informations		RAL / D. Griffin	Astrium / J. Long		
AI8	Provide comments to TN6		ASED / Hohn	RAL / D. Griffin		
AI9	Provide backshell informations		ASED / J. Long	RAL / D. Griffin		
AI10	Investigate the possibility of connecting the FPU Faraday Shield link to the backshell on the rear of unit		RAL / D. Griffin	ASED / J. Long		

Quantity	Name	Dep./Comp.	Quantity	Name	Dep./Comp.
	Alberti von Mathias Dr.	ED 544		Runge Axel	OTN/TN 94
	Barlage Bernhard	ED 62		Sachsse Bernt	EC 34
	Bayer Thomas	ED 532		Sagner Udo	OTN/TN 64
1	Faas Horst	ED 516		Schäffler Johannes	OTN/TN 64
1	Grasl Andreas	OTN/TN 64		Schink Dietmar	ED 522
	Grasshoff Brigitte	ED 511		Schlosser Christian	OTN/TN 64
	Hartmann Hans Dr.	ED 172		Schweickert Gunn	ED 544
1	Hauser Armin	ED 541		Steininger Eric	ED 522
	Hinger Jürgen	ED 541	1	Stritter Rene	ED 61
1	Hohn Rüdiger	ED 531		Tenhaeff Dieter	ED 544
1	Hölzle Edgar	ED 171		Thörmer Klaus-Horst Dr.	OTN/ED 37
	Huber Johann	ED 532		Wagner Adalbert	OTN/IP 35
1	Hund Walter	ED 556		Wagner Klaus	ED 541
	Idler Siegmund	ED 521		Wietbrock, Walter	ED 511
	Iványi von András	EC 32		Wilz Eberhard	OTN/ED 37
	Jahn Gerd Dr.	ED 541		Wöhler Hans	ED 544
1	Kalde Clemens	ED 513		Ziegler Fred	OTN/ED 522
1	Kameter Rudolf	OTN/TN 64		Zipf Ludwig	EC 32
	Knoblauch August	ED 51			
	Koelle Markus	ED 533			
	Kroeker Jürgen	ED 515			
	Lamprecht Ernst	OTN/TN 72			
1	Lang Jürgen	ED 556			
	Langfermann Michael	ED 531			
	Mack Paul	OTN/TN 64	1	Pastorino Michel	ASPI Resid.
	Maier Hans-Ulrich	ED 61			
	Mauch Alfred	ED 544	1	Alcatel (on FTP-Server)	
1	Moritz Konrad Dr.	ED 37	1	ESTEC (on FTP-Server)	
	Müller Lutz	OTN/TN 64			
	Muhl Eckhard	OTN/TN 64			
	Peitzker Helmut	ED 37		APCO	
	Peltz Heinz-Willi	ED 515		MPE	
1	Peters, Gerhard	ED 533	1	RAL	
	Pietroboni Karin	ED 37		SRON	
	Puttlitz Joachim	OTN/ED 37			
	Raupp Helmut	ED 543			
	Rebholz Reinhold	ED 531			
	Reuß Friedhelm	ED 7			
	Rühe Wolfgang	ED 3			