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 ..... **Date:** .....

APPROVED BY: J. 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
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 15/3/02
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
	Auguères	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

CONTENTS

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

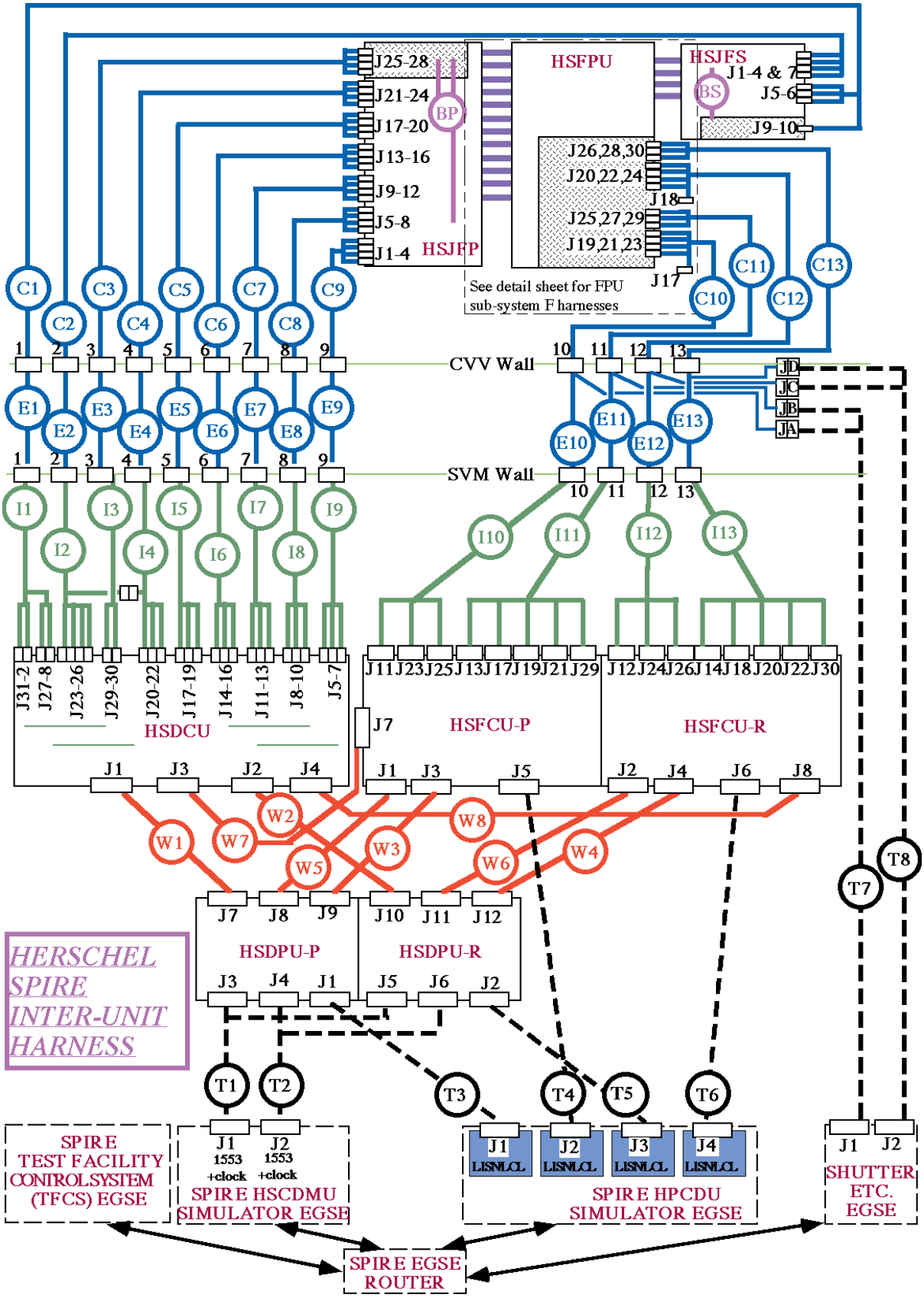
ID	TITLE	NUMBER
AD-1	SPIRE Development Plan and Model Philosophy	SPIRE-RAL-PRJ-000035

2.1 REFERENCE DOCUMENTS

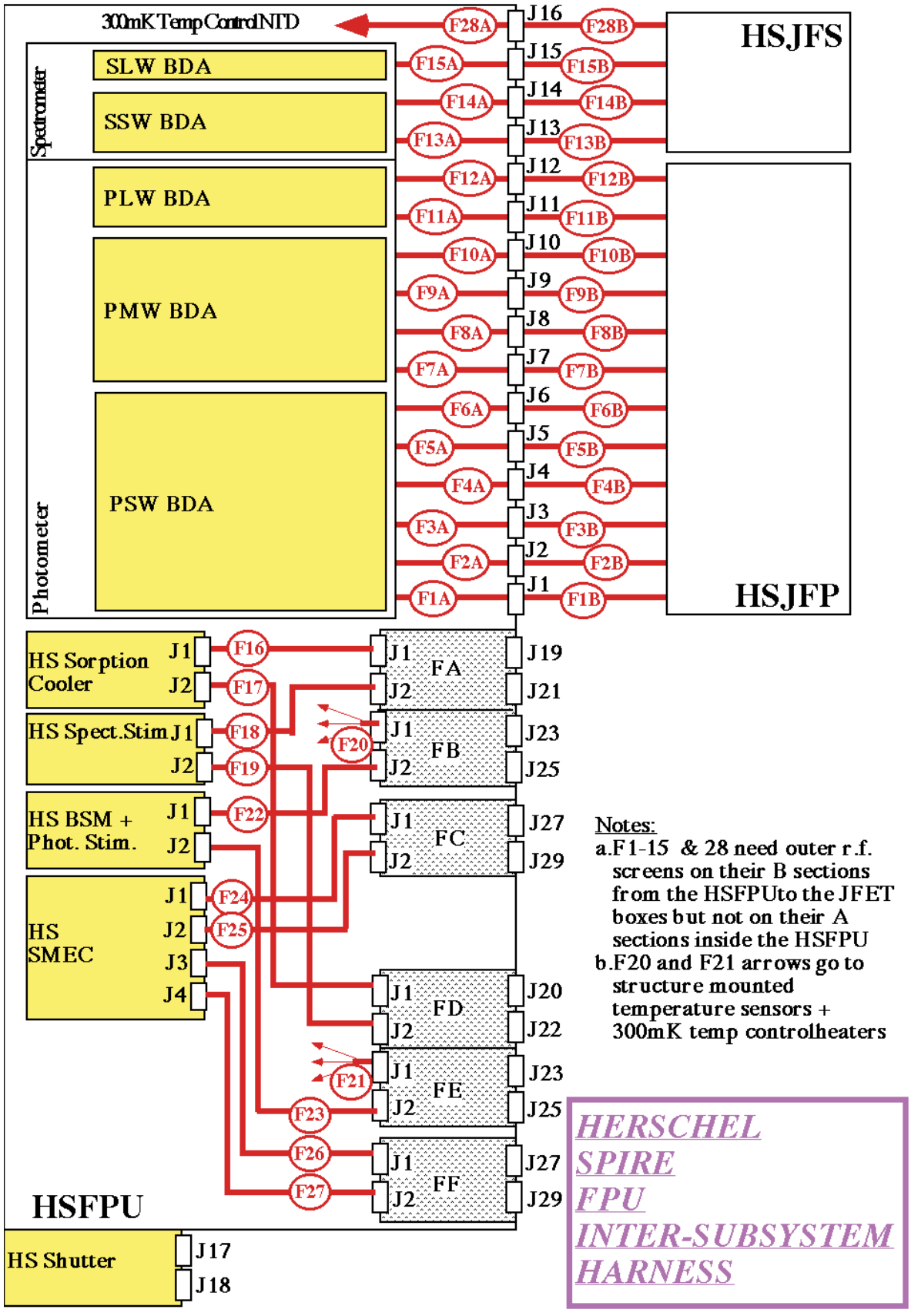
ID	TITLE	NUMBER	ISSUE	DATE
RD-1	SPIRE Block Diagram	SPIRE-RAL-DWG-000646	4.0	6 March 2002

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

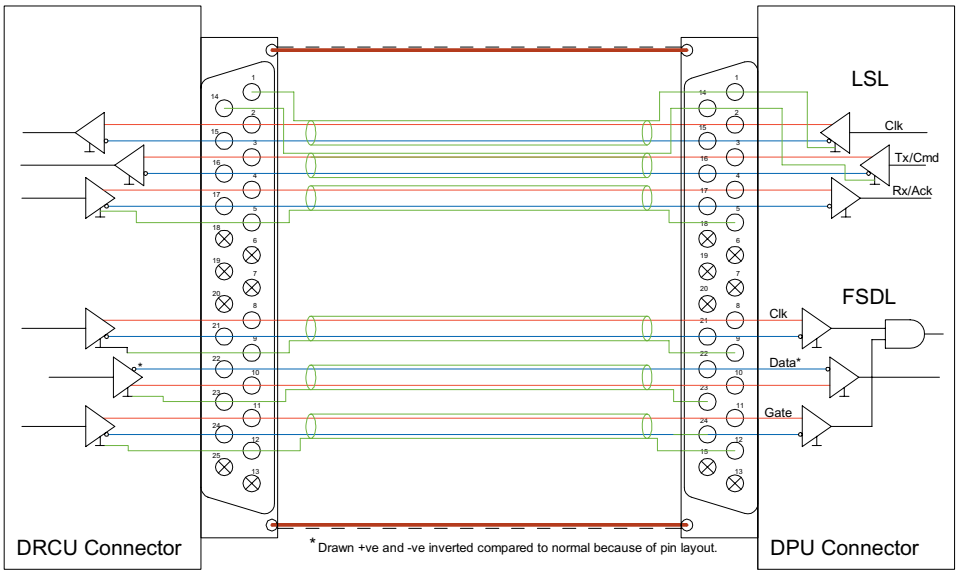
Overall Mechanical Drawing

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 DCU J2
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPU J10

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 FCU J3
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPU J9

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 FCU J4
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPU J12

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 FCU J2
DBMA 25 S + Glenair 550 - T - 039 - M - 3 - TBD - H - 0 - TBD to DPU J11

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 FCU J7
DBMA 25 S + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD to DCU J3

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

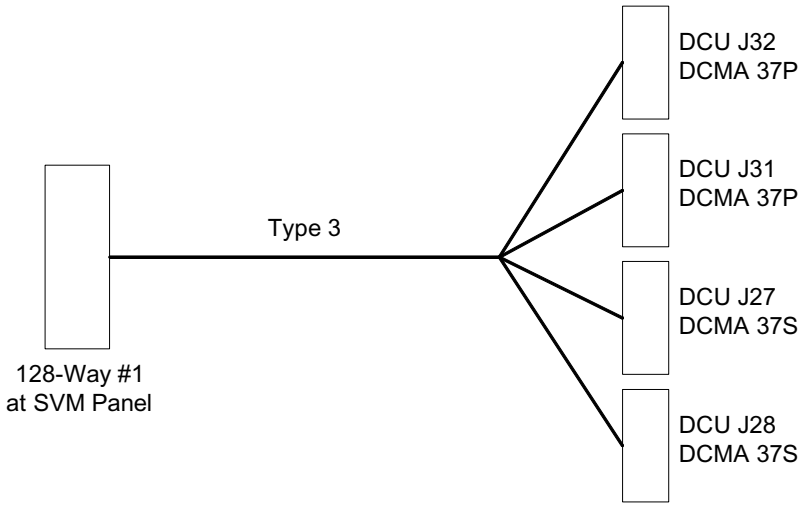
As W7

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



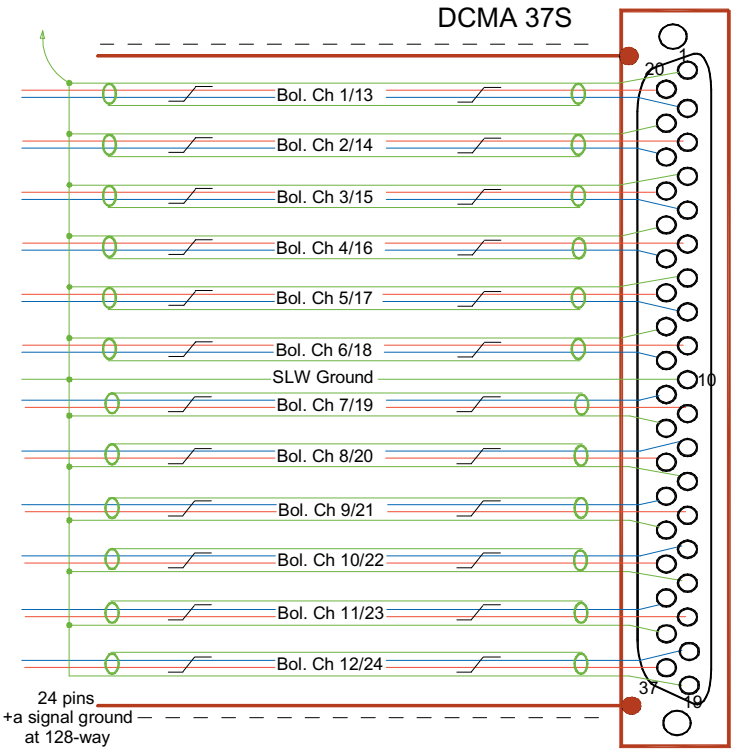
Connector/Backshell Details:

DCMA 37 S + Glenair 550 - E - 039 - M - 4 -	TBD	- H -	TBD	- TBD	to DCU J27	DCU-JFS
DCMA 37 S + Glenair 550 - E - 039 - M - 4 -	TBD	- H -	TBD	- TBD	to DCU J28	DCU-JFS
DCMA 37 P + Glenair 550 - E - 039 - M - 4 -	TBD	- H -	TBD	- TBD	to DCU J31	Spect. Bias (Prime)
DCMA 37 P + 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

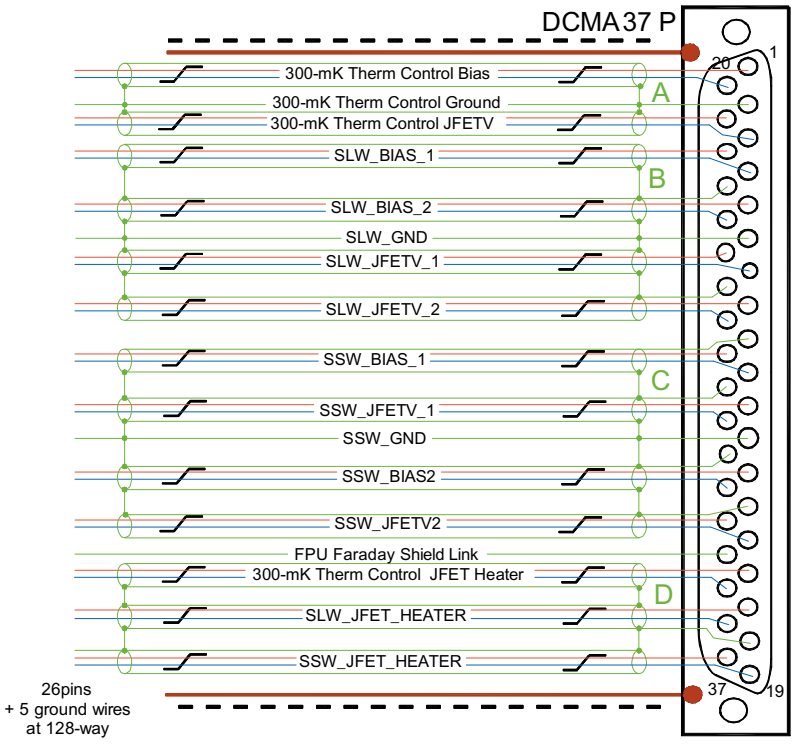
· Good flat layup for cryoharness

· 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.

Two Spectrometer Bias tails thus:



Type 3 Bias Tails (DCU J31/J32)

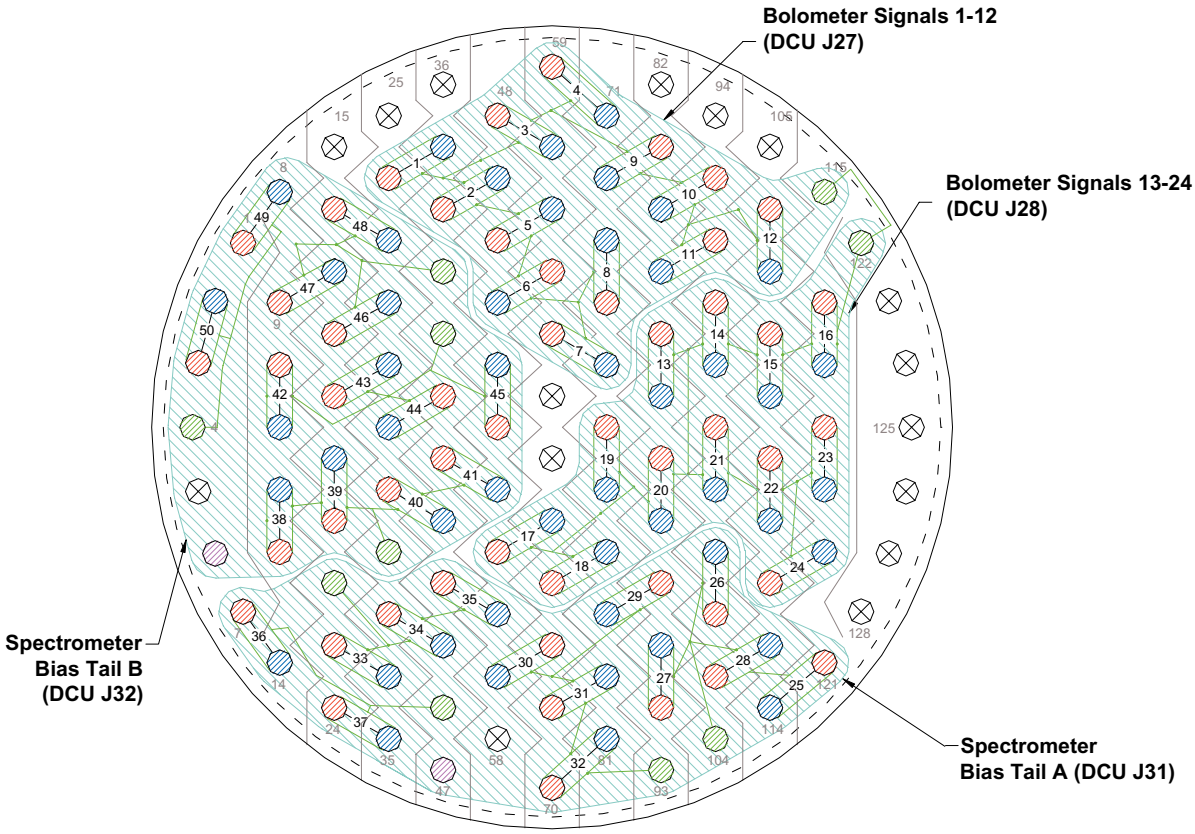
· 13 Insulated STPs
· 4 Single insulated ground wires
· Note SLW and SSW Ground Separation

· 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.

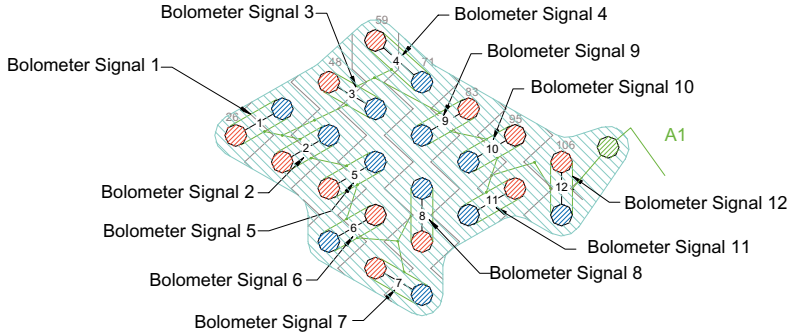
128-Way Pin Allocations



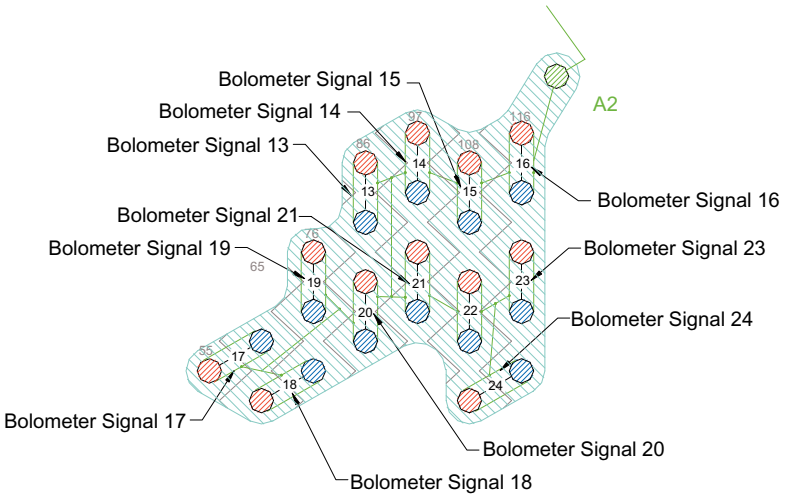
- Signal Supply Pin
- Signal Return Pin
- Signal Ground Pin
- FPU Faraday Shield Link Pin
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)
- Signal Ground Connection

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

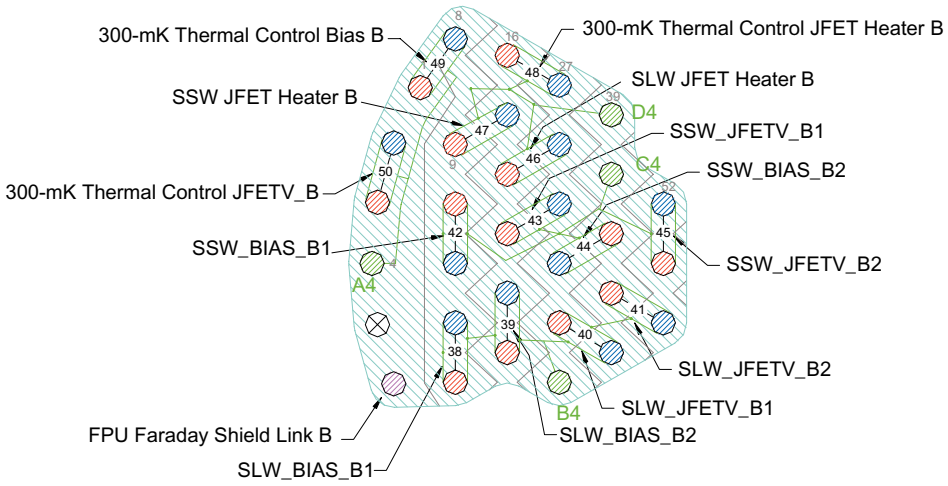
112 Contacts used out of 128



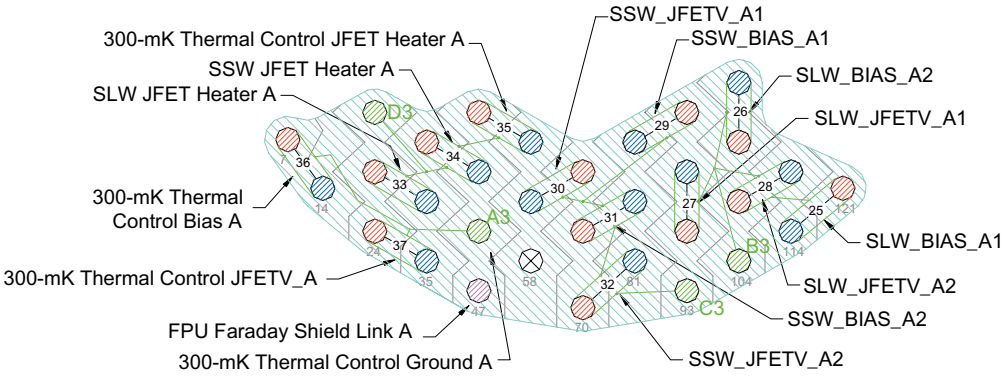
Bolometer Signals 1-12
(DCU J27)



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		

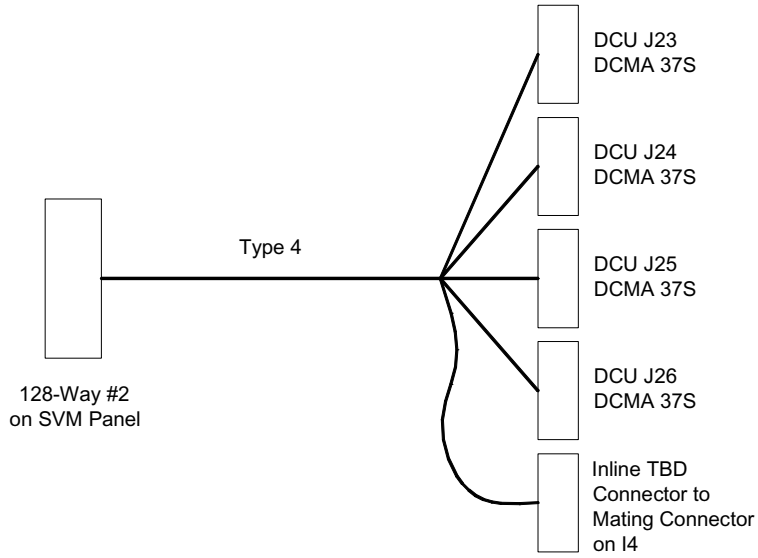
Name	128-way #1	37-way A (J27) Bol. Sig. 1-12	37-way B (J28) Bol. Sig. 13-24	37-way C (J31) S. Bias Tail A	37-way D (J32) S. Bias Tail B
Channel 13 -	87		2		
Channel 13gnd shld	122 (A2)		1		
Channel 14 +	97		3		
Channel 14 -	98		22		
Channel 14gnd shld	122 (A2)		21		
Channel 15 +	108		23		
Channel 15 -	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

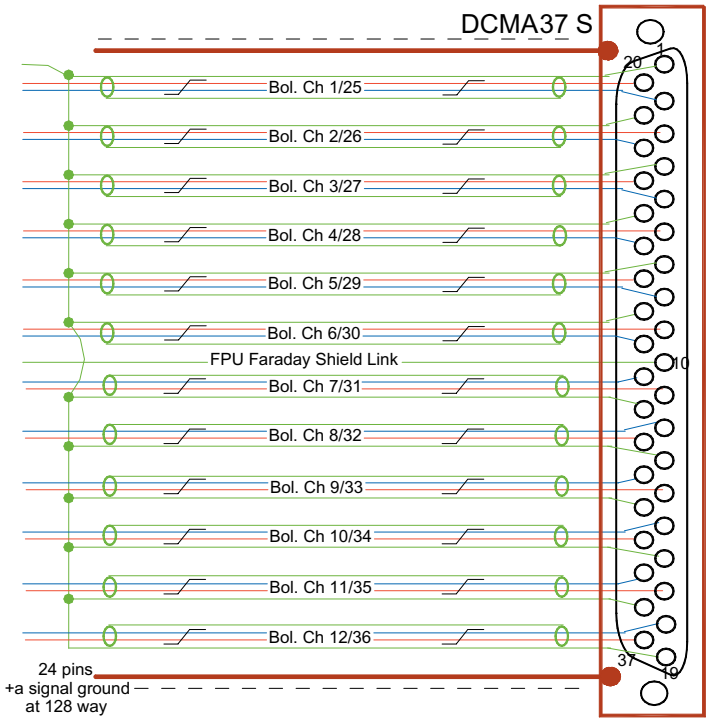


Refer to Annex 7 for details of how the I2 and I4 harnesses together with the inline connector to incorporate readout of the 300-mK thermal control hardware within the photometer LIAs.

Connector/Backshell Details

DCMA 37 S + Glenair 550 - E - 039 - M - 4 - TBD - H - TBD - TBD to DCU J23 DCU-JFS
DCMA 37 S + Glenair 550 - E - 039 - M - 4 - TBD - H - TBD - TBD to DCU J24 DCU-JFS
DCMA 37 S + Glenair 550 - E - 039 - M - 4 - TBD - H - TBD - TBD to DCU J25 DCU-JFS
DCMA 37 S + Glenair 550 - 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).

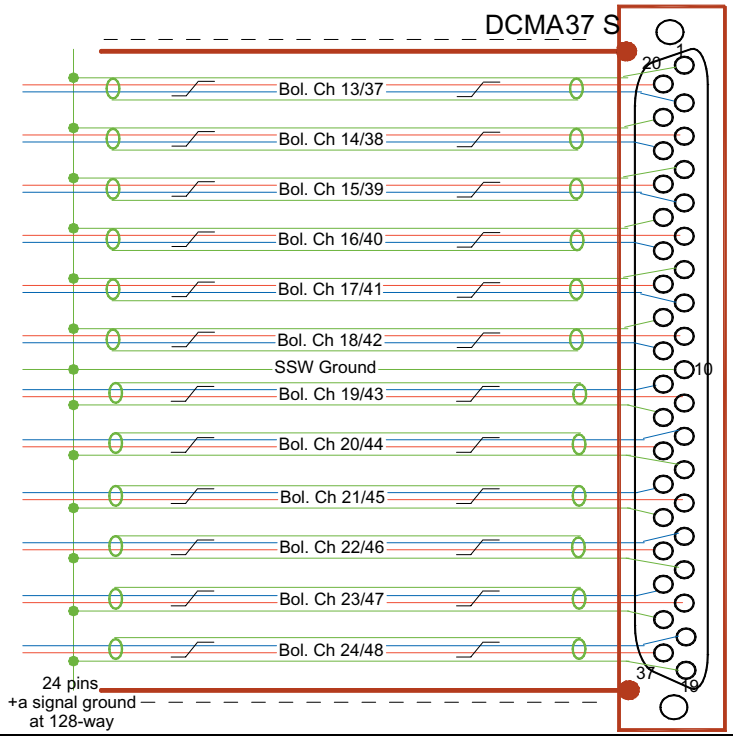
Common to all such tails, although others have ch. 13-24, etc.
Good flat layup for cryoharness

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

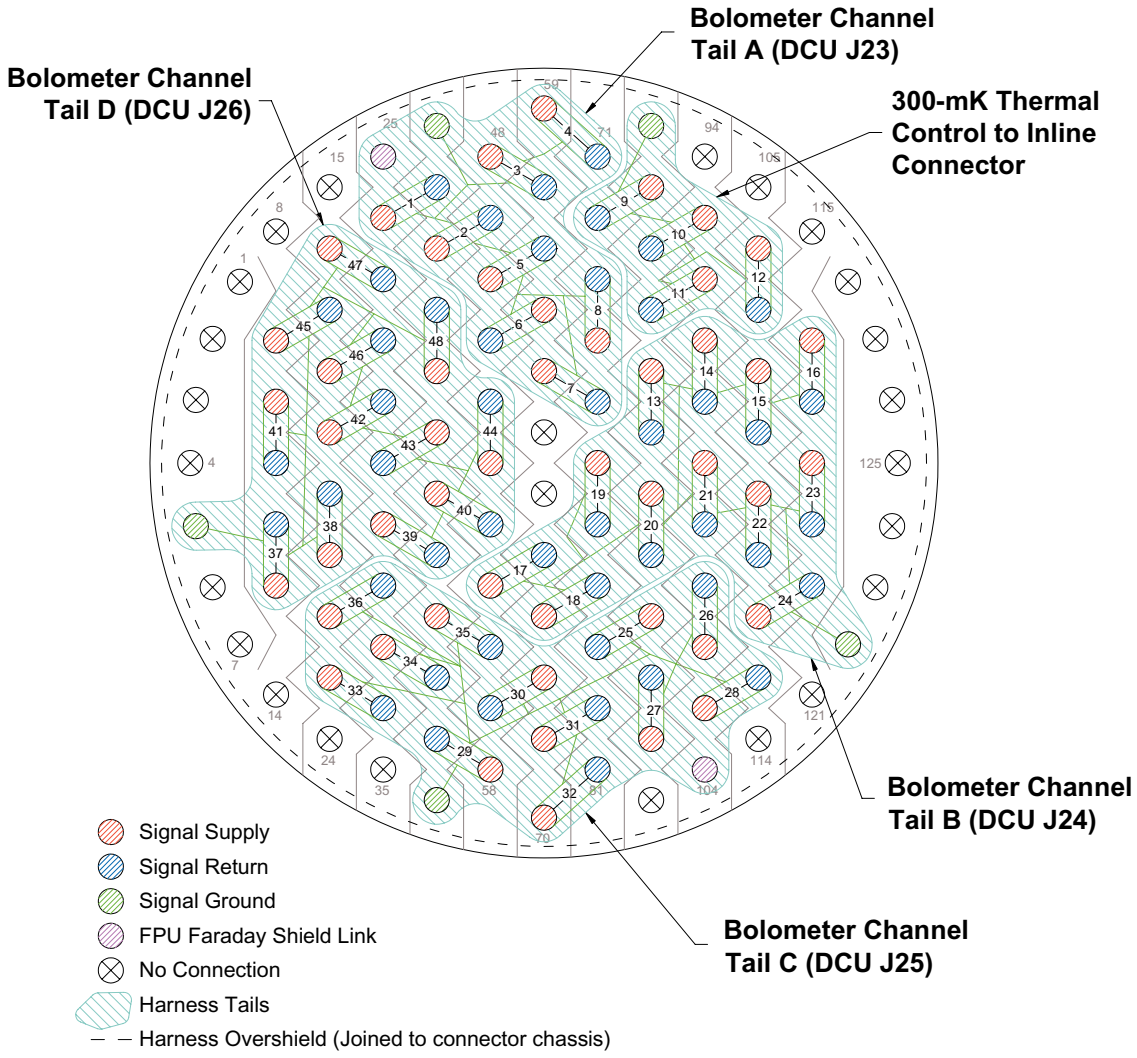
12 insulated screened twisted pairs plus 1 ground wire.

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

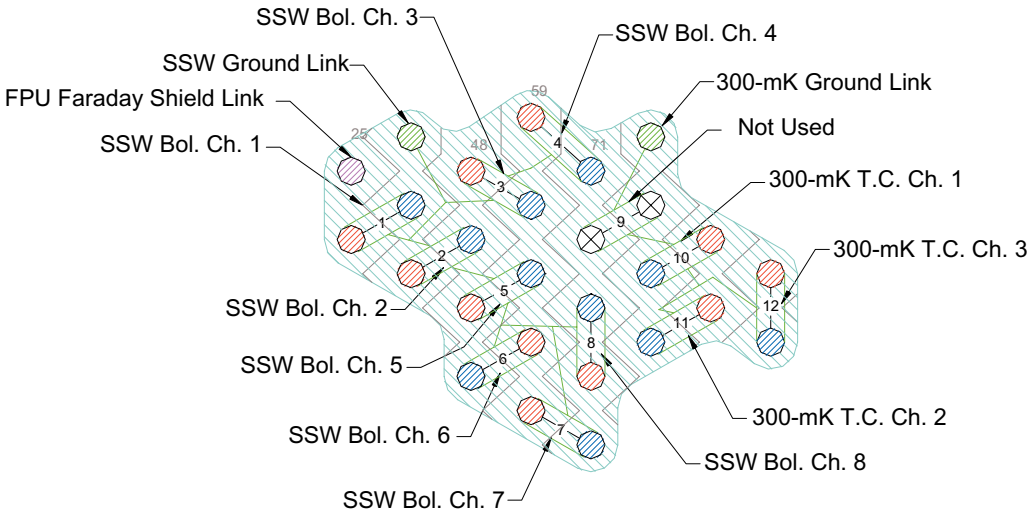
I2 128-Way Pin Allocation



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

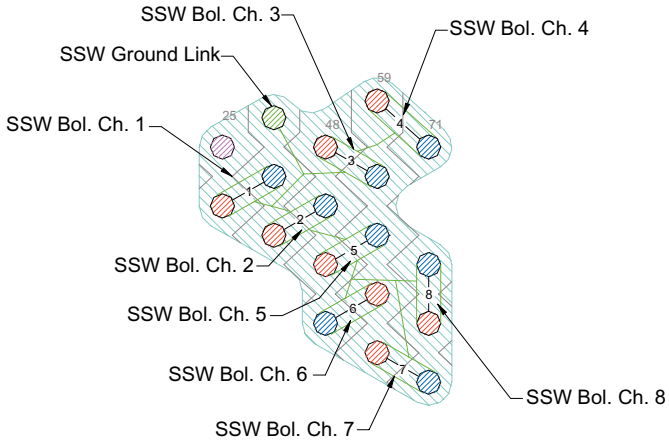
102 out of 128 Contacts used

Ground Test Configuration

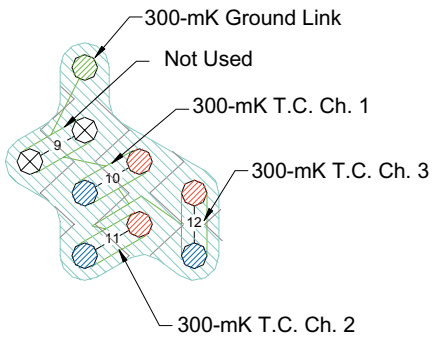


Bolometer Channel Tail A (DCU J23)
Ground Test Configuration

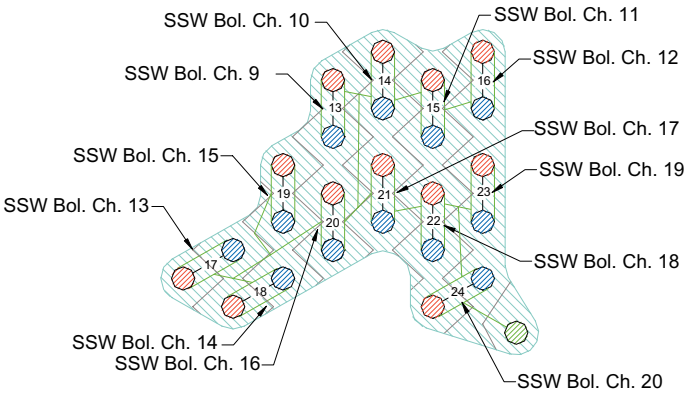
Flight Configuration



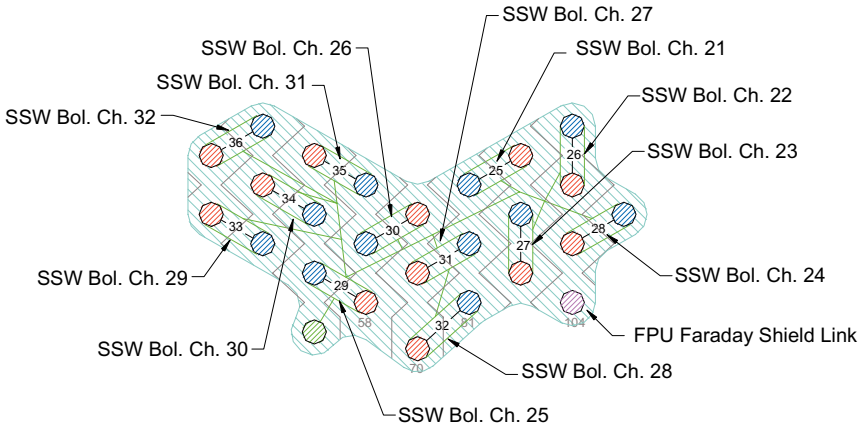
Bolometer Channel Tail A (DCU J23)
Flight Configuration



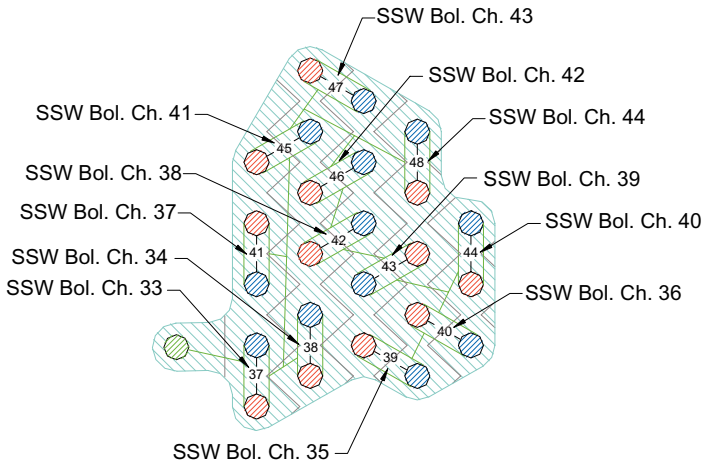
300-mK Thermal Control
Inline Connector Tail



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.

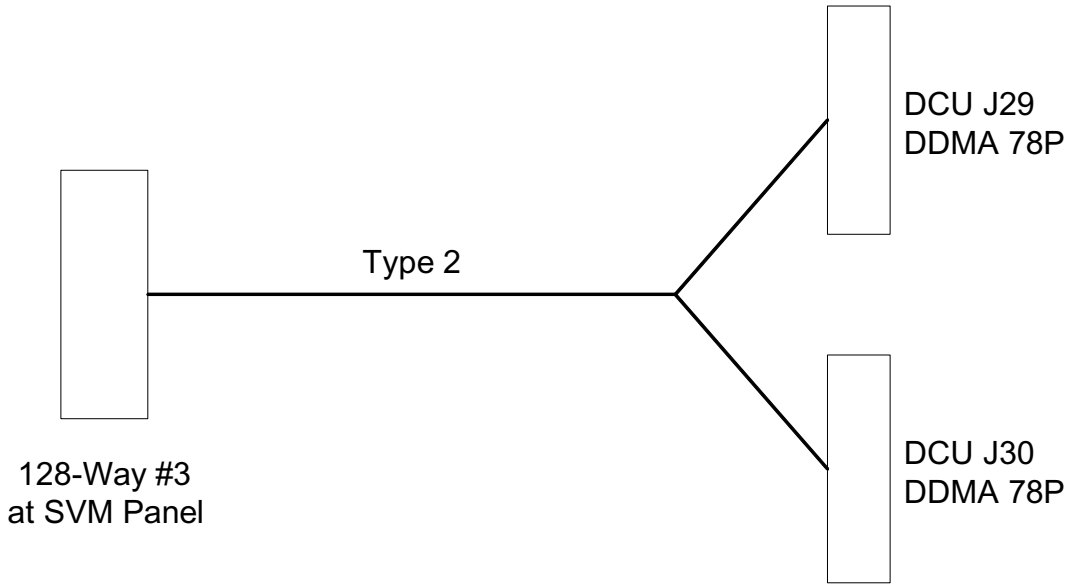
Name	128Way #2	37-Way J23	37-Way J24	37-Way J25	37-Way J26	300-mK Thermal Control Inline Connector
Channel 1 +	26	20				
Channel 1 -	37	2				
Channel 1gnd shld	36 (A)	1				
Channel 2 +	38	3				
Channel 2 -	49	22				
Channel 2gnd shld	36 (A)	21				
Channel 3 +	48	23				
Channel 3 -	60	5				
Channel 3gnd 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				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			

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

DDMA 78 P + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to	DCU J29	Phot Bias (Prime)
DDMA 78 P + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to	DCU J30	Phot Bias (Red.)

Harness Layup

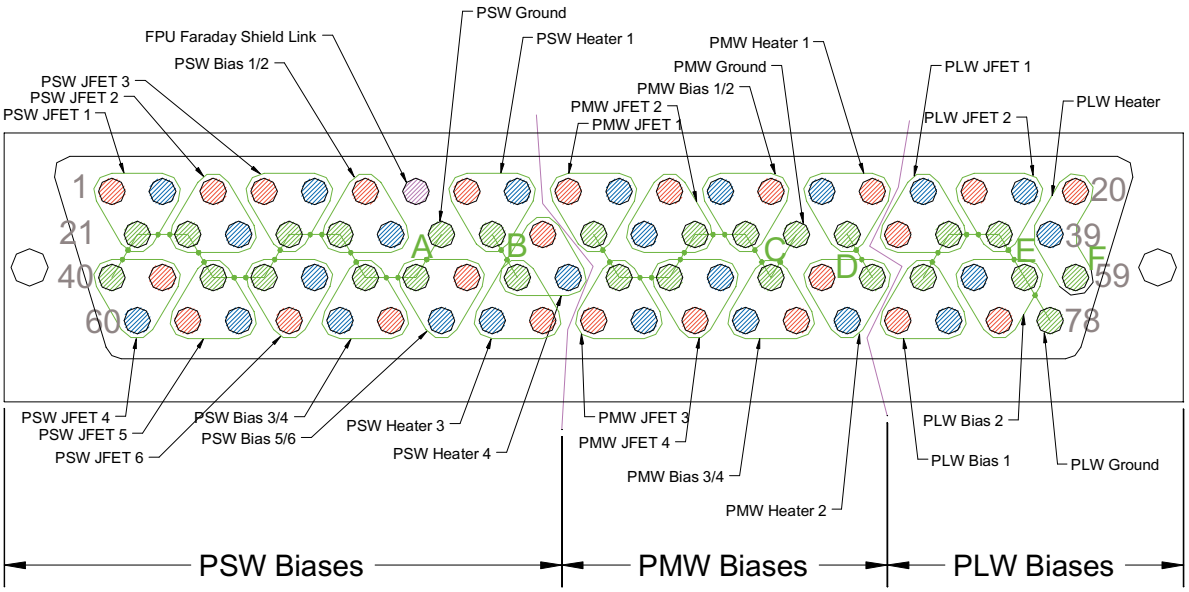
Type 2 Bias Tails (DCU J29/J30)

· 25 Insulated STPs
· 4 Single insulated ground wires
· Note PSW, PMW and PSW Ground Separation

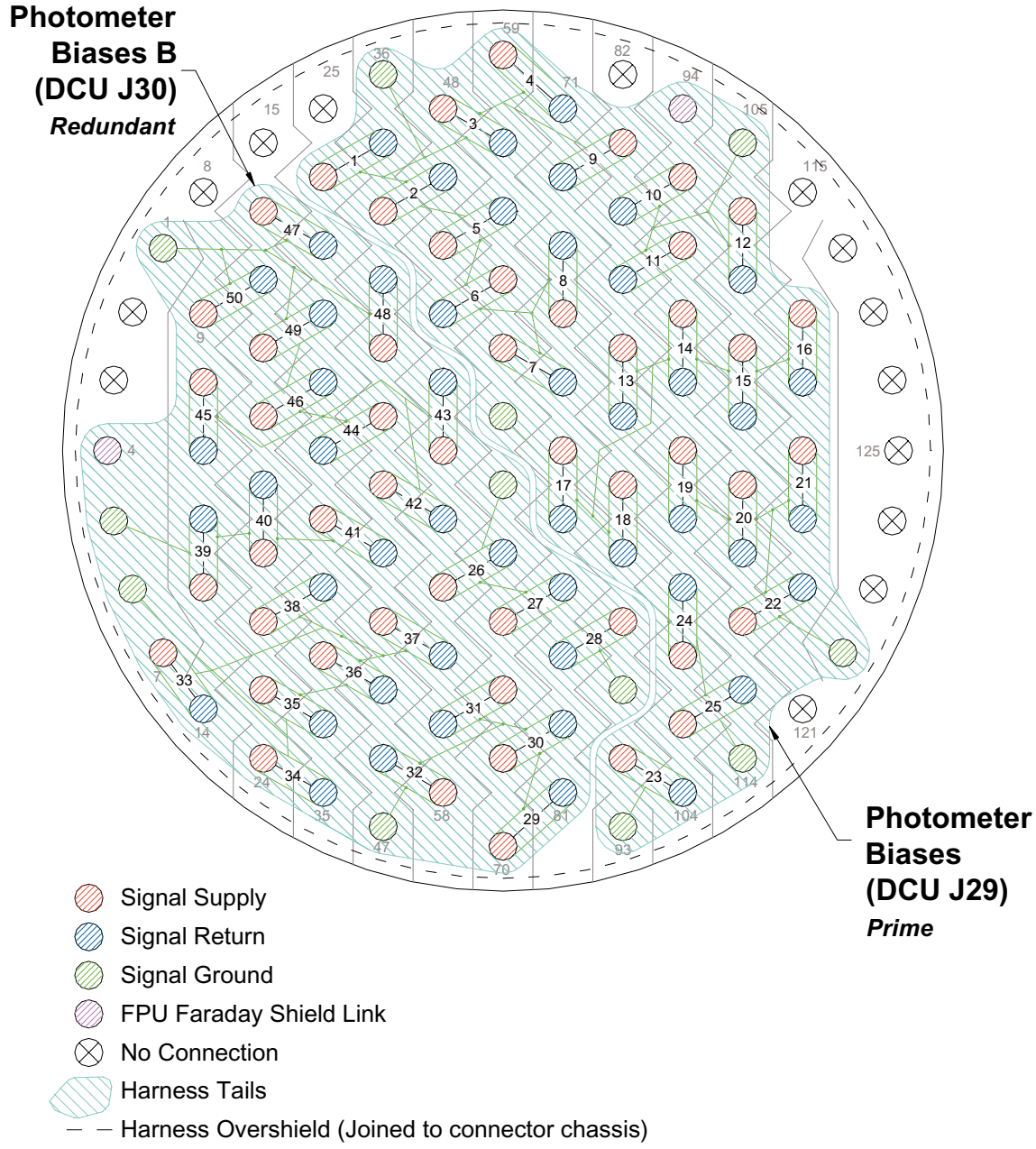
· The whole harness bundle is overlain with an RF screen connected to EMC backshells at the DCU and the wall of the CVV.

· 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.

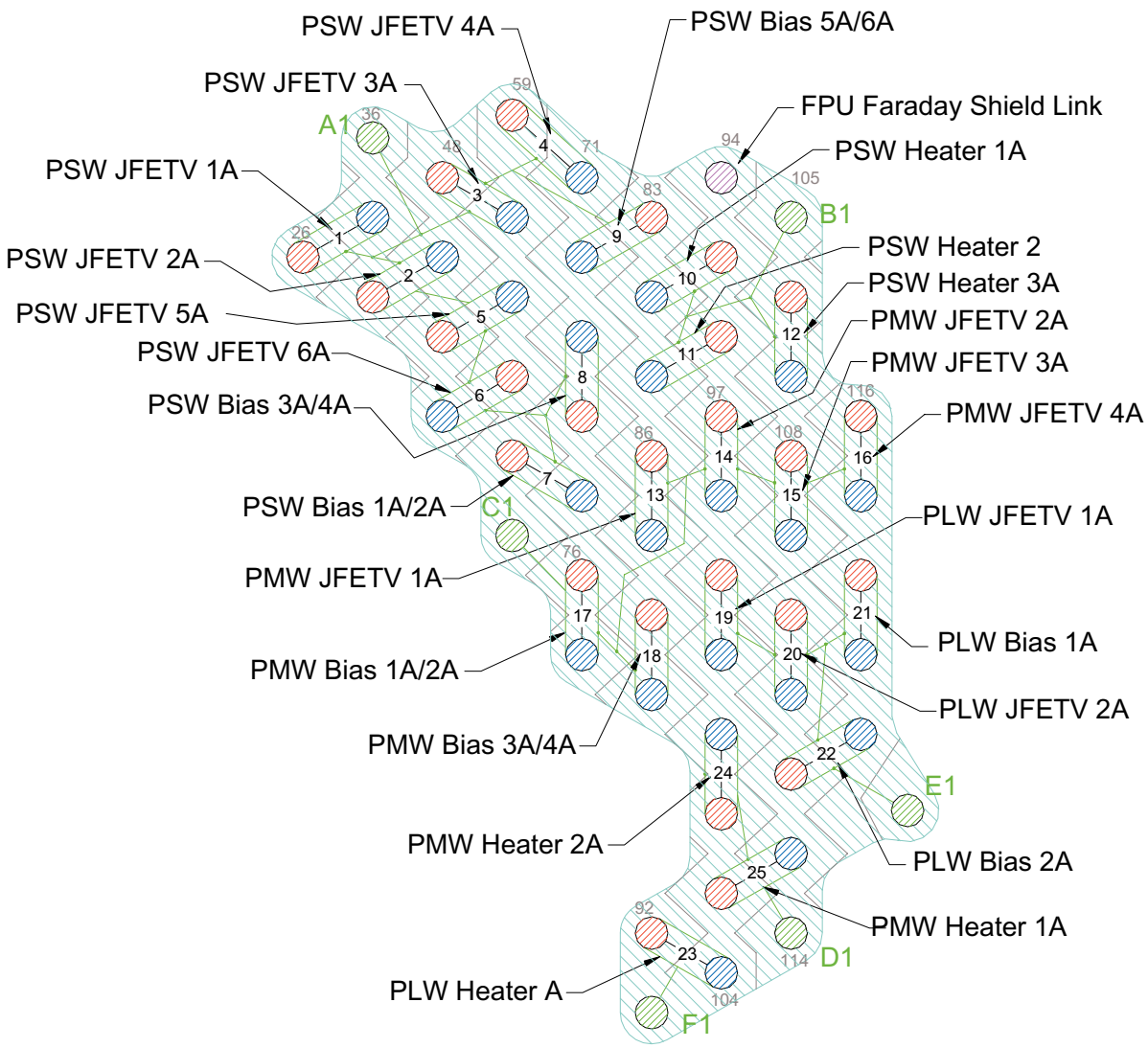


128-Way Pin Allocations

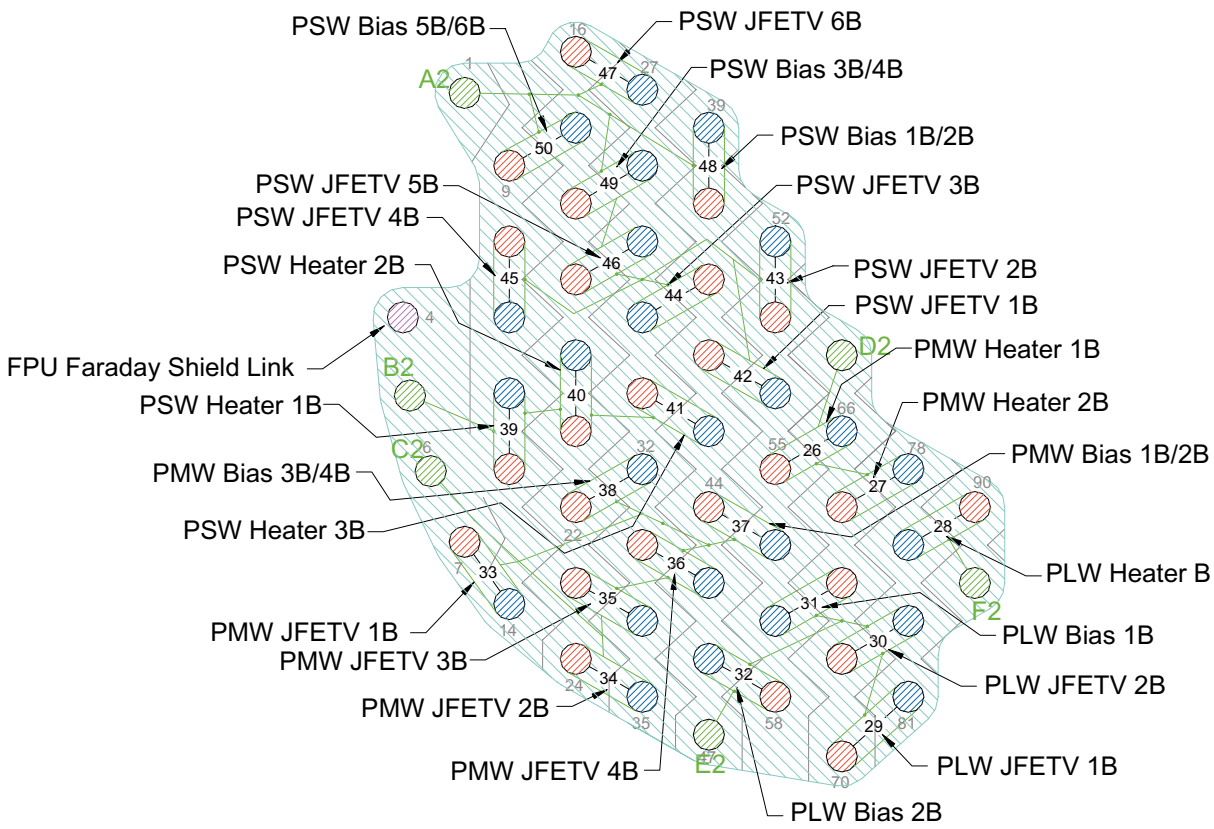


Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

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.

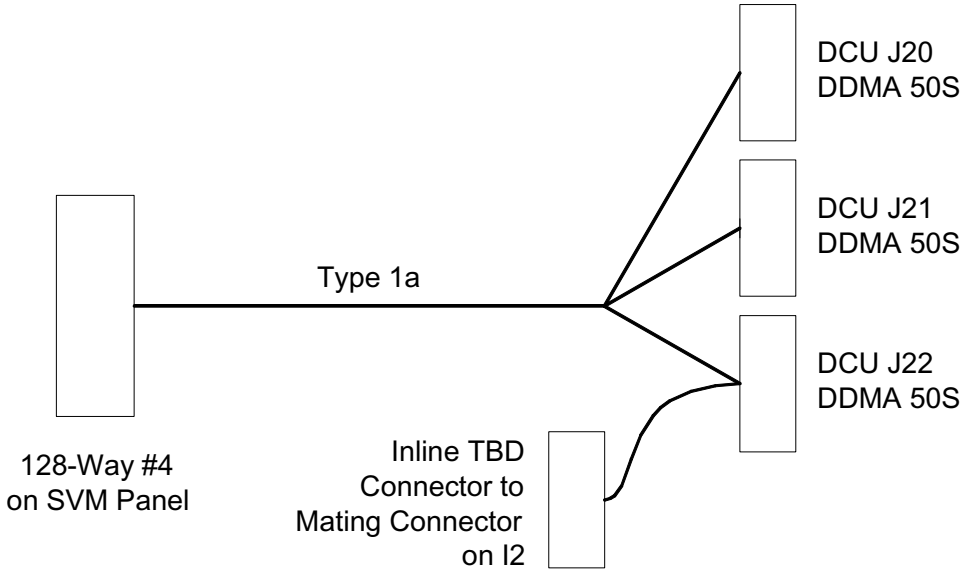
Name	128-Way #3	78-way Photometer Biases (J29)	78-way Photometer Biases (J30)
PSW_JFETV1_A +	26	1	
PSW_JFETV1_A -	37	2	
PSW_JFETV1_A shld	36 (A1)	21 (A1)	
PSW_JFETV2_A +	38	3	
PSW_JFETV2_A -	49	23	
PSW_JFETV2_A shld	36 (A1)	22 (A1)	
PSW_JFETV3_A +	48	4	
PSW_JFETV3_A -	60	5	
PSW_JFETV3_A shld	36 (A1)	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)	

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

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

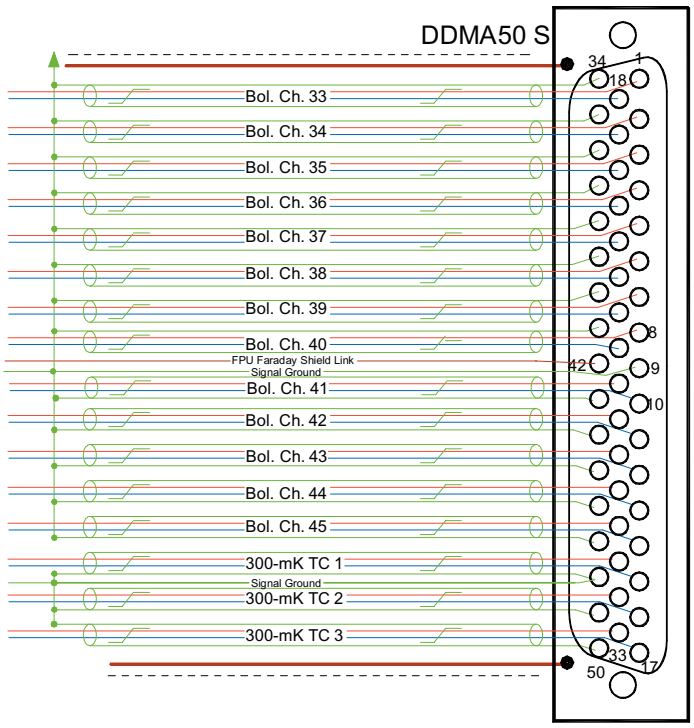
4.2.4 I4 SVM 4 – DRCU (Type 1) PMW

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



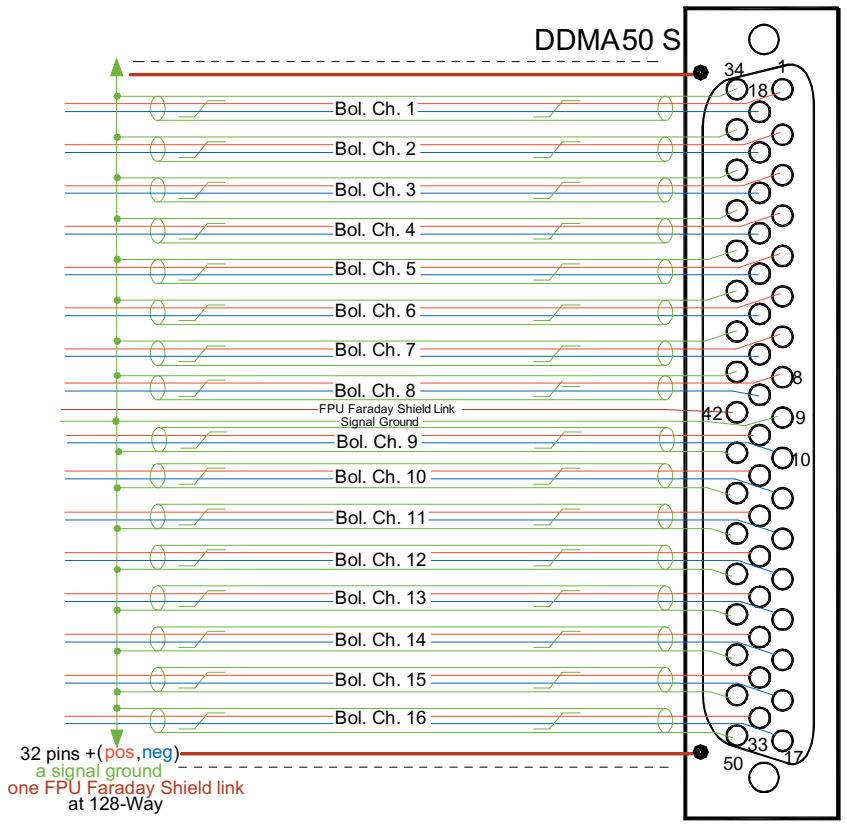
DCU J22
PMW and 300-mK Thermal Control Readout

· 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.



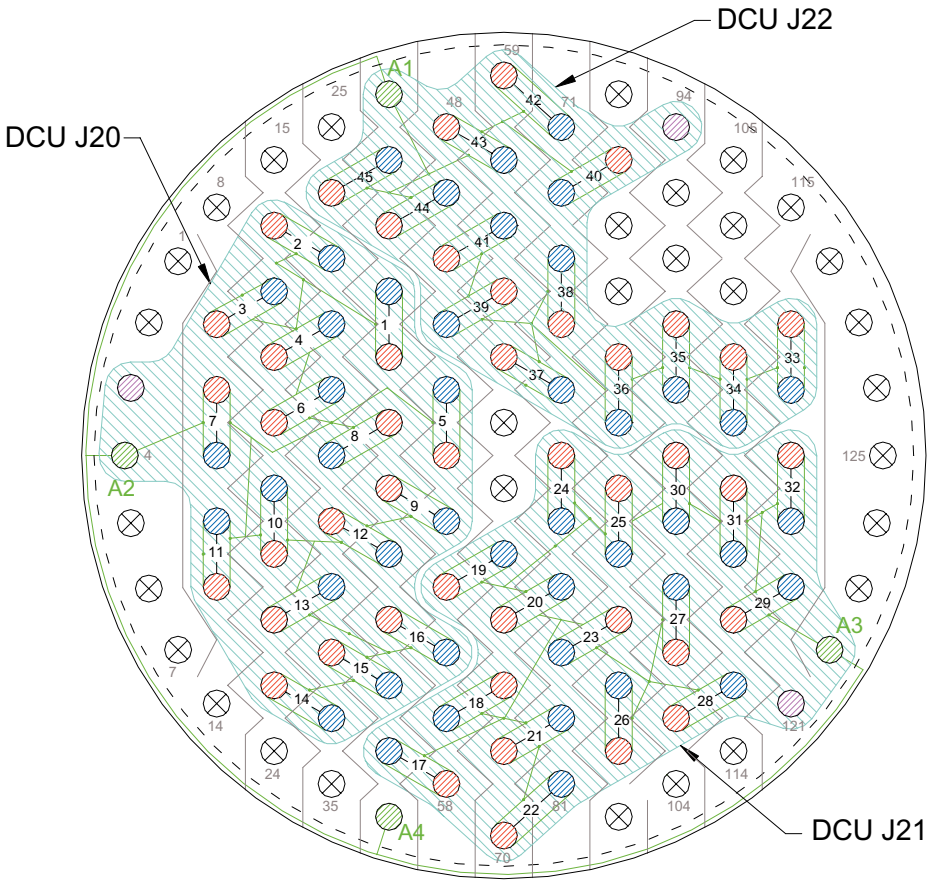
Type 1 DCU Tails

· 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.

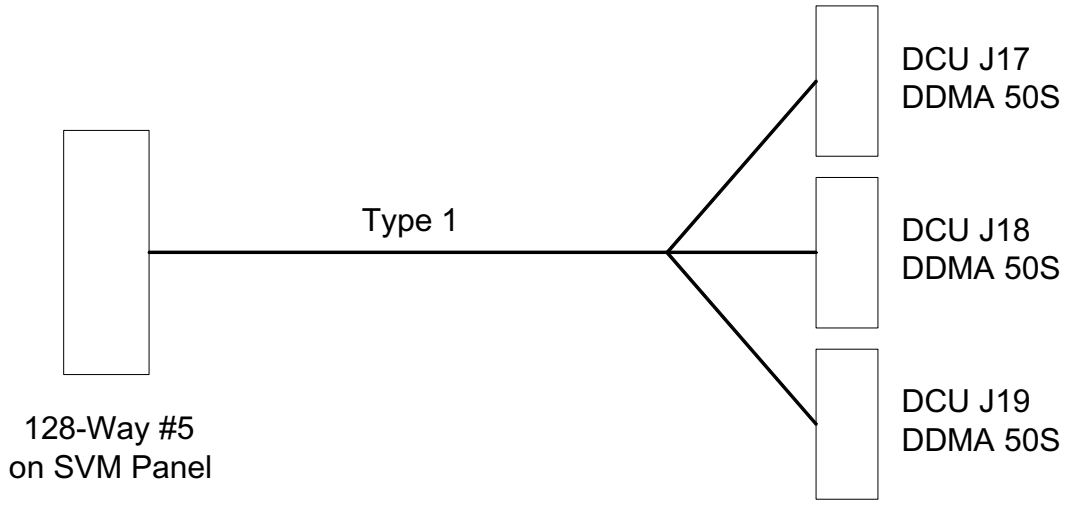
Name	128Way #4	DCU J20	DCU J21	DCU J22	Inline Connector
Ground Pin	47 (A4)				
Channel 1 +	40	1			
Channel 1 -	39	18			
Channel 1gnd shld	4 (A2)	34			
Channel 2 +	16	2			
Channel 2 -	27	19			
Channel 2gnd shld	4 (A2)	35			
Channel 3 +	9	3			
Channel 3 -	17	20			
Channel 3gnd shld	4 (A2)	36			
Channel 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	

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	

4.2.5 I5 SVM 5 – DRCU (Type 1) PMW

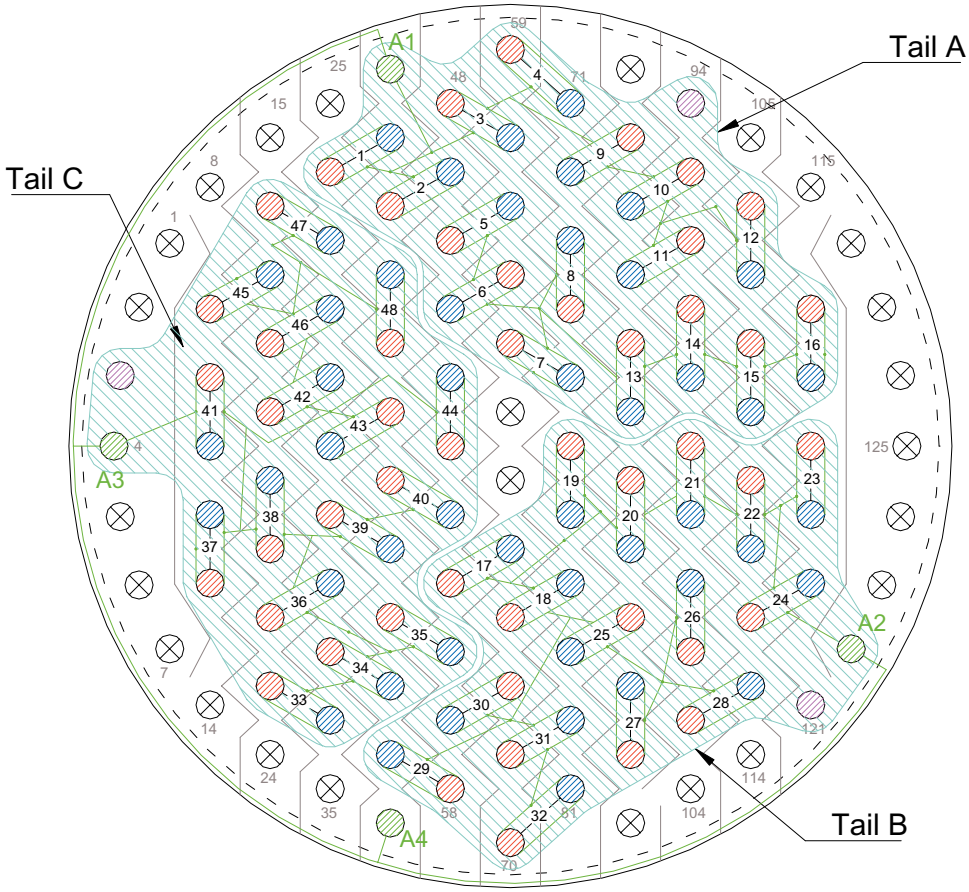
Overall Mechanical Drawing



Connector/Backshell Details

DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J17	DCU-JFP
DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J18	DCU-JFP
DDMA 50 S + Glenair 550 - 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
Tail B connected to HSDCU J18
Tail C connected to HSDCU J19

Contact Details

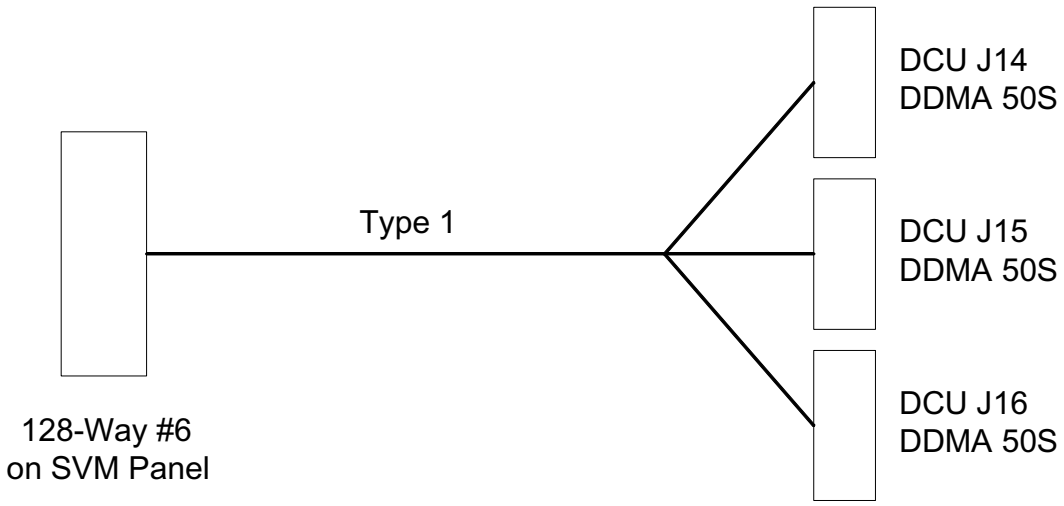
Name	128Way #5	50way A	50wayB	50way C
Ground Pin	47 (A4)			
Channel 1 +	26	1		
Channel 1 -	37	18		
Channel 1gnd shld	36 (A1)	34		
Channel 2 +	38	2		
Channel 2 -	49	19		
Channel 2gnd shld	36 (A1)	35		
Channel 3 +	48	3		
Channel 3 -	60	20		
Channel 3gnd shld	36 (A1)	36		
Channel 4 +	59	4		
Channel 4 -	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

DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J14	DCU-JFP
DDMA 50 S + Glenair 550 - T - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J15	DCU-JFP
DDMA 50 S + Glenair 550 - T - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J16	DCU-JFP

Harness Layup

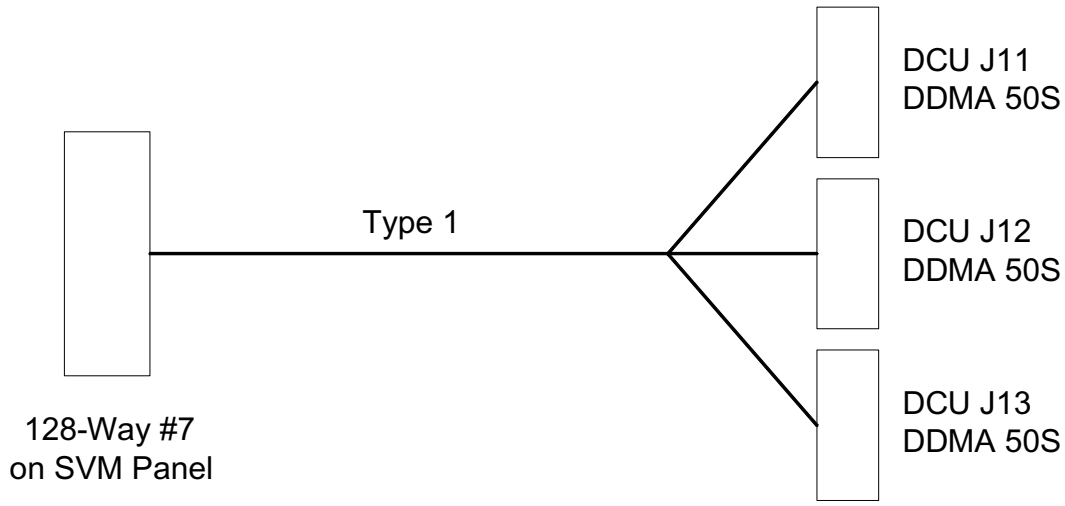
As I 5 except
Tail A connected to HSDCU J14
Tail B connected to HSDCU J15
Tail C connected to HSDCU J16

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

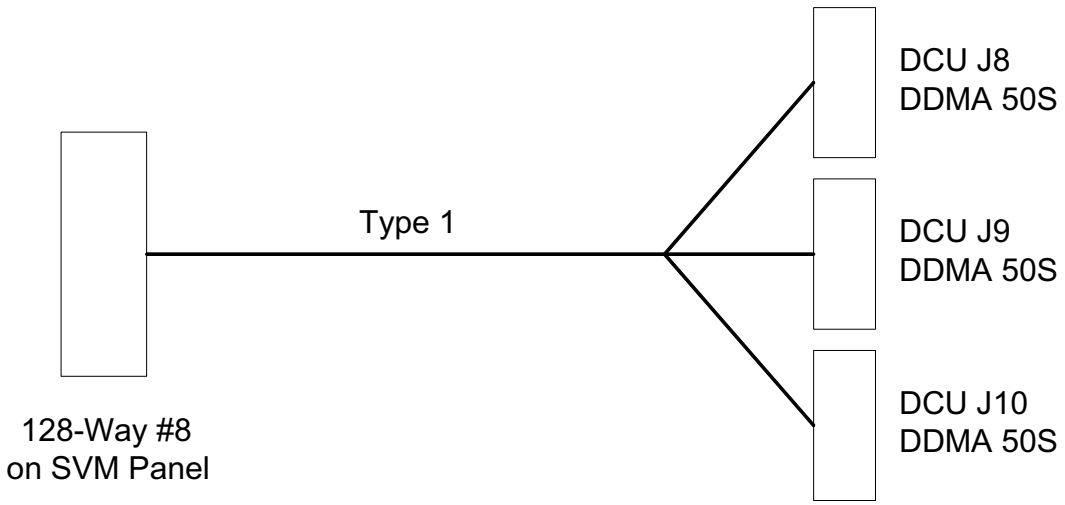
As I5 except
Tail A connected to HSDCU J11
Tail B connected to HSDCU J12
Tail C connected to HSDCU J13

Contact Details

As I 5

4.2.8 I8 SVM 8 – DRCU (Type 1) PSW

Overall Mechanical Drawing



Connector/Backshell Details

DDMA 50 S + Glenair 550 - T - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J8	DCU-JFP
DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J9	DCU-JFP
DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J10	DCU-JFP

Harness Layup

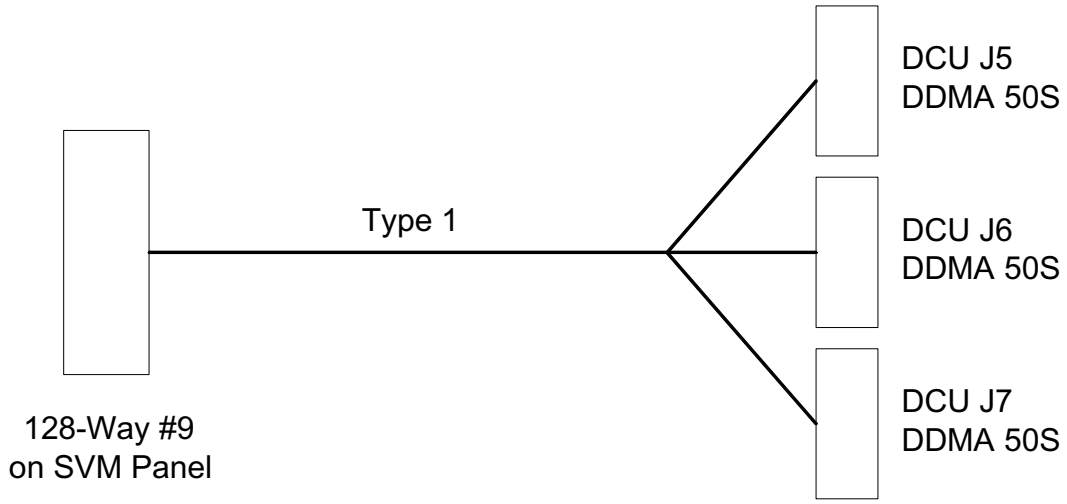
As I5 except
Tail A connected to HSDCU J8
Tail B connected to HSDCU J9
Tail C connected to HSDCU J10

Contact Details

As I 5

4.2.9 I9 SVM 9 – DRCU (Type 1) PSW

Overall Mechanical Drawing



Connector/Backshell Details

DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J5	DCU-JFP
DDMA 50 S + Glenair 550 - E - 039 - M - 5 -	TBD	- H -	TBD	- TBD	to DCU J6	DCU-JFP
DDMA 50 S + Glenair 550 - 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

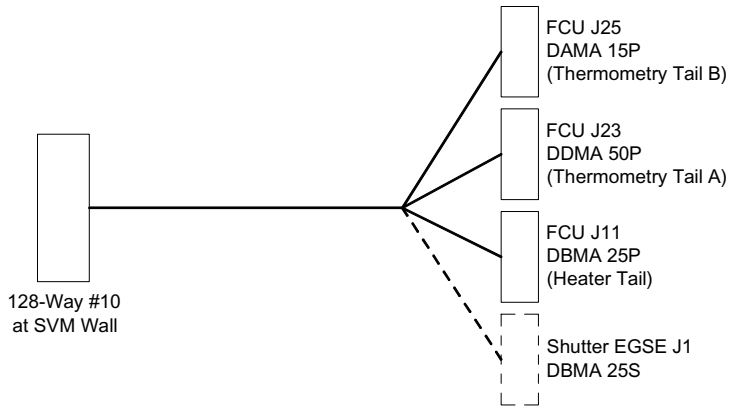
As I 5

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

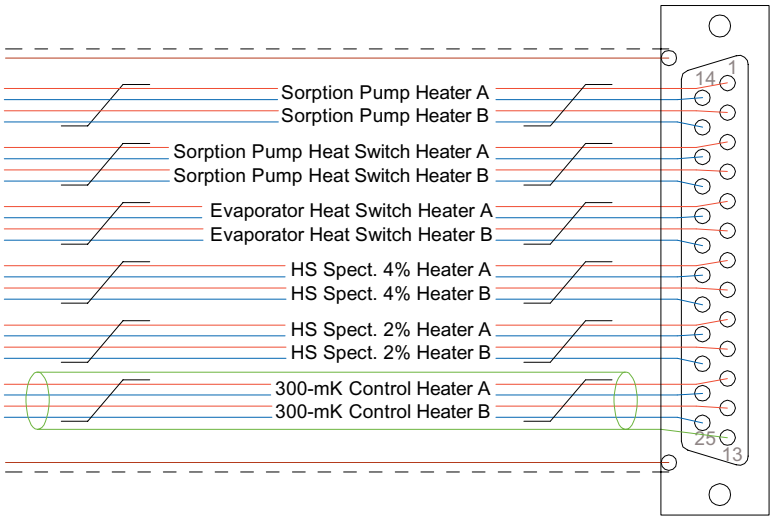


Connector/Backshell Details

Prime side harness

DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD	to	FCU	J11	Heater Tail (Prime)
DBMA 25 P + Glenair 550 - E - 039 - M - 3 - TBD - H - 0 - TBD	to	Shutter EGSE	J1	Shutter EGSE (Prime)
DDMA 50 P + Glenair 550 - E - 039 - M - 5 - TBD - H - 0 - TBD	to	FCU	J23	FPU Thermometry Tail A (Prime)
DAMA 15 P + Glenair 550 - T - 039 - M - 2 - TBD - H - 0 - TBD	to	FCU	J25	FPU Thermometry Tail B (Prime)

Heater Tail Layup (FCU J11)



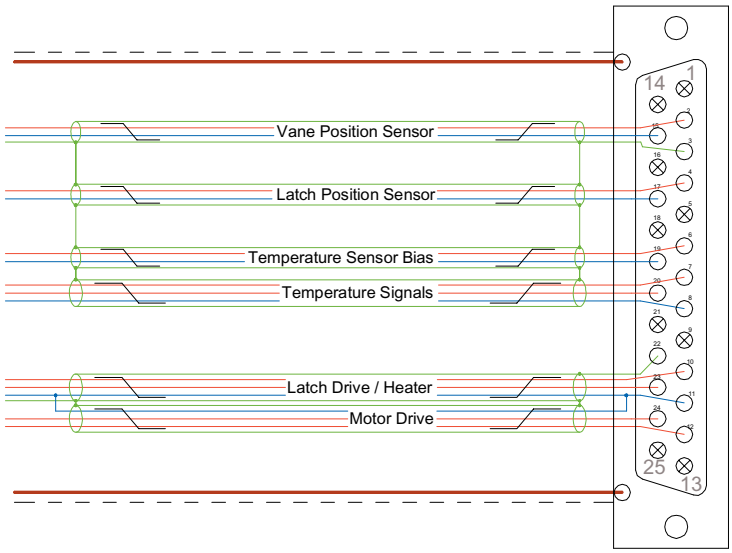
Heaters FCU J11

· 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.

Shutter EGSE Tail Layup (EGSE J1)



Shutter EGSE Tail (J1/J2)

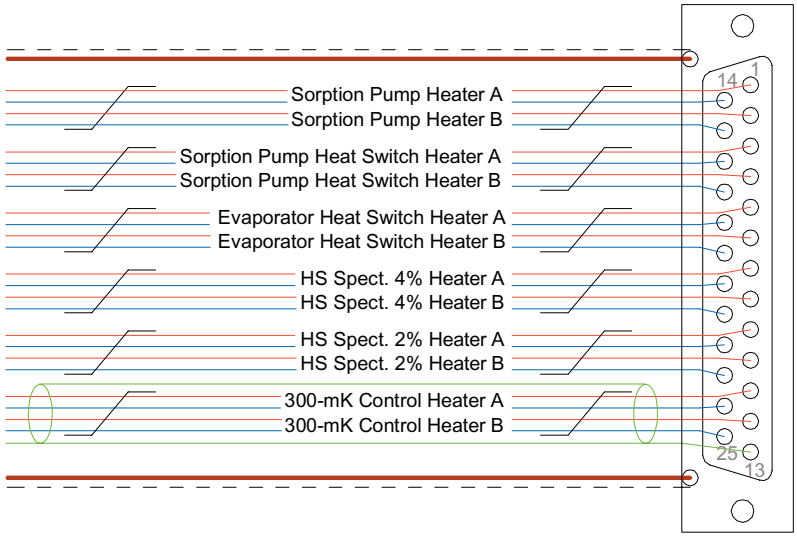
· 3 Insulated STPs
· 3 Insulated STTs

· 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

Heaters (FCU J11)



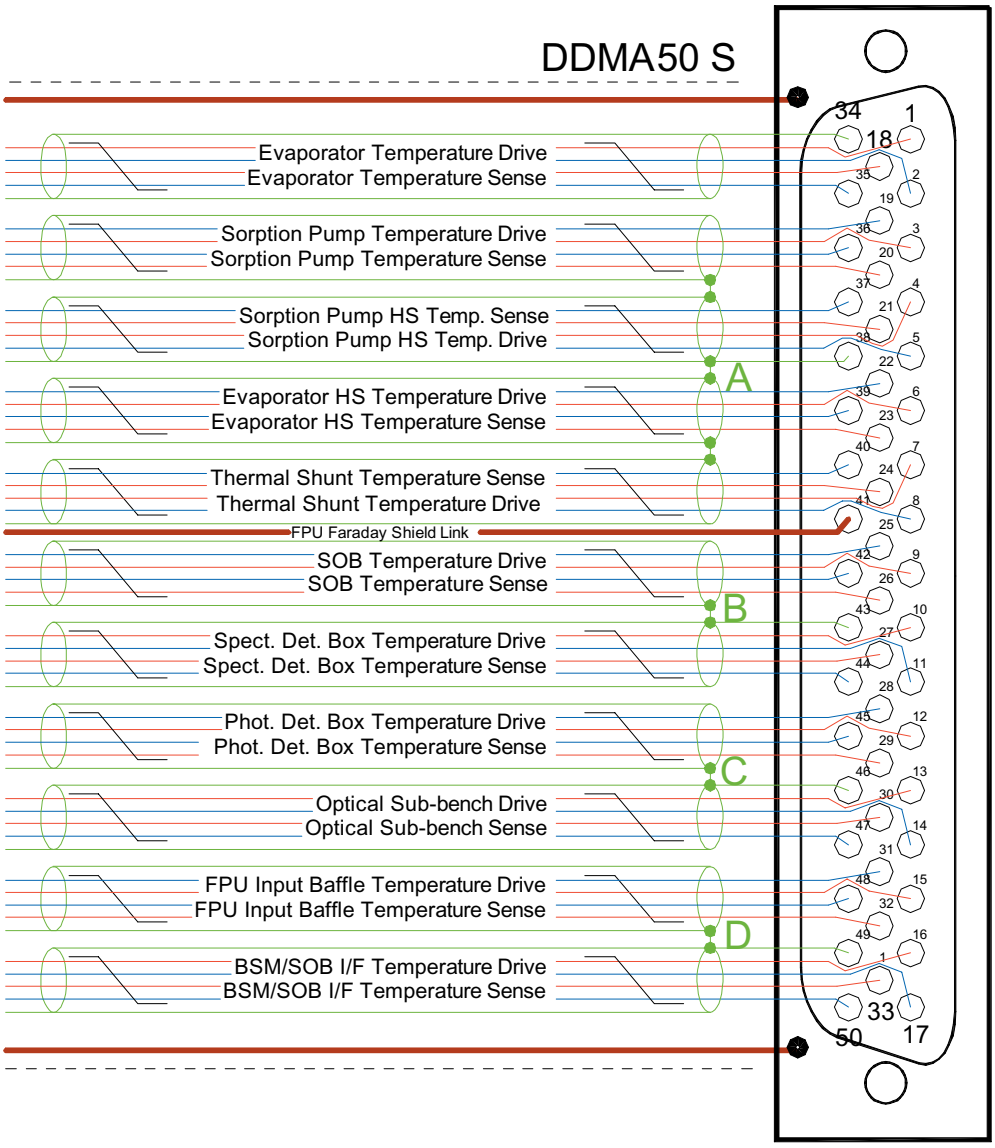
Heaters FCU J11

· 5 TQ
· 1 STQ

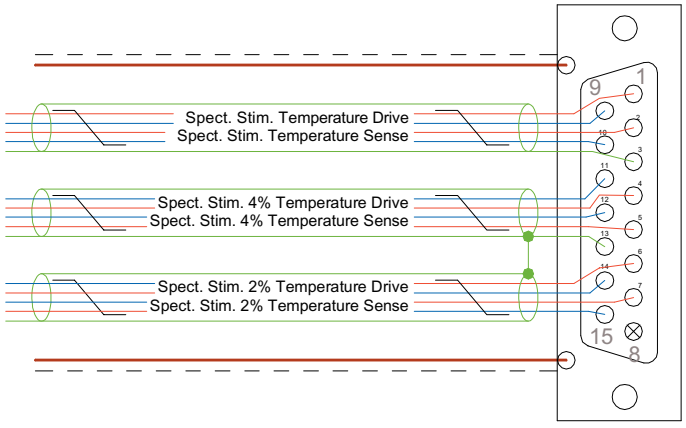
· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at the WE and the wall of the CVV.

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

FPU Thermometry Tail A (FCU J23)



FPU Thermometry Tail B (FCU J25)

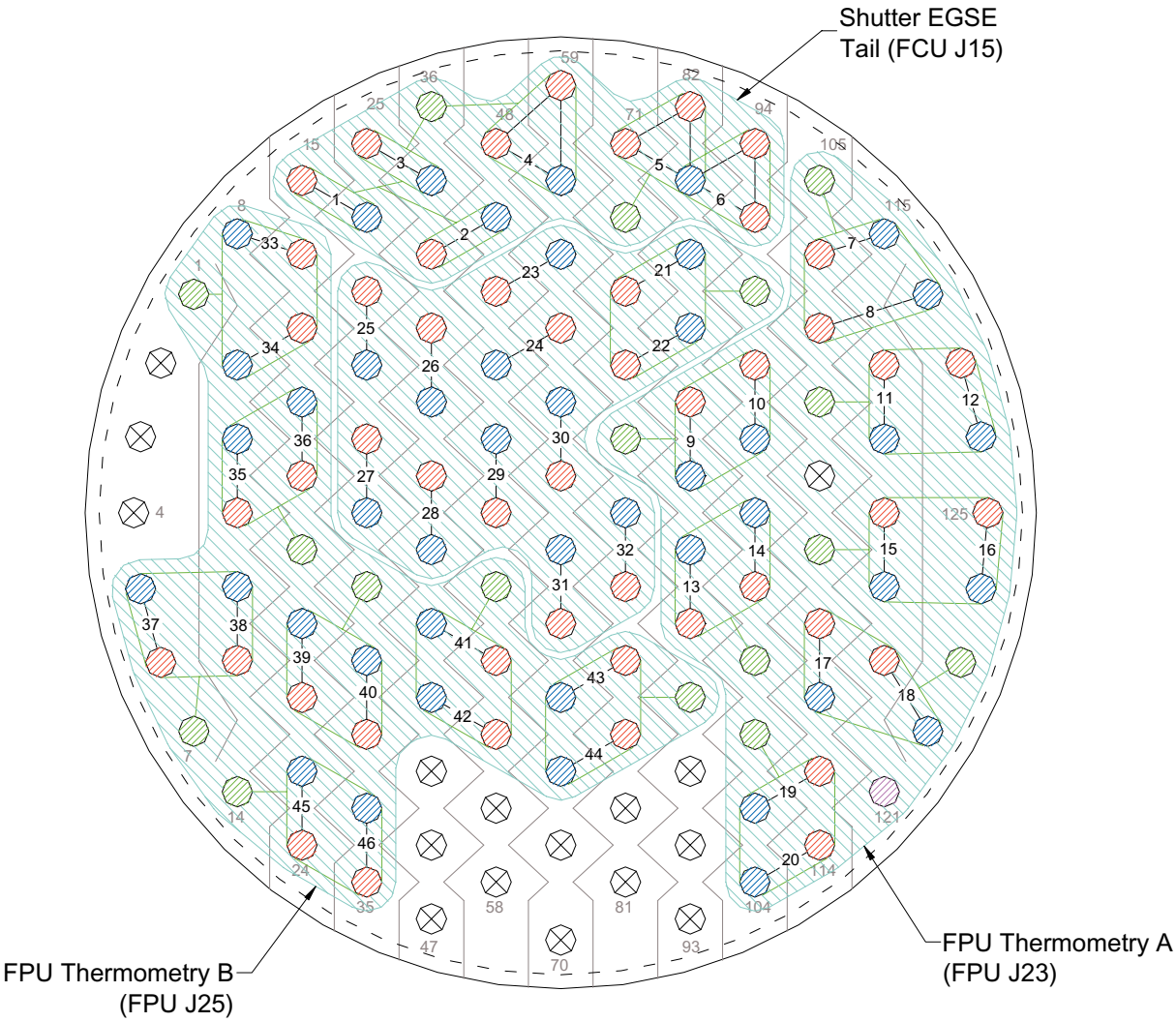


FPU Thermometry B (FCU J25/J26)

· 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

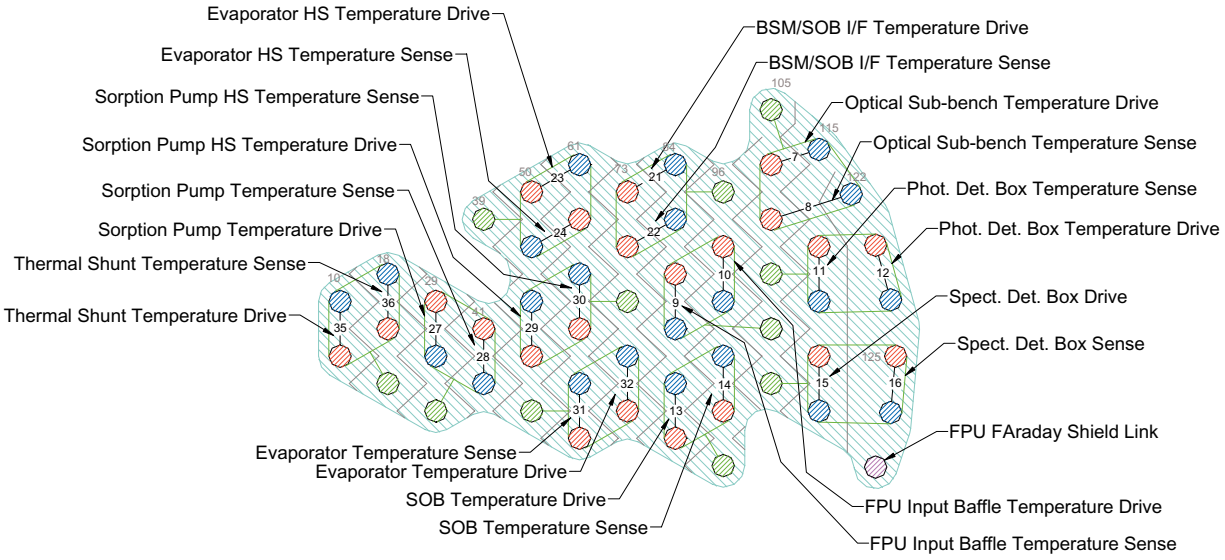


- Shields of STP and STQ are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

- 112 of 128 Contacts Used

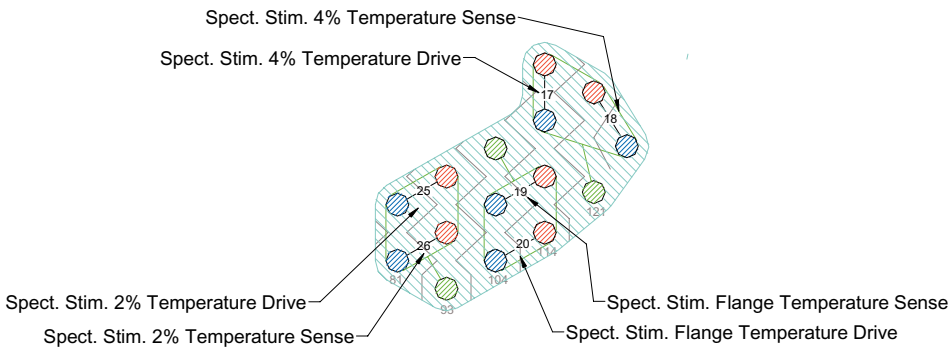
- Signal Supply
- Signal Return
- Signal Ground
- FPU Faraday Shield Link
- No Connection
- Harness Tails
- Harness Overshield (Joined to connector chassis)

I10 128-Way FPU Thermometry Tail A Pin Allocation



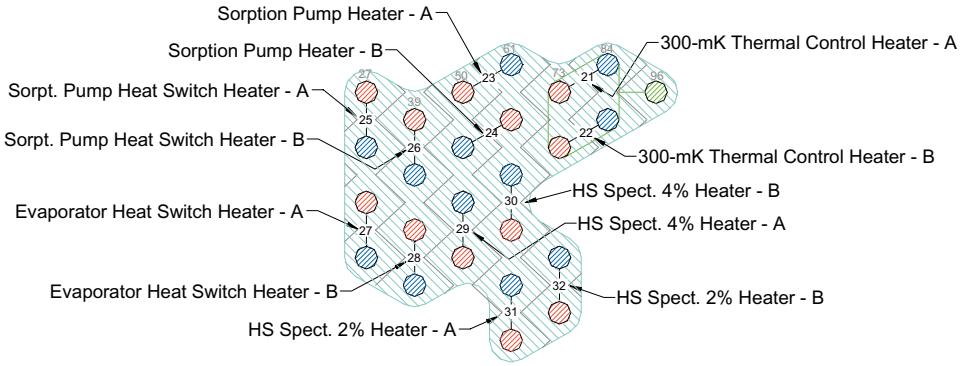
FPU Thermometry Tail A (FCU J23)

I10 128-Way FPU Thermometry Tail B Pin Allocation



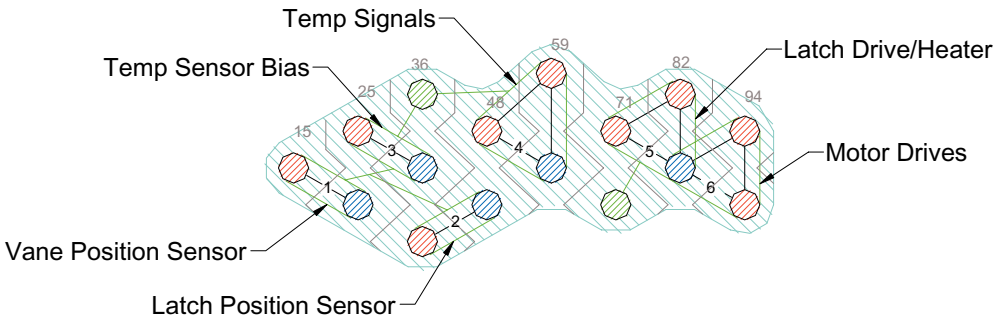
FPU Thermometry Tail B (FCU J25)

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)

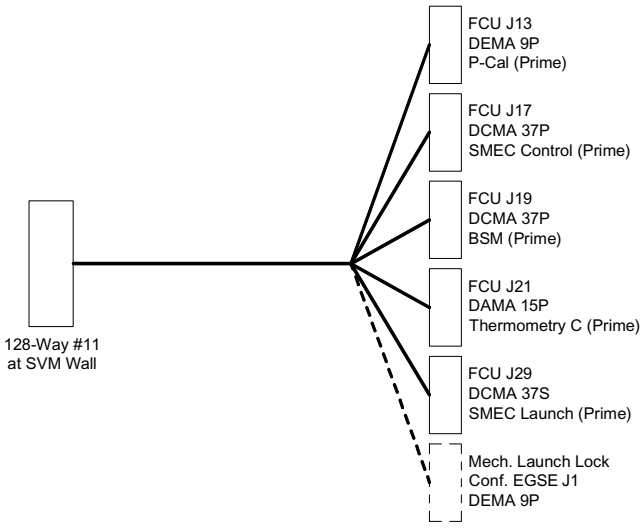
Function	15-Way J23	Max. Current	Wire Lay-up	Max Ohms	128Way #10
Spect. Stim. Flange temperature I+		1 µA	Insulated screened twisted quad	1000	114
Spect. Stim. Flange temperature V+		N/A		1000	113
Spect. Stim. Flange temperature V-		N/A		1000	103
Spect. Stim. Flange temperature I-		1 µA		1000	104
Spect. 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."

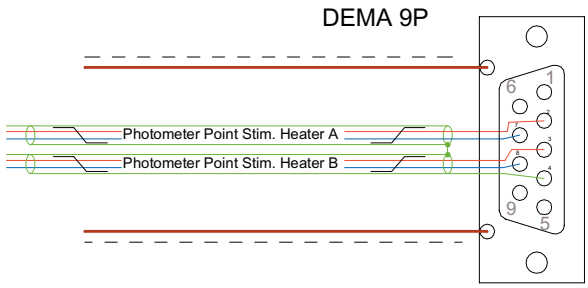
Overall Mechanical Drawing



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

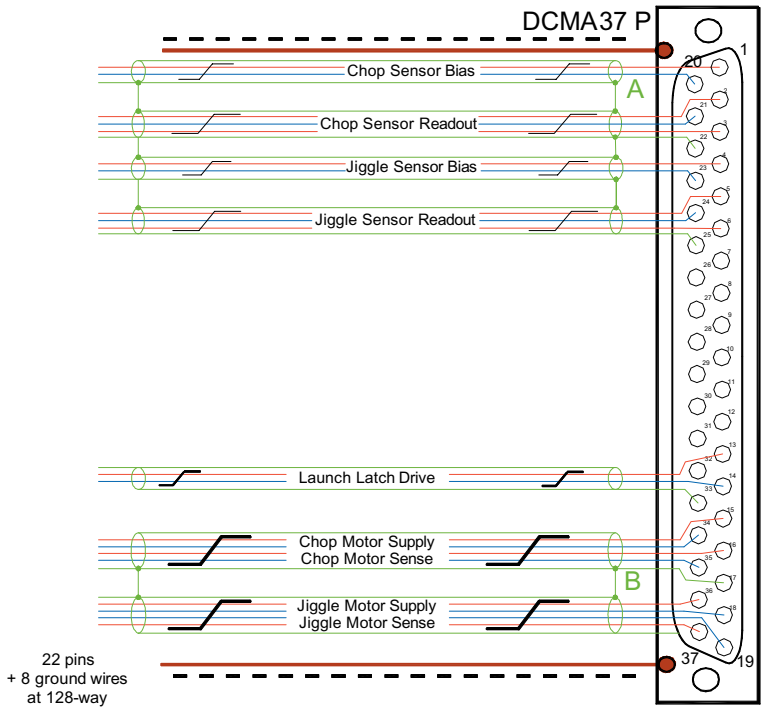


Phot. Stimulus (FCU J13/J14)

· 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

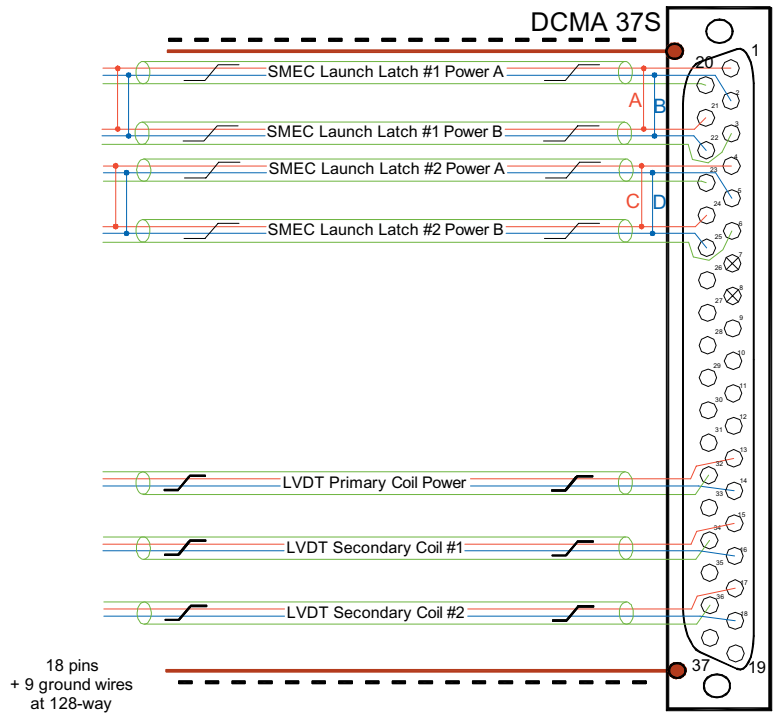
· 4 STP
· 2 STT
· 2 STQ

· 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 harness.

· 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



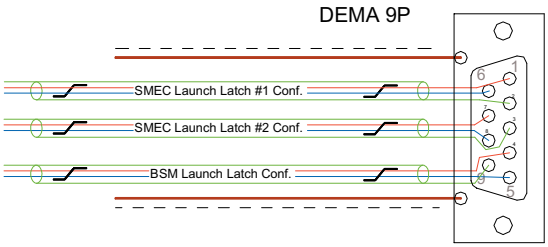
SMEC Launch Tail FCU J29

· 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.

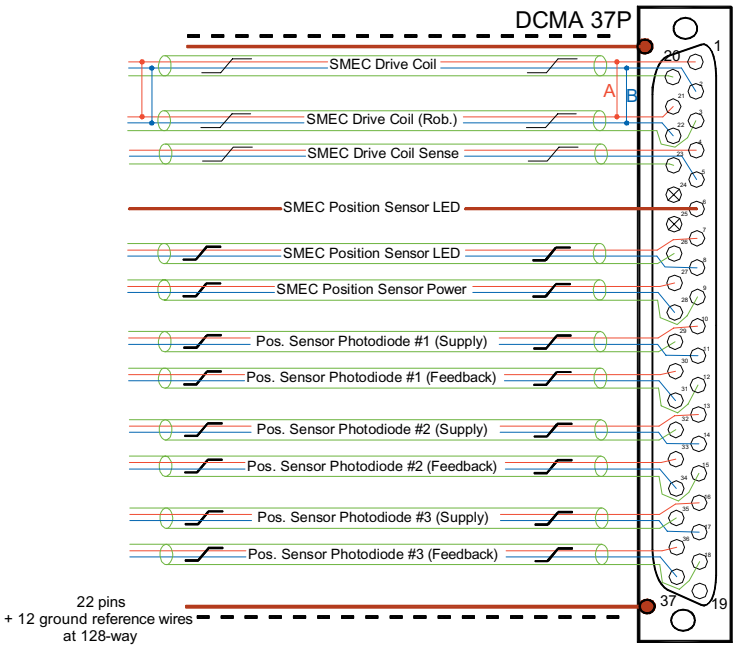


Mech. Launch Lock Confirm EGSE (EGSE J1/J2)

· 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)



SMEC Control Tail FCU J17

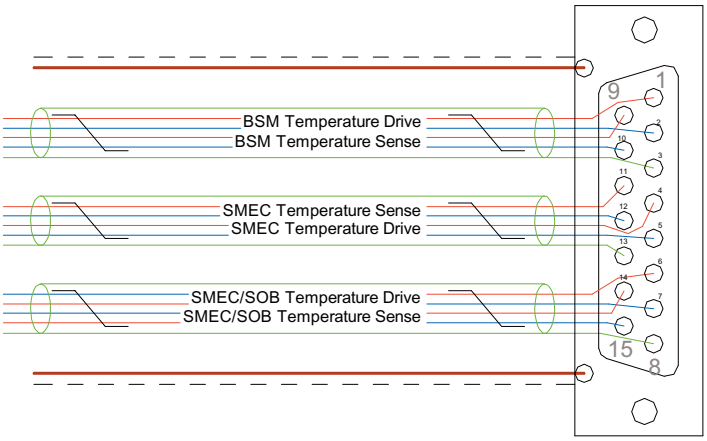
· 11 STP
· 1 Single

· 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)

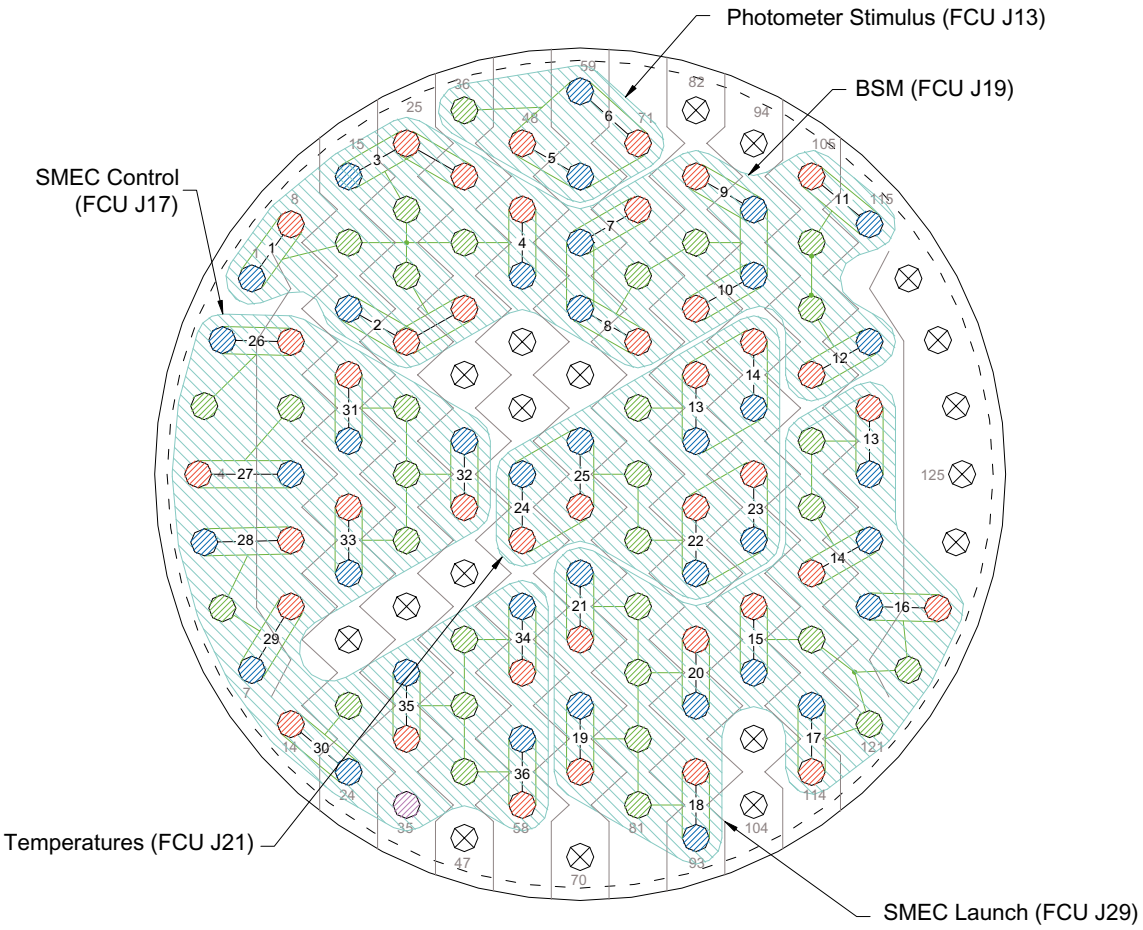


Thermometry Tail C (FCU J21/J22)

· 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.

I11 128-Way Pin Assignment (Ground Test Configuration)

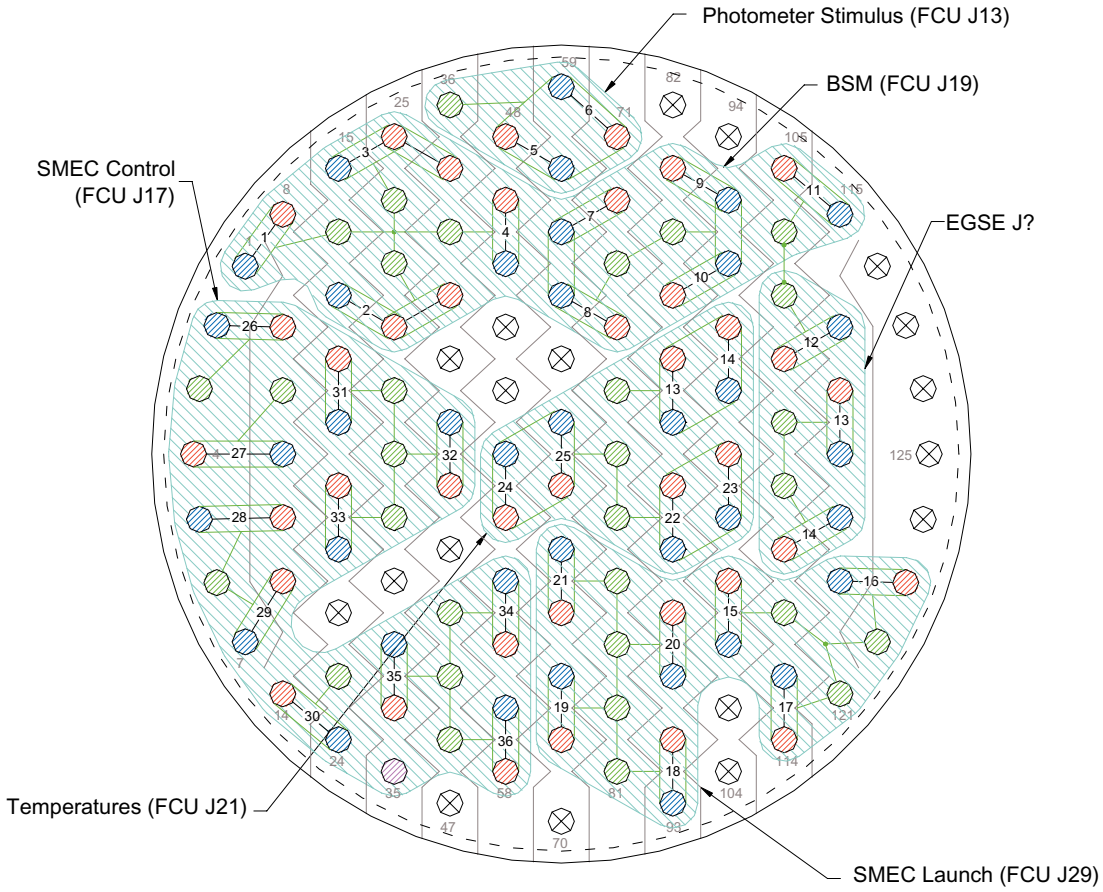


- Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

- 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)

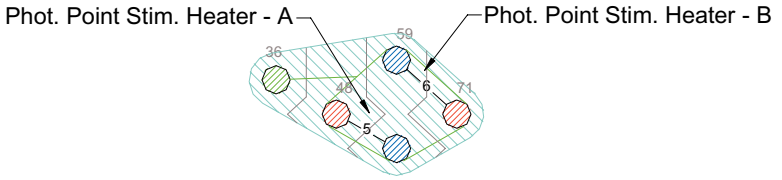
I11 128-Way Pin Assignment (Flight Configuration)



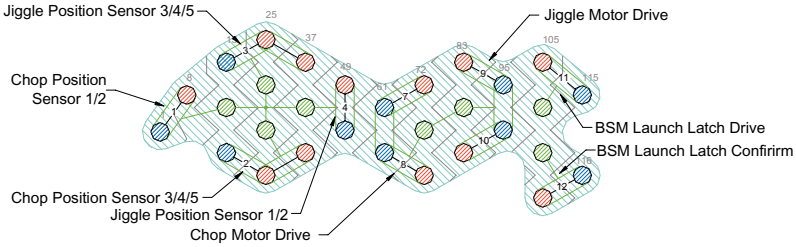
- Shields of STP are commoned as indicated by signal ground connections and passed through the 128-way by a dedicated ground pin.

- 110 of 128 Contacts Used

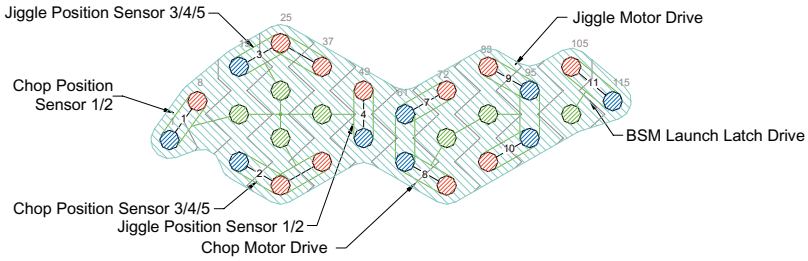
Bolometer Signal +
Bolometer Signal -
Signal Ground
FPU Faraday Shield Link
No Connection
Harness Tails
Harness Overshield (Joined to connector chassis)



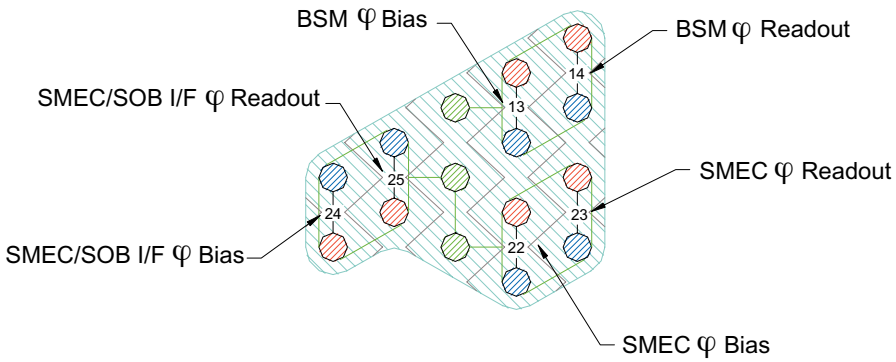
FCU Photometer Stimulus (FCU J13)
(Flight and Ground Test Configurations)



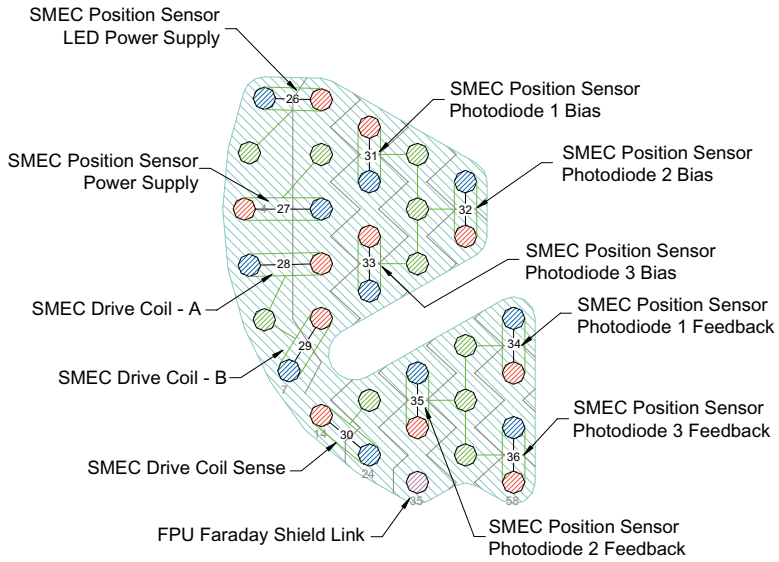
FCU BSM (J19)
Ground Test Configuration



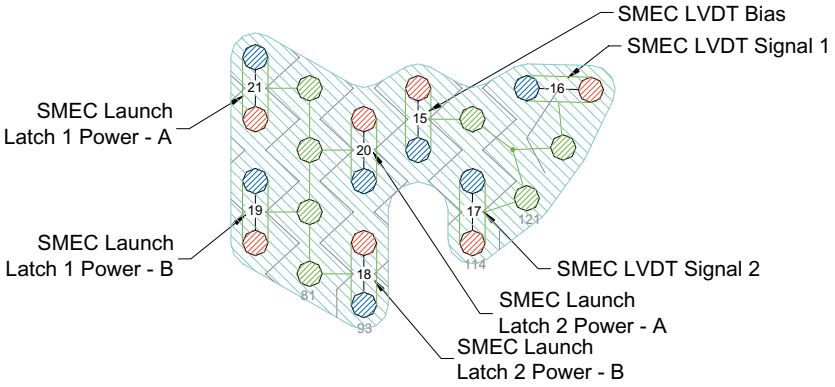
FCU BSM (J19) (Flight Configuration)



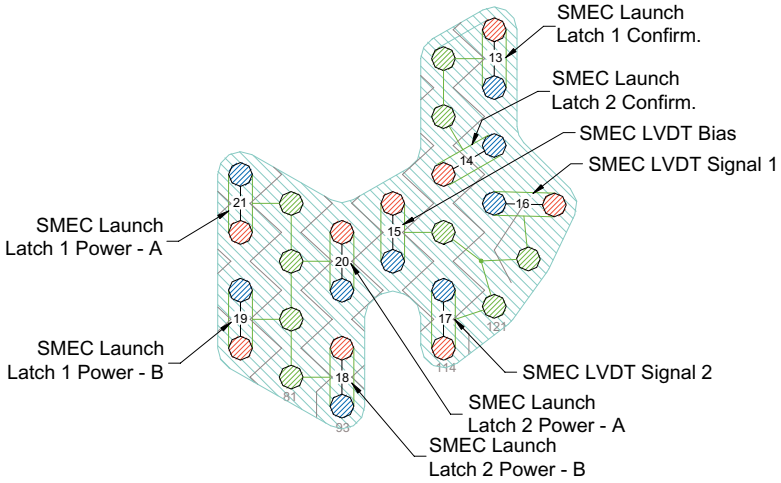
FCU Temperatures (J21)
(Flight and Ground Test Configuration)



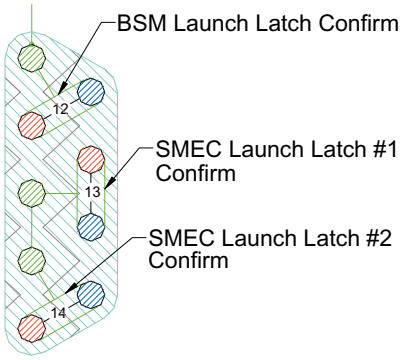
FCU SMEC Control (FCU J17)
(Flight and Ground Test Configurations)



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				

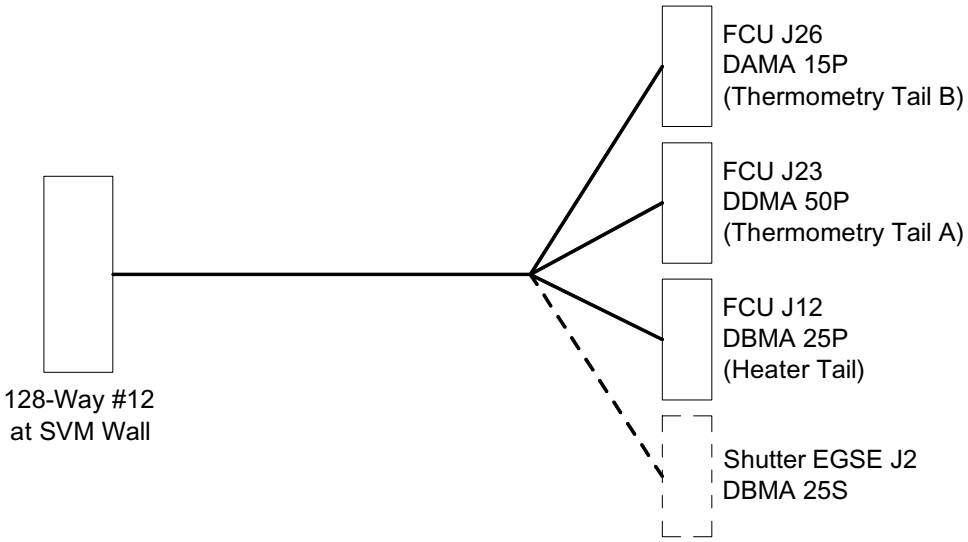
BSM Tail Listing (FCU J19)

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 gnd~~	~~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

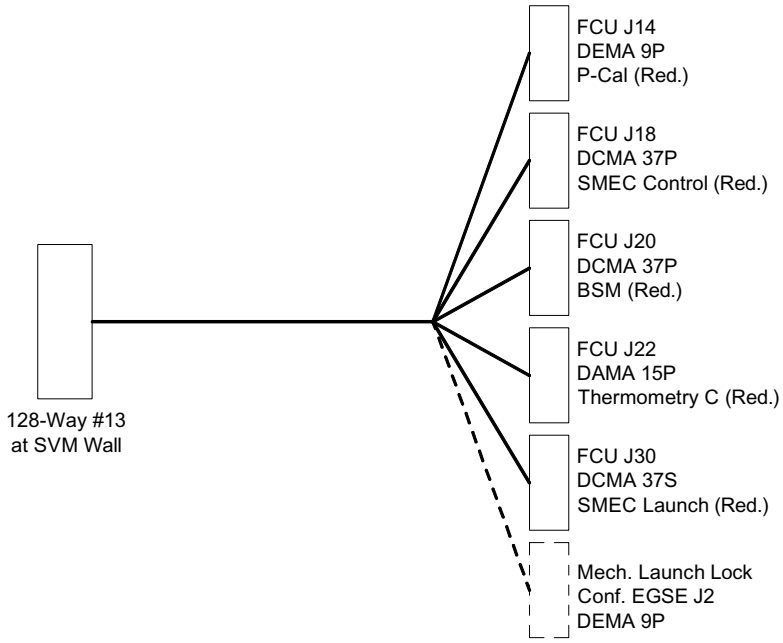
DBMA25P+Glenair550-E-039-M-3- TBD -H-0-TBD	to	FCU J12	Heater Tail (Red)
DBMA25P+Glenair550-E-039-M-3- TBD -H-0-TBD	to	Shutter EGSE J2	Shutter EGSE (Red.)
DDMA50P+Glenair550-E-039-M-5- TBD -H-0-TBD	to	FCU J24	FPU Thermometry Tail A (Red.)
DAMA15P+Glenair550-T-039-M-2- TBD -H-0-TBD	to	FCU J26	FPU Thermometry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

Harness Layup

As I10

4.2.13 I13 SVM13 – DRCU DRV-R

Overall Mechanical Drawing



Format as I11, maybe differing lengths.

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

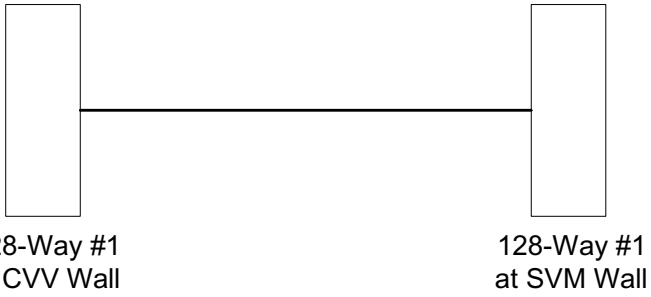
As I11

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 SVM 1 – CVV1

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

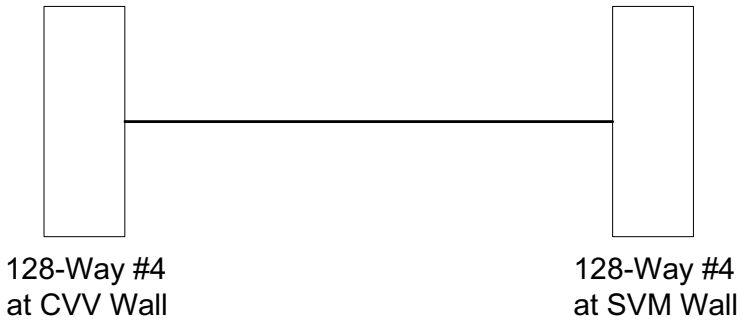
As per I3

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

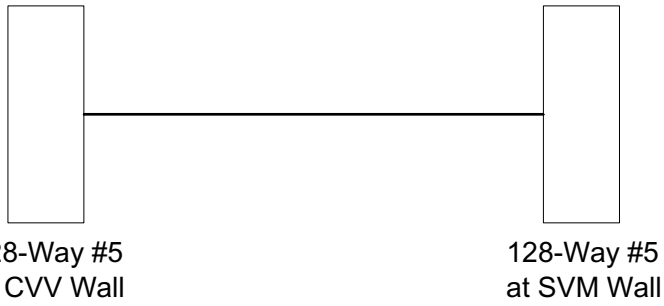
As per I4

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

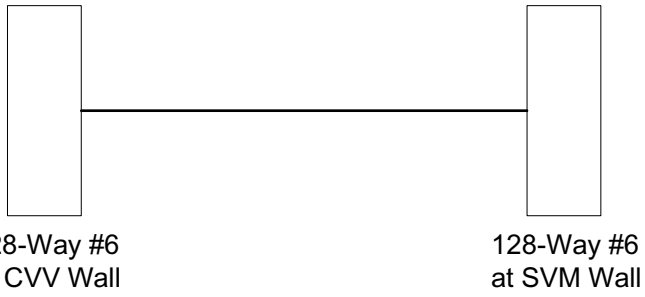
As per I5

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

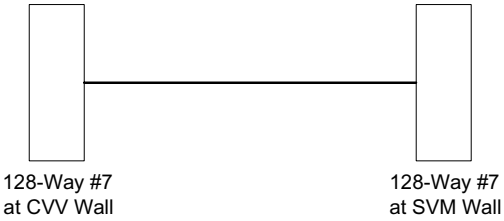
As per I6

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

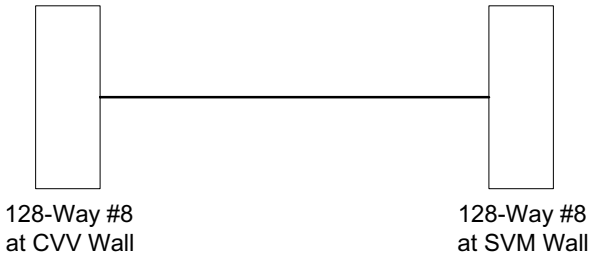
As per I7

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

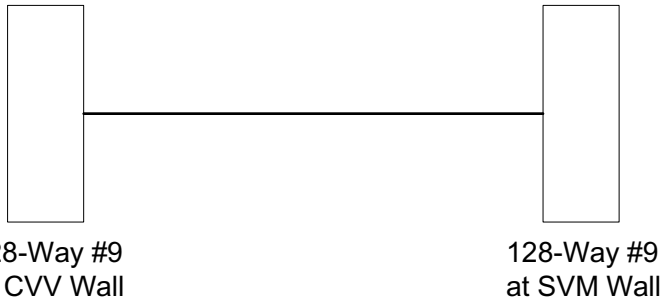
As per I8

Contact Details

As per 128-way connector on I8

4.3.9 E9 SVM 9 – CVV 9

Overall Mechanical Drawing



Connector/Backshell Details

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

Harness Layup

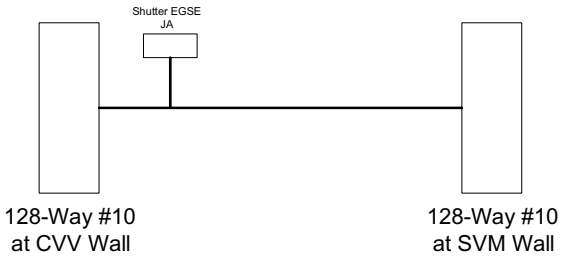
As per I9

Contact Details

As per 128-way connector on I9

4.3.10 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

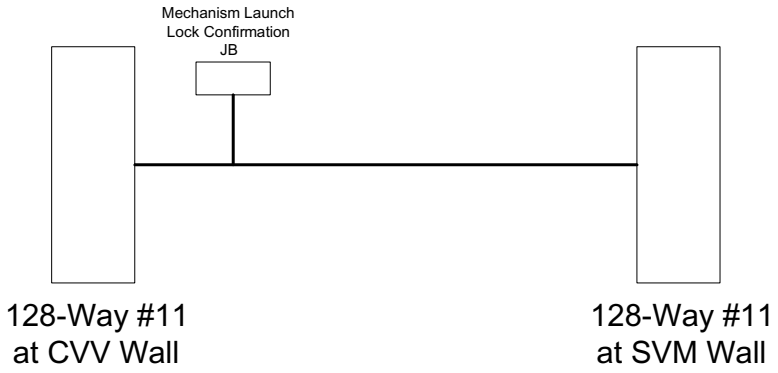
As per I10

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

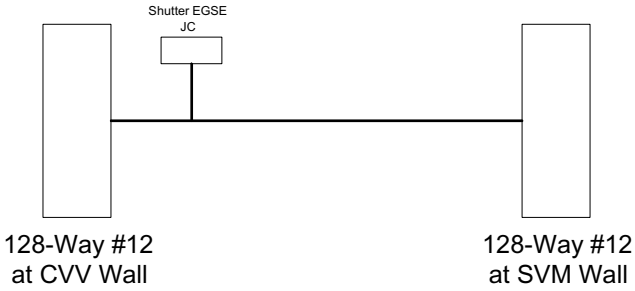
As per I11

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

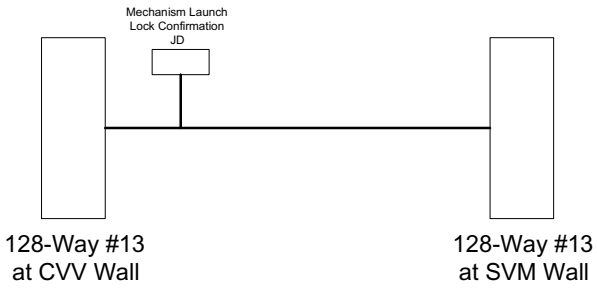
As per E10

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

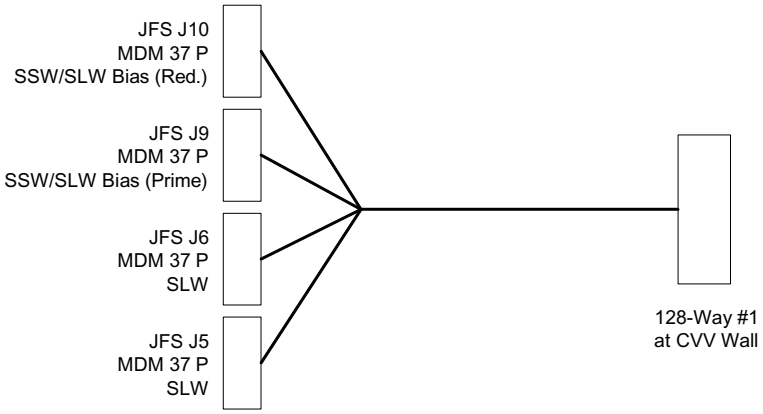
Contact Details

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	JFS J5	SLW JFET
MDM	25	S	+	Glenair	500	-	T	-	010	-	M	-	25	-	F	-	TBD	to	JFS J6	SLW JFET
MDM	37	P	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to	JFS J9	Spect. Bias
MDM	37	P	+	Glenair	500	-	T	-	010	-	M	-	37	-	F	-	TBD	to	JFS J10	Spect. Bias

Harness Layup

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

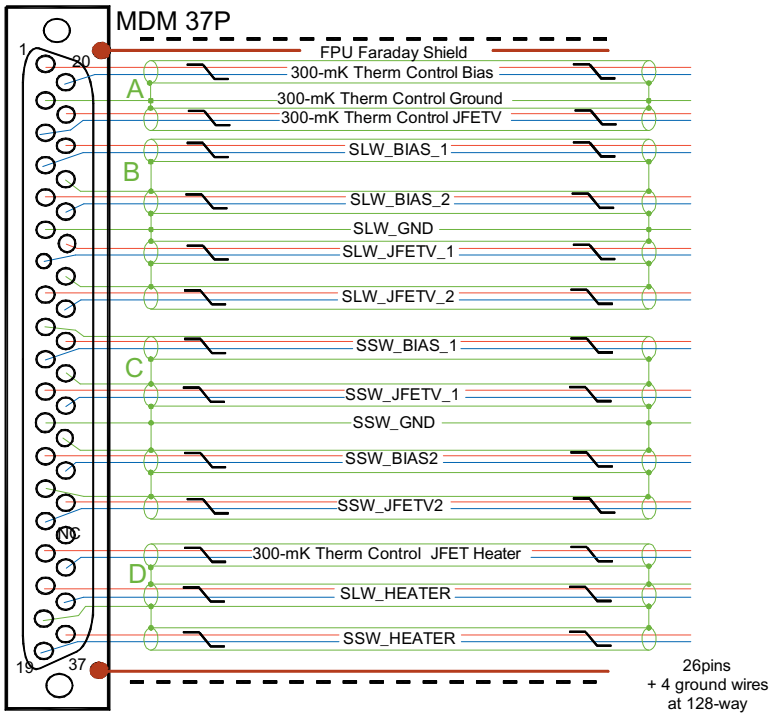
Type 3 Bias Tails

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

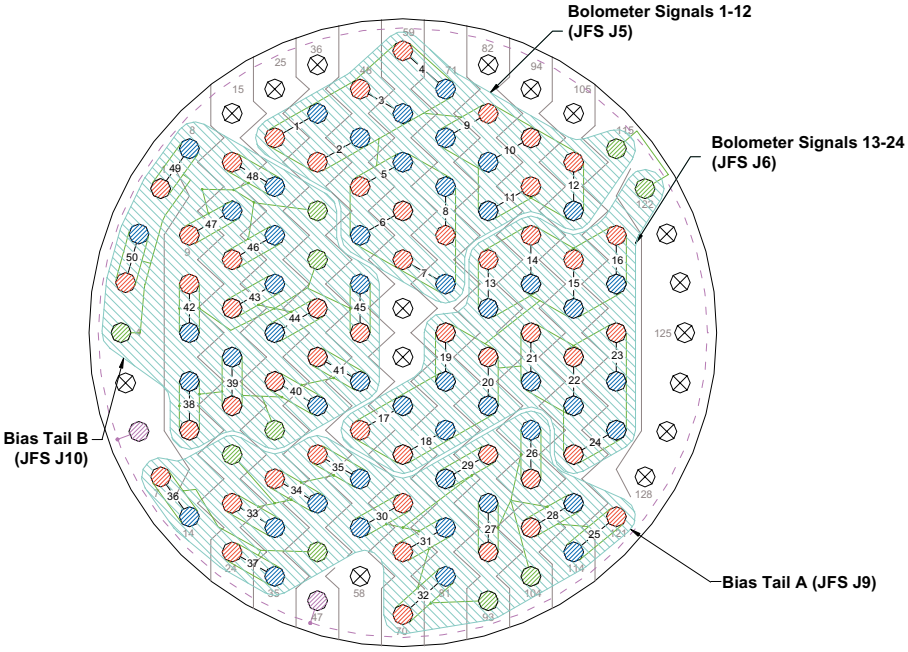
· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at JFS but isolated from the wall of the CVV.

· 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.

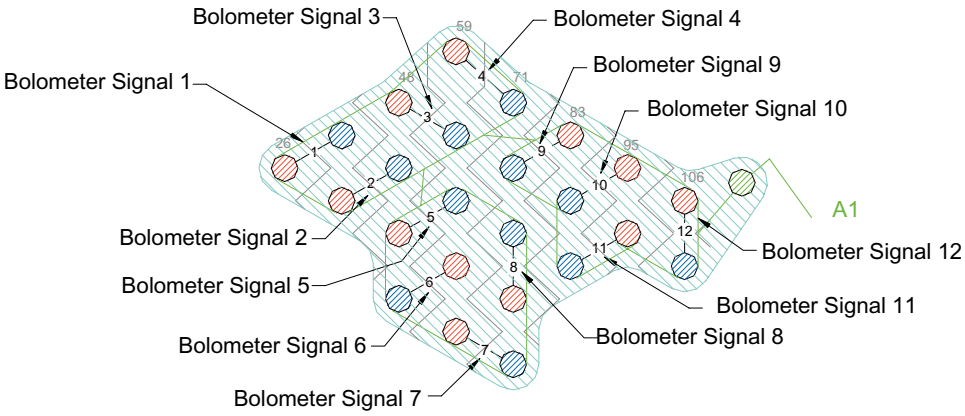


Because the small SLW has no subgroups that might fail, EACH of the JFET backharness leads are double-wired in this cryoharness, requiring links across in the filters.

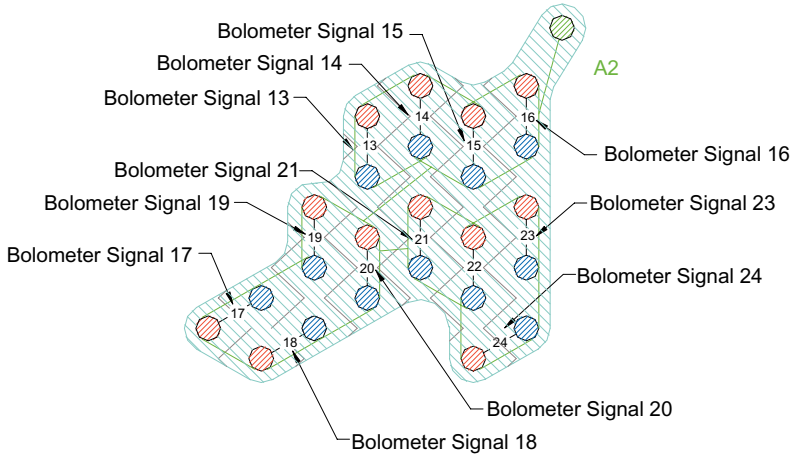


Bolometer Signal +
Bolometer Signal -
Signal Ground
FPU Faraday Shield Link
No Connection
Harness Tails
Harness Overshield (Joined to FPU Faraday Shield Link Pins and isolated from connector chassis)
Signal Ground Connection

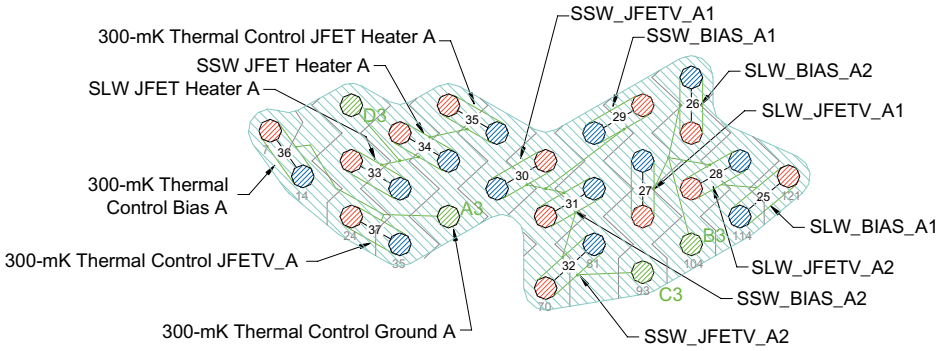
Overshields of the 12-ax and STP are commoned as indicated by signal ground connections and passed through the 128-way by dedicated ground pins.



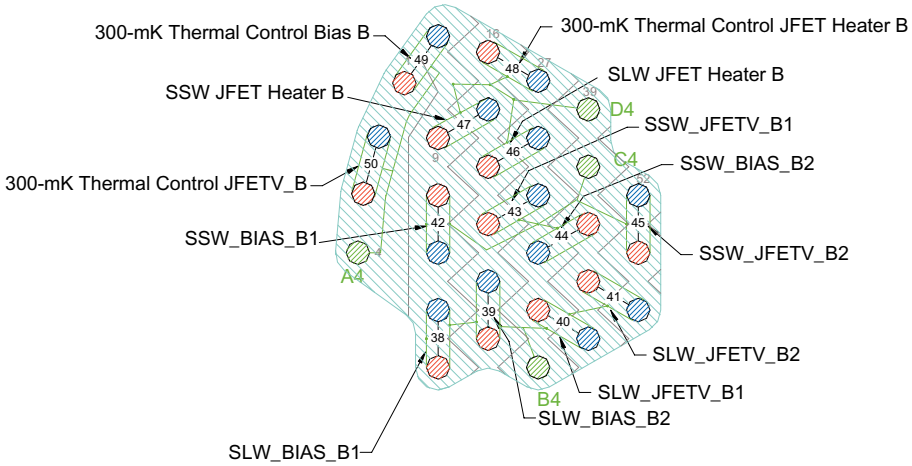
Bolometer Signals 1-12
(JFS J5)



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)

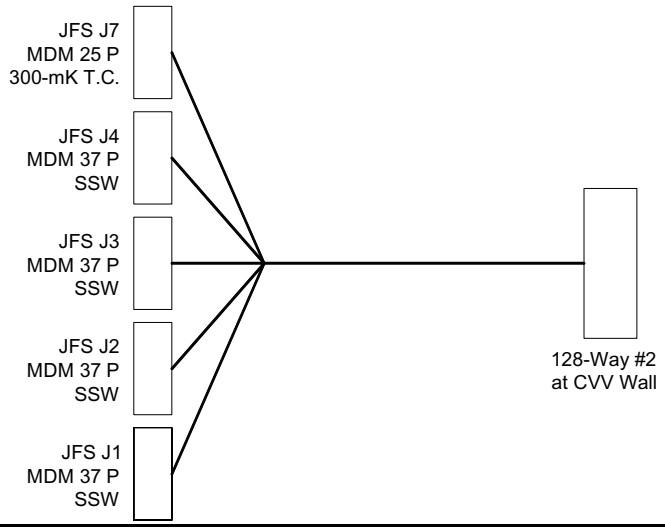
Name	25-Way A J5	25-Way B J6	37-Way C J9	37-Way D J10	CVV 128-Way #1
Channel 19 +		20			122 (A2)
Channel 19 -		7			76
Channel 19gnd shld		NC			77
Channel 20 +		21			122 (A2)
Channel 20 -		8			88
Channel 1gnd shld		NC			89
Channel 21 +		22			122 (A2)
Channel 21 -		9			99
Channel 21gnd shld		NC			100
Channel 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

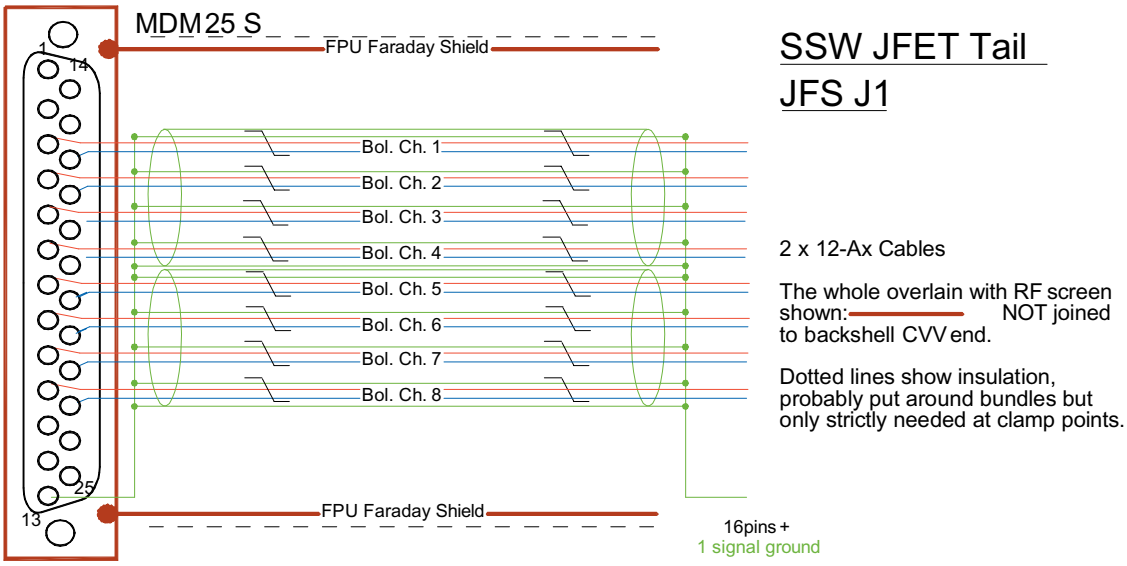
Overall Mechanical Drawing

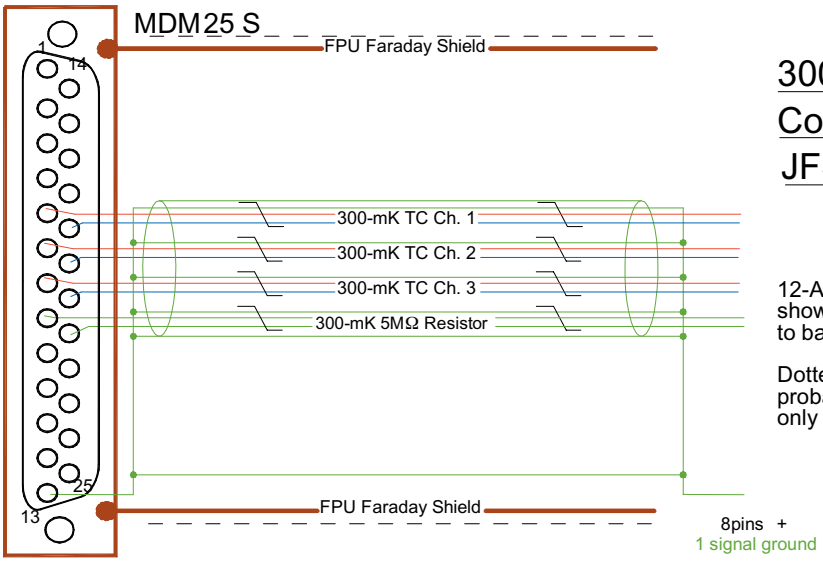


Connector/Backshell Details

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



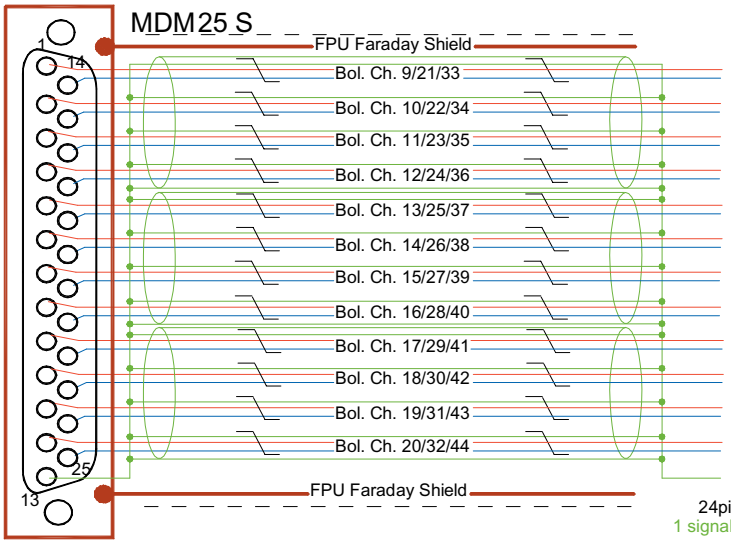


300-mK Thermal Control Signals JFS J7

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

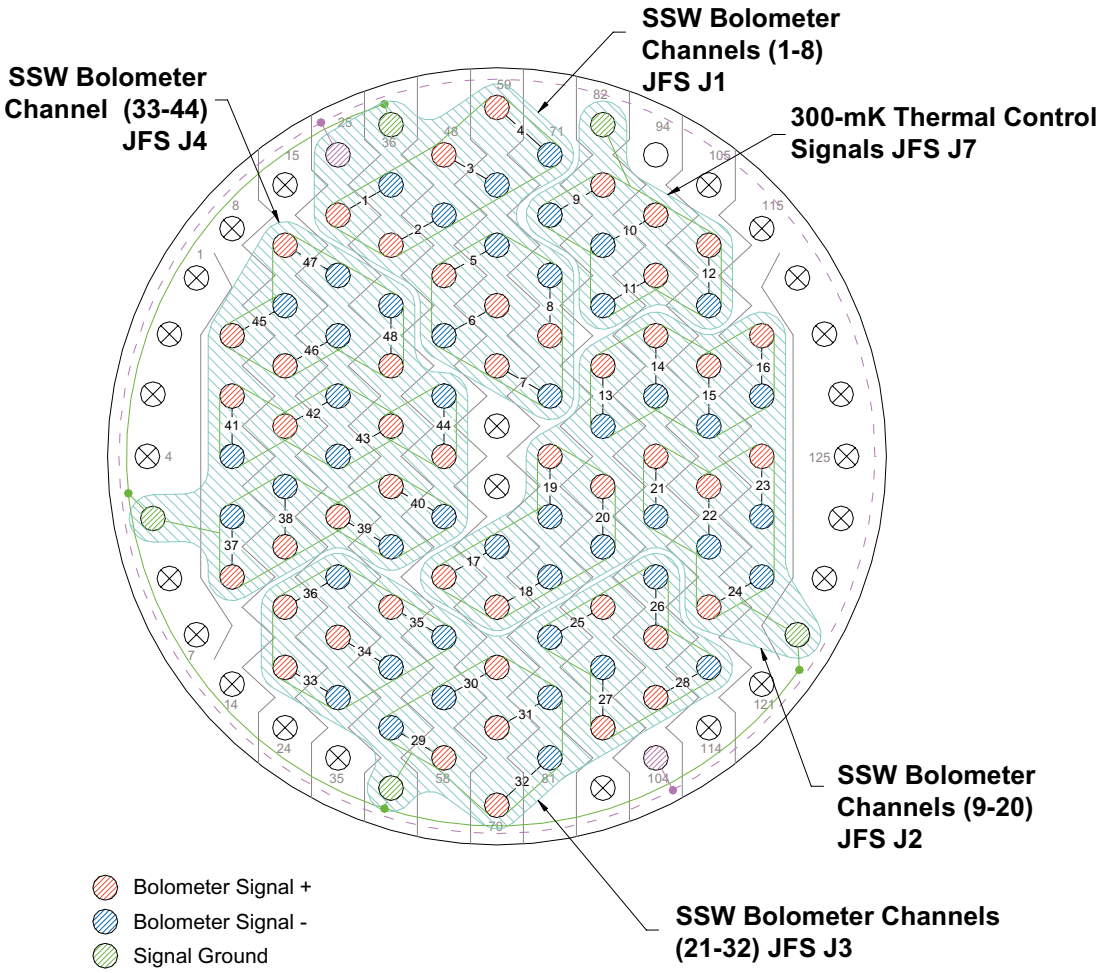
Common to JFS Tails J2, J3 & J4
J2 carries Bolometer pairs 9-20
J3 carries Bolometer pairs 21-32
J4 carries Bolometer pairs 33/44

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.

128 Way Pin Allocations



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.

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.

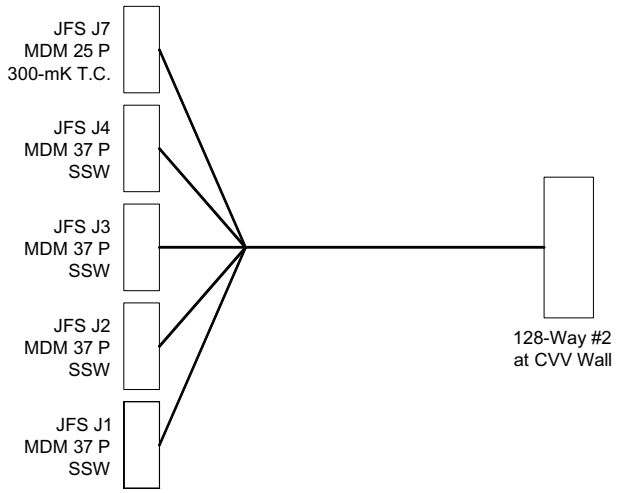
Name	25way A JFS J1	25wayB JFS J2	25Way C JFS J3	25way D JFS J4	25-Way E JFS J7	128Way #2
Bol. Channel 1 +	3					26
Bol. Channel 1 -	16					37
Bol. Channel 1gnd	13 (A)					36(A)
Bol. Channel 2 +	4					38
Bol. Channel 2 -	17					49
Bol. Channel 2gnd	13 (A)					36(A)
Bol. Channel 3 +	5					48
Bol. Channel 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

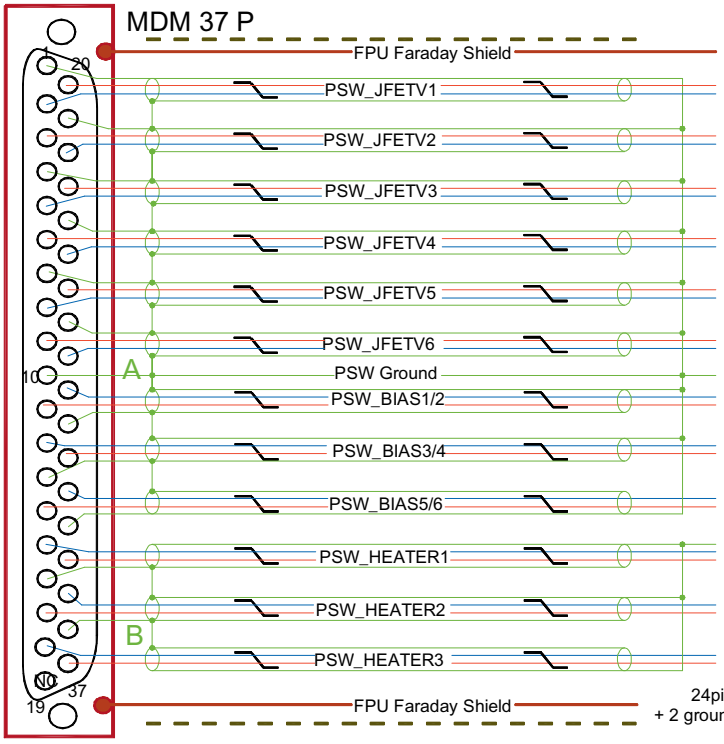
Overall Mechanical Drawing



Connector/Backshell Details

MDM	37	P + Glenair 500 - T - 010 - M - 37 - F - TBD	to	JFP	J25	PSW Bias (P)
MDM	37	P + Glenair 500 - T - 010 - M - 37 - F - TBD	to	JFP	J26	PSW Bias (R)
MDM	37	P + Glenair 500 - T - 010 - M - 37 - F - TBD	to	JFP	J27	PMW/PLW Bias (P)
MDM	37	P + Glenair 500 - T - 010 - M - 37 - F - TBD	to	JFP	J28	PMW/PLW Bias (R)

HARNESS LAYUP



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

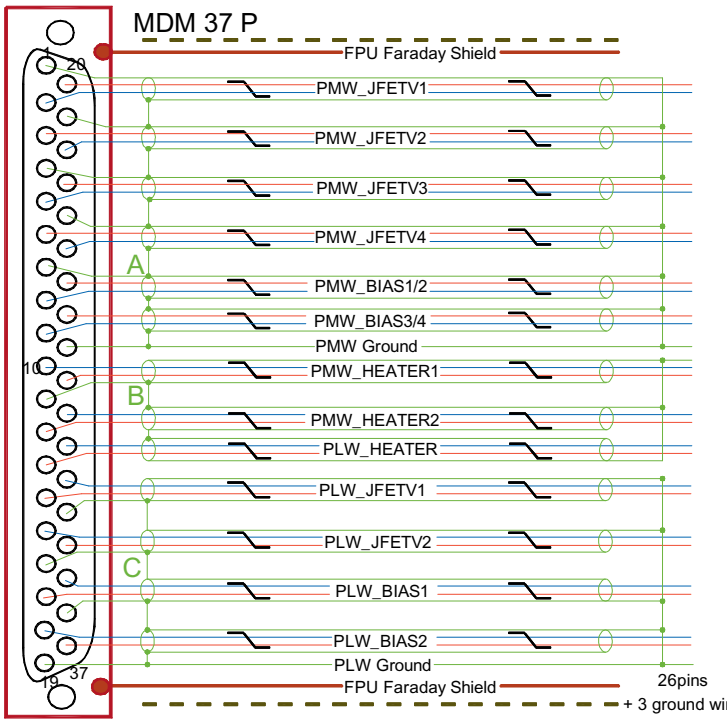
· 12 Insulated STPs
· 1 Single insulated ground wire

· 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

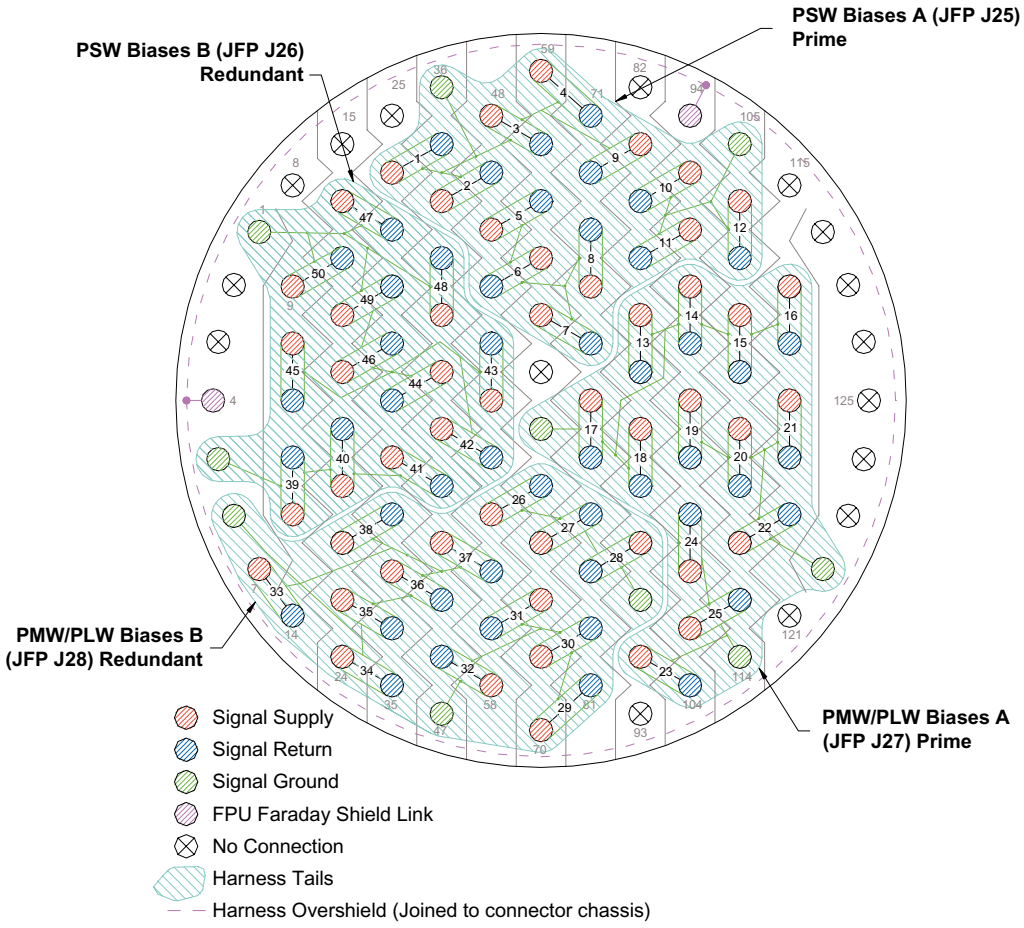
· The whole harness bundle is overlain with an RF screen Indicated by: ——— which is connected to EMC backshells at JFP but isolated from the wall of the CVV.

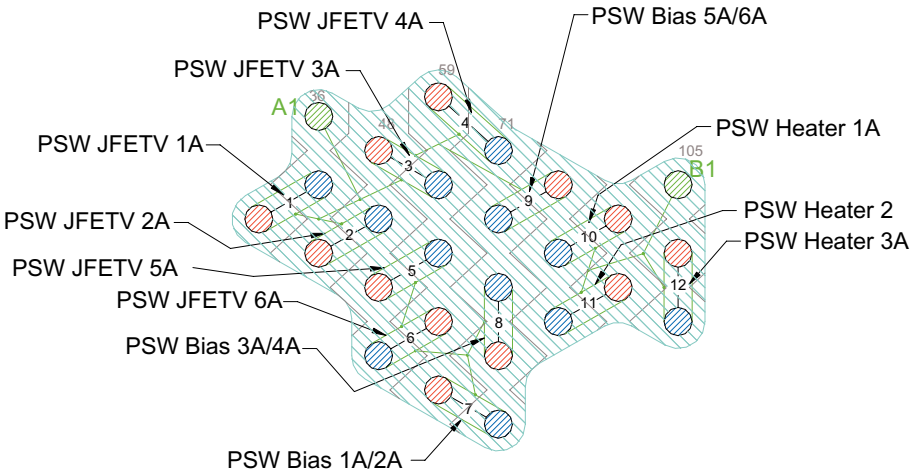
· The dotted lines indicate insulation jacket covering the overshield. Only required at clamp points but could cover entire length of harness.

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

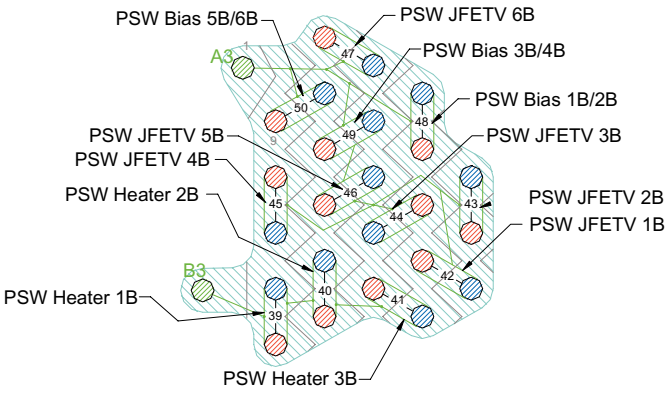
· There are A (J27) and B (J28) versions of this tail in order to implement redundancy

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

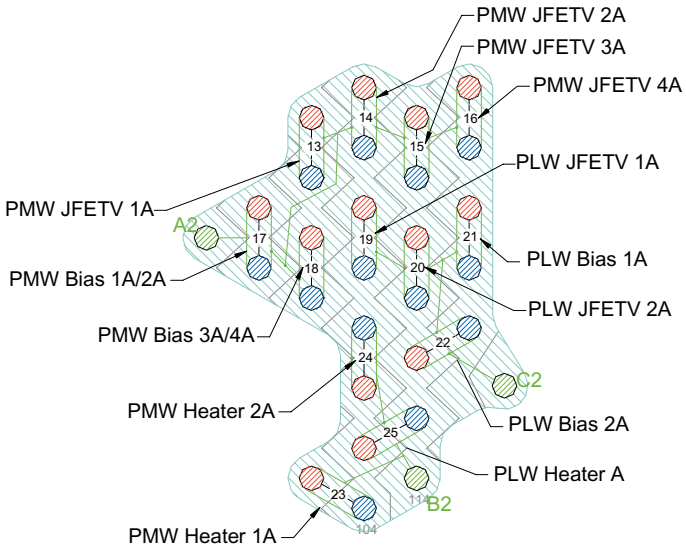




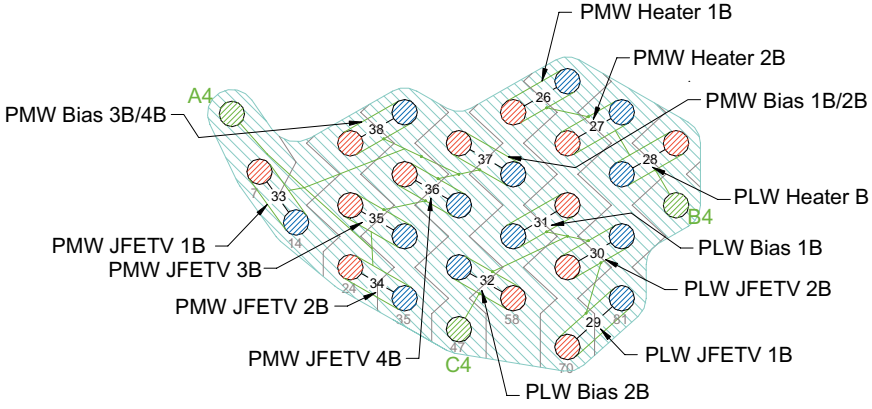
PSW Biases A (JFP J25)
Prime



PSW Biases B (JFP J26)
Redundant



PMW/PLW Biases A (JFP J27)
Prime



PMW/PLW Biases B (JFP J28)
Redundant

Contact Details

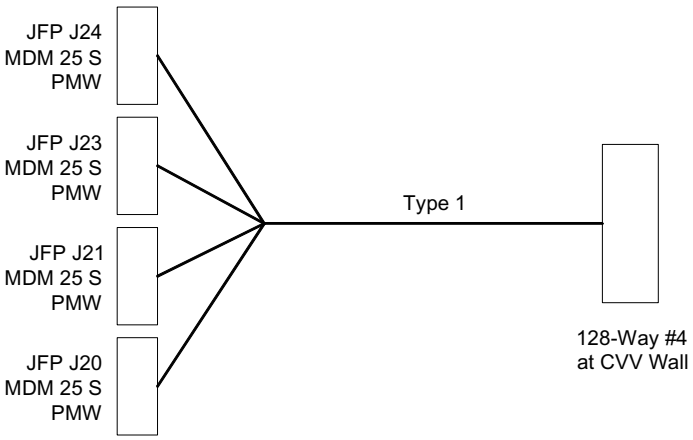
Name	37-way J25	37-way J27	37-Way J26	37-Way J28	128-Way #3
PSW_JFETV1_A +	20				26
PSW_JFETV1_A -	2				37
PSW_JFETV1_A shld	1 (A1)				36 (A1)
PSW_JFETV2_A +	3				38
PSW_JFETV2_A -	22				49
PSW_JFETV2_A shld	21 (A1)				36 (A1)
PSW_JFETV3_A +	23				48
PSW_JFETV3_A -	5				60
PSW_JFETV3_A shld	4 (A1)				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

4.4.4 C4 CVV4 to HSJFP Type1

Overall Mechanical Drawing

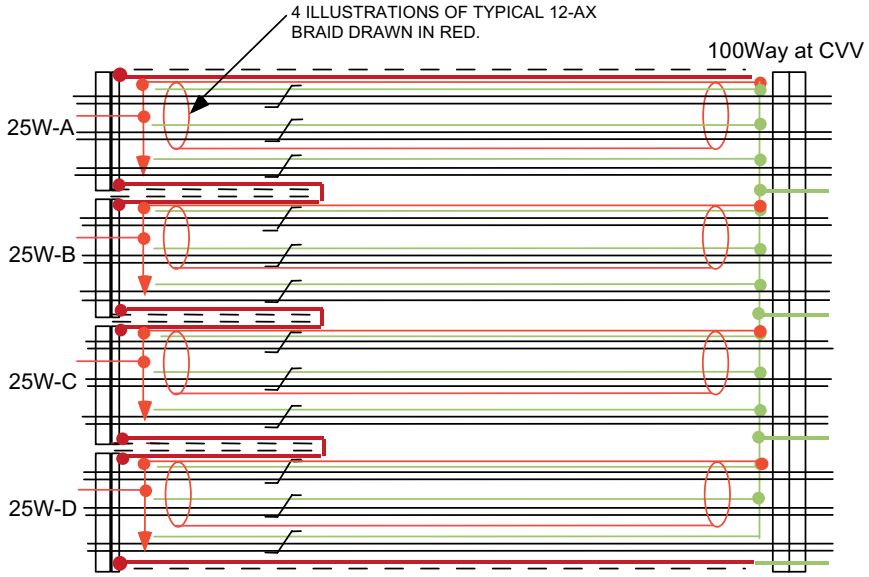


Connector Backshell Details

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:



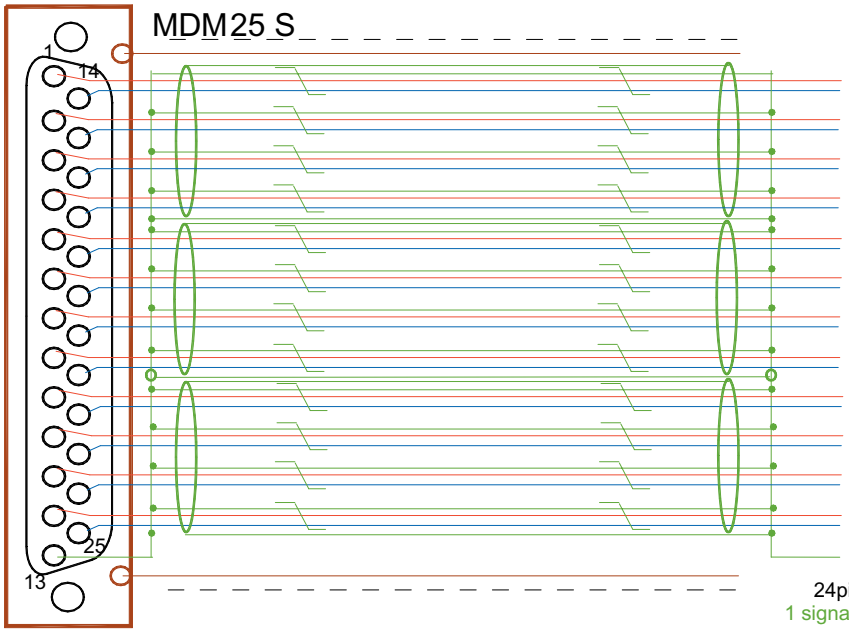
There are 48 channels each carried as a twisted triple, grouped in fours as "12-ax", each with its own insulated screen. So are 12 x 12-ax in all with three 12-ax to each 25 way MDM. The use of a third wire twisted with each channel's + & - wires minimises interchannel cross-talk inside each 12-

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: -



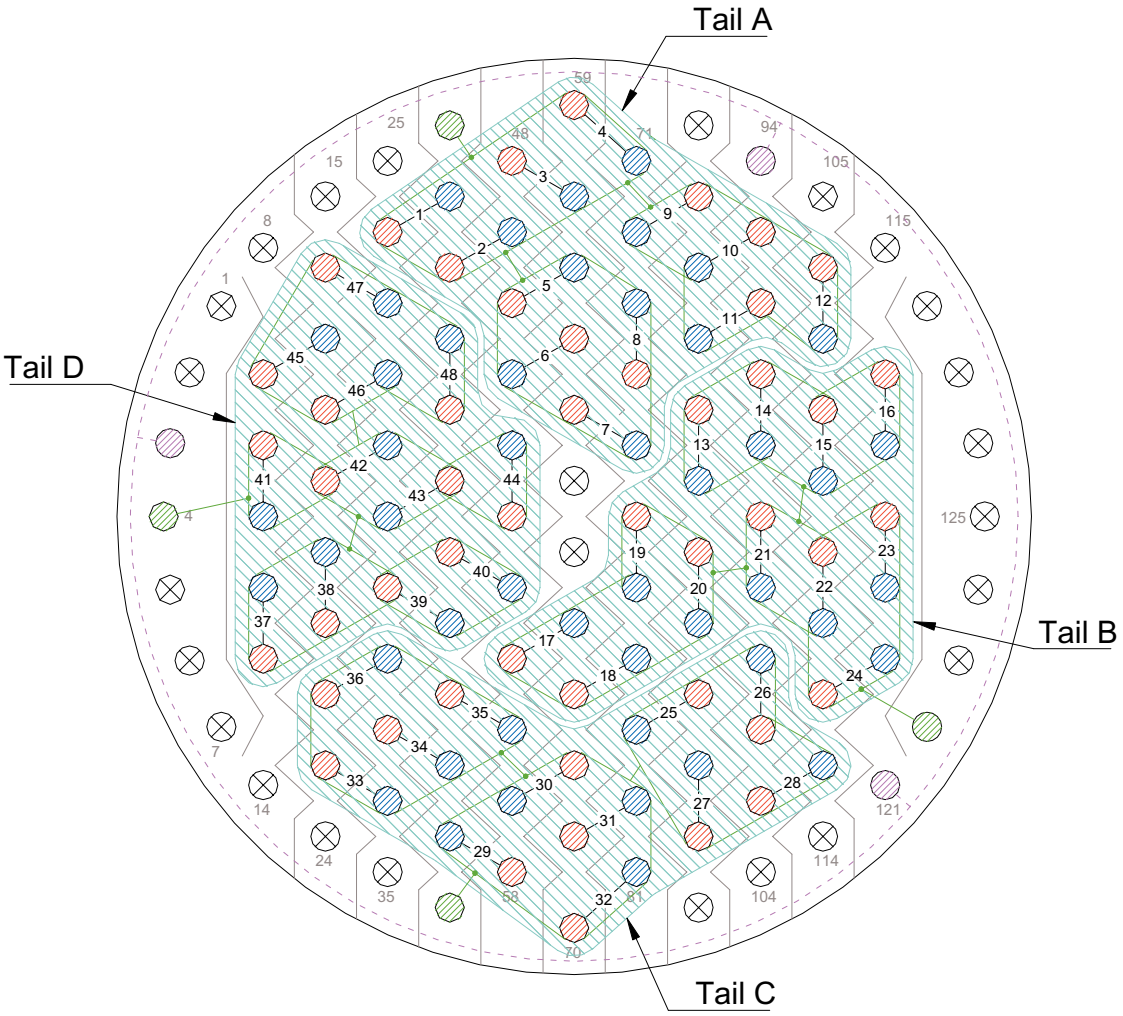
Type 1 JFET tails

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.

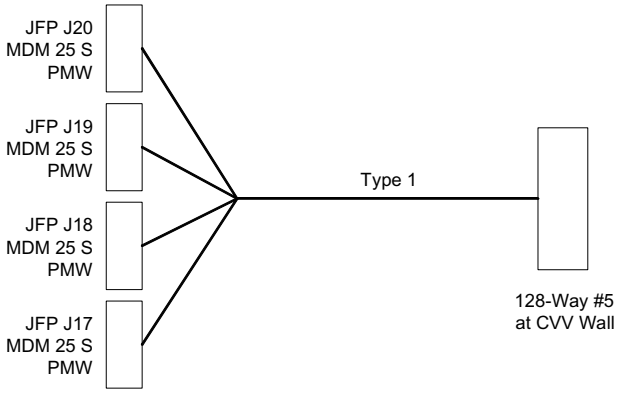
Name	25way A	25wayB	25Way C	25way D	128Way #4
Channel 1 +	1				26
Channel 1 -	14				37
Channel 1gnd	13 (A1)				36 (A1)
Channel 2 +	2				38
Channel 2 -	15				49
Channel 2gnd	13 (A1)				36 (A1)
Channel 3 +	3				48
Channel 3 -	16				60
Channel 3gnd	13 (A1)				36 (A1)
Channel 4 +	4				59
Channel 4 -	17				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+Glenair 500-T-010-M-37-F-	TBD	to	JFP J17	PMW Signals
MDM37 0+Glenair 500-T-010-M-37-F-	TBD	to	JFP J18	PMW Signals
MDM37 0+Glenair 500-T-010-M-37-F-	TBD	to	JFP J19	PMW Signals
MDM37 0+Glenair 500-T-010-M-37-F-	TBD	to	JFP J20	PMW Signals

Harness Layup

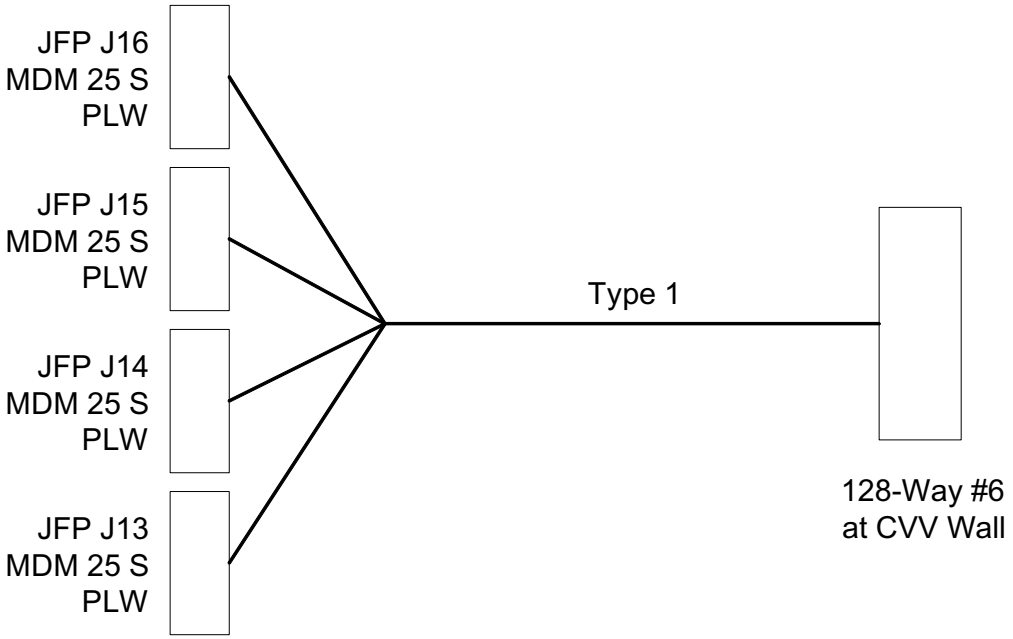
As C4.

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

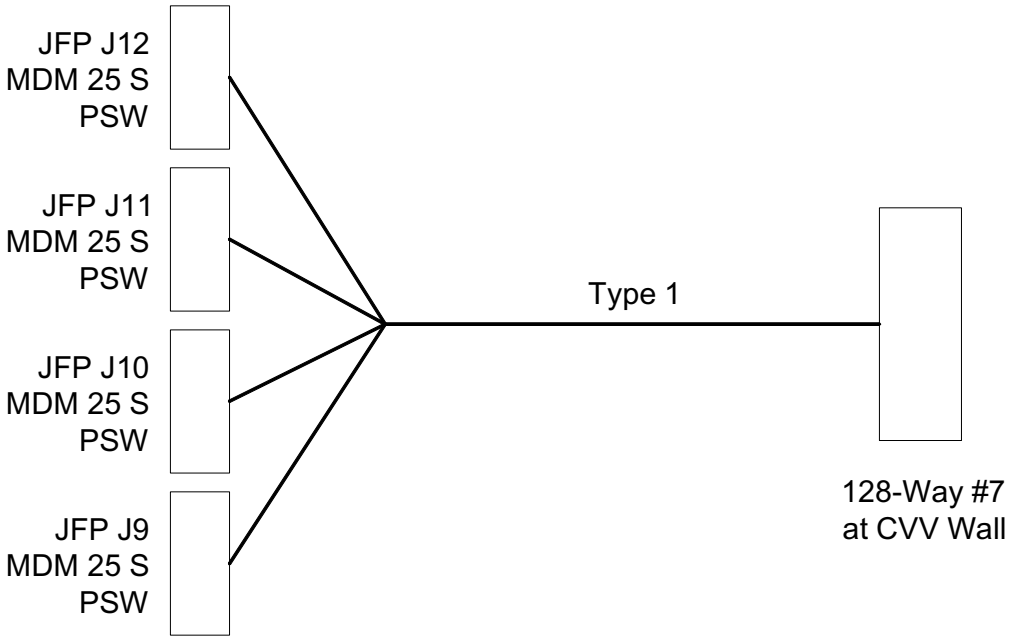
As C4.

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

Harness Layup

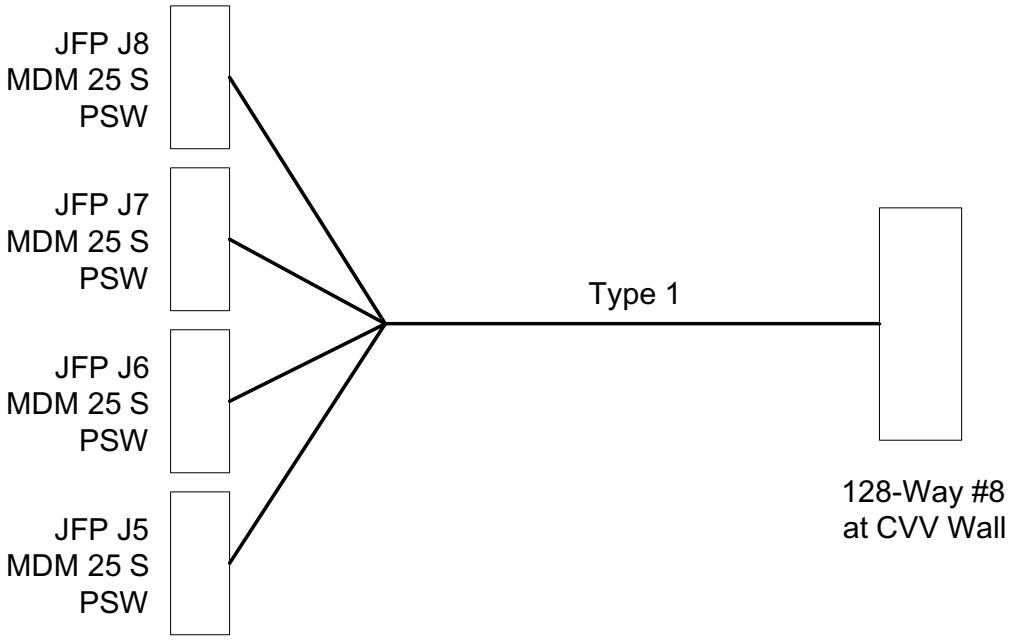
As C4.

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

Harness Layup

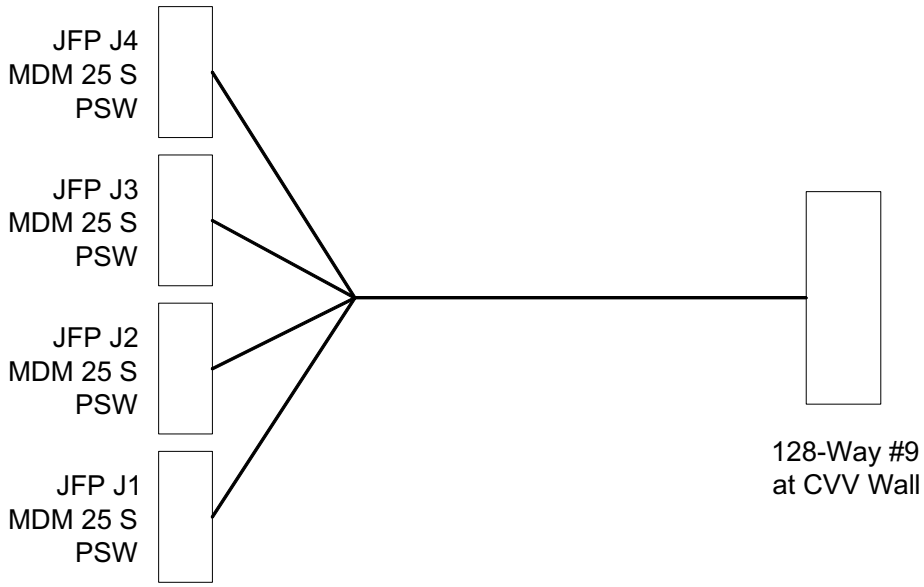
As C4.

Contact Details

As C4.

4.4.9 C9 CVV9 to HSJFP Type1

Overall Mechanical Drawing



Connector/Backshell Details

MDM 37 0 + Glenair 500 - T - 010 - M - 37 - F -	TBD	to	JFP J1	PSW Signals
MDM 37 0 + Glenair 500 - T - 010 - M - 37 - F -	TBD	to	JFP J2	PSW Signals
MDM 37 0 + Glenair 500 - T - 010 - M - 37 - F -	TBD	to	JFP J3	PSW Signals
MDM 37 0 + Glenair 500 - T - 010 - M - 37 - F -	TBD	to	JFP J4	PSW Signals

Harness Layup

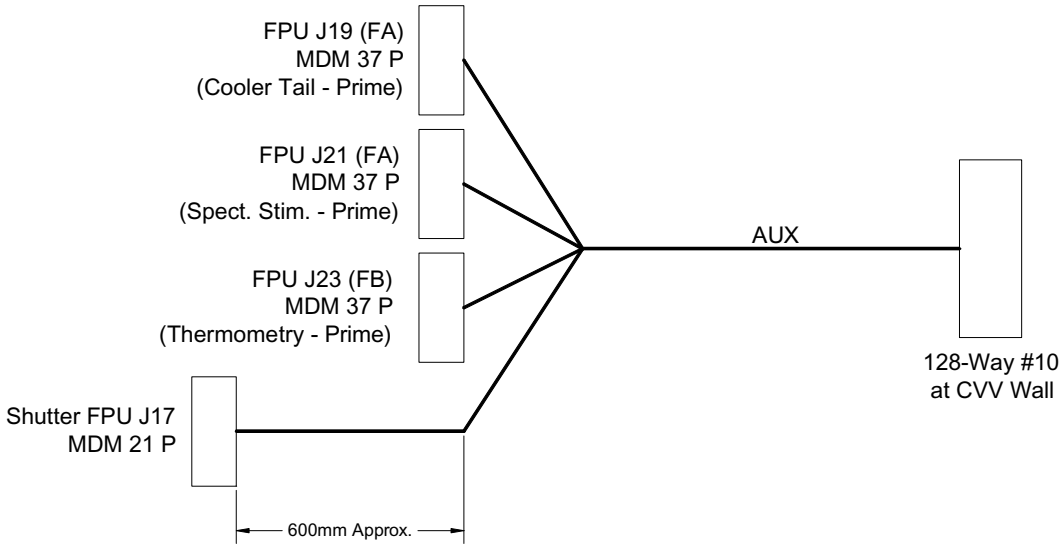
As C4.

Contact Details

As C4.

4.4.10 C10 CVV10 to HSFPU AUX-P

Overall Mechanical Drawing



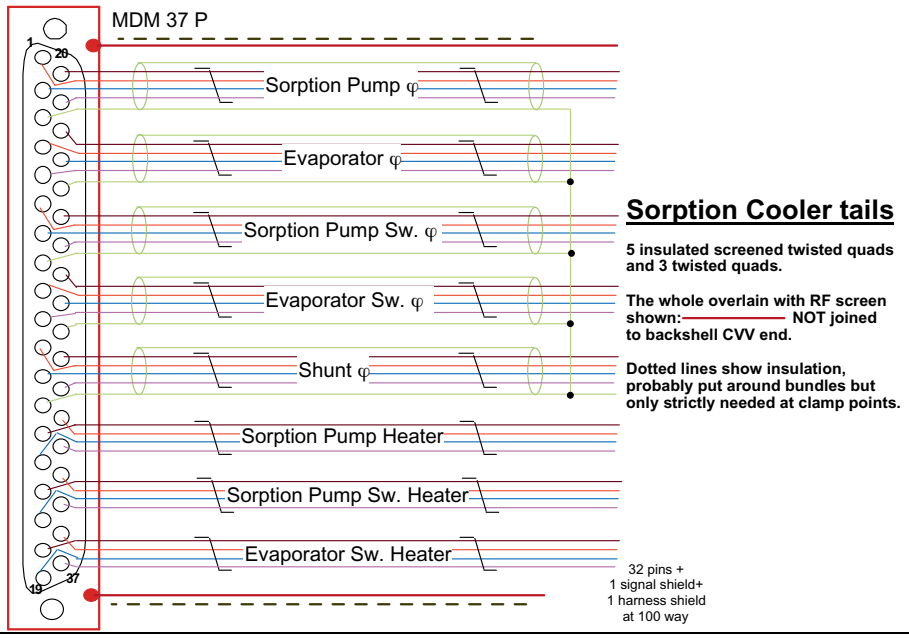
Connector/Backshell Details

Prime side harness

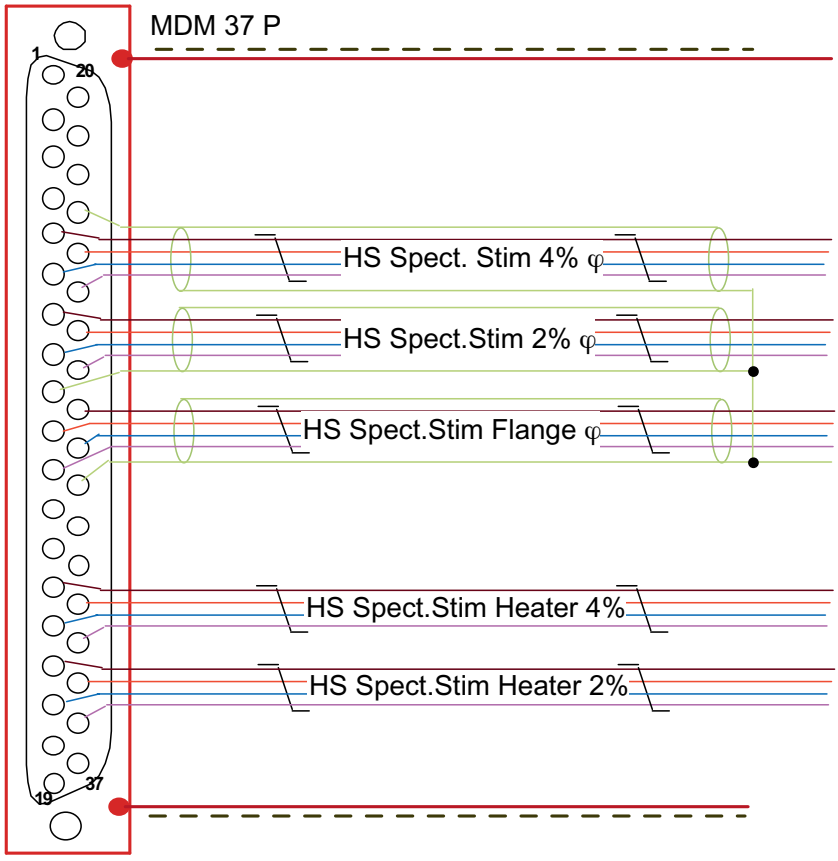
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J19	FA - Cooler (P)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J21	FA – Spect. Stim. (P)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J23	FB – Therm. (P)
MDM 21 P + Glenair 500-T-010-M-21-F-H	to	FPU J17	Shutter (P)

Harness Layup

Cooler Tail (FPU J19)



Spect. Stimulus Tail



Spectrometer Stimulus tails

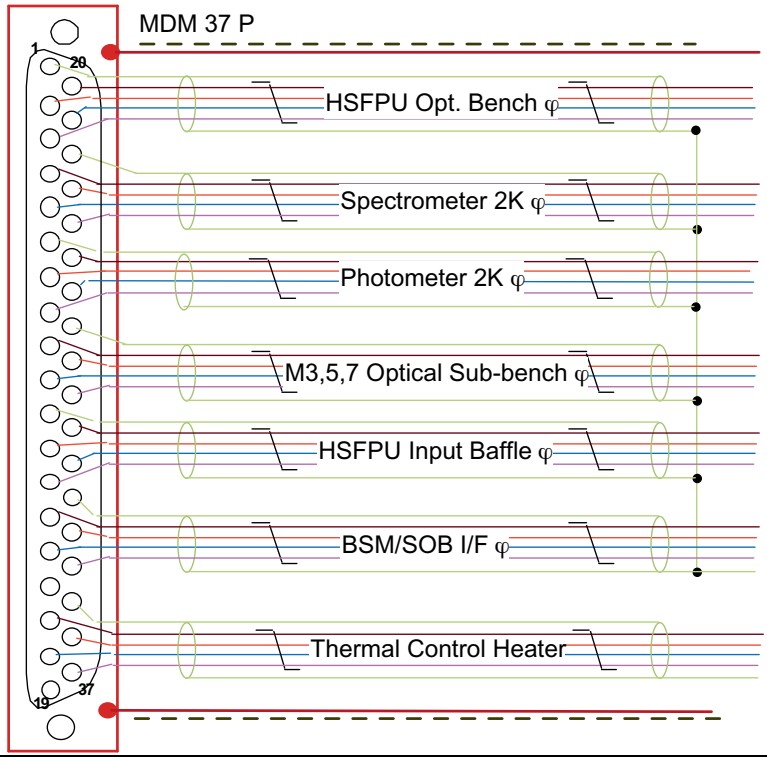
3 insulated screened twisted quads and 2 insulated twisted quads.

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.

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

HSFPU Thermometry Tail



Thermometry tails

7 insulated screened twisted quads.

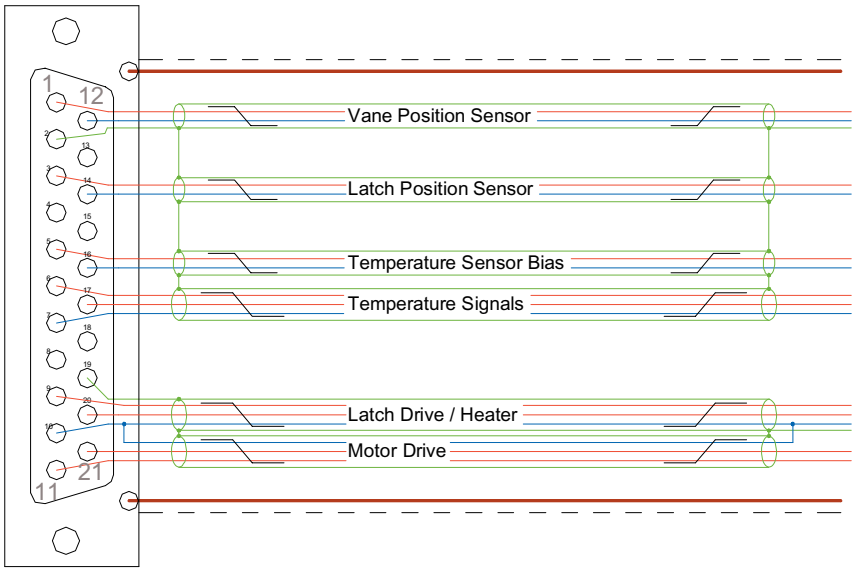
The whole overlain with RF screen shown: ——— NOT joined to backshell CVV end.

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

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)

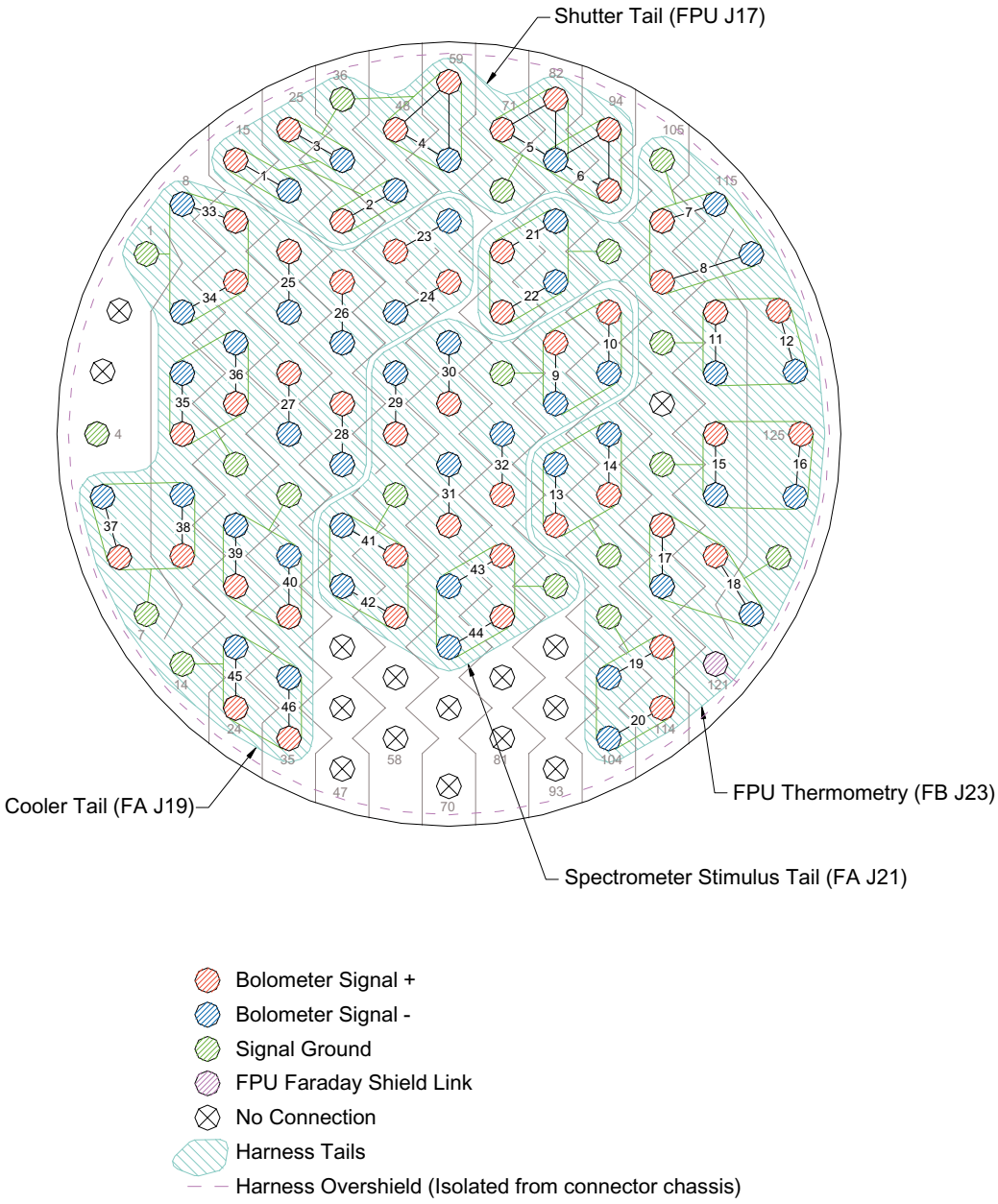
· 3 Insulated STPs
· 3 Insulated STTs

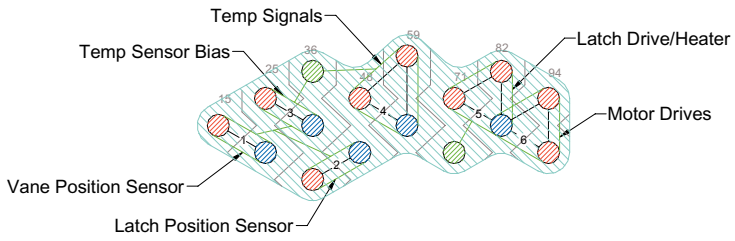
· The whole harness bundle is overlain with an RF screen Indicated by: which is connected to EMC backshells at the Shutter but NOT connected to the wall of the CVV.

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

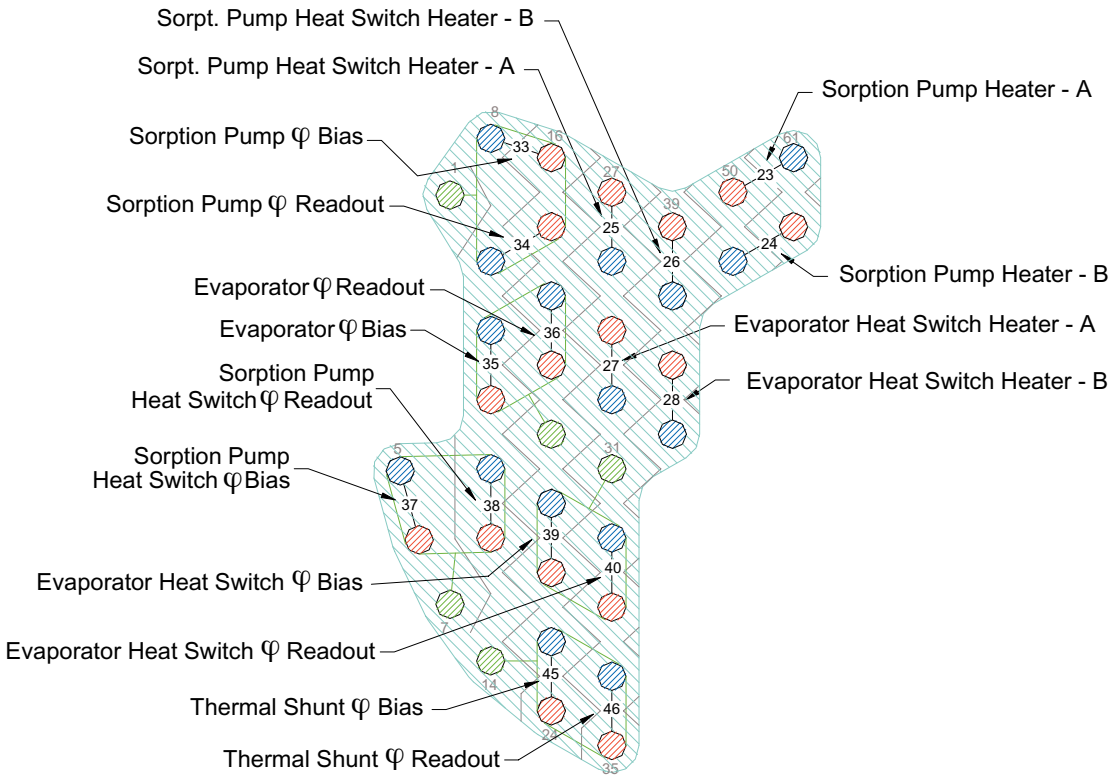
· 16 Pins used on the 128-Way

C10 128-Way Connector Pin Allocations

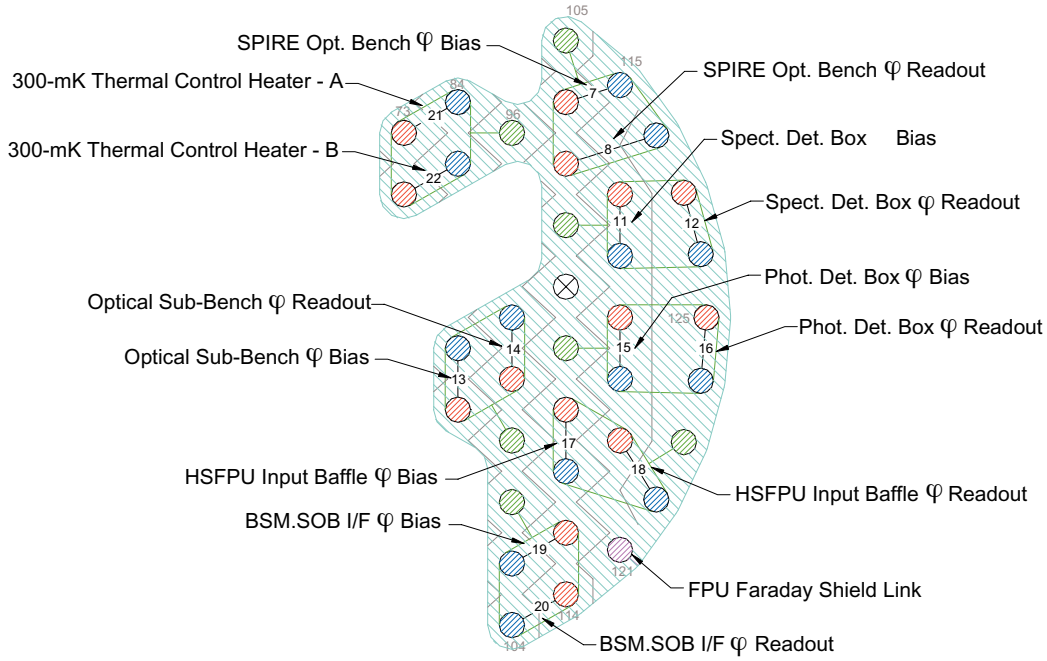




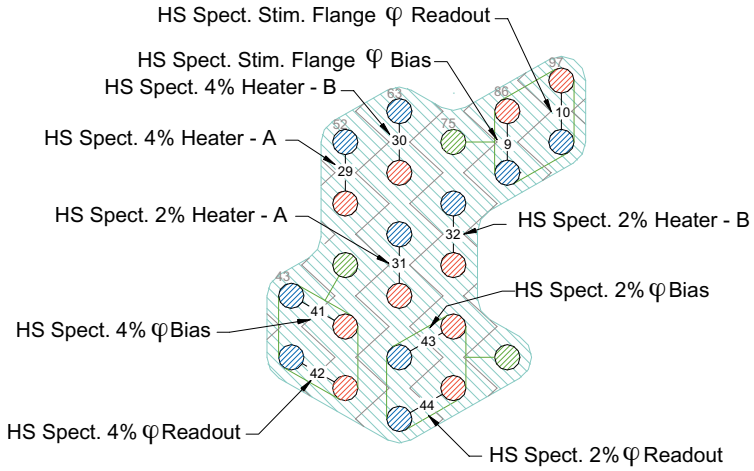
Shutter Tail (FPU J17)



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				

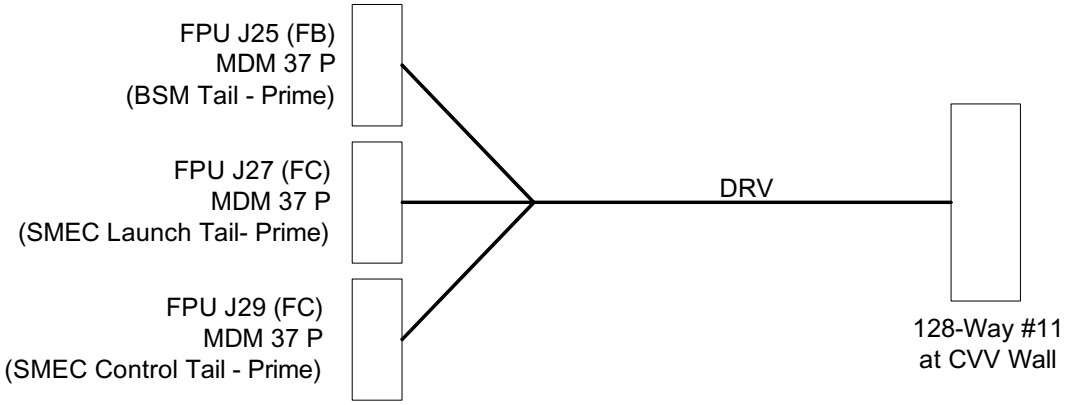
FPU Thermometry Listing

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

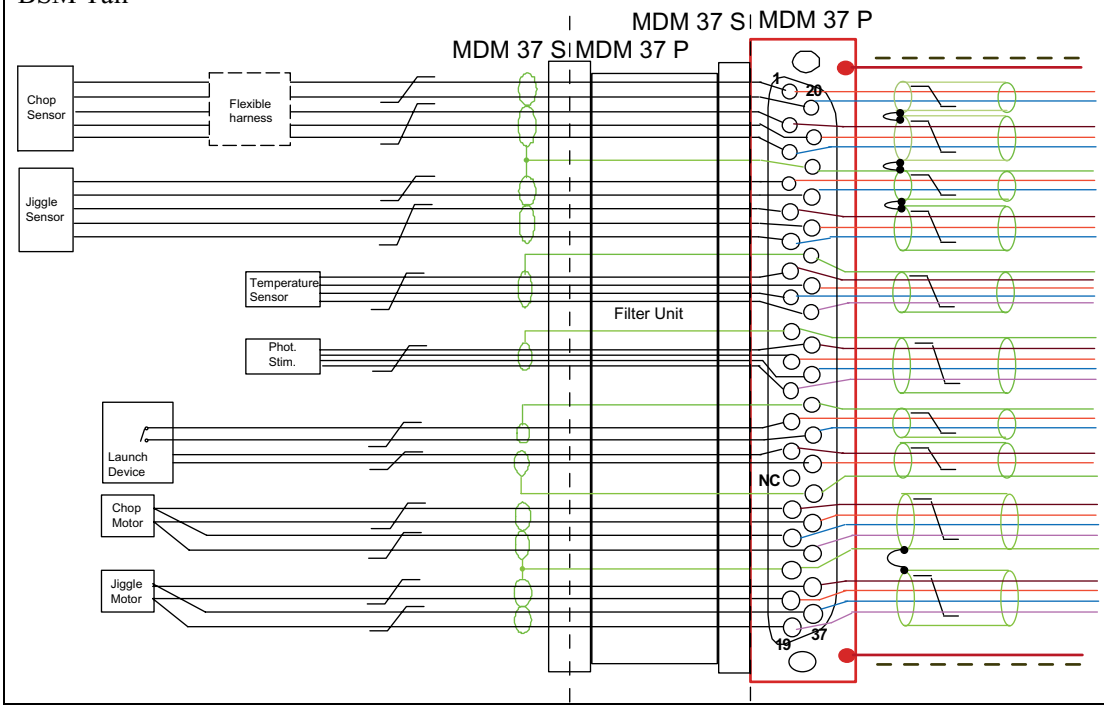


Connector/Backshell Details

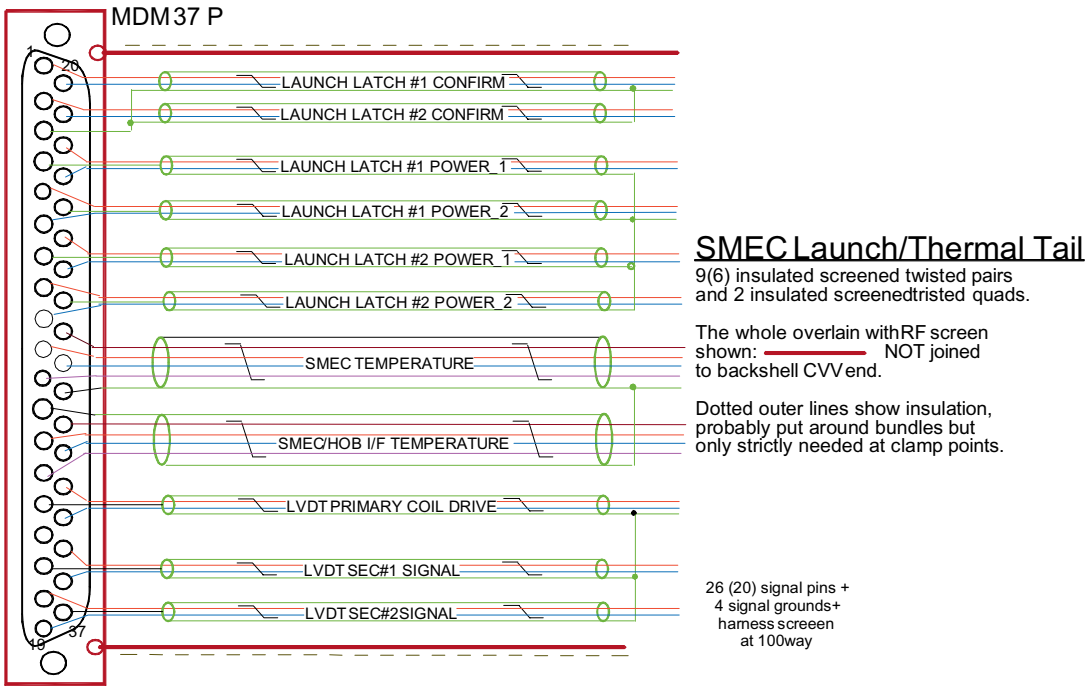
MDM 37 P + Glenair 500-T-010-M-37-F-H to	FPU J25	FB - BSM (P)
MDM 37 P + Glenair 500-T-010-M-37-F-H to	FPU J27	FC - SMEC Launch (P)
MDM 37 P + Glenair 500-T-010-M-37-F-H to	FPU J29	FC - SMEC Control (P)

Harness Layup

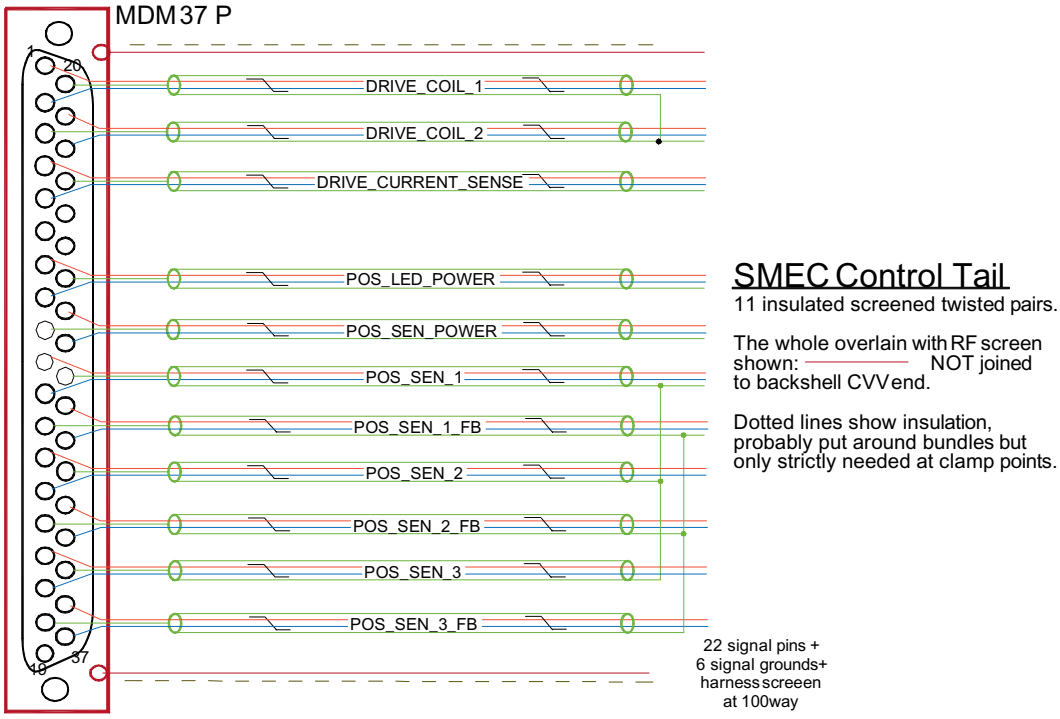
BSM Tail

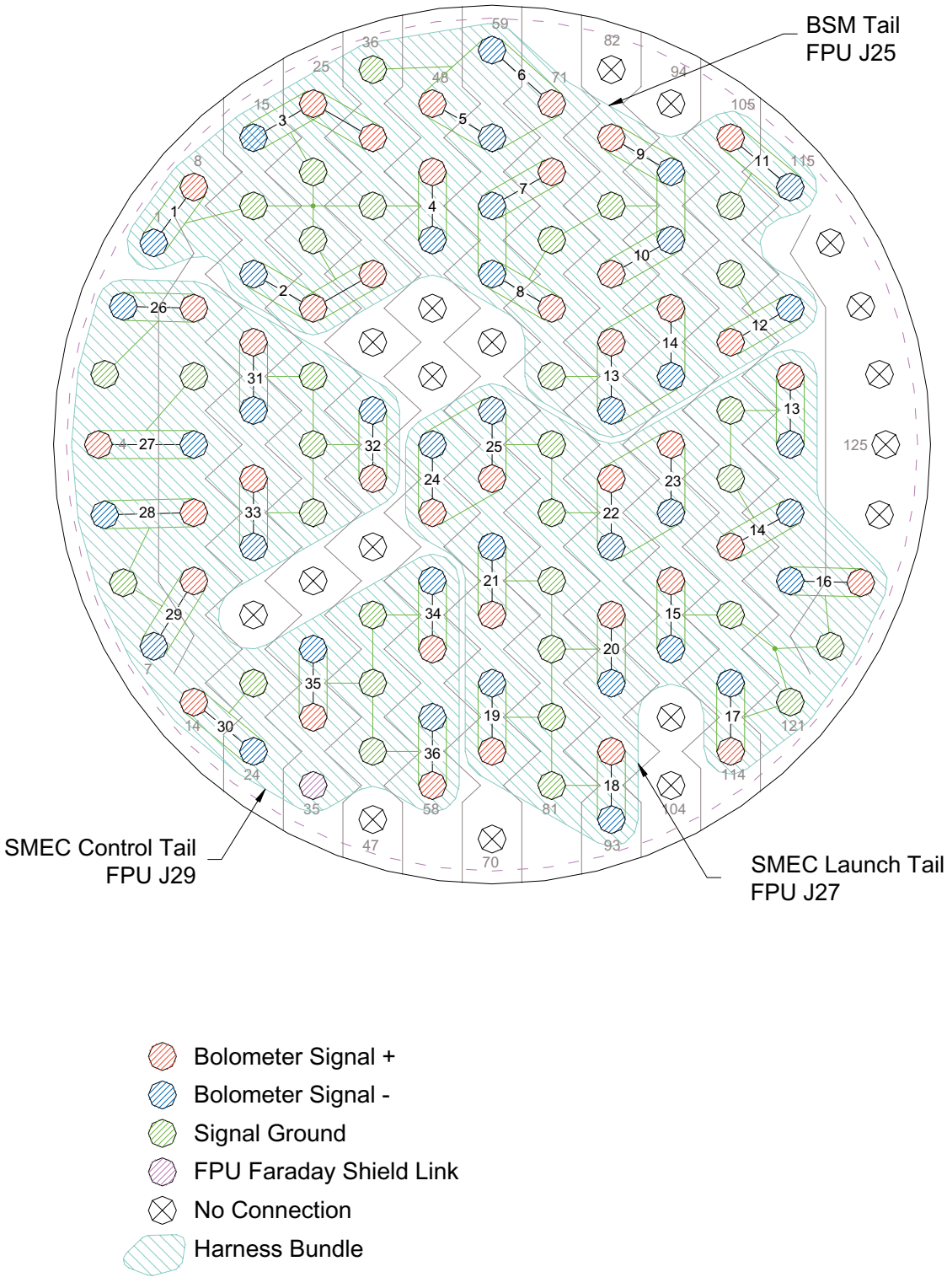


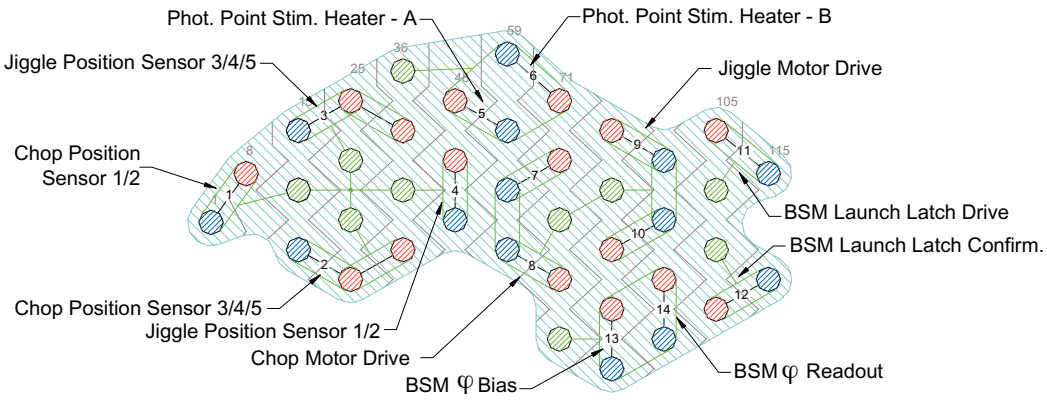
SMEC Launch/Thermal Tail



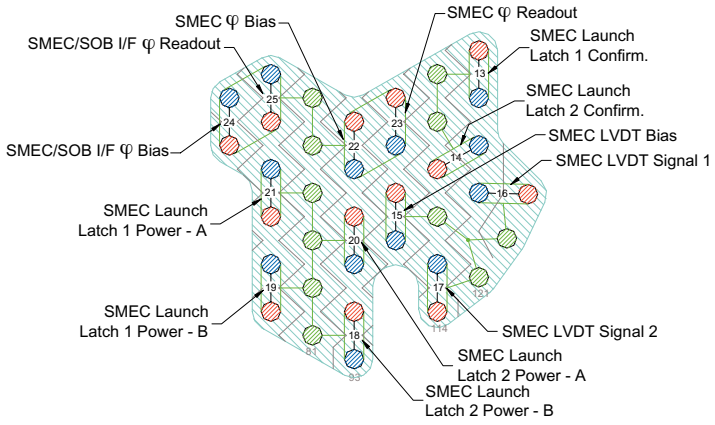
SMEC Control Tail



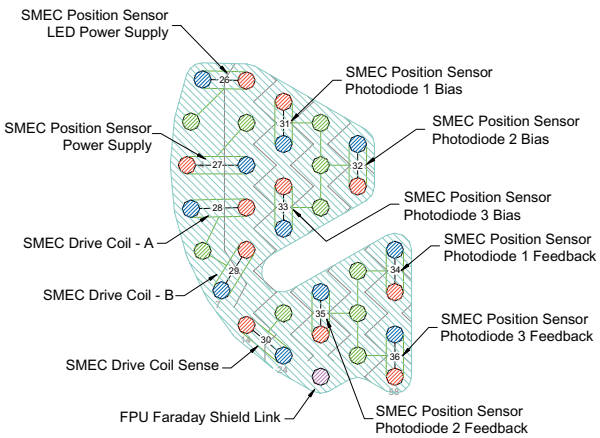

BSM Tail
FPU J25
SMEC Control Tail
FPU J29
SMEC Launch Tail
FPU J27
Bolometer Signal +
Bolometer Signal -
Signal Ground
FPU Faraday Shield Link
No Connection
Harness Bundle



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.

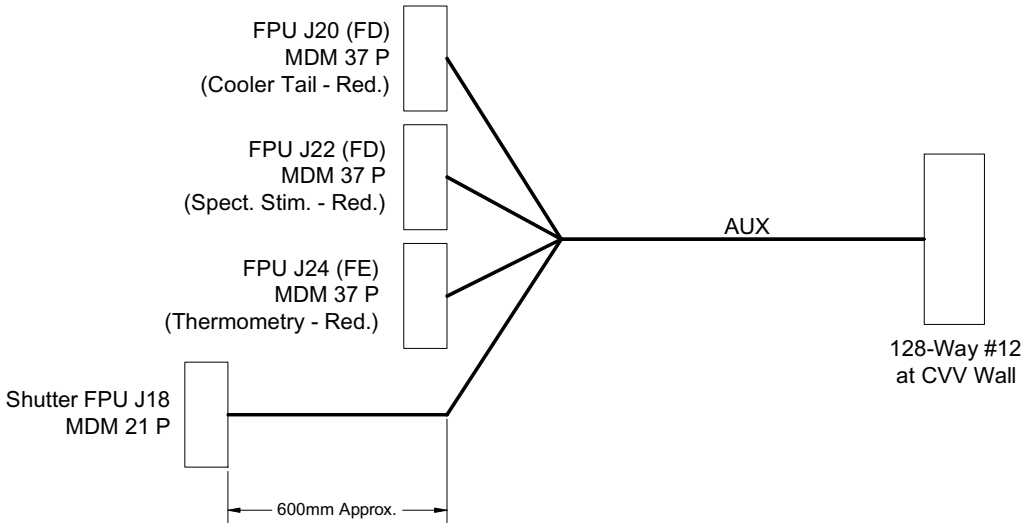
Total used through 128 Way = 36 + 31+ 29 = 96.

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	FPU J20	FD - Cooler (R)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J22	FD - Spect. Stim (R)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J24	FE - Therm. (R)
MDM 21 P + Glenair 500-T-010-M-21-F-H	to	FPU J18	Shutter (R)

Harness Layup

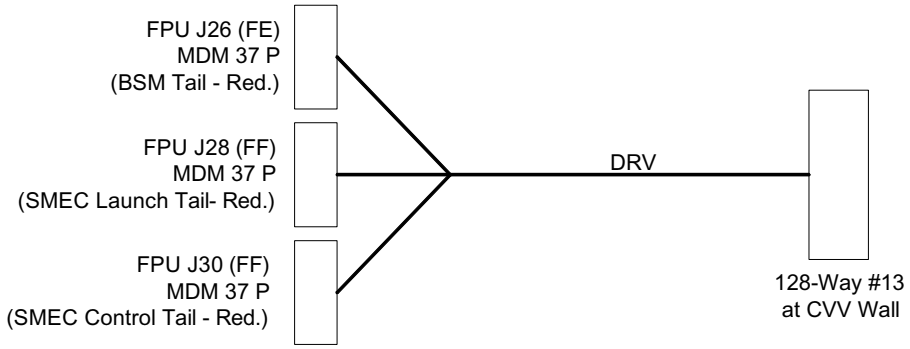
Redundant/identical version of C10

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

MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J26	FE - BSM (R)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J28	FF - SMEC Launch (R)
MDM 37 P + Glenair 500-T-010-M-37-F-H	to	FPU J30	FF - SMEC Control (R)

Harness Layup

As C11.

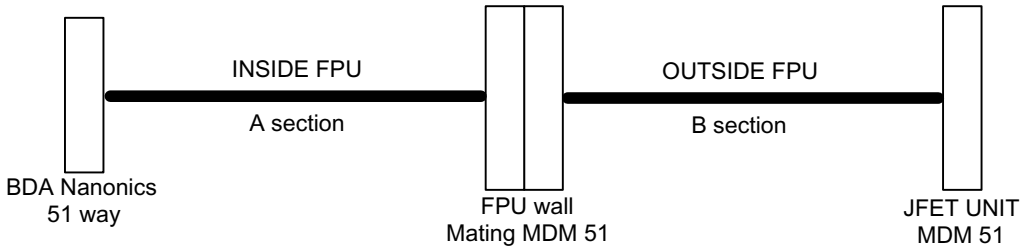
Contact Details

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

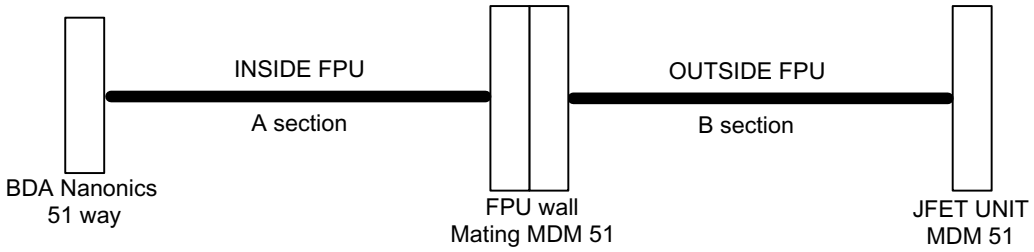
Function	MDM51 contact	Cable	Nanonics contact
Channel A +	35	12-ax	1
Channel A -	51		26
Channel Agnd	To 12-ax shield one end		To 12-ax shield one end
Channel B +	17		2
Channel B -	18		27
Channel Bgnd	To 12-ax shield one end		To 12-ax shield one end
Channel C +	15		3
Channel C -	16		28
Channel Cgnd	To 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.

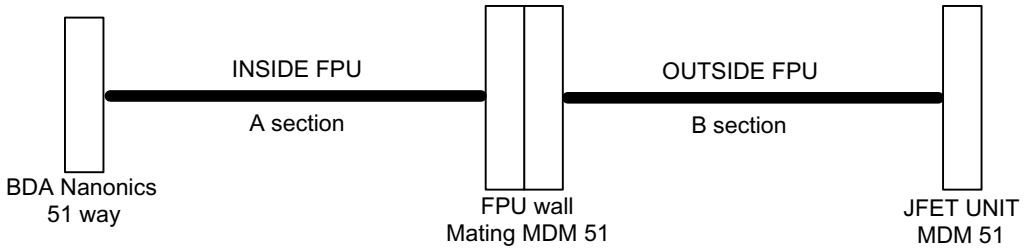
As F1, length a variable

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.

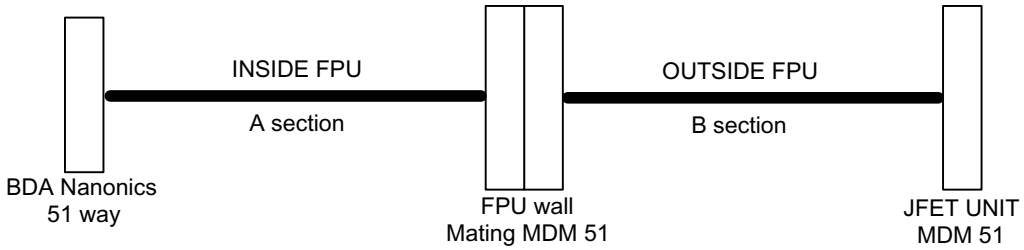
As F1, length a variable

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.

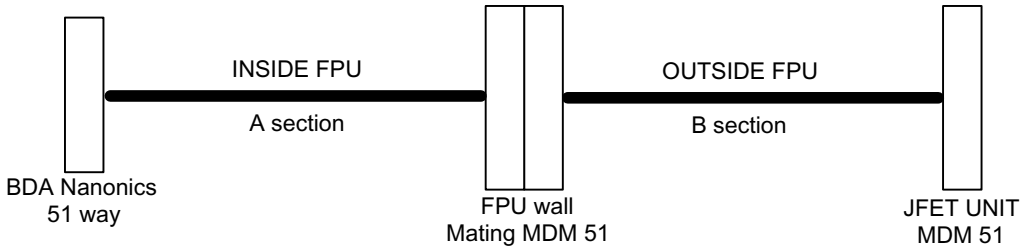
As F1, length a variable

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.

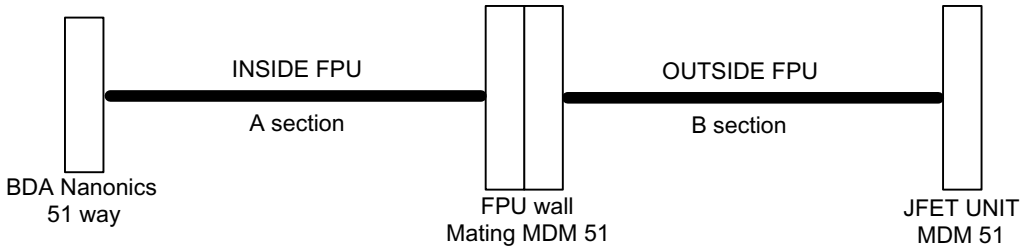
As F1, length a variable

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.

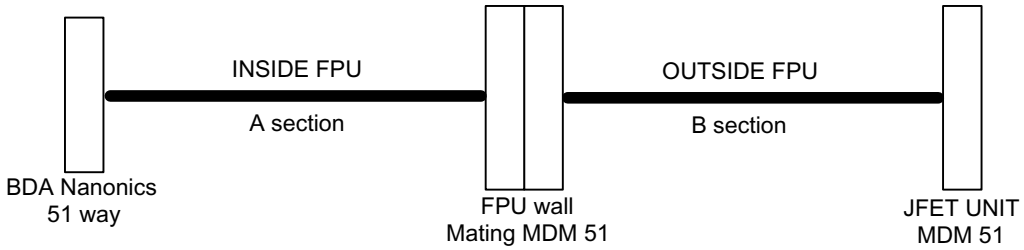
As F1, length a variable

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.

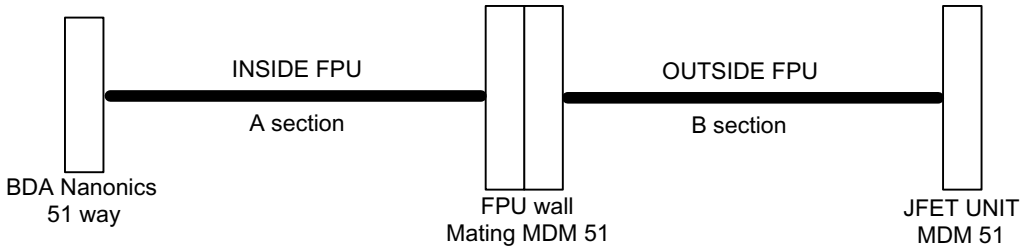
As F1, length a variable

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.

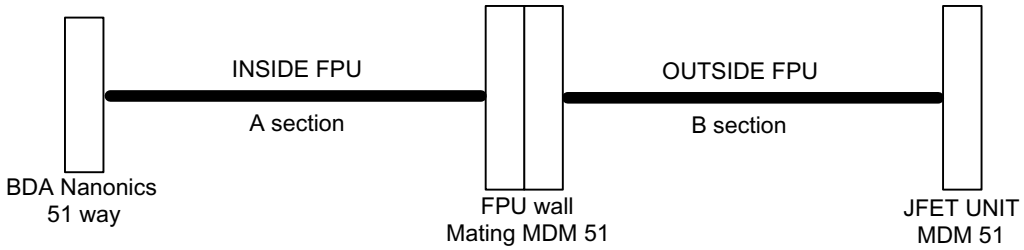
As F1, length a variable

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.

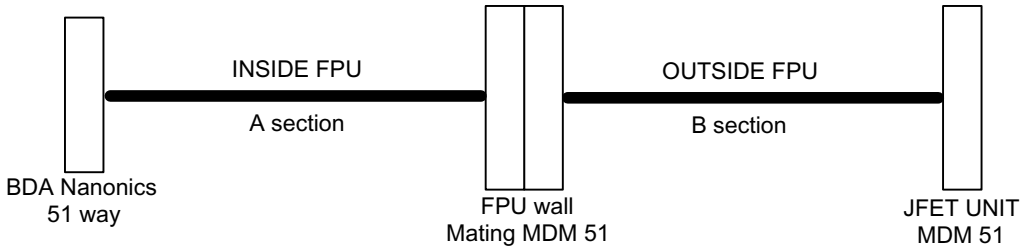
As F1, length a variable

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.

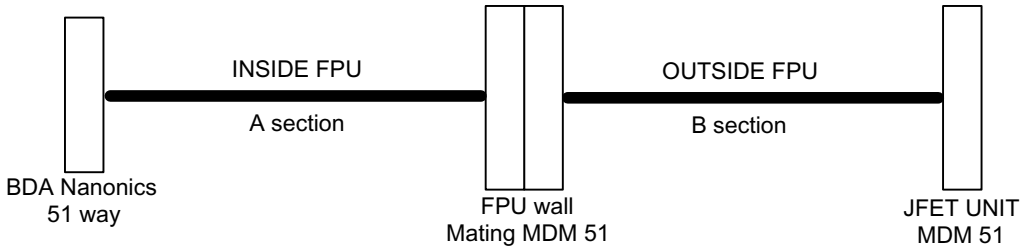
As F1, length a variable

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.

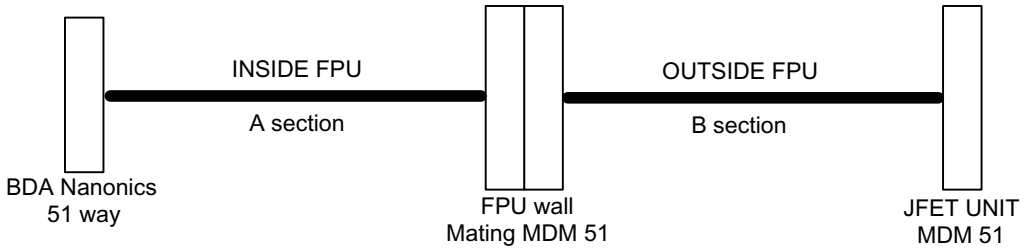
As F1, length a variable

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.

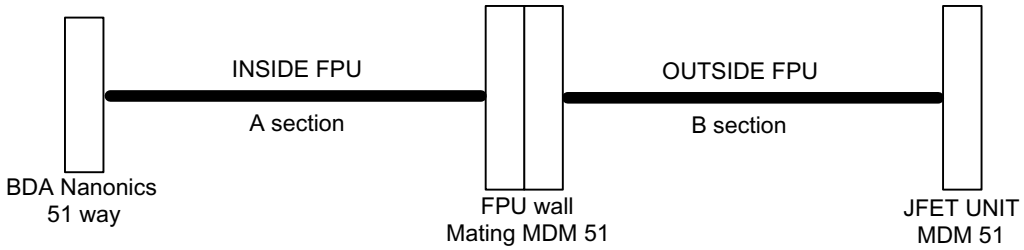
As F1, length a variable

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.

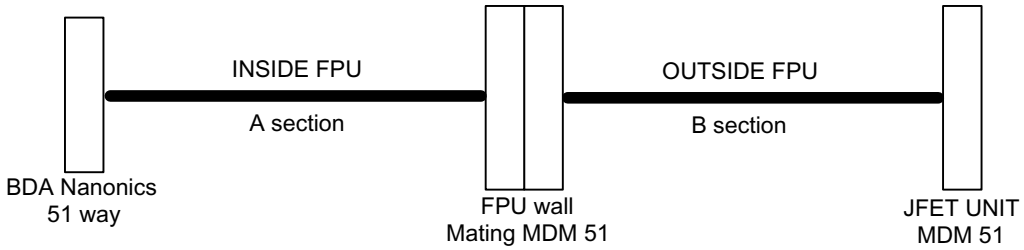
As F1, length a variable

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.

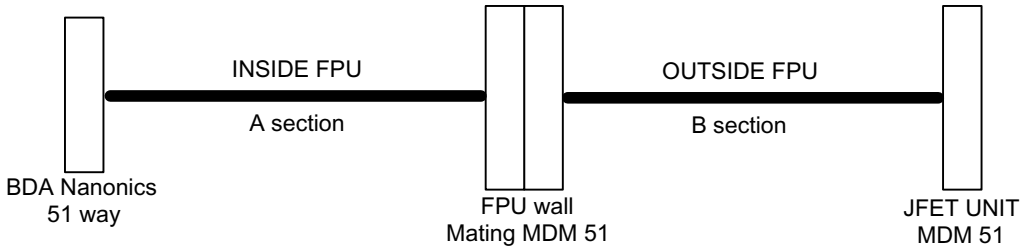
As F1, length a variable

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	

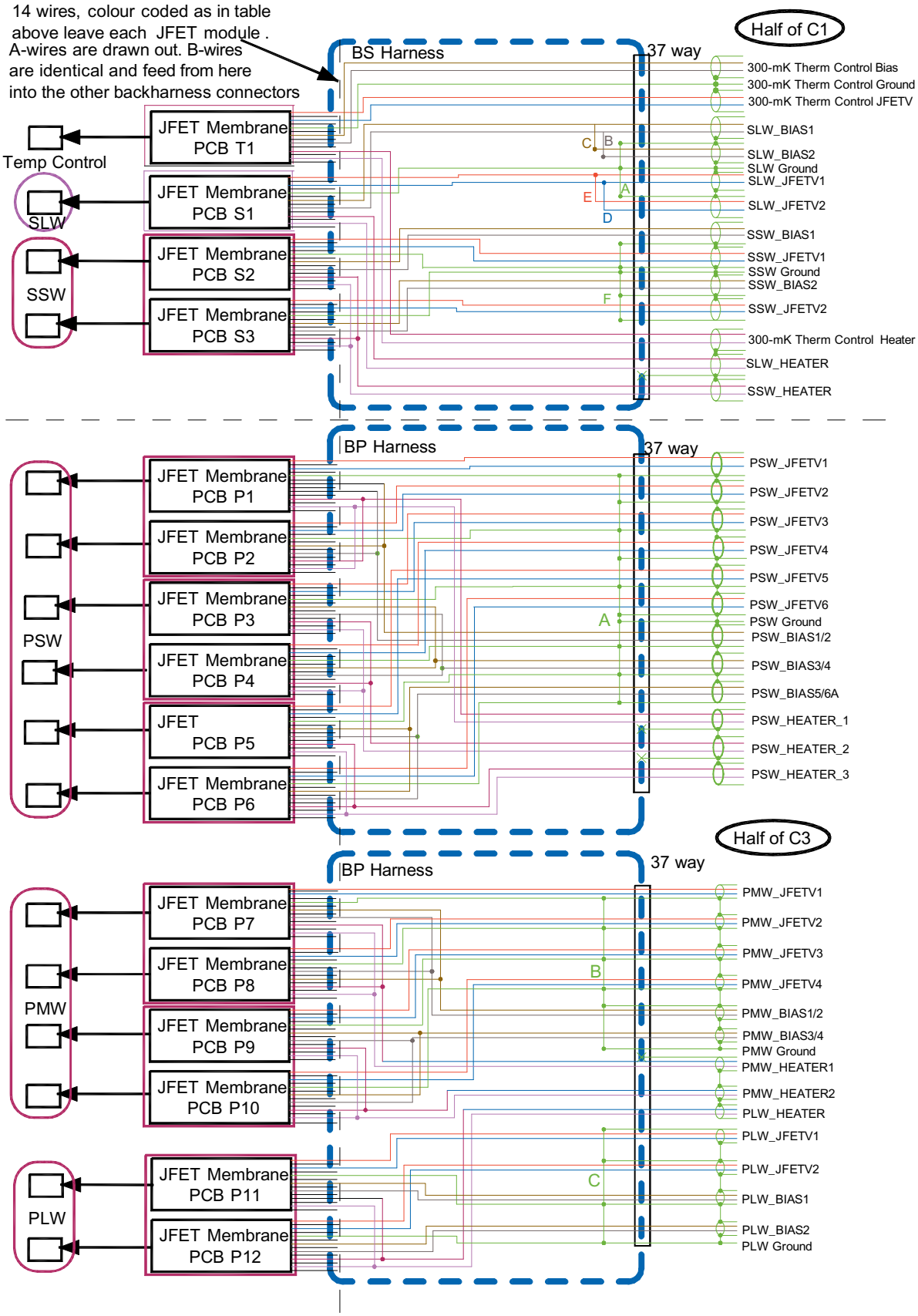
For the photometer, the 4 x 37 = 148 C3 harness contacts cannot accommodate all the 12 x 14 =168 contacts from the JFET boxes. However not all these possible 168 at the 37 way filters can proceed through the 100(128) ways available in the C3 harness. A similar situation applies for the spectrometer. 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.

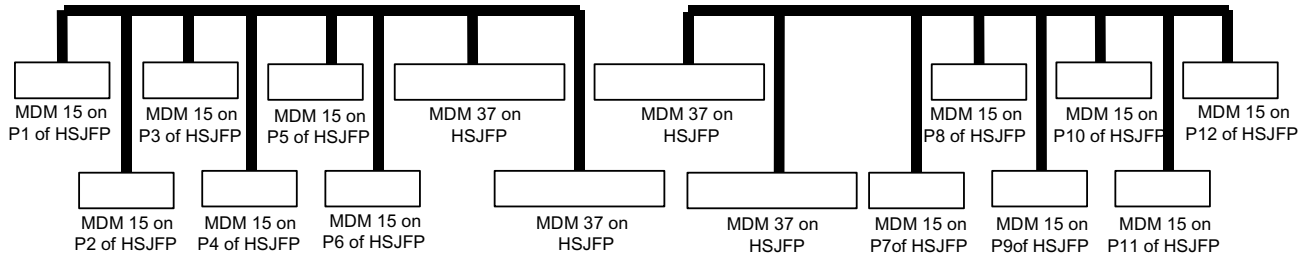
Looking at the table above*, note that the A and B wires for each of these functions must be linked in the HSDCU to maintain cryoharness robustness against single wire breakage, *whether or not* they then split into two again and feed into Prime and Redundant DCU electronics functions. The A and B wires 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
BS Harness
37 way
Half of C1
Temp Control
SLW
SSW
JFET Membrane PCB T1
JFET Membrane PCB S1
JFET Membrane PCB S2
JFET Membrane PCB S3
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
BP Harness
37 way
PSW
JFET Membrane PCB P1
JFET Membrane PCB P2
JFET Membrane PCB P3
JFET Membrane PCB P4
JFET PCB P5
JFET Membrane PCB P6
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
Half of C3
BP Harness
37 way
PMW
PLW
JFET Membrane PCB P7
JFET Membrane PCB P8
JFET Membrane PCB P9
JFET Membrane PCB P10
JFET Membrane PCB P11
JFET Membrane PCB P12
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

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`

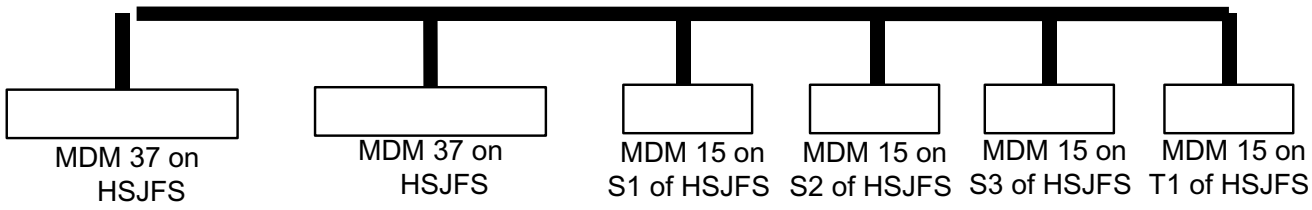
	HSJFP				PSW Backplane Harness						PMW/PLW Backplane Harness					
Name	**J25 37way**	**J26 37way**	**J27 37way**	**J28 37way**	**P1 15 way**	**P2 15 way**	**P3 15 way**	**P4 15 way**	**P5 15 way**	**P6 15 way**	**P7 15way**	**P8 15way**	**P9 15way**	**P10 15way**	**P11 15way**	**P12 15way**
PSW_JFETV1_A +	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		

	HSJFS		SSW/SLW Backplane Harness			
Function	**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)

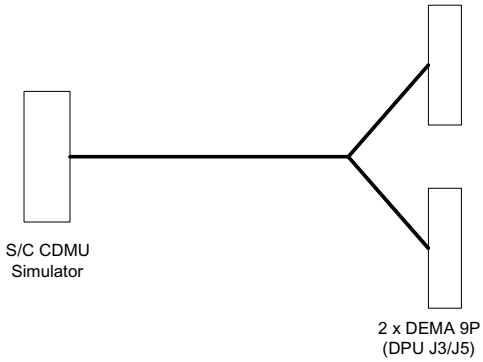
E – This wire is spliced within the SSW/SLW Backplane Harness to the SLW_JFETV_1 +ve (i.e. Pin 5 (TBC) is spliced with pin 22 (TBC) on the 37 Way connector J9/J10)

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

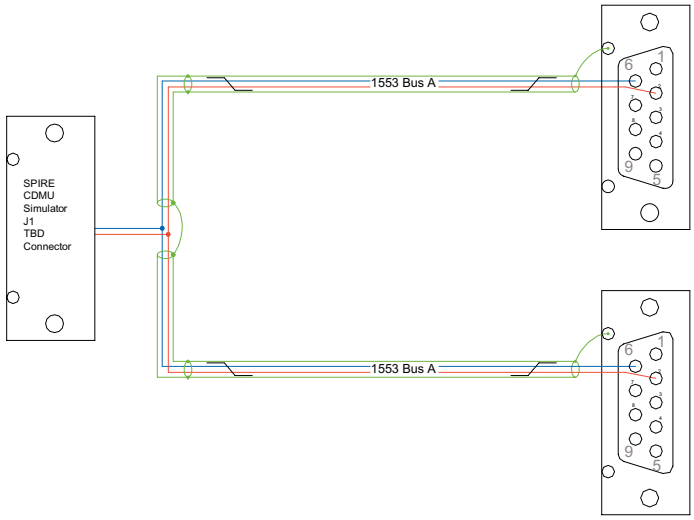
Overall Mechanical Drawing



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

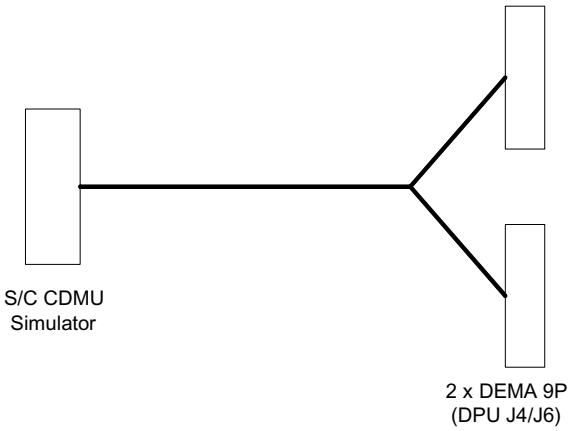
Harness Layup



Contact Details

4.7.2 T2 1553 Bus B

Overall Mechanical Drawing

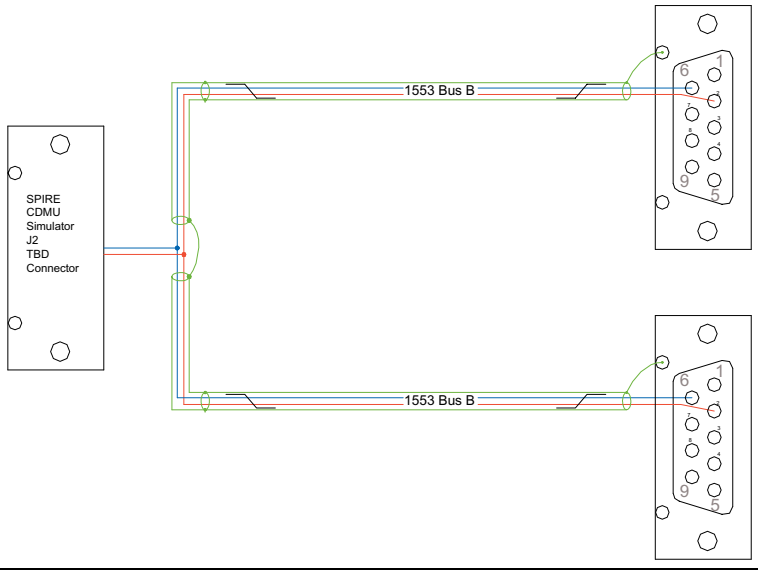


Connector/Backshell Details

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

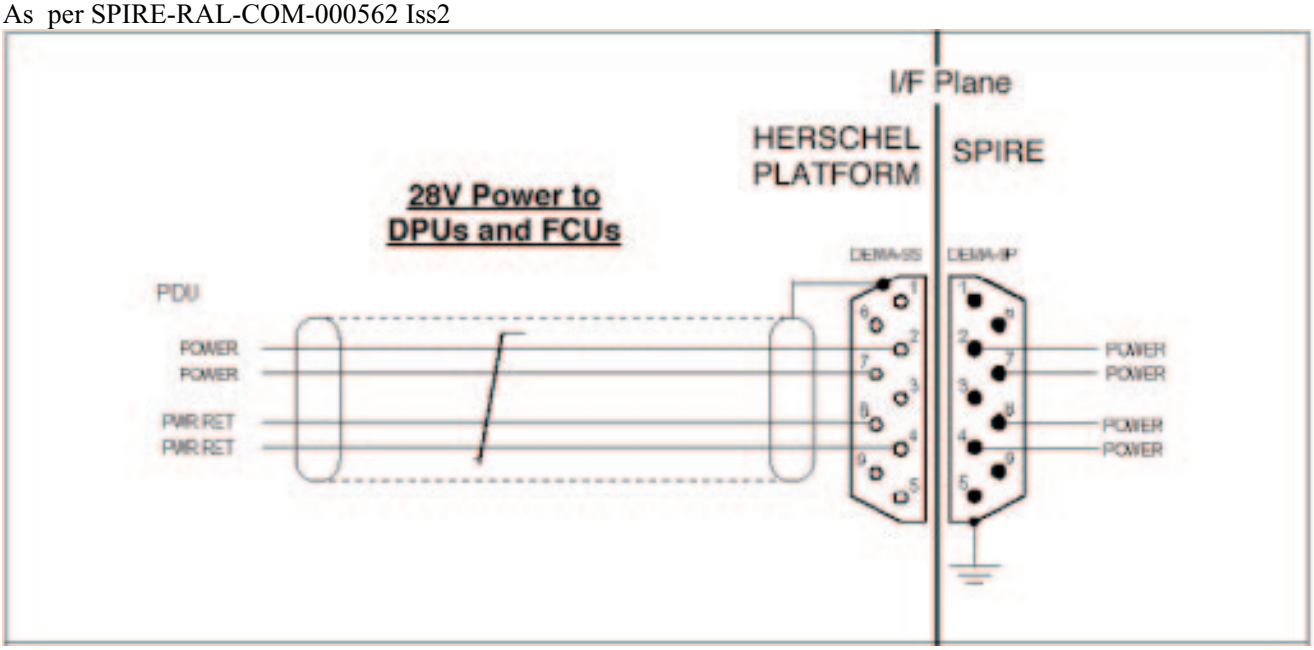
Overall Mechanical Drawing

Connector/Backshell Details

To HSDPU J1

Harness Layup

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



4.7.4 T4 DPU-R Power

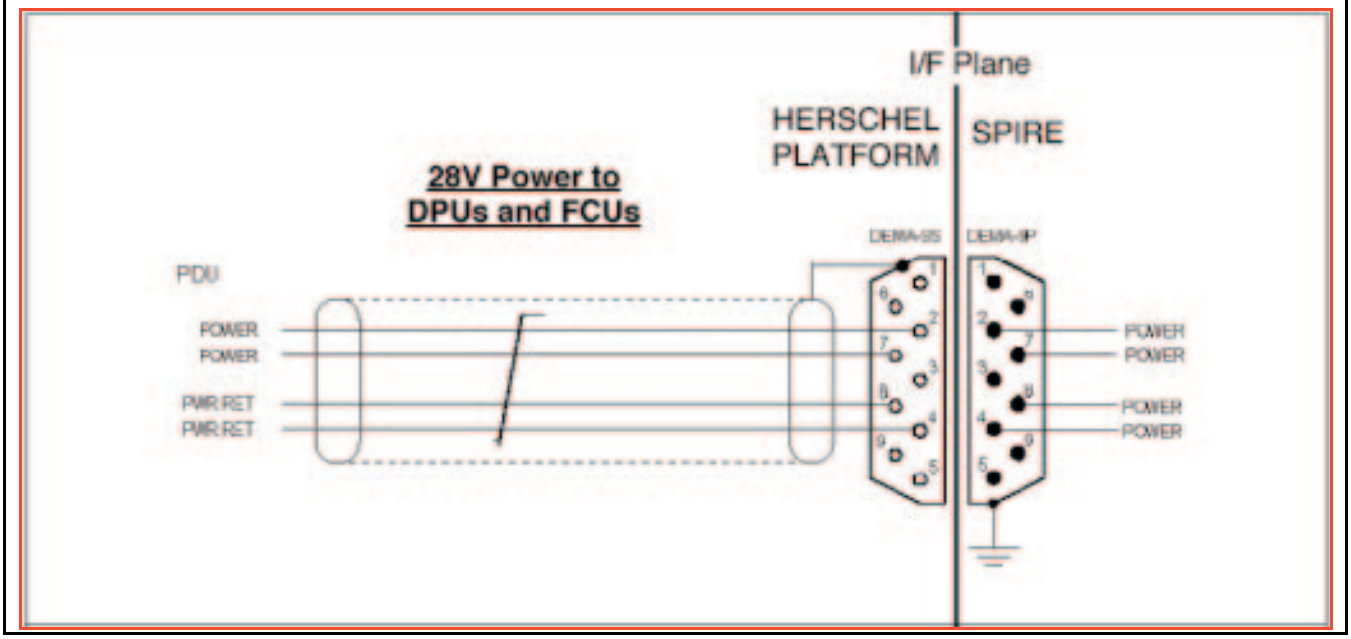
Overall Mechanical Drawing

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

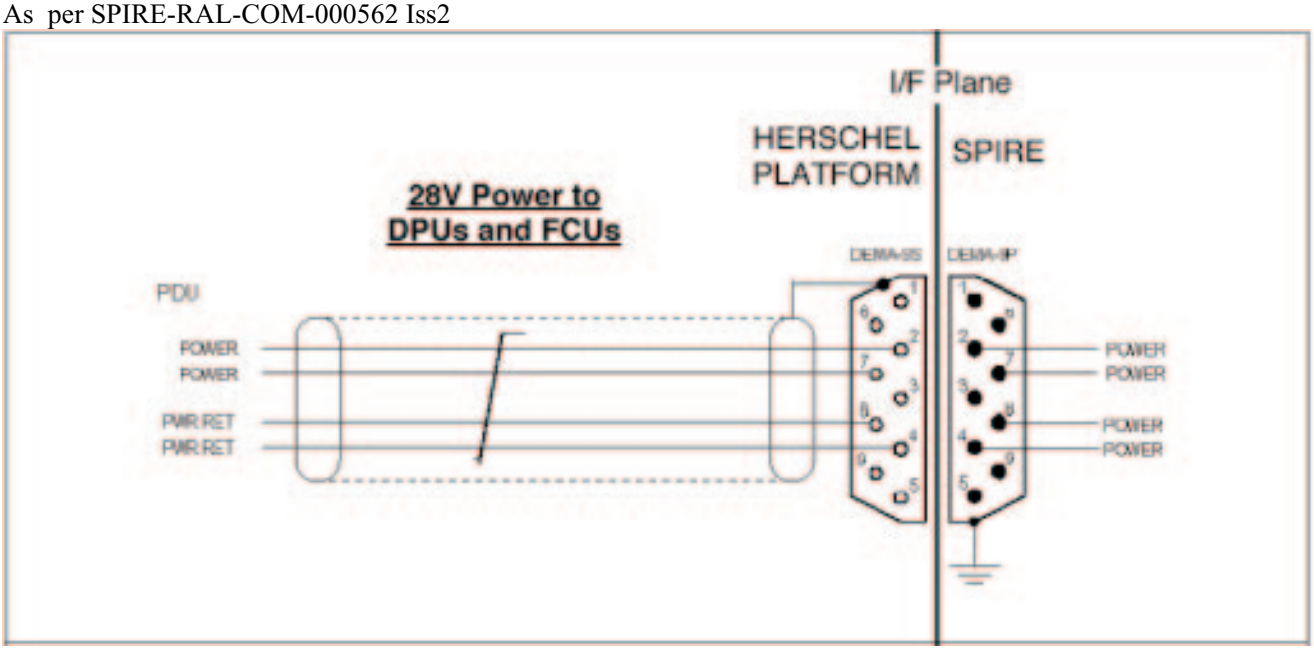
1:1

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

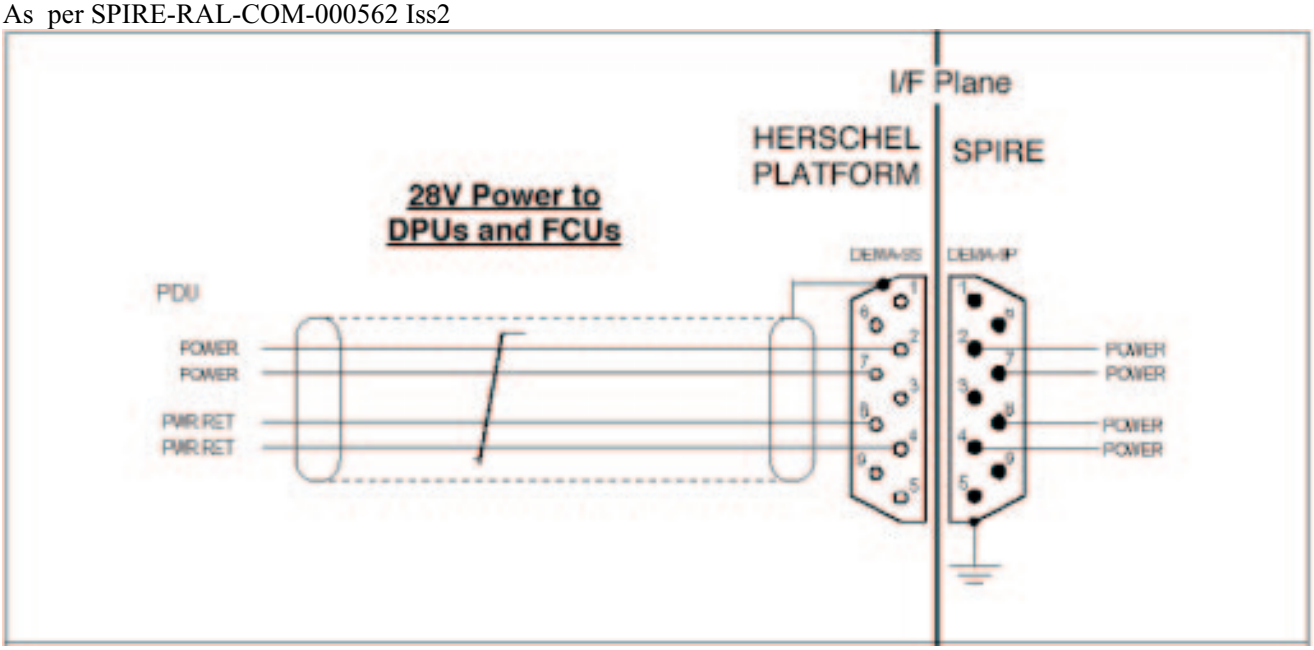
1:1

Connector/Backshell Details

To HSFCU J6

Harness Layup

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

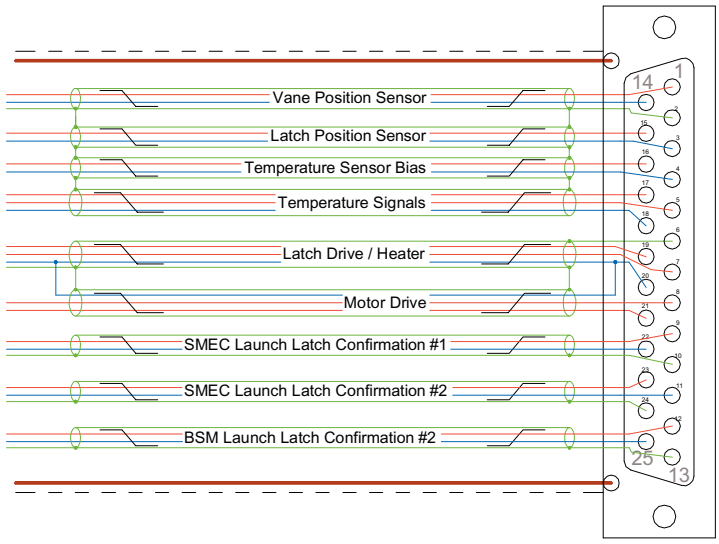


4.7.7 T7 SHT via FCU-P

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. 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.

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. 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
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	CVV 10	FPU J19	MDM 37P	Sorption Pump Heater	4	0	TQ	10			2.5E-02	6.3E-03	2%	33%	1%	
Aux-P				Heat switch heaters	8	0	TQ	50			1.5E-03	3.8E-04	2%	33%	1%	
				Various cooler thermistors	20	5	STQ	1000			1.0E-06	1.0E-06	100%	33%	33%	
		FPU J21	MDM 37P	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	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%	
Drive-P				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

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	CVV 12	FPU J20	MDM 37P	Sorption Pump Heater	4	0	TQ	10			2.5E-02	0.0E+00	2%	33%	1%	
Aux-R				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					
				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	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%	
Drive-R				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

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. 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
I1/E1	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
Type3				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	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
Type4				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						

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						

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.

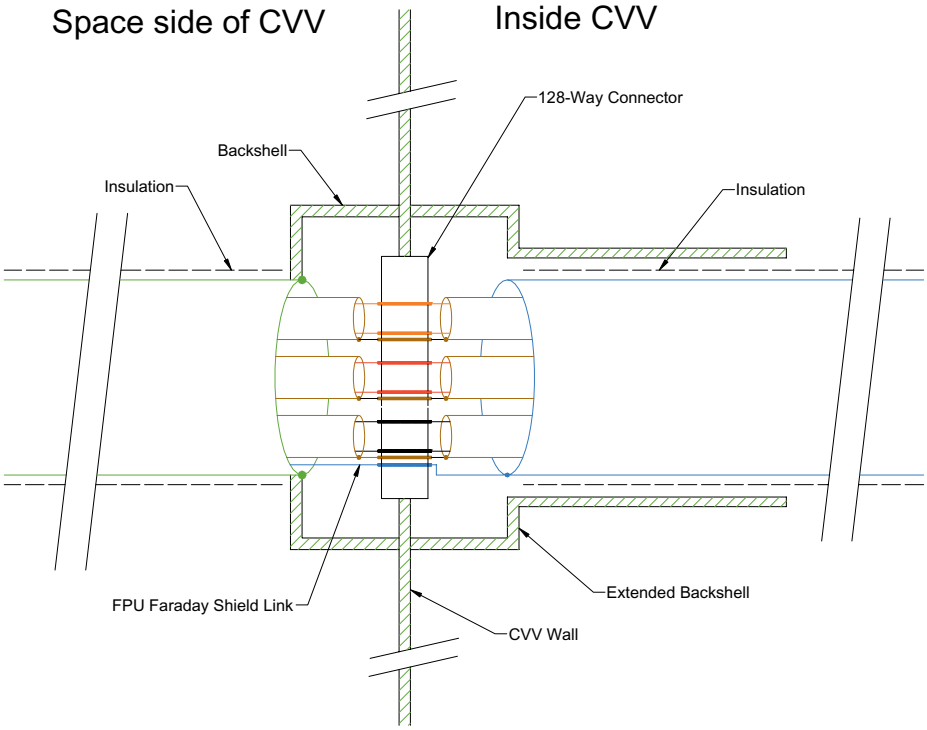
Using the black wires as screens for twisted pairs (red and blue), capacitance and thermal conductivity are low compared to four screened twisted pairs and cross-talk is apparently acceptable.

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.

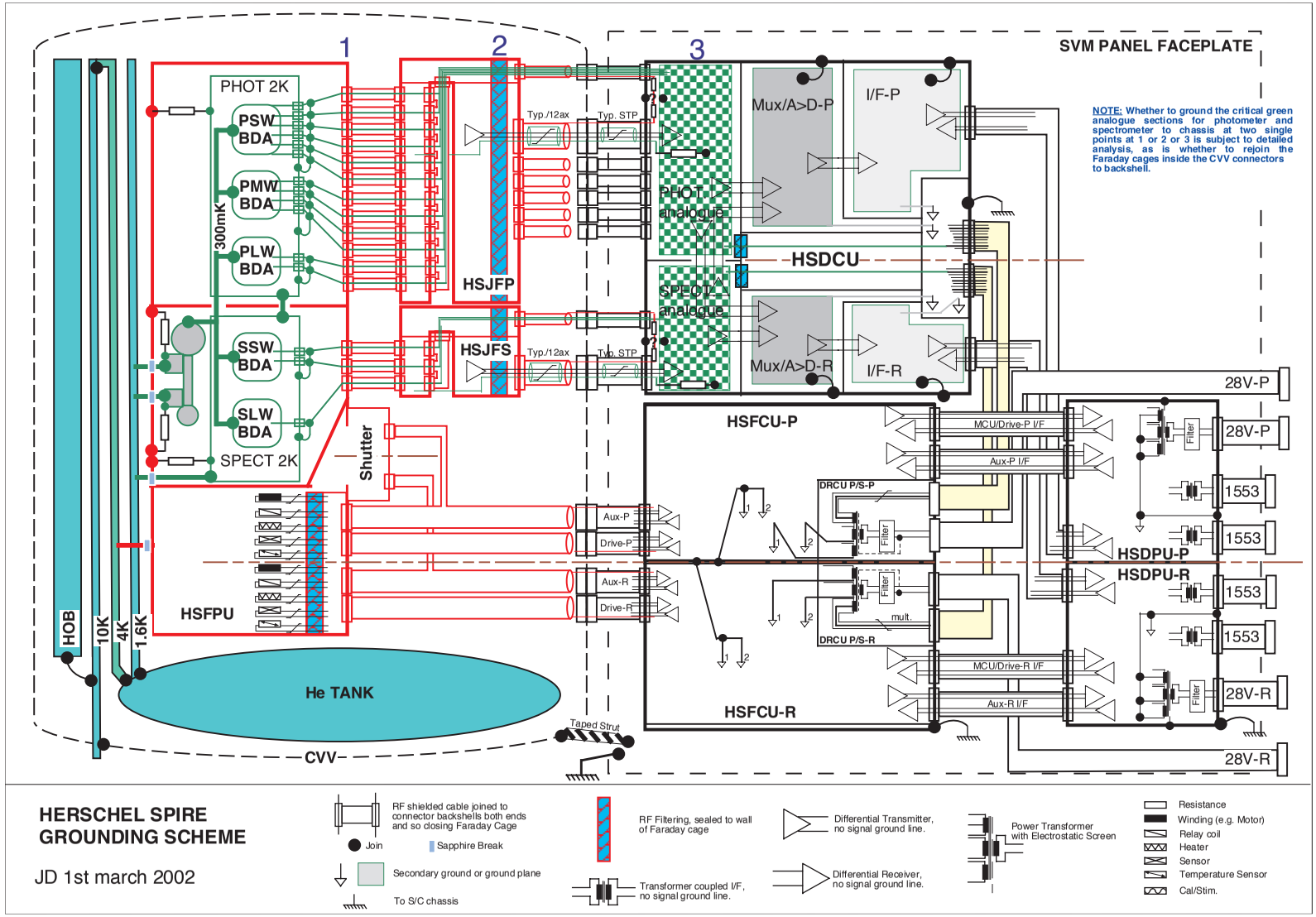
Annex 5 – CVV Bulkhead EMI Backshells

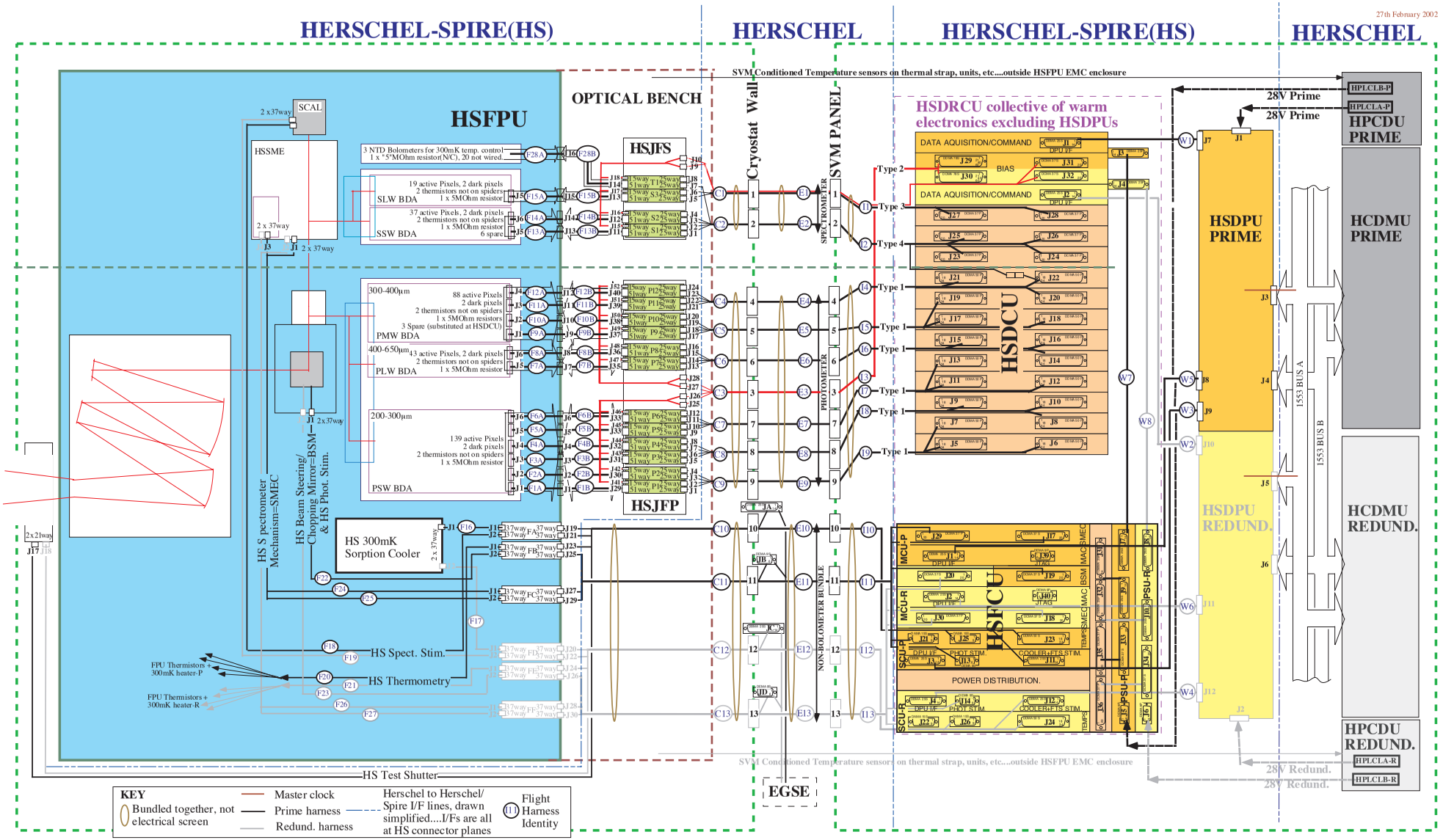
Space Side: The overshields of the cryoharnesses I1-I13 between the DRCU and the 128-way connectors in the wall of the cryostat are terminated at the EMI backshell as shown below. Links to the overshields of the C1-13 harnesses pass through contacts in the 128-way connectors and are carried as wires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



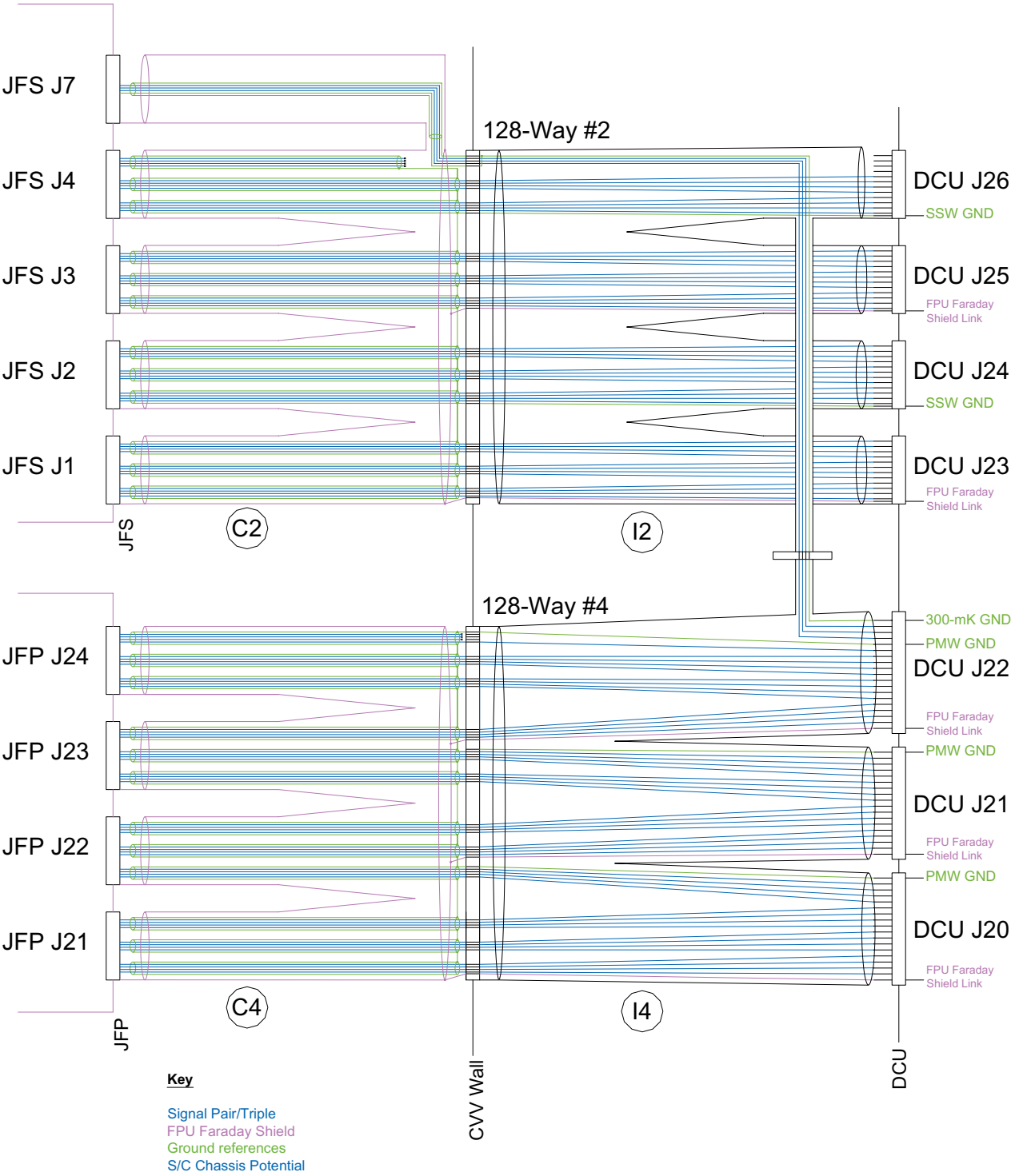
Annex 6 - SPIRE Grounding Diagram




27th February 2002
HERSCHEL-SPIRE(HS)
HERSCHEL
HERSCHEL-SPIRE(HS)
HERSCHEL
HSFPU
OPTICAL BENCH
HSJFS
HSJFP
Cryostat Wall
SVM PANEL
SVM Conditioned Temperature sensors on thermal strap, units, etc....outside HSFPU EMC enclosure
HSDRCU collective of warm electronics excluding HSDPUs
DATA AQUISITION/COMMAND
BIAS
HSDCU
HSFCU
HSDPU PRIME
HSDPU REDUND.
28V Prime
28V Prime
HPLCLB-P
HPLCLA-P
HPCDU PRIME
HCDMU PRIME
HCDMU REDUND.
HPCDU REDUND.
HPLCLA-R
HPLCLB-R
28V Redund.
28V Redund.
1553 BUS A
1553 BUS B
SCAL
HSSME
3 NTD Bolometers for 300mK temp. control
1 x *5"MOhm resistor(N/C), 20 not wired.
SLW BDA
SSW BDA
PMW BDA
PLW BDA
PSW BDA
HS S pectrometer Mechanism=SMEC
HS Beam Steering/ Chopping Mirror=BSM & HS Phot. Stim.
HS 300mK Sorption Cooler
HS Spect. Stim.
HS Thermometry
HS Test Shutter
FPU Thermistors + 300mK heater-P
FPU Thermistors + 300mK heater-R
EGSE
KEY
Bundled together, not electrical screen
Master clock
Prime harness
Redund. harness
Herschel to Herschel/ Spire I/F lines, drawn simplified....I/Fs are all at HS connector planes
Flight Harness Identity

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.