

Subject:	HERSCHEL SPIRE HARNESS DEFINITION
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This isse (0.8) maintains the bolometer signal ‘C’ harnesses in 12-ax. If confirmed, these will change to STP in issue 0.9 as per the ‘I’ harnesses. Also the suggestion that the ‘I’ harness be divided into a section from the CVV connectors to an SVM bracket based on stainless steel construction and another standard copper harness from the SVM bracket to the DRCU is not yet implemented.

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Date:



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 2 of 174

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 44pin 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.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 3 of 174

ISSUE	DATE	SECTION	CHANGE(S) MADE
		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 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 connectors 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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 4 of 174

ISSUE	DATE	SECTION	CHANGE(S) MADE
		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 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
		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
Next Issue (0.9)	ASAP	Annexes 1 & 2	Bring wiring lists into line with issue.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 5 of 174

ACRONYM LIST

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 6 of 174

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 7 of 174

DISTRIBUTION LIST

Institute	Holder	Issue/ Revision and Distribution Date							
		0.1 28/3/01	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
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
	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
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
LAM	Pouliquen	x	x	X	x	x	x	x	x
	Ferrand							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
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
Astrium	Fass						x	x	x

	Hoelzle							x	x
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	SPIRE HARNESS DEFINITION	Doc #: SPIRE-RAL-PRJ-000608 Issue: 0.8 Date: 02/11/01 Page 9 of 174
---	--	---

CONTENTS

CHANGE RECORD.....	2
ACRONYM LIST	5
DISTRIBUTION LIST	7
1 SCOPE.....	11
2 APPLICABLE DOCUMENTS	11
3 INTRODUCTION	12
4 HARNESS DETAILS.....	15
4.1 WARM HARNESSES	15
4.1.1 W1 HSDPU-P to HSDCU-P	15
4.1.2 W2 HSDPU-R to HSDCU-R	16
4.1.3 W3 HSDPU-P to HSSCU-P	17
4.1.4 W4 HSDPU-R to HSSCU-R	18
4.1.5 W5 HSDPU-P to HSMCU-P	19
4.1.6 W6 HSDPU-R to HSMCU-R	20
4.1.7 W7 HSFCU-P to HSDCU-P	21
4.1.8 W8 HSFCU-R to HSDCU-R	22
4.2 INTERMEDIATE HARNESSES	23
4.2.1 I1 HSDCU to CVV1 Type3	23
4.2.2 I2 HSDCU to CVV2 Type4	30
4.2.3 I3 HSDCU to CVV3 Type2	38
4.2.4 I4 HSDCU to CVV4 Type1	46
4.2.5 I5 HSDCU to CVV5 Type1	51
4.2.6 I6 HSDCU to CVV6 Type1	52
4.2.7 I7 HSDCU to CVV7 Type1	53
4.2.8 I8 HSDCU to CVV8 Type1	54
4.2.9 I9 HSDCU to CVV9 Type1	55
4.2.10 I10 HSDCU to CVV10 AUX-P	56
4.2.11 I11 HSDCU to CVV11 DRV-P	64
4.2.12 I12 HSDCU to CVV12 AUX-R	72
4.2.13 I13 HSDCU to CVV13 DRV-R	73
4.3 CRYOGENIC HARNESSES	74
4.3.1 C1 CVV1 to HSJFS Type3	74
4.3.2 C2 CVV2 to HSJFS Type4	80
4.4 C3 CVV3 TO HSJFP TYPE2	86
4.4.1 C4 CVV4 to HSJFP Type1	91
4.4.2 C5 CVV5 to HSJFP Type1	97
4.4.3 C6 CVV6 to HSJFP Type1	98
4.4.4 C7 CVV7 to HSJFP Type1	99
4.4.5 C8 CVV8 to HSJFP Type1	100
4.4.6 C9 CVV9 to HSJFP Type1	101
4.4.7 C10 CVV10 to HSFPU AUX-P	102
4.4.8 C11 CVV11 to HSFPU DRV-P	111
4.4.9 C12 CVV12 to HSFPU AUX-R	119
4.4.10 C13 CVV13 to HSFPU DRV-R	120
4.5 FPU HARNESSES	121
4.5.1 F1[A&B] PSW-A BDA to HSJFP	121
4.5.2 F2[A&B] PSW-B BDA to HSJFP	123
4.5.3 F3[A&B] PSW-C BDA to HSJFP	124



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 10 of 174

4.5.4	F4[A&B] PSW-D BDA to HSJFP.....	125
4.5.5	F5[A&B] PSW-E BDA to HSJFP.....	126
4.5.6	F6[A&B] PSW-F BDA to HSJFP.....	127
4.5.7	F7[A&B] PMW-A BDA to HSJFP.....	128
4.5.8	F8[A&B] PMW-B BDA to HSJFP.....	129
4.5.9	F9[A&B] PMW-D BDA to HSJFP.....	130
4.5.10	F10[A&B] PMW-D BDA to HSJFP.....	131
4.5.11	F11[A&B] PLW-A BDA to HSJFP.....	132
4.5.12	F12[A&B] PLW-B BDA to HSJFP.....	133
4.5.13	F13[A&B] SSW-A BDA to HSJFS.....	134
4.5.14	F14[A&B] SSW-B BDA to HSJFS.....	135
4.5.15	F15[A&B] SLW-A BDA to HSJFS.....	136
4.5.16	F16 COOLER-P to FA.....	137
4.5.17	F17 COOLER-R to FA.....	138
4.5.18	F18 SPECT_STIM-P to FA.....	139
4.5.19	F19 SPECT_STIM-R to FD.....	140
4.5.20	F20 THERM-P from FA.....	141
4.5.21	F21 THERM-R from FE.....	142
4.5.22	F22 BSM-P to FB.....	143
4.5.23	F23 BSM-R to FE.....	144
4.5.24	F24 SMECSIG-P to FC.....	145
4.5.25	F25 SCECDRV-P to FC.....	146
4.5.26	F26 SMECSIG-R to FF.....	147
4.5.27	F27 SMECDRV-P to FF.....	148
4.5.28	F28 300-mK Thermal Control Hardware to HSJFS.....	149
4.6	JFET UNIT BACK-HARNESSES.....	150
4.6.1	Overview.....	150
4.6.2	BP-Photometer.....	152
4.6.3	BS-Spectrometer (To be updated).....	156
4.7	TEST HARNESSES.....	159
4.7.1	T1 Primary 1553 Bus + System Clock.....	159
4.7.2	T2 Secondary 1553 Bus.....	160
4.7.3	T3 DPU-P Power.....	161
4.7.4	T4 DPU-R Power.....	162
4.7.5	T5 FCU-P Power.....	163
4.7.6	T6 FCU-R Power.....	164
4.7.7	T7 SHT via FCU-P.....	165
4.7.8	T8 SHT via FCU-R.....	166
ANNEX. 1 – INTERNAL CRYOSTAT WIRING LIST (NEEDS TO BE UPDATED).....		167
ANNEX 2 – EXTERNAL CRYOSTAT WIRING LIST (NEEDS TO BE UPDATED).....		169
ANNEX 3. - BDA CHANNELS		172
ANNEX 4 - WHAT IS 12-AX?.....		172
ANNEX 5 – CVV BULKHEAD EMI BACKSHELLS.....		173
ANNEX 7 - SPIRE GROUNDING DIAGRAM.....		174

	SPIRE HARNESS DEFINITION	Doc #: SPIRE-RAL-PRJ-000608 Issue: 0.8 Date: 02/11/01 Page 11 of 174
--	---	---

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.

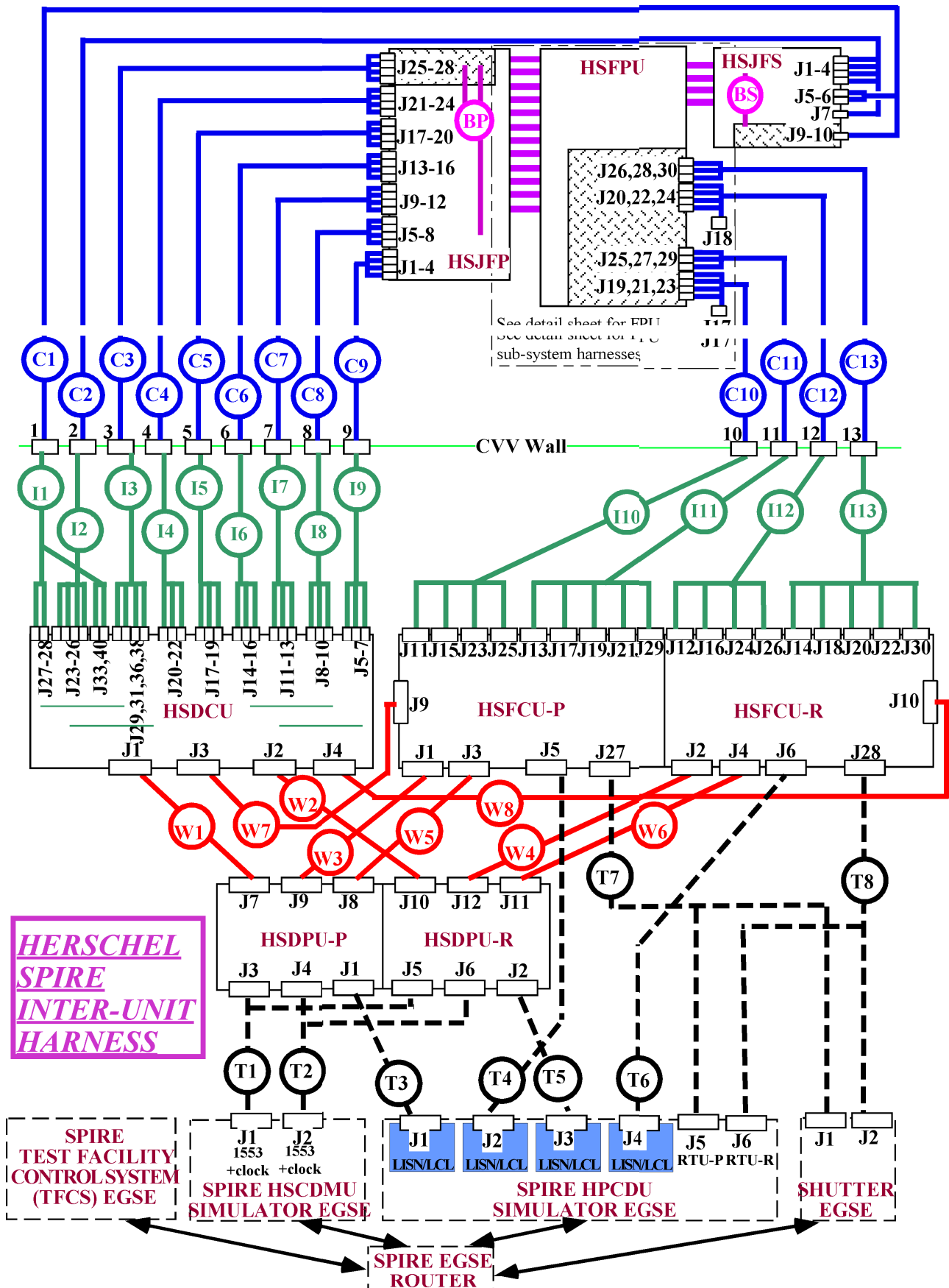
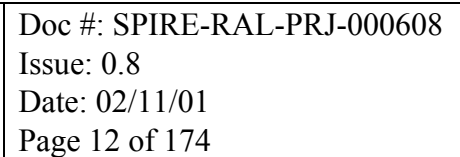
A conductor count/sizing summary list for the C/I series cryoharness is appended as an Annex and may, together with other summary information, be edited into the SPIRE IID-B. Spire is unusual in that these harnesses are not standard I/Fs between separately grounded systems but rather links within extended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

2 APPLICABLE DOCUMENTS

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

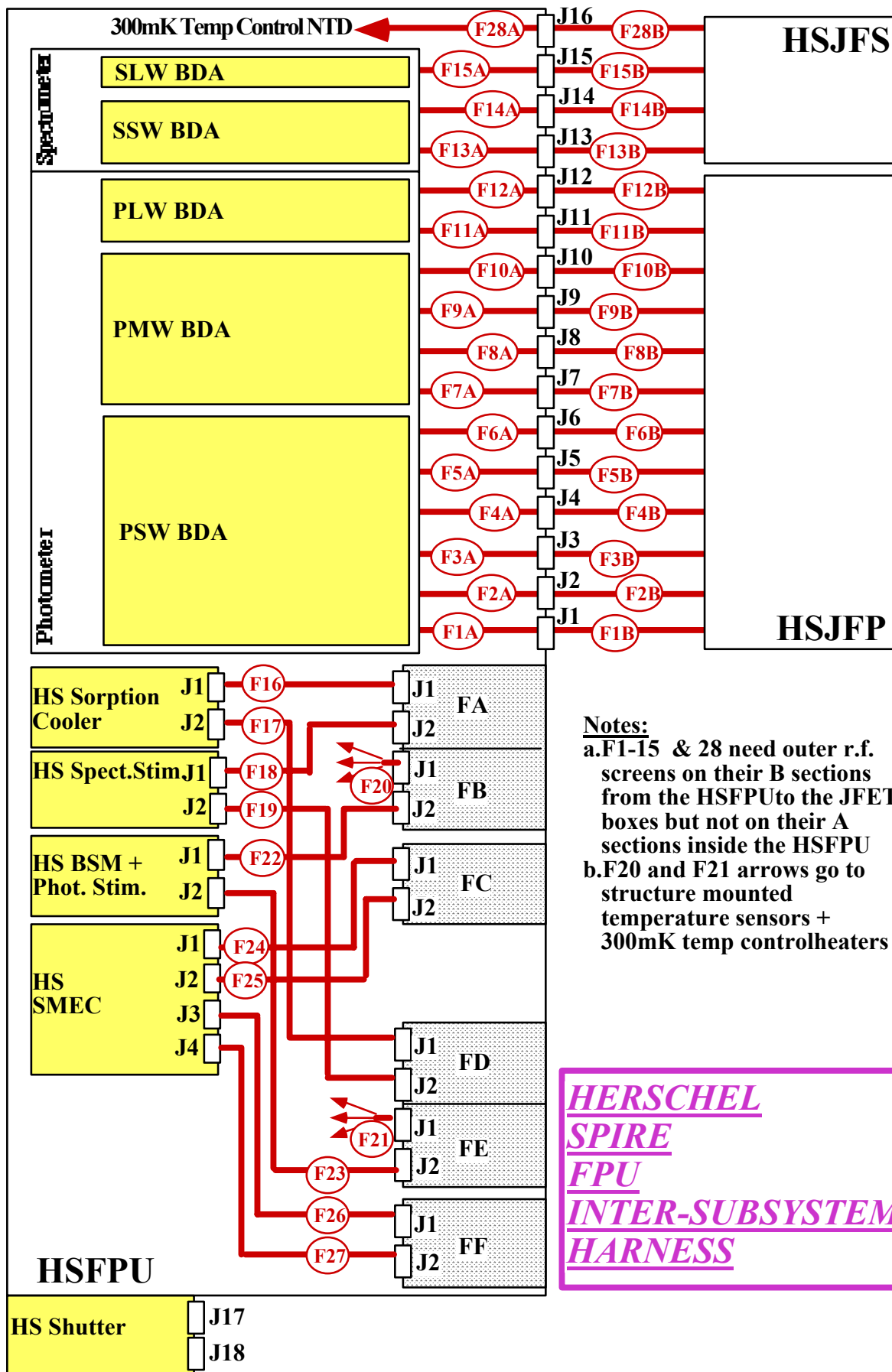




SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 13 of 174

The details in the HSFPU are as follows:



	SPIRE HARNESS DEFINITION	Doc #: SPIRE-RAL-PRJ-000608 Issue: 0.8 Date: 02/11/01 Page 14 of 174
--	--	---

Notes:

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.

The HSJFS + HSJFP "back-harnesses", BS and BP respectively, are now within the scope of this document as they permit the instrument 's architecture to be more clearly followed.

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.

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.

The FPU harnesses, F series, are each provided by the institute which sources the sub-system to which they connect.

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.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 15 of 174

4 HARNESS DETAILS

4.1 Warm Harnesses

4.1.1 W1 HSDPU-P to HSDCU-P

Overall Mechanical Drwg.

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

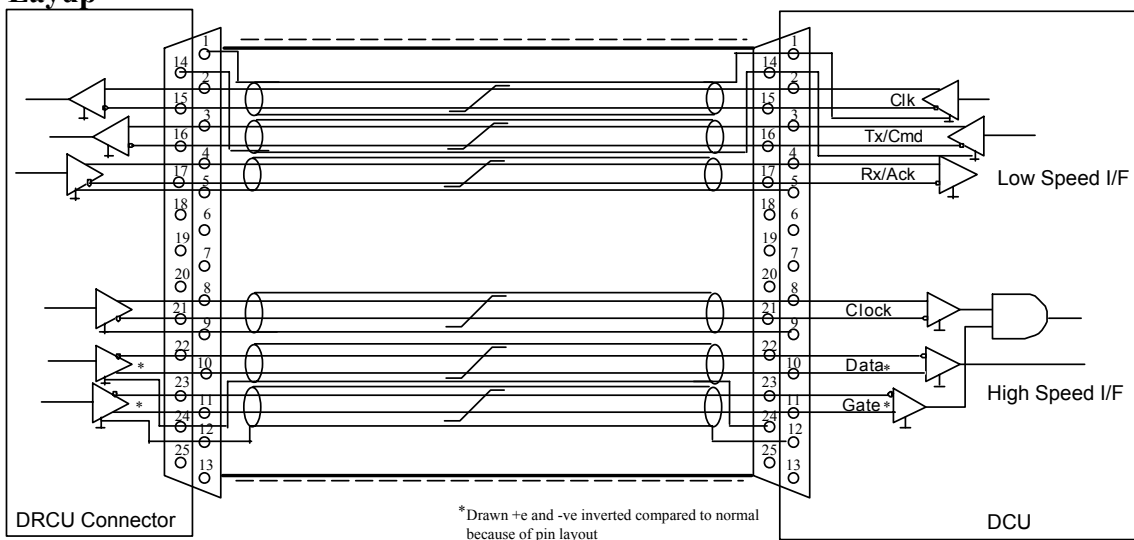
Connector/Backshell Details

Prime Side Harness

DBMA 25 P + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DCU J1 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DPU J7

Harness Layup



Contact Details: Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
CLKS-DCU_P_shd	1	28AWG STP-A	CMD-DCU_P_shd	14	28AWG STP-B
CLKS-DCU_P_+	2	28AWG STP-A	CLKS-DCU_P_-	15	28AWG STP-A
CMD-DCU_P_+	3	28AWG STP-B	CMD-DCU_P_-	16	28AWG STP-B
ACK-DCU_P_+	4	28AWG STP-C	ACK-DCU_P_-	17	28AWG STP-C
ACK-DCU_P_shd	5	28AWG STP-C		18	
	6			19	
	7			20	
CLKF-DCU_P_+	8	28AWG STP-D	CLKF-DCU_P_-	21	28AWG STP-D
CLKF-DCU_P_shd	9	28AWG STP-D	DATA-DCU_P_-	22	28AWG STP-E
DATA-DCU_P_+	10	28AWG STP-E	GATE-DCU_P_-	23	28AWG STP-F
GATE-DCU_P_+	11	28AWG STP-F	DATA-DCU_P_shd	24	28AWG STP-E
GATE-DCU_P_shd	12	28AWG STP-F		25	
	13				
RF Overshield	EMC Backshell-Backshell				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 16 of 174

4.1.2 W2 HSDPU-R to HSDCU-R

Overall Mechanical Drwg.

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 R3 H 1-02 to mate with DCU J2 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DPU J10

Harness Layup

As W1

Contact Details

Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
CLKS-DCU_R_shd	1	28AWG STP-A	CMD-DCU_R_shd	14	28AWG STP-B
CLKS-DCU_R_+	2	28AWG STP-A	CLKS-DCU_R_-	15	28AWG STP-A
CMD-DCU_R_+	3	28AWG STP-B	CMD-DCU_R_-	16	28AWG STP-B
ACK-DCU_R_+	4	28AWG STP-C	ACK-DCU_R_-	17	28AWG STP-C
ACK-DCU_R_shd	5	28AWG STP-C		18	
	6			19	
	7			20	
CLKF-DCU_R_+	8	28AWG STP-D	CLKF-DCU_R_-	21	28AWG STP-D
CLKF-DCU_R_shd	9	28AWG STP-D	DATA-DCU_R_-	22	28AWG STP-E
DATA-DCU_R_+	10	28AWG STP-E	GATE-DCU_R_-	23	28AWG STP-F
GATE-DCU_R_+	11	28AWG STP-F	DATA-DCU_R_shd	24	28AWG STP-E
GATE-DCU_R_shd	12	28AWG STP-F7		25	
	13				
RF Overshield	EMC Backshell-Backshell				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 17 of 174

4.1.3 W3 HSDPU-P to HSSCU-P

Overall Mechanical Drwg.

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 R3 H 1-02 to mate with FCU J1 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DPU J9

Harness Layup

As W1

Contact Details

Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
CLKS-SCU_P_shd	1	28AWG STP-A	CMD-SCU_P_shd	14	28AWG STP-B
CLKS-SCU_P_+	2	28AWG STP-A	CLKS-SCU_P_-	15	28AWG STP-A
CMD-SCU_P_+	3	28AWG STP-B	CMD-SCU_P_-	16	28AWG STP-B
ACK-SCU_P_+	4	28AWG STP-C	ACK-SCU_P_-	17	28AWG STP-C
ACK-SCU_P_shd	5	28AWG STP-C		18	
	6			19	
	7			20	
CLKF-SCU_P_+	8	28AWG STP-D	CLKF-SCU_P_-	21	28AWG STP-D
CLKF-SCU_P_shd	9	28AWG STP-D	DATA-SCU_P_-	22	28AWG STP-E
DATA-SCU_P_+	10	28AWG STP-E	GATE-SCU_P_-	23	28AWG STP-F
GATE-SCU_P_+	11	28AWG STP-F	DATA-SCU_P_shd	24	28AWG STP-E
GATE-SCU_P_shd	12	28AWG STP-F		25	
	13				
RF Overshield	EMC Backshell-Backshell				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 18 of 174

4.1.4 W4 HSDPU-R to HSSCU-R

Overall Mechanical Drwg.

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 R3 H 1-02 to mate with FCU J2 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DPU J12

Harness Layup

As W1

Contact Details

Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
CLKS-SCU_R_shd	1	28AWG STP-A	CMD-SCU_R_shd	14	28AWG STP-B
CLKS-SCU_R_+	2	28AWG STP-A	CLKS-SCU_R_-	15	28AWG STP-A
CMD-SCU_R_+	3	28AWG STP-B	CMD-SCU_R_-	16	28AWG STP-B
ACK-SCU_R_+	4	28AWG STP-C	ACK-SCU_R_-	17	28AWG STP-C
ACK-SCU_R_shd	5	28AWG STP-C		18	
	6			19	
	7			20	
CLKF-SCU_R_+	8	28AWG STP-D	CLKF-SCU_R_-	21	28AWG STP-D
CLKF-SCU_R_shd	9	28AWG STP-D	DATA-SCU_R_-	22	28AWG STP-E
DATA-SCU_R_+	10	28AWG STP-E	GATE-SCU_R_-	23	28AWG STP-F
GATE-SCU_R_+	11	28AWG STP-F	DATA-SCU_R_shd	24	28AWG STP-E
GATE-SCU_R_shd	12	28AWG STP-F		25	
	13				
RF Overshield	EMC Backshell-Backshell				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 19 of 174

4.1.5 W5 HSDPU-P to HSMCU-P

Overall Mechanical Drwg.

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 R3 H 1-02 to mate with FCU J3 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DPU J8

Harness Layup

As W1

Contact Details

Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
CLKS-MCU_P_shd	1	28AWG STP-A	CMD-MCU_P_shd	14	28AWG STP-B
CLKS-MCU_P_+	2	28AWG STP-A	CLKS-MCU_P_-	15	28AWG STP-A
CMD-MCU_P_+	3	28AWG STP-B	CMD-MCU_P_-	16	28AWG STP-B
ACK-MCU_P_+	4	28AWG STP-C	ACK-MCU_P_-	17	28AWG STP-C
ACK-MCU_P_shd	5	28AWG STP-C		18	
	6			19	
	7			20	
CLKF-MCU_P_+	8	28AWG STP-D	CLKF-MCU_P_-	21	28AWG STP-D
CLKF-MCU_P_shd	9	28AWG STP-D	DATA-MCU_P_-	22	28AWG STP-E
DATA-MCU_P_+	10	28AWG STP-E	GATE-MCU_P_-	23	28AWG STP-F
GATE-MCU_P_+	11	28AWG STP-F	DATA-MCU_P_shd	24	28AWG STP-E
GATE-MCU_P_shd	12	28AWG STP-F		25	
	13				
RF Overshield	EMC Backshell-Backshell				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 20 of 174

4.1.6 W6 HSDPU-R to HSMCU-R

Overall Mechanical Drwg.

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 R3 H 1-02 to mate with FCU J4 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DPU J11

Harness Layup

As W1

Contact Details

Wired 1:1 in harness

Signal Name	Pin	Wire	Signal Name	Pin	Wire
CLKS-MCU_R_shd	1	28AWG STP-A	CMD-MCU_R_shd	14	28AWG STP-B
CLKS-MCU_R_+	2	28AWG STP-A	CLKS-MCU_R_-	15	28AWG STP-A
CMD-MCU_R_+	3	28AWG STP-B	CMD-MCU_R_-	16	28AWG STP-B
ACK-MCU_R_+	4	28AWG STP-C	ACK-MCU_R_-	17	28AWG STP-C
ACK-MCU_R_shd	5	28AWG STP-C		18	
	6			19	
	7			20	
CLKF-MCU_R_+	8	28AWG STP-D	CLKF-MCU_R_-	21	28AWG STP-D
CLKF-MCU_R_shd	9	28AWG STP-D	DATA-MCU_R_-	22	28AWG STP-E
DATA-MCU_R_+	10	28AWG STP-E	GATE-MCU_R_-	23	28AWG STP-F
GATE-MCU_R_+	11	28AWG STP-F	DATA-MCU_R_shd	24	28AWG STP-E
GATE-MCU_R_shd	12	28AWG STP-F		25	
	13				
RF Overshield	EMC Backshell-Backshell				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 21 of 174

4.1.7 W7 HSFCU-P to HSDCU-P

Overall Mechanical Drwg.

1:1

Connector/Backshell Details

Prime side secondary power distribution harness

DBMA 25 P + Glenair 550 T 039 M 3 R3 H 1-02 to mate with FCU J9 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DCU J3

Harness Layup

Contact Details

TBC



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 22 of 174

4.1.8 W8 HSFCU-R to HSDCU-R

Overall Mechanical Drwg.

1:1

Connector/Backshell Details

Redundant side secondary power distribution harness

DBMA 25 P + Glenair 550 T 039 M 3 R3 H 1-02 to mate with FCU J10 to

DBMA 25 S + Glenair 550 T 039 M 3 R3 H 1-02 to mate with DCU J4

Harness Layup

As W7

Contact Details

As W7



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

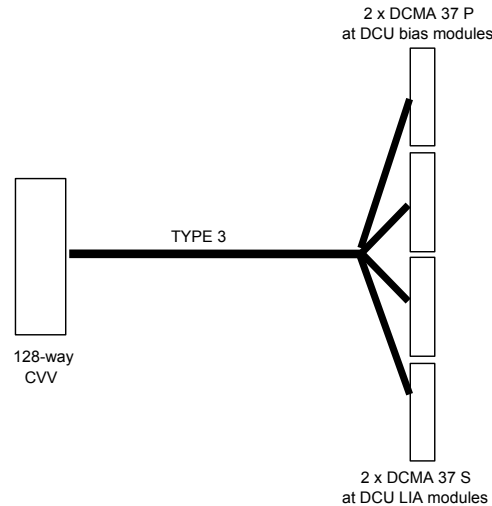
Date: 02/11/01

Page 23 of 174

4.2 Intermediate Harnesses

4.2.1 I1 HSDCU to CVV1 Type3

Overall Mechanical Drwg.



Connector/Backshell Details:

DCMA 37 S + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J27 12ch. bolometer

DCMA 37 S + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J28 12ch. bolometer

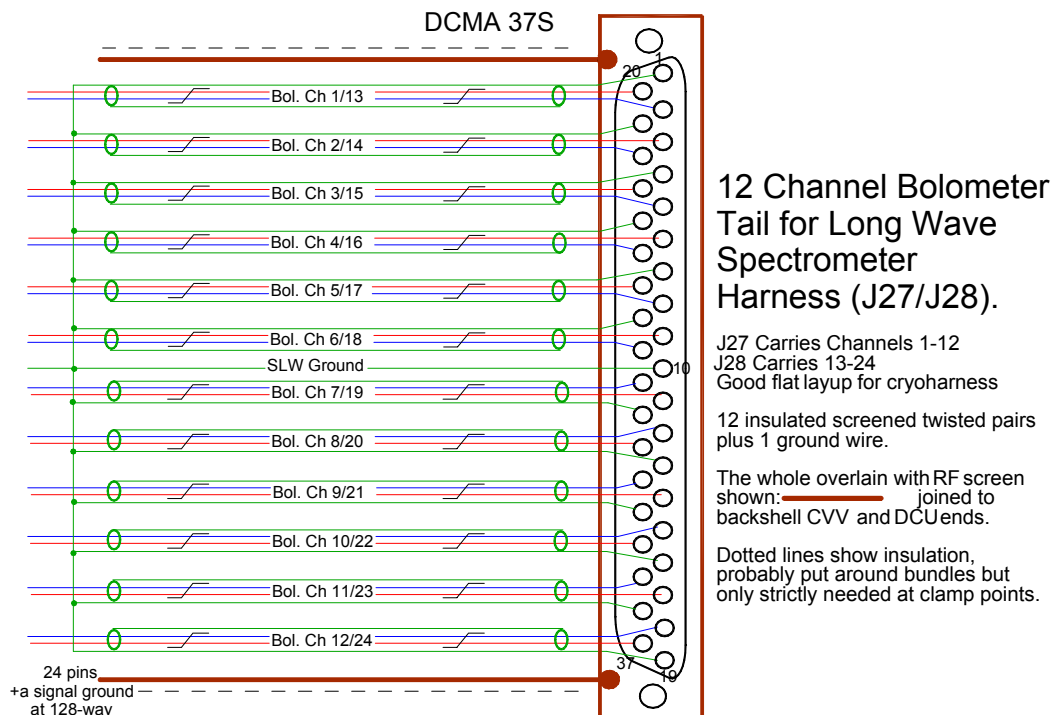
DCMA 37 P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J33 Spect bias A

DCMA 37 P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J34 Spect bias B

SEE NOTE ON BIAS HARNESS CONFIGURATION AT THIS POINT IN SECTION 4.2.3

Harness Lay-up

Two Bolometer Tails Thus:





SPIRE HARNESS DEFINITION

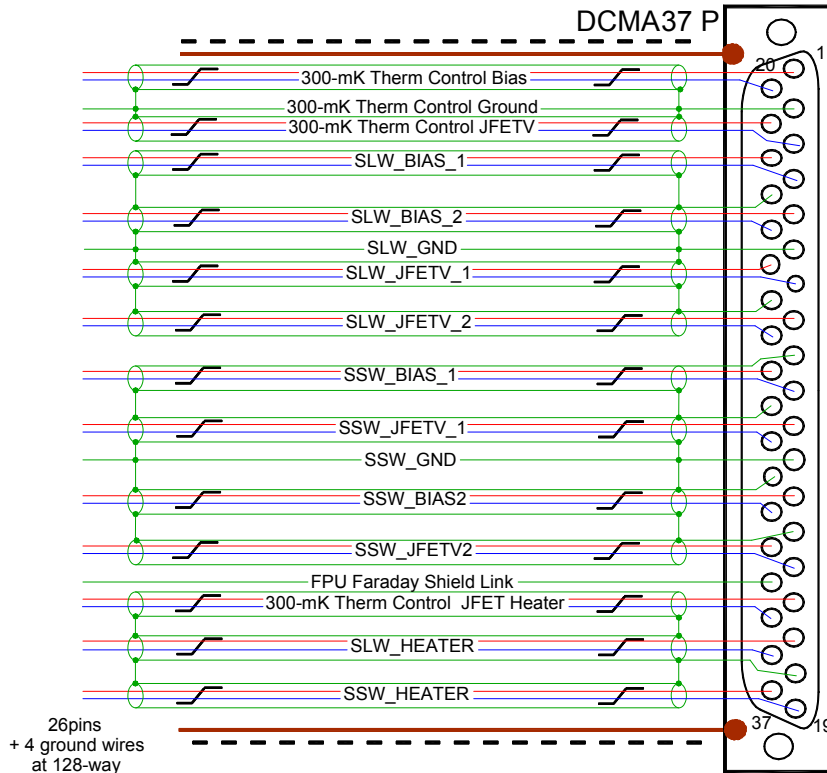
Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 24 of 174

Two Spectrometer Bias tails thus:



Type 3 Bias Filters

13 isolated screened twisted pairs + 4 ground single wires.

Note SLW and SSW ground separation.

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.

Note that there are A & B versions of this tail.

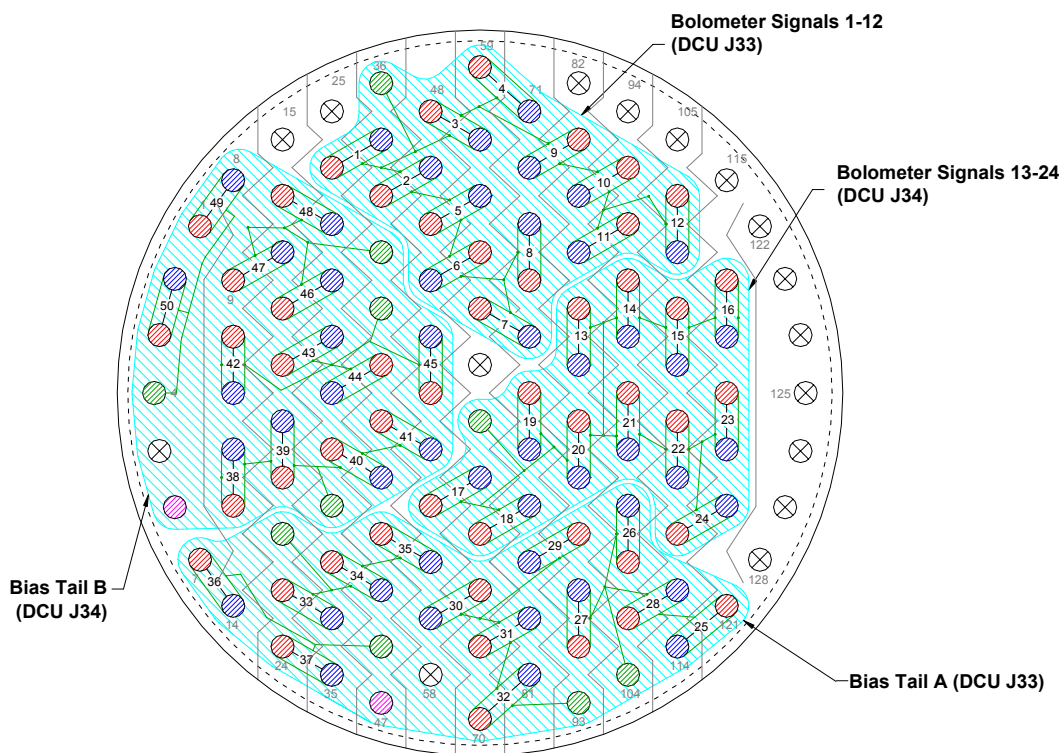
Heater wires should be current rated for same current as the JFET supplies for which they substitute.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 25 of 174

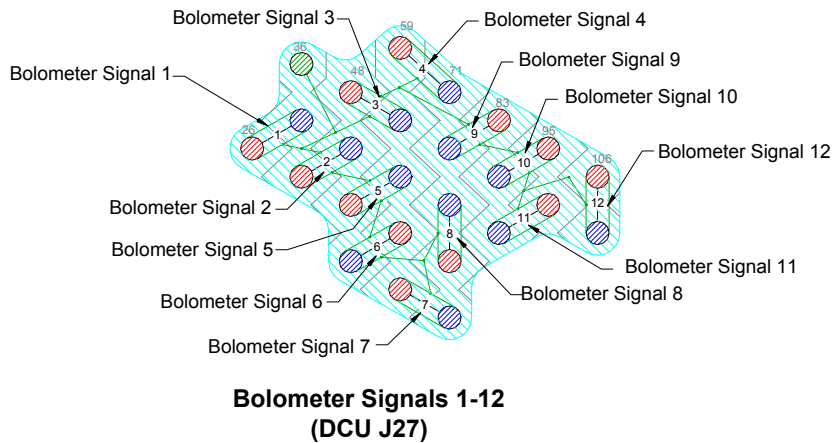
128-Way Pin Allocations



- 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 by a dedicated ground pin.

112 Contacts used out of 128





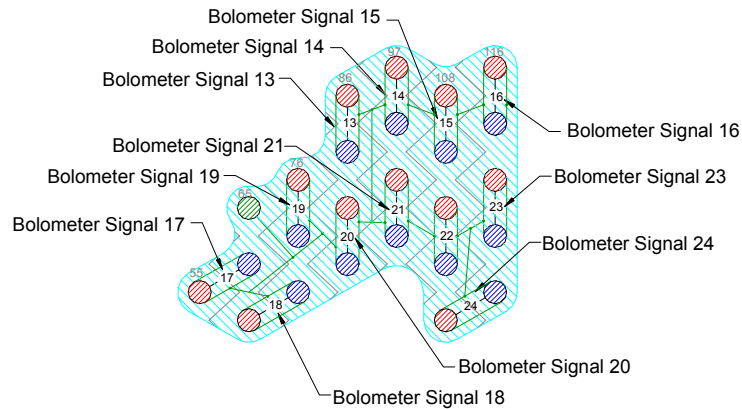
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

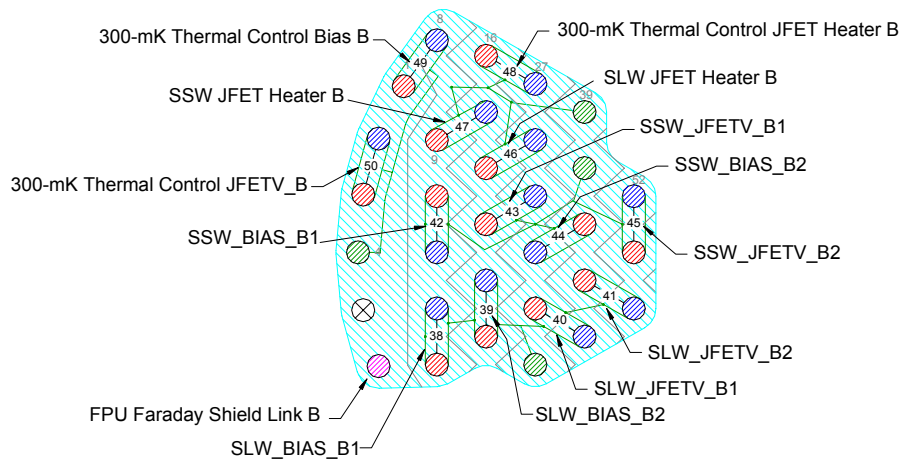
Issue: 0.8

Date: 02/11/01

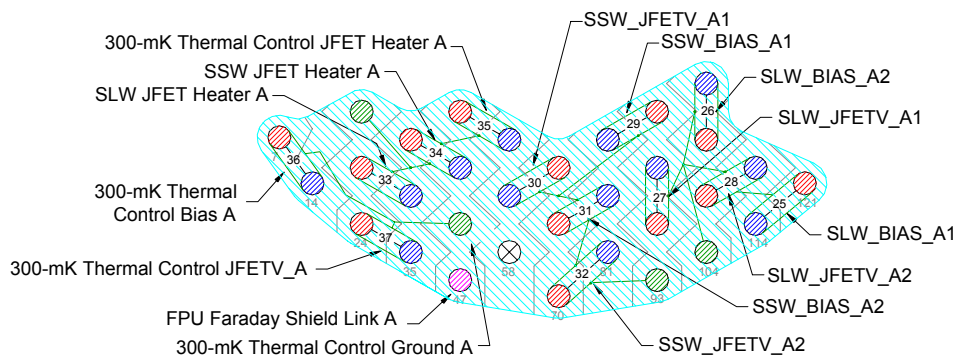
Page 26 of 174



**Bolometer Signals 13-24
(DCU J28)**



**Bias Tail B
(DCU J34)**



**Bias Tail A
(DCU J33)**



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 27 of 174

Contact Details

Name	128Way #1	37way A J27	37wayBJ28	37way C J33	37way D J34
Channel 1 +	26	20			
Channel 1 -	37	2			
Channel 1gnd shld	36*	1			
Channel 2 +	38	3			
Channel 2 -	49	22			
Channel 2gnd shld	36*	21			
Channel 3 +	48	23			
Channel 3 -	60	5			
Channel 3gnd shld	36*	4			
Channel 4 +	59	6			
Channel 4 -	71	25			
Channel 4gnd shld	36*	24			
Channel 5 +	50	26			
Channel 5 -	61	8			
Channel 5gnd shld	36*	7			
Channel 6 +	62	9			
Channel 6 -	51	28			
Channel 6gnd shld	36*	27			
SLW GND WIRE	36*	10			
Channel 7 +	63	11			
Channel 7 -	75	29			
Channel 7gnd shld	36*	30			
Channel 8 +	74	31			
Channel 8 -	73	12			
Channel 8gnd shld	36*	13			
Channel 9 +	83	14			
Channel 9 -	72	32			
Channel 9gnd shld	36*	33			
Channel 10 +	95	34			
Channel 10 -	84	15			
Channel 10gnd shld	36*	16			
Channel 11 +	96	17			
Channel 11 -	85	35			
Channel 11gnd shld	36*	36			
Channel 12 +	106	37			
Channel 12 -	107	18			
Channel 12gnd shld	36*	19			
Channel 13 +	86		20		
Channel 13 -	87		2		
Channel 13gnd shld	65*		1		
Channel 14 +	97		3		
Channel 14 -	98		22		
Channel 14gnd shld	65*		21		
Channel 15 +	108		23		
Channel 15 -	109		5		
Channel 15gnd shld	65*		4		
Channel 16 +	116		6		
Channel 16 -	117		25		
Channel 16gnd shld	65*		24		
Channel 17 +	55		26		
Channel 17 -	66		8		
Channel 17gnd shld	65*		7		
Channel 18 +	67		9		
Channel 18 -	78		28		
Channel 18gnd shld	65*		27		
SLW GND WIRE	65*		10		
Channel 19 +	76		11		



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 28 of 174

Name	128Way #1	37way A J27	37wayBJ28	37way C J33	37way D J34
Channel 19 -	77		29		
Channel 19gnd shld	65*		30		
Channel 20 +	88		31		
Channel 20 -	89		12		
Channel 20gnd shld	65*		13		
Channel 21 +	99		14		
Channel 21 -	100		32		
Channel 21gnd shld	65*		33		
Channel 22 +	110		34		
Channel 22 -	111		15		
Channel 22gnd shld	65*		16		
Channel 23 +	118		17		
Channel 23 -	119		35		
Channel 23gnd shld	65*		36		
Channel 24 +	112		37		
Channel 24 -	120		18		
Channel 24gnd shld	65*		19		
300-mK TC Bias A +ve	7			1	
300-mK TC Bias A -ve	14			20	
300-mK TC Bias A Shield	46*			2*	
300-mK TC Ground A	46*			2*	
300-mK JFETV Bias A +ve	24			21	
300-mK JFETV Bias A -ve	35			3	
300-mK JFETV Bias A Shield	46*			2*	
SLW BIAS A1+ve	121			22	
SLW BIAS A1-ve	114			4	
SLW BIAS A1 shld	104*			6*	
SLW BIAS A2 +ve	102			5	
SLW BIAS A2 -ve	101			24	
SLW BIAS A2 shld	104*			23	
SLW JFETV A1 +ve	92			25	
SLW JFETV A1 -ve	91			7	
SLW JFETV A1 shld	104*			6*	
SLW JFETV A2 +ve	103			8	
SLW JFETV A2 -ve	113			27	
SLW JFETV A2 shld	104*			6*	
SLW GND WIRE A	104*			6*	
FPU Faraday Shield Link A	47			34	
SSW GND WIRE A	93*			12	
SSW BIAS1 A +ve	90			28	
SSW BIAS1 A -ve	79			10	
SSW BIAS1 A shld	93*			9	
SSW JFETV1 A +ve	68			11	
SSW JFETV1 A -ve	57			30	
SSW JFETV1 A shld	93*			29	
SSW BIAS2 A +ve	69			13	
SSW BIAS2 A -ve	80			32	
SSW BIAS2 A shld	93*			31	
SSW JFETV2 A +ve	70			33	
SSW JFETV2 A -ve	81			15	
SSW JFETV2 A shld	93*			14	
S HEATER GROUND WIRE A	22*			NC	
SLW JFET HEATER A +ve	23			17	
SLW JFET HEATER A -ve	34			36	
SLW JFET HEATER A shld	22*			18*	
SSW JFET HEATER A +ve	33			37	
SSW JFET HEATER A -ve	45			19	
SSW JFET HEATER A shld	22*			18*	



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 29 of 174

Name	128Way #1	37way A J27	37wayBJ28	37way C J33	37way D J34
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*			18*	
300-mK TC Bias B +ve	1				1
300-mK TC Bias B -ve	8				20
300-mK TC Bias B Shield	4*				2*
300-mK TC Ground B	4*				2*
300-mK JFETV Bias B +ve	3				21
300-mK JFETV Bias B -ve	2				3
300-mK JFETV Bias B Shield	4*				2*
SLW BIAS B1+ve	13				22
SLW BIAS B1-ve	12				4
SLW BIAS B1 shld	32*				6*
SLW BIAS B2 +ve	21				5
SLW BIAS B2 -ve	20				24
SLW BIAS B2 shld	32*				23
SLW JFETV B1 +ve	31				25
SLW JFETV B1 -ve	43				7
SLW JFETV B1 shld	32*				6*
SLW JFETV B2 +ve	42				8
SLW JFETV B2 -ve	54				27
SLW JFETV B2 shld	32*				6*
SLW GND WIRE B	32*				6*
FPU Faraday Shield Link B	6				34
SSW GND WIRE B	40*				12
SSW BIAS1 B +ve	10				28
SSW BIAS1 B -ve	11				10
SSW BIAS1 B shld	40*				9
SSW JFETV1 B +ve	19				11
SSW JFETV1 B -ve	29				30
SSW JFETV1 B shld	40*				29
SSW BIAS2 B +ve	41				13
SSW BIAS2 B -ve	30				32
SSW BIAS2 B shld	40*				31
SSW JFETV2 B +ve	53				33
SSW JFETV2 B -ve	52				15
SSW JFETV2 B shld	40*				14
S HEATER GROUND WIRE B	39*				NC
SLW HEATER B +ve	18				17
SLW HEATER B -ve	28				36
SLW HEATER B shld	39*				18*
SSW HEATER B +ve	9				37
SSW HEATER B -ve	17				19
SSW HEATER B shld	39*				18*
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*				18*
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

Pins denoted by * indicate interconnection of the pins within the connector

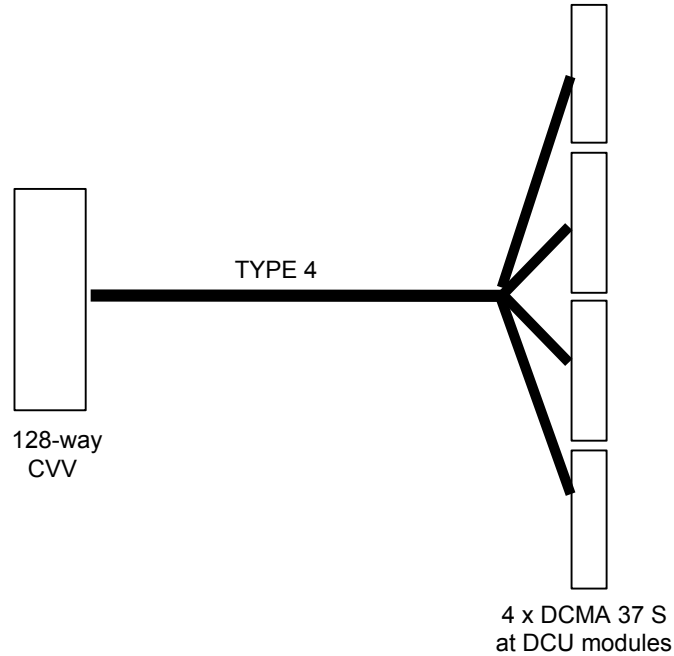


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 30 of 174

4.2.2 I2 HSDCU to CVV2 Type4

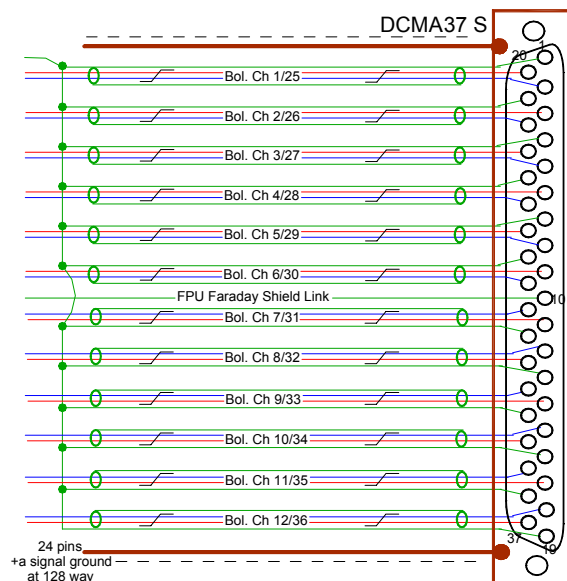
Overall Mechanical Drwg.



Connector/Backshell Details

DCMA 37 S + ESA/SCC 340102237B (ITT Cannon DC 24660):: interface to HSDCU J23 12ch. bolometer
DCMA 37 S + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J24 12ch. bolometer
DCMA 37 S + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J25 12ch. bolometer
DCMA 37 S + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J26 12ch. bolometer

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.

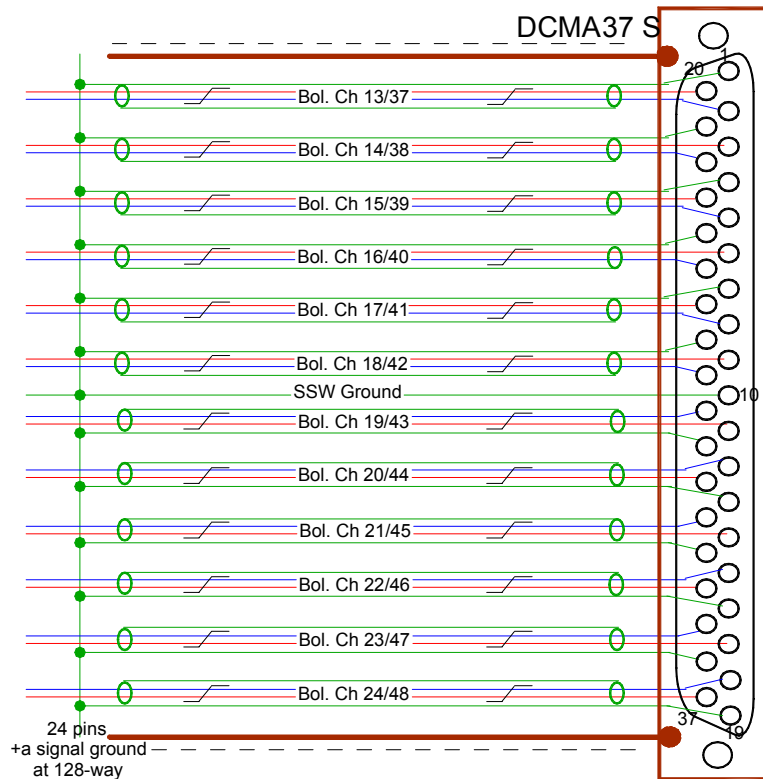
Dotted lines show insulation,
probably put around bundles but
only strictly needed at clamp points.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 31 of 174

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.



SPIRE HARNESS DEFINITION

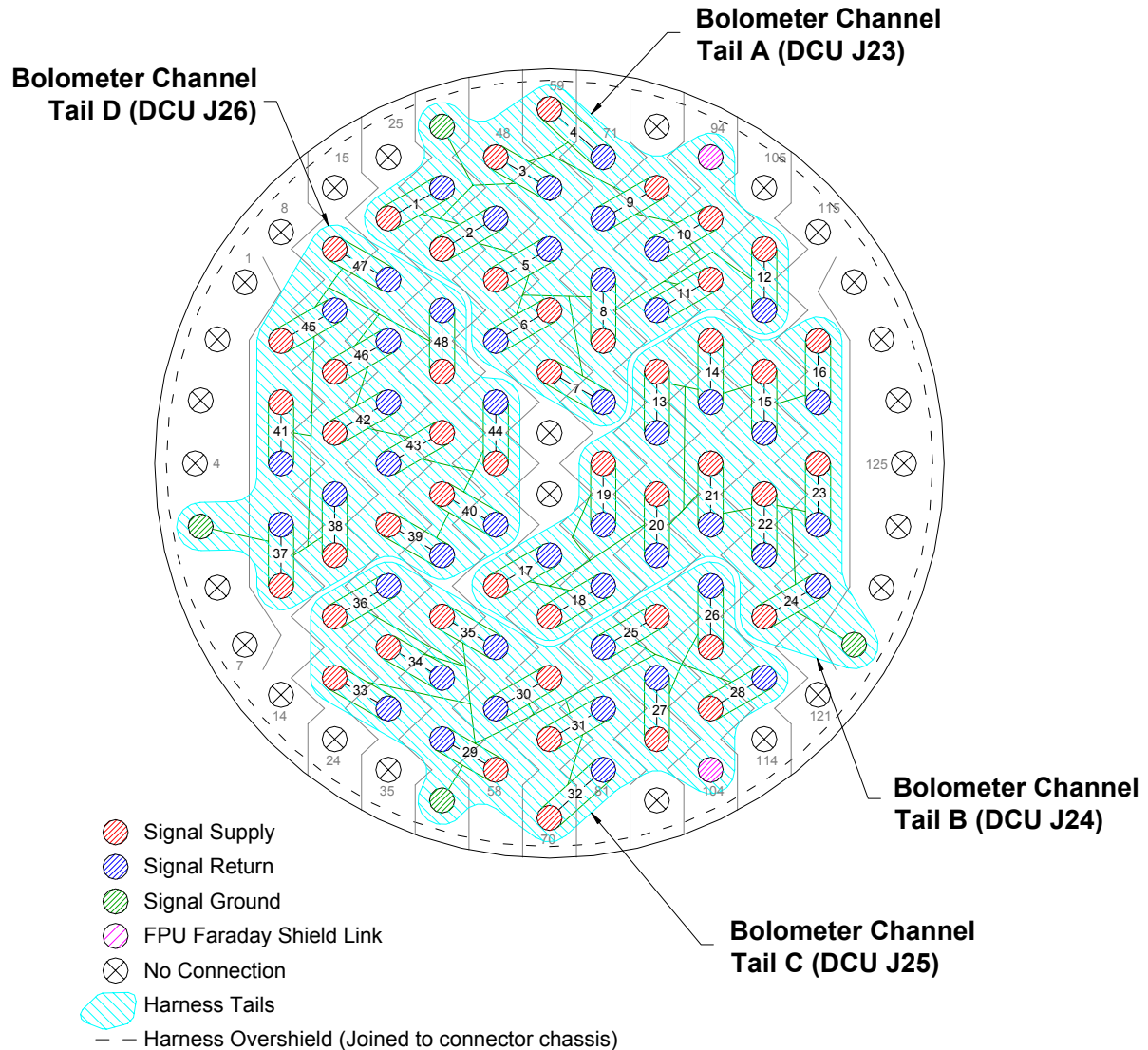
Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 32 of 174

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



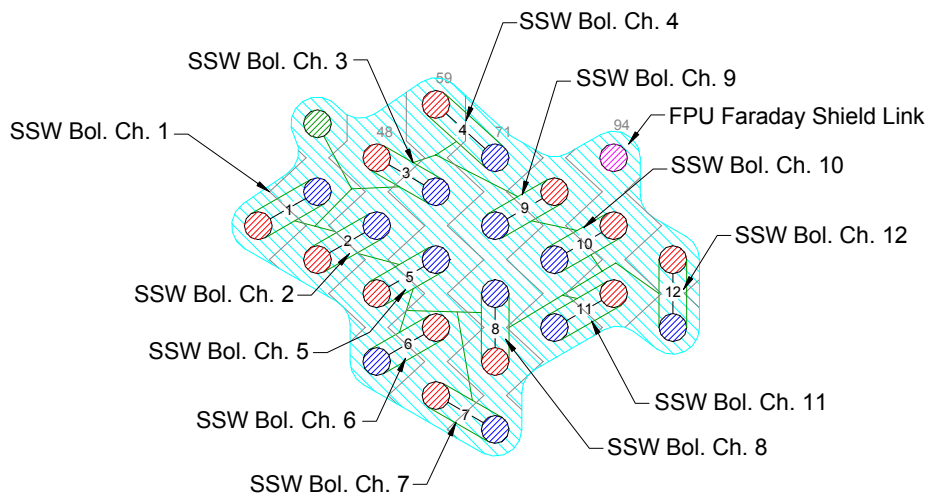
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

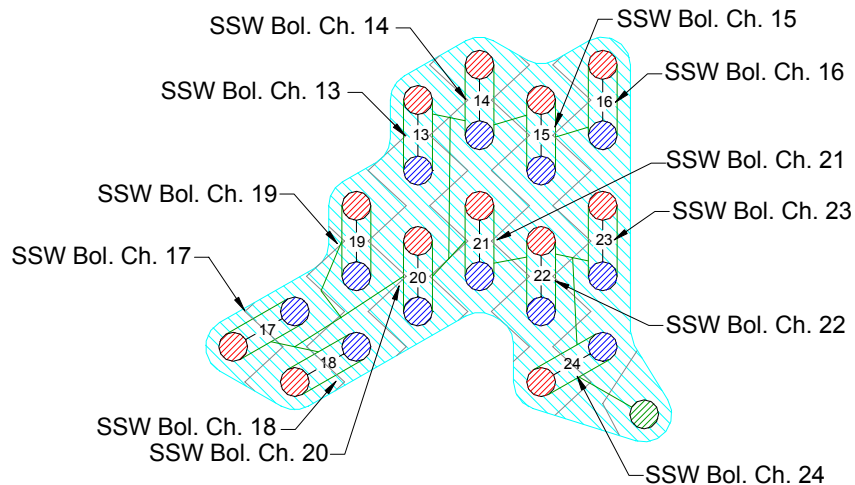
Issue: 0.8

Date: 02/11/01

Page 33 of 174



Bolometer Channel Tail A (DCU J23)



Bolometer Channel Tail B (DCU J24)



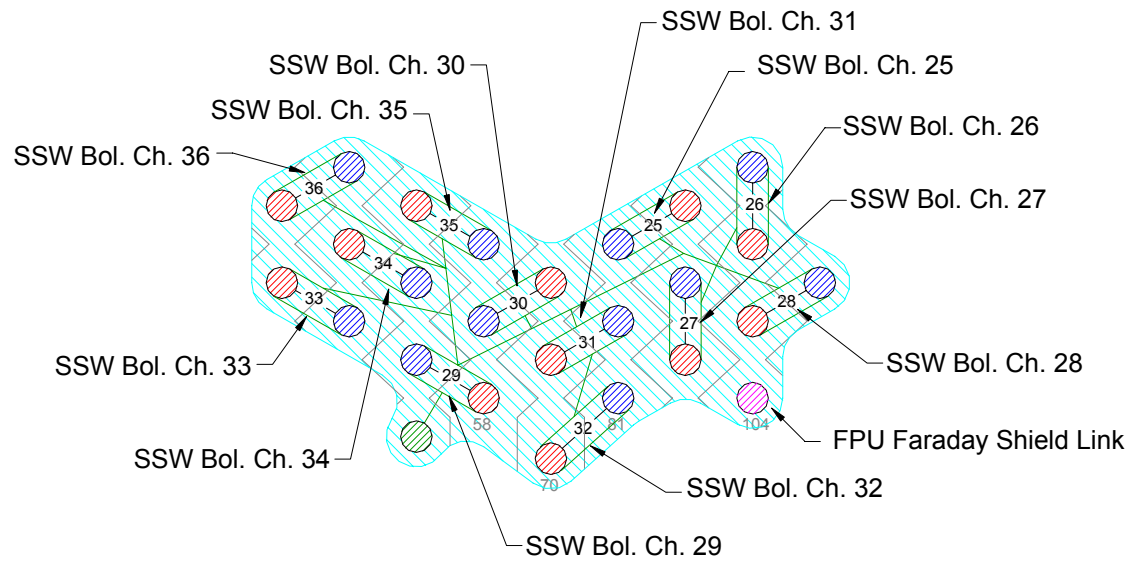
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

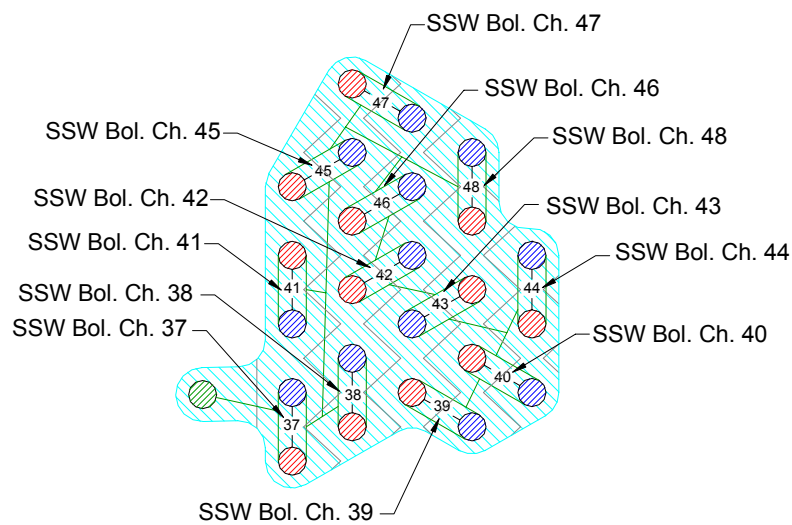
Issue: 0.8

Date: 02/11/01

Page 34 of 174



Bolometer Channel Tail C (DCU J25)



Bolometer Channel Tail D (DCU J26)



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 35 of 174

Contact Details

Name	128Way #2	37way J23	37way J24	37way J25	37way J26
Channel 1 +	26	20			
Channel 1 -	37	2			
Channel 1gnd shld	36	1			
Channel 2 +	38	3			
Channel 2 -	49	22			
Channel 2gnd shld	36	21			
Channel 3 +	48	23			
Channel 3 -	60	5			
Channel 3gnd shld	36	4			
Channel 4 +	59	6			
Channel 4 -	71	25			
Channel 4gnd shld	36	24			
Channel 5 +	50	26			
Channel 5 -	61	8			
Channel 5gnd shld	36	7			
Channel 6 +	62	9			
Channel 6 -	51	28			
Channel 6gnd shld	36	27			
FPU Faraday Shield Link	94	10			
Channel 7 +	63	11			
Channel 7 -	75	29			
Channel 7gnd shld	36	30			
Channel 8 +	74	31			
Channel 8 -	73	12			
Channel 8gnd shld	36	13			
Channel 9 +	83	14			
Channel 9 -	72	32			
Channel 9gnd shld	36	33			
Channel 10 +	95	34			
Channel 10 -	84	15			
Channel 10gnd shld	36	16			
Channel 11 +	96	17			
Channel 11 -	85	35			
Channel 11gnd shld	36	36			
Channel 12 +	106	37			
Channel 12 -	107	18			
Channel 12gnd shld	36	19			
Channel 13 +	86		20		
Channel 13 -	87		2		
Channel 1gnd shld	128		1		
Channel 14 +	97		3		
Channel 14 -	98		22		
Channel 1gnd shld	128		21		
Channel 15 +	108		23		
Channel 15 -	109		5		
Channel 15gnd shld	128		4		
Channel 16 +	116		6		
Channel 16 -	117		25		
Channel 16gnd shld	128		24		
Channel 17 +	55		26		
Channel 17 -	66		8		
Channel 17gnd shld	128		7		
Channel 18 +	67		9		
Channel 18 -	78		28		
Channel 18gnd shld	128		27		
GND WIRE	128		10		



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 36 of 174

Name	128Way #2	37way J23	37way J24	37way J25	37way J26
Channel 19 +	76		11		
Channel 19 -	77		29		
Channel 19gnd shld	128		30		
Channel 20 +	88		31		
Channel 20 -	89		12		
Channel 1gnd shld	128		13		
Channel 21 +	99		14		
Channel 21 -	100		32		
Channel 21gnd shld	128		33		
Channel 22 +	110		34		
Channel 22 -	111		15		
Channel 22gnd shld	128		16		
Channel 23 +	118		17		
Channel 23 -	119		35		
Channel 23gnd shld	128		36		
Channel 24 +	112		37		
Channel 24 -	120		18		
Channel 24gnd shld	128		19		
Channel 25 +	90			20	
Channel 25 -	79			2	
Channel 25gnd shld	47			1	
Channel 26 +	102			3	
Channel 26 -	101			22	
Channel 26gnd shld	47			21	
Channel 27 +	92			23	
Channel 27 -	91			5	
Channel 27gnd shld	47			4	
Channel 28 +	103			6	
Channel 28 -	113			25	
Channel 28gnd shld	47			24	
Channel 29 +	58			26	
Channel 29 -	46			8	
Channel 29gnd shld	47			7	
Channel 30 +	68			9	
Channel 30 -	57			28	
Channel 30gnd shld	47			27	
FPU Faraday Shield Link	104			10	
Channel 31 +	69			11	
Channel 31 -	80			29	
Channel 31gnd shld	47			30	
Channel 32 +	70			31	
Channel 32 -	81			12	
Channel 32gnd shld	47			13	
Channel 33 +	23			14	
Channel 33 -	34			32	
Channel 33gnd shld	47			33	
Channel 34 +	33			34	
Channel 34 -	45			15	
Channel 34gnd shld	47			16	
Channel 35 +	44			17	
Channel 35 -	56			35	
Channel 35gnd shld	47			36	
Channel 36 +	22			37	
Channel 36 -	32			18	
Channel 36gnd shld	47			19	
Channel 37 +	13				20
Channel 37 -	12				2
Channel 37gnd shld	5				1
Channel 38 +	21				3



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 37 of 174

Name	128Way #2	37way J23	37way J24	37way J25	37way J26
Channel 38 -	20				22
Channel 38gnd shld	5				21
Channel 39 +	31				23
Channel 39 -	43				5
Channel 39gnd shld	5				4
Channel 40 +	42				6
Channel 40 -	54				25
Channel 40gnd shld	5				24
Channel 41 +	10				26
Channel 41 -	11				8
Channel 41gnd shld	5				7
Channel 42 +	19				9
Channel 42 -	29				28
Channel 42gnd shld	5				27
GND WIRE	5				10
Channel 43 +	41				11
Channel 43 -	30				29
Channel 43gnd shld	5				30
Channel 44 +	53				31
Channel 44 -	52				12
Channel 44gnd shld	5				13
Channel 45 +	9				14
Channel 45 -	17				32
Channel 45gnd	5				33
Channel 46 +	18				34
Channel 46 -	28				15
Channel 46gnd shld	5				16
Channel 47 +	16				17
Channel 47 -	27				35
Channel 47gnd shld	5				36
Channel 48 +	40				37
Channel 48 -	39				18
Channel 48gnd shld	5				19
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

Pins denoted by * indicate interconnection of the pins within the connector

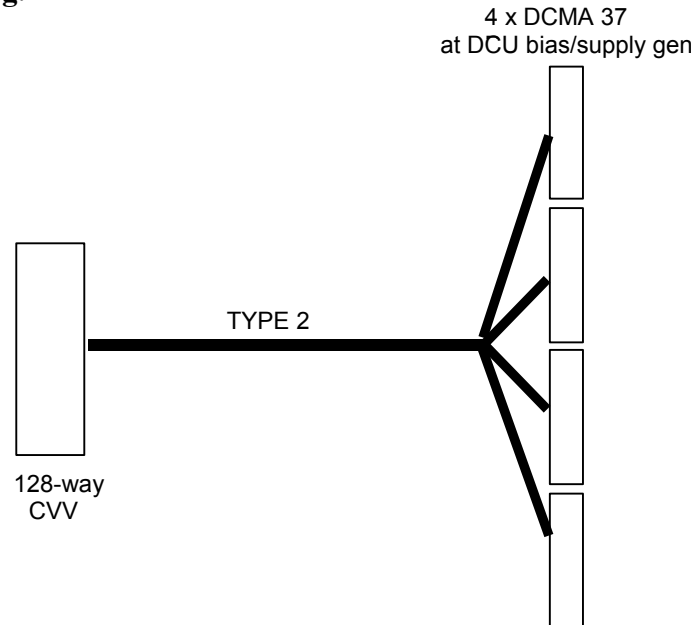


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 38 of 174

4.2.3 I3 HSDCU to CVV3 Type2

Overall Mechanical Drwg.



Connector/Backshell Details

DCMA 37P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J29 PSW BIAS A

DCMA 37P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J31 PMW/PLW BIAS A

DCMA 37P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J30 PSW BIAS B

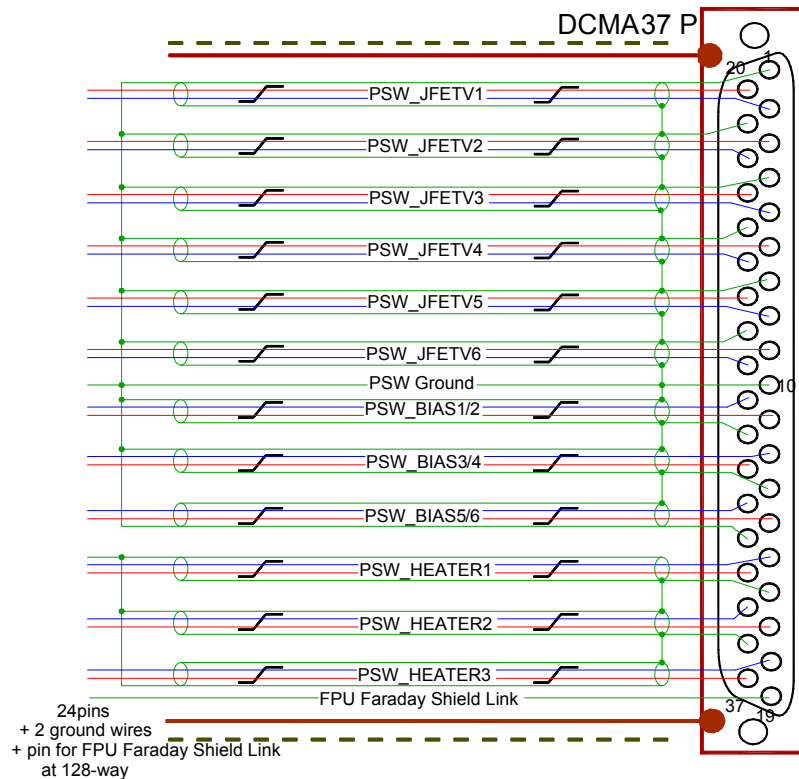
DCMA 37P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSDCU J32 PMW/PLW BIAS B



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 39 of 174

Harness Layup



Type 2A (PSW) Bias/Supply Filters

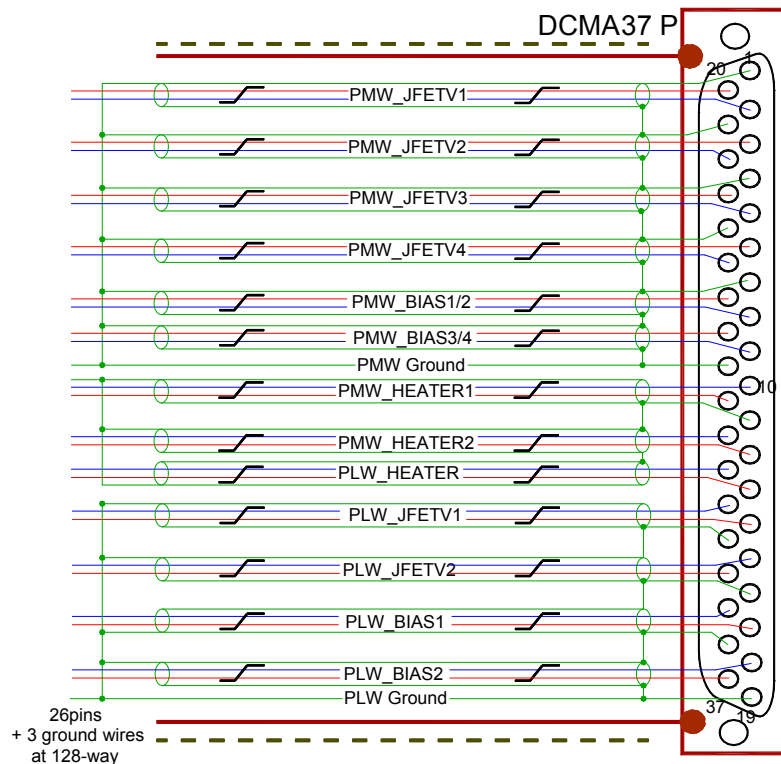
12 Isolated screened twisted pairs with one ground single wire+ shield link.

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.

Note that there are A & B versions of this tail.

Heater wires should be current rated for same current as the JFET supplies for which they substitute.



Type 2B (PLW/PMW) Bias/Supply Filters

13 Isolated screened twisted pairs with one ground single wire+ shield link.

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.

Note that there are A & B versions of this tail.

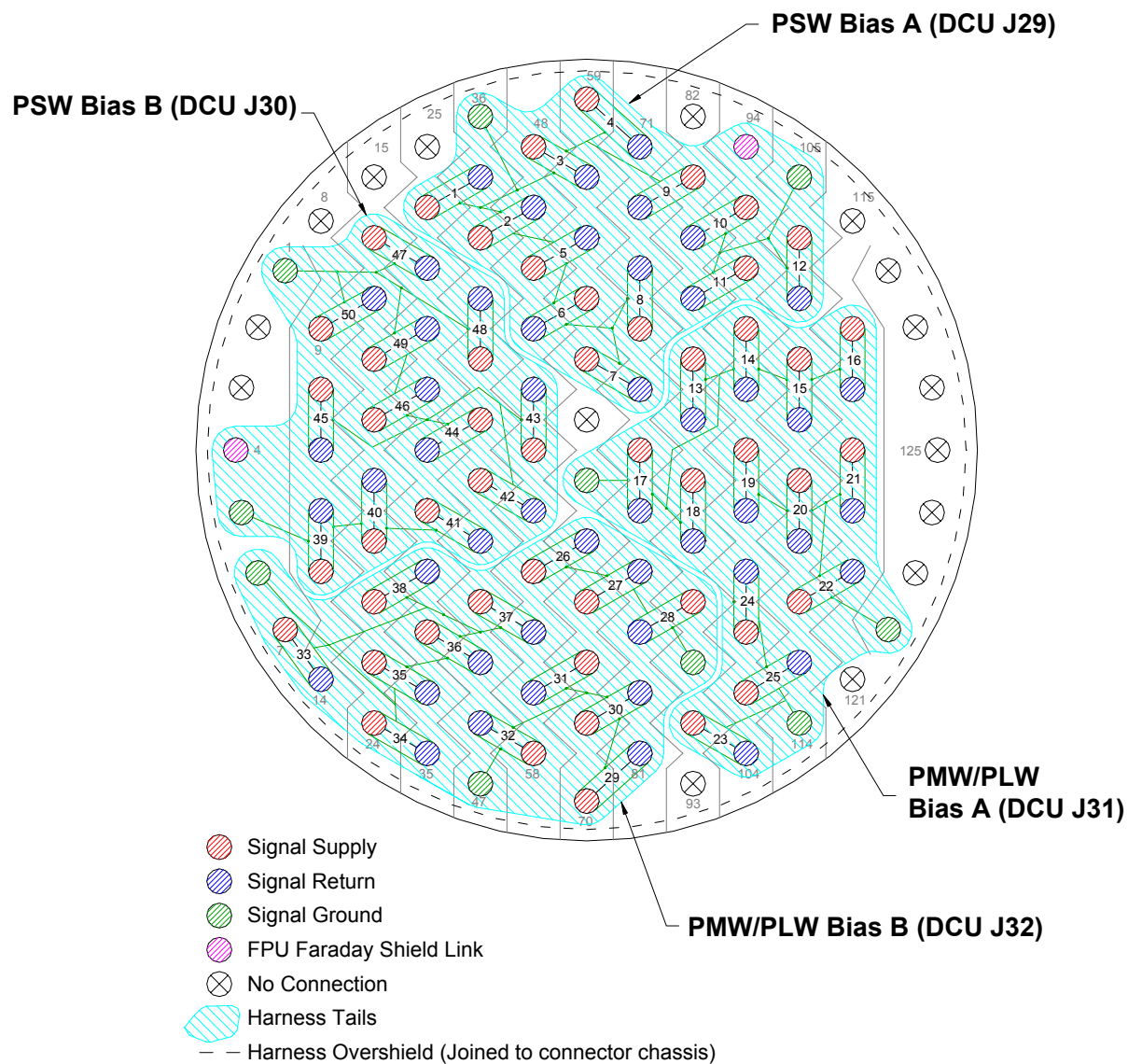
Heater wires should be current rated for same current as the JFET supplies for which they substitute.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 40 of 174

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



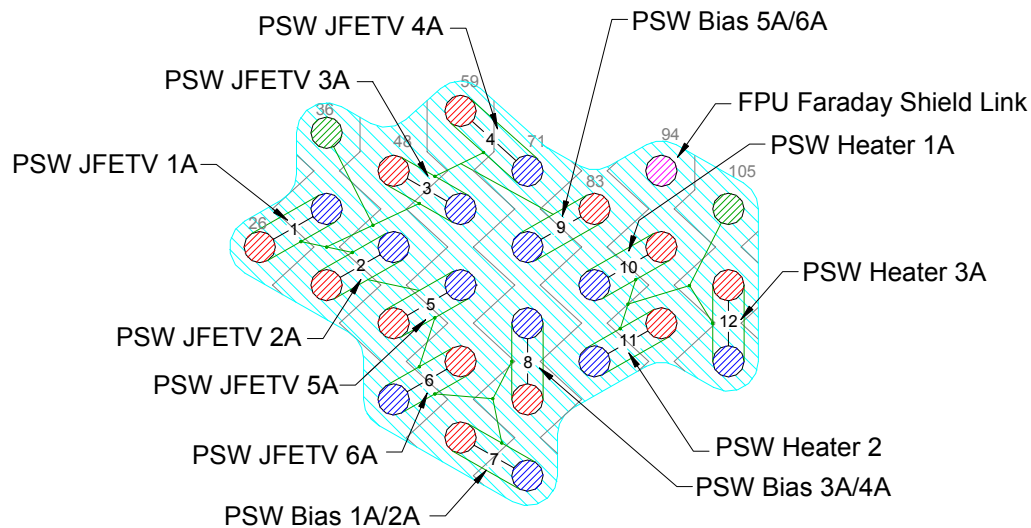
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

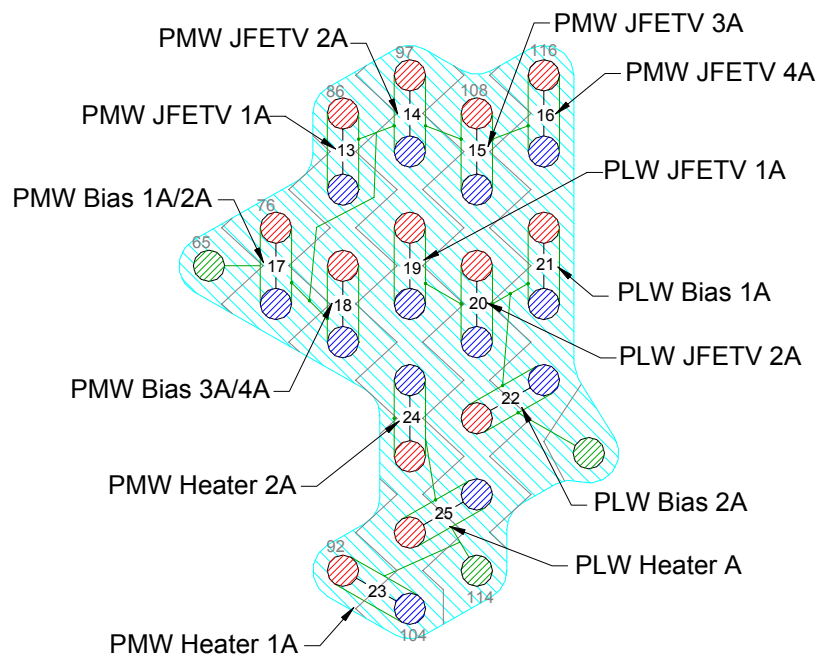
Issue: 0.8

Date: 02/11/01

Page 41 of 174



PSW Bias A (DCU J29)



PMW/PLW Bias A (DCU J31)



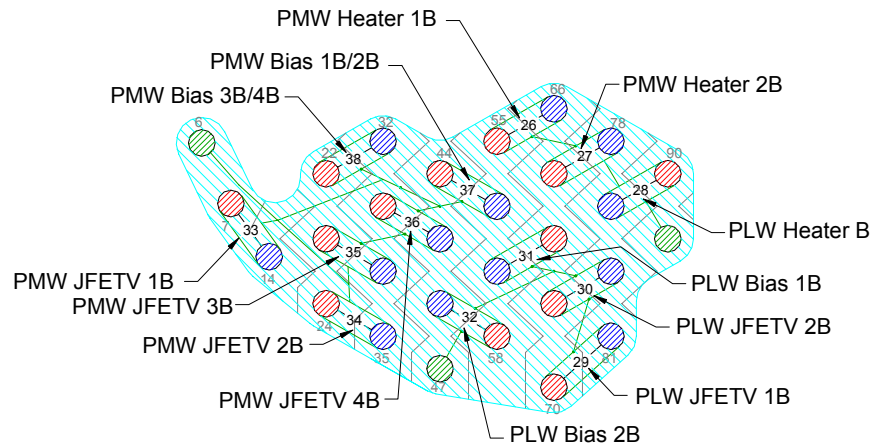
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

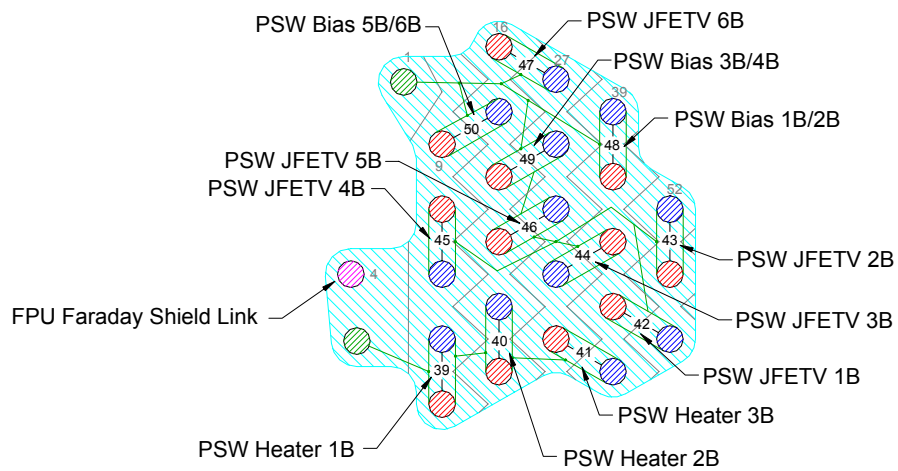
Issue: 0.8

Date: 02/11/01

Page 42 of 174



PMW/PLW Bias B (DCU J32)



PSW Bias B (DCU J30)



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 43 of 174

Contact Details

Name	128Way #3	37way J29	37way J31	37Way J30	37way J32
PSW_JFETV1_A +	26	20			
PSW_JFETV1_A -	37	2			
PSW_JFETV1_A shld	36	1			
PSW_JFETV2_A +	38	3			
PSW_JFETV2_A -	49	22			
PSW_JFETV2_A shld	36	21			
PSW_JFETV3_A +	48	23			
PSW_JFETV3_A -	60	5			
PSW_JFETV3_A shld	36	4			
PSW_JFETV4_A +	59	6			
PSW_JFETV4_A -	71	25			
PSW_JFETV4_A shld	36	24			
PSW_JFETV5_A +	50	26			
PSW_JFETV5_A -	61	8			
PSW_JFETV5_A shld	36	7			
PSW_JFETV6_A +	62	9			
PSW_JFETV6_A -	51	28			
PSW_JFETV6_A shld	36	27			
PSW_GRND_A	36	10			
PSW_BIAS1/2_A +	63	11			
PSW_BIAS1/2_A -	75	29			
PSW_BIAS1/2_A shld	36	30			
PSW_BIAS3/4_A +	74	31			
PSW_BIAS3/4_A -	73	12			
PSW_BIAS3/4_A shld	36	13			
PSW_BIAS5/6_A +	83	14			
PSW_BIAS5/6_A -	72	32			
PSW_BIAS5/6_A shld	36	33			
PSW_HEATER_A1 +	95	34			
PSW_HEATER_A1 -	84	15			
PSW_HEATER_A1 shld	105	16			
PSW_HEATER_A2 +	96	17			
PSW_HEATER_A2 -	85	35			
PSW_HEATER_A2 shld	105	36*			
PSW_HEATER_A3 +	106	37			
PSW_HEATER_A3 -	107	18			
PSW_HEATER_A3 shld	105	36*			
FPU Faraday Shield Link	94	19			
PMW_JFETV1_A +	86		20		
PMW_JFETV1_A -	87		2		
PMW_JFETV1_A shld	65		1		
PMW_JFETV2_A +	97		3		
PMW_JFETV2_A -	98		22		
PMW_JFETV2_A shld	65		21		
PMW_JFETV3_A +	108		23		
PMW_JFETV3_A -	109		5		
PMW_JFETV3_A shld	65		4		
PMW_JFETV4_A +	116		6		
PMW_JFETV4_A -	117		25		
PMW_JFETV4_A shld	65		24		
PMW_BIAS1/2_A +	76		26		
PMW_BIAS1/2_A -	77		8		
PMW_BIAS1/2_A shld	65		7		
PMW_BIAS3/4_A +	88		27		
PMW_BIAS3/4_A -	89		9		
PMW_BIAS3/4_A shld	65		28*		



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 44 of 174

Name	128Way #3	37way J29	37way J31	37Way J30	37way J32
PMW GND WIRE A	65		28*		
PMW HEATER A1 +	92		29		
PMW HEATER A1 -	104		10		
PMW HEATER A1 shld	114		11		
PMW HEATER A2 +	102		12		
PMW HEATER A2 -	101		30		
PMW HEATER A2 shld	114		11*		
PLW HEATER A +	103		13		
PLW HEATER A -	113		31		
PLW HEATER A shld	114		11*		
PLW JFETV1 A +	99		14		
PLW JFETV1 A -	100		32		
PLW JFETV1 A shld	128		33		
PLW JFETV2 A +	110		34		
PLW JFETV2 A -	111		15		
PLW JFETV2 A shld	128		16		
PLW BIAS1 A +	118		17		
PLW BIAS1 A -	119		35		
PLW BIAS1 A shld	128		36		
PLW BIAS2 A +	112		37		
PLW BIAS2 A -	120		18		
PLW BIAS2 A shld	128		19*		
PLW GROUND WIRE A	128		19*		
PSW JFETV1 B +	42			20	
PSW JFETV1 B -	54			2	
PSW JFETV1 B shld	1			1	
PSW JFETV2 B +	53			3	
PSW JFETV2 B -	52			22	
PSW JFETV2 B shld	1			21	
PSW JFETV3 B +	41			23	
PSW JFETV3 B -	30			5	
PSW JFETV3 B shld	1			4	
PSW JFETV4 B +	10			6	
PSW JFETV4 B -	11			25	
PSW JFETV4 B shld	1			24	
PSW JFETV5 B +	19			26	
PSW JFETV5 B -	29			8	
PSW JFETV5 B shld	1			7	
PSW JFETV6 B +	16			9	
PSW JFETV6 B -	27			28	
PSW JFETV6 B shld	1			27	
PSW GRND B	1			10	
PSW BIAS1/2 B +	40			11	
PSW BIAS1/2 B -	39			29	
PSW BIAS1/2 B shld	1			30	
PSW BIAS3/4 B +	18			31	
PSW BIAS3/4 B -	28			12	
PSW BIAS3/4 B shld	1			13	
PSW BIAS5/6 B +	9			14	
PSW BIAS5/6 B -	17			32	
PSW BIAS5/6 B shld	1			33	
PSW HEATER B1 +	13			34	
PSW HEATER B1 -	12			15	
PSW HEATER B1 shld	5			16	
PSW HEATER B2 +	21			17	
PSW HEATER B2 -	20			35	
PSW HEATER B2 shld	5			36	
PSW HEATER B3 +	31			37	
PSW HEATER B3 -	43			18	



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 45 of 174

Name	128Way #3	37way J29	37way J31	37Way J30	37way J32
PSW HEATER B3 shld	5			36*	
FPU Faraday Shield Link	4			19	
PMW JFETV1 B +	7				20
PMW JFETV1 B -	14				2
PMW JFETV1 B shld	6*				1
PMW JFETV2 B +	24				3
PMW JFETV2 B -	35				22
PMW JFETV2 B shld	6*				21
PMW JFETV3 B +	23				23
PMW JFETV3 B -	34				5
PMW JFETV3 B shld	6*				4
PMW JFETV4 B +	33				6
PMW JFETV4 B -	45				25
PMW JFETV4 B shld	6*				24
PMW BIAS1/2 B +	44				26
PMW BIAS1/2 B -	56				8
PMW BIAS1/2 B shld	6*				7
PMW BIAS3/4 B +	22				27
PMW BIAS3/4 B -	32				9
PMW BIAS3/4 B shld	6*				28*
PMW GND WIRE B	6*				28*
PMW HEATER B1 +	55				29
PMW HEATER B1 -	66				10
PMW HEATER B1 shld	91*				11
PMW HEATER B2 +	67				12
PMW HEATER B2 -	78				30
PMW HEATER B2 shld	91*				11*
PLW HEATER B +	90				13
PLW HEATER B -	79				31
PLW HEATER B shld	91*				11*
PLW JFETV1 B +	70				14
PLW JFETV1 B -	81				32
PLW JFETV1 B shld	47*				33
PLW JFETV2 B +	69				34
PLW JFETV2 B -	80				15
PLW JFETV2 B shld	47*				16
PSW BIAS1 B +	68				17
PSW BIAS1 B -	57				35
PSW BIAS1 B shld	47*				36
PSW BIAS2 B +	58				37
PSW BIAS2 B -	46				18
PSW BIAS2 B shld	47*				19*
PLW GROUND WIRE B	47*				19*
Harness Over-shield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

Pins denoted by * indicate interconnection of the pins within the connector

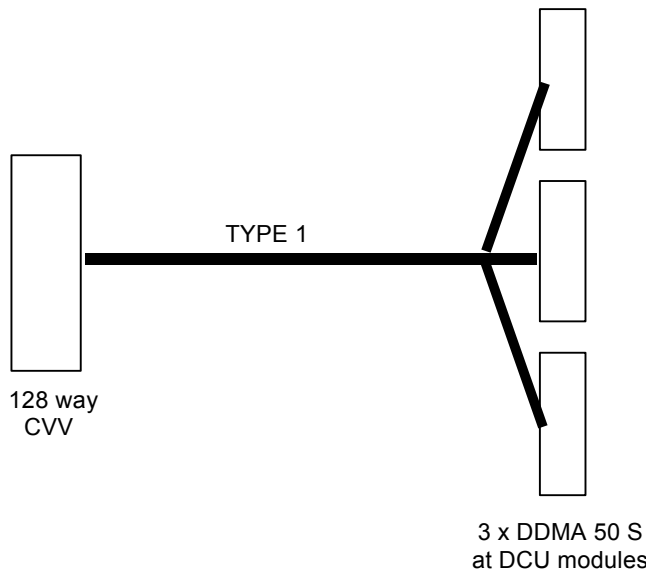


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 46 of 174

4.2.4 I4 HSDCU to CVV4 Type1

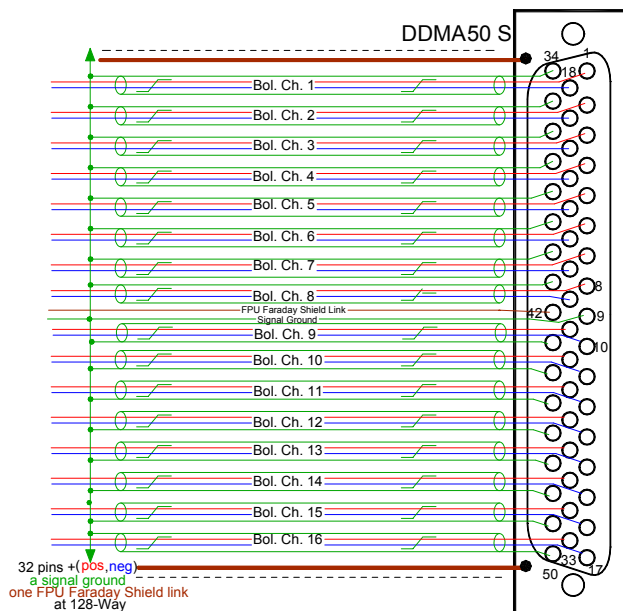
Overall Mechanical Drwg.



Connector/Backshell Details

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J20 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J21 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J22 16ch. bolometer

Harness Layup



Type 1 DCU tails

Common to all 3 tails, although others have ch. 17-32 and 33-48.
Good flat layup for cryoharness

16 insulated screen twisted pairs, plus
One FPU Faraday Shield Link
One higher conductivity Signal Gnd.

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

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 47 of 174

128-Way Pin Allocations



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 48 of 174

Contact Details

Note 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.

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 49 of 174

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 50 of 174

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

Pins denoted by * indicate interconnection of the pins within the connector

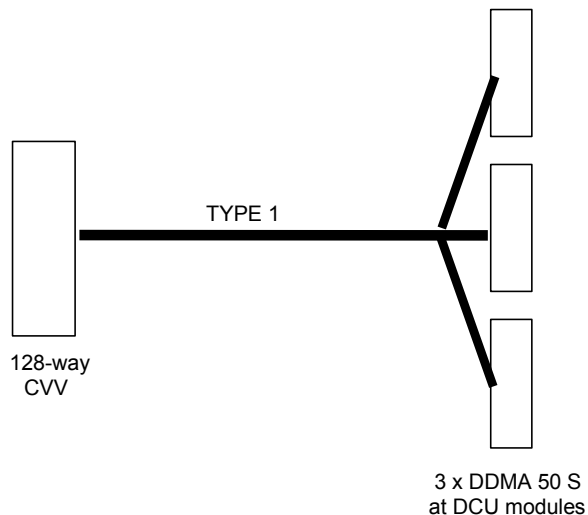


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 51 of 174

4.2.5 I5 HSDCU to CVV5 Type1

Overall Mechanical Drwg.



Connector/Backshell Details

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J17 16ch. bolometer

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J18 16ch. bolometer

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J19 16ch. bolometer

Harness Layup

As I4 except

Tail A connected to HSDCU J17

Tail B connected to HSDCU J18

Tail C connected to HSDCU J19

Contact Details

As I 4.

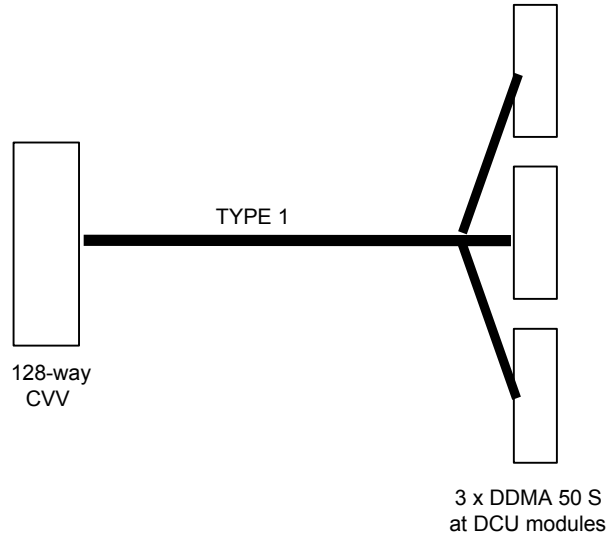


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 52 of 174

4.2.6 I6 HSDCU to CVV6 Type1

Overall Mechanical Drwg.



Connector/Backshell Details

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J14 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J15 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J16 16ch. bolometer

Harness Layup

As I 4 except
Tail A connected to HSDCU J14
Tail B connected to HSDCU J15
Tail C connected to HSDCU J16

Contact Details

As I 4.

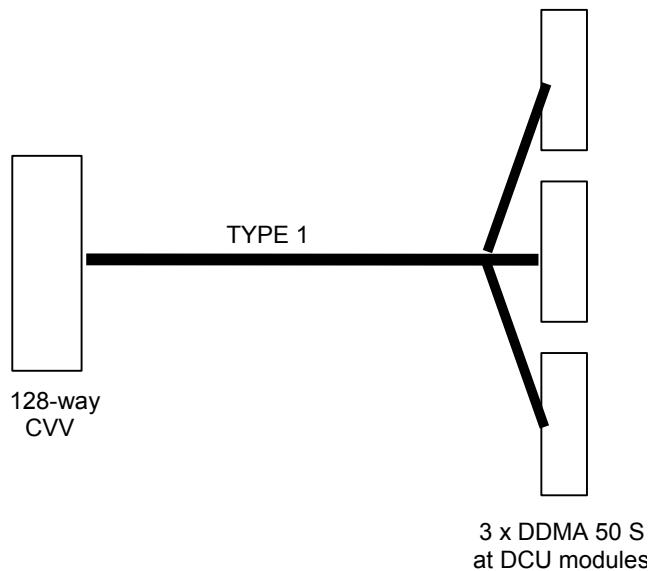


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 53 of 174

4.2.7 I7 HSDCU to CVV7 Type1

Overall Mechanical Drwg.



Connector/Backshell Details

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J11 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J12 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J13 16ch. bolometer

Harness Layup

As I4 except

Tail A connected to HSDCU J11

Tail B connected to HSDCU J12

Tail C connected to HSDCU J13

Contact Details

As I 4.

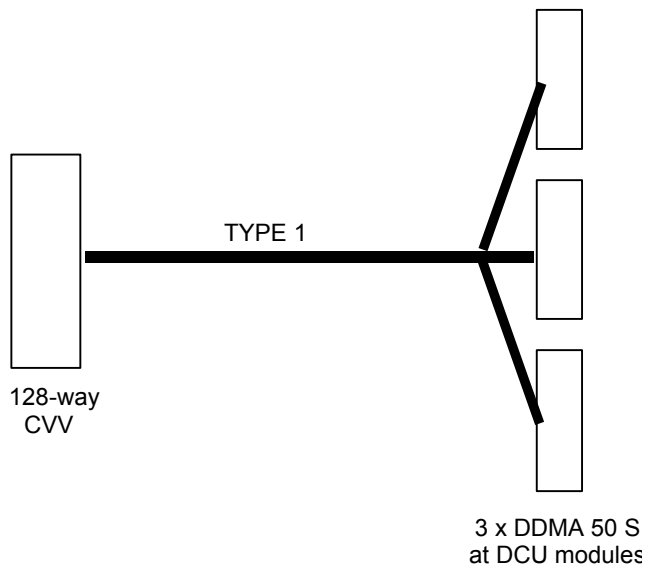


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 54 of 174

4.2.8 I8 HSDCU to CVV8 Type1

Overall Mechanical Drwg.



Connector/Backshell Details

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J8 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J9 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J10 16ch. bolometer

Harness Layup

As I4 except

Tail A connected to HSDCU J8

Tail B connected to HSDCU J9

Tail C connected to HSDCU J10

Contact Details

As I 4.

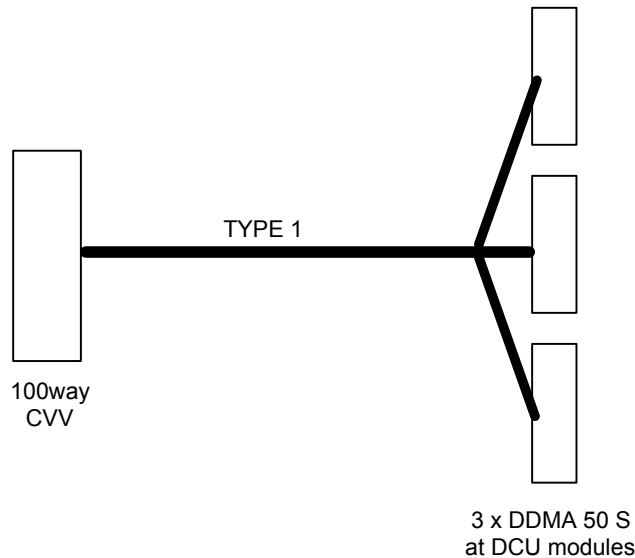


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 55 of 174

4.2.9 I9 HSDCU to CVV9 Type1

Overall Mechanical Drwg.



Connector/Backshell Details

DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J516ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J6 16ch. bolometer
DDMA 50 S + ESA/SCC 340102238B (ITT Cannon DD 24661): interface to HSDCU J7 16ch. bolometer

Harness Layup

As I 4 except
Tail A connected to HSDCU J5
Tail B connected to HSDCU J6
Tail C connected to HSDCU J7

Contact Details

As I 4.

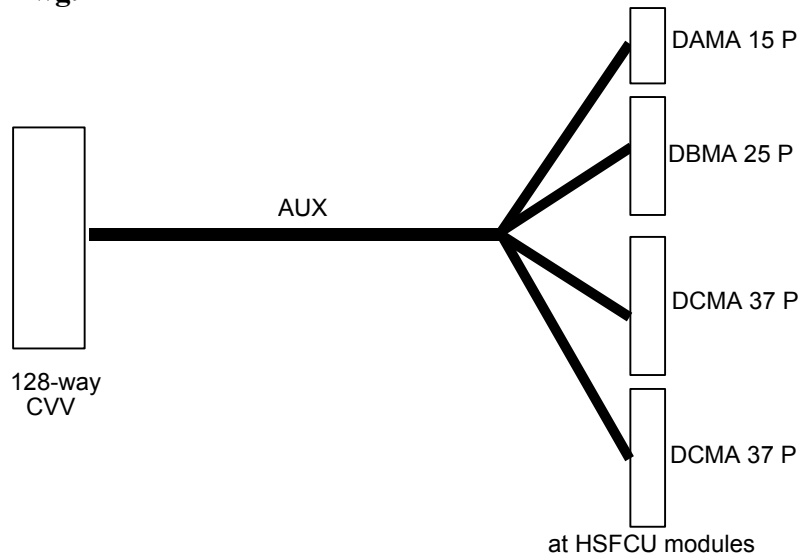


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 56 of 174

4.2.10 I10 HSDCU to CVV10 AUX-P

Overall Mechanical Drwg.



Connector/Backshell Details

Prime side harness

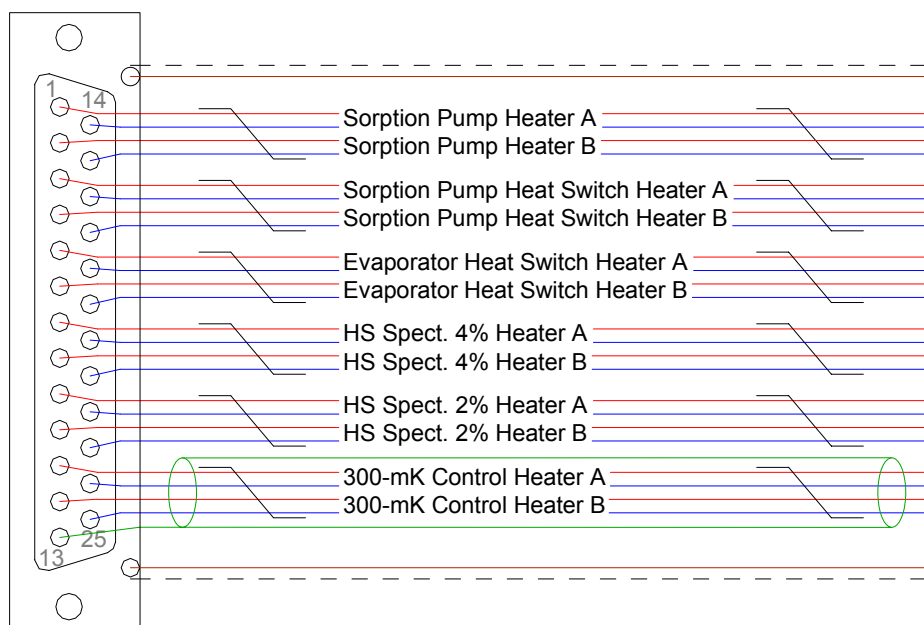
DAMA 15 P + ESA/SCC 340102235B (ITT Cannon DA 24658): interface to HSFCU J15 Shutter

DBMA 25 P + ESA/SCC 340102236B (ITT Cannon DB 24659): interface to HSFCU J11 Cooler, FTS Stimulus, and 300mK Control Heater.

DCMA 37 P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J23 Temperature sensors A

DCMA 37 P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J25 Temperature sensors B

Cooler-Harness Layup (FCU J11)

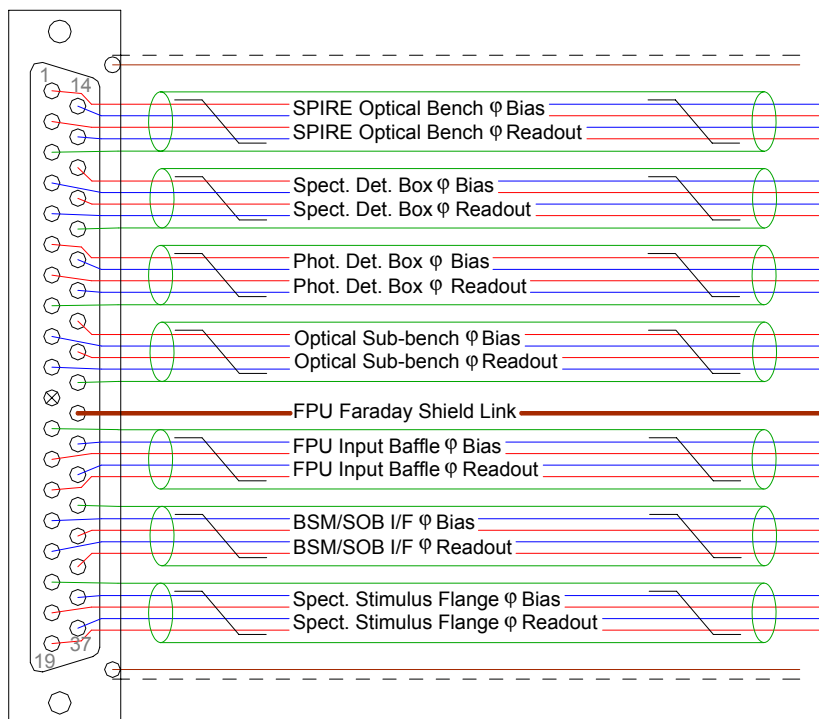




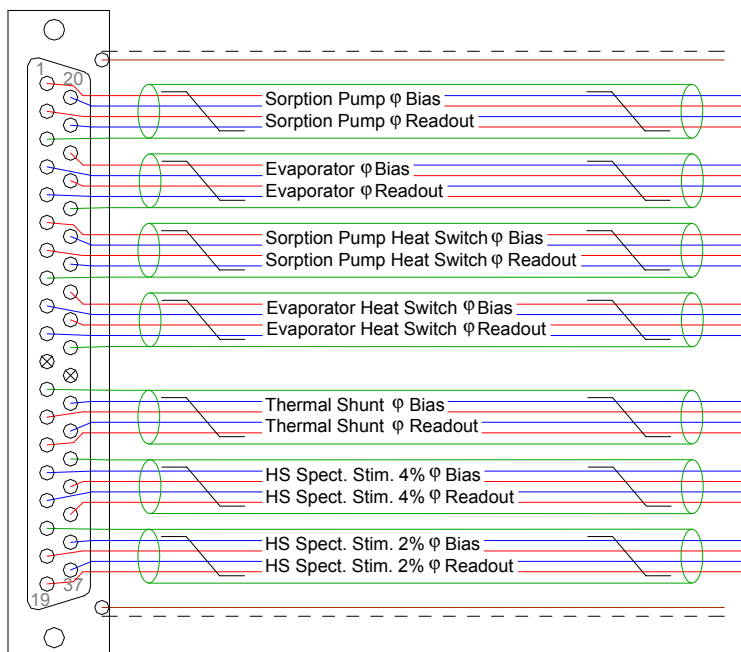
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 57 of 174

FPU Thermometry Harness A Layup (FCU J23)



FPU Thermometry Harness B Layup (FCU J25)



Shutter Harness Layup



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

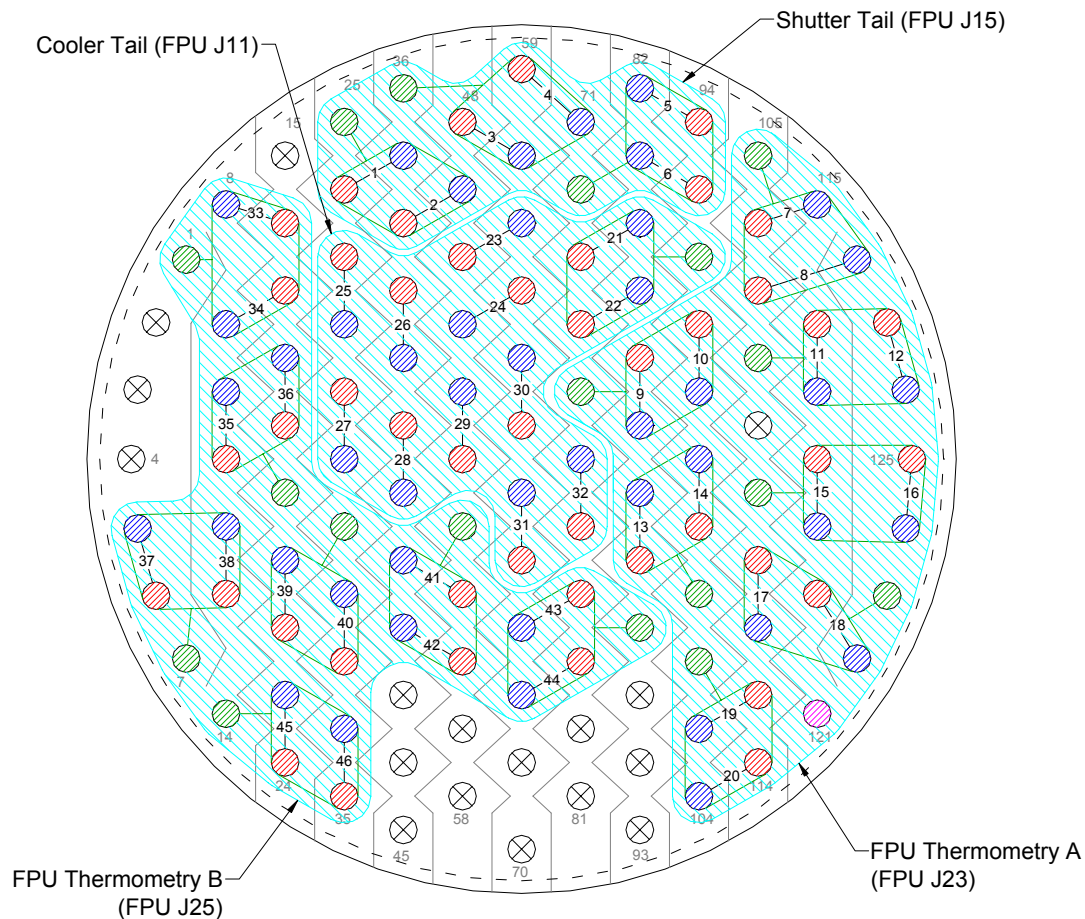
Issue: 0.8

Date: 02/11/01

Page 58 of 174

Identical to the layup used in I10/I12

I10 128-Way Connector 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)



SPIRE HARNESS DEFINITION

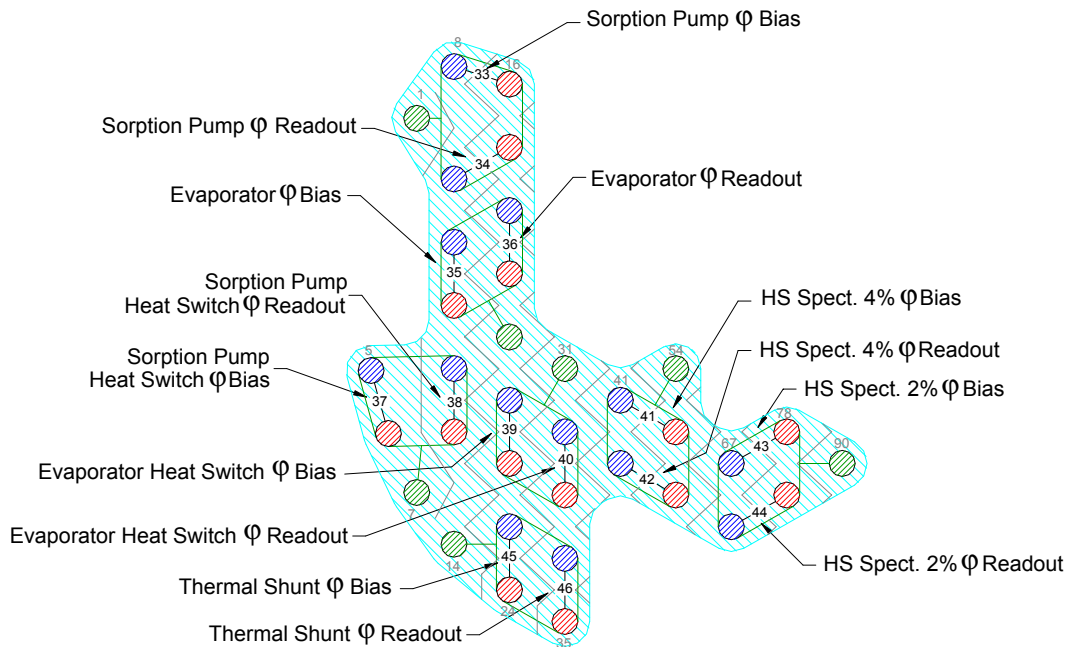
Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

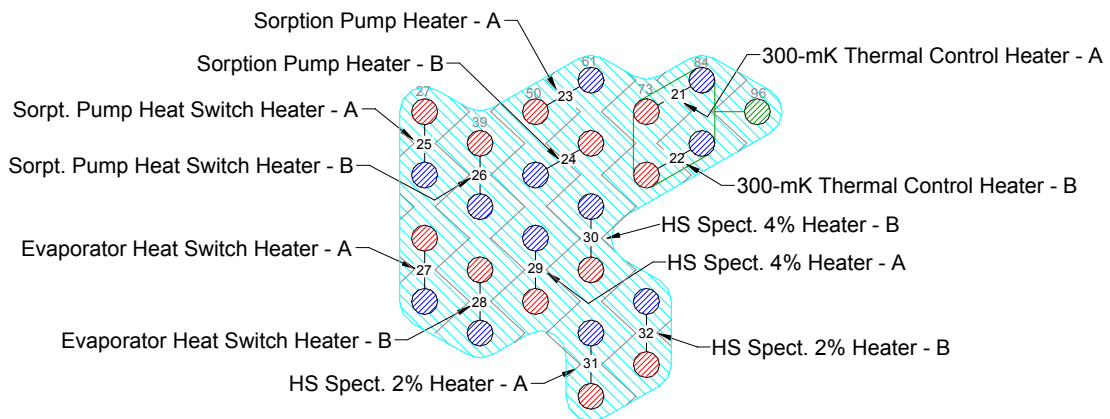
Date: 02/11/01

Page 59 of 174

Details of C10 128-Way Allocation



FPU Thermometry B (FCU J25)



Cooler Tail (J11)



SPIRE HARNESS DEFINITION

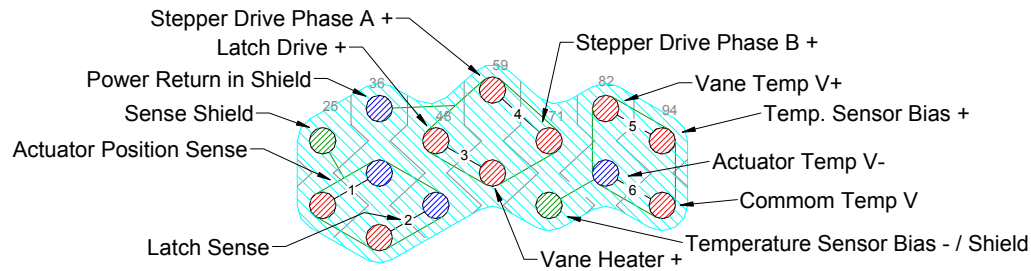
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Issue: 0.8

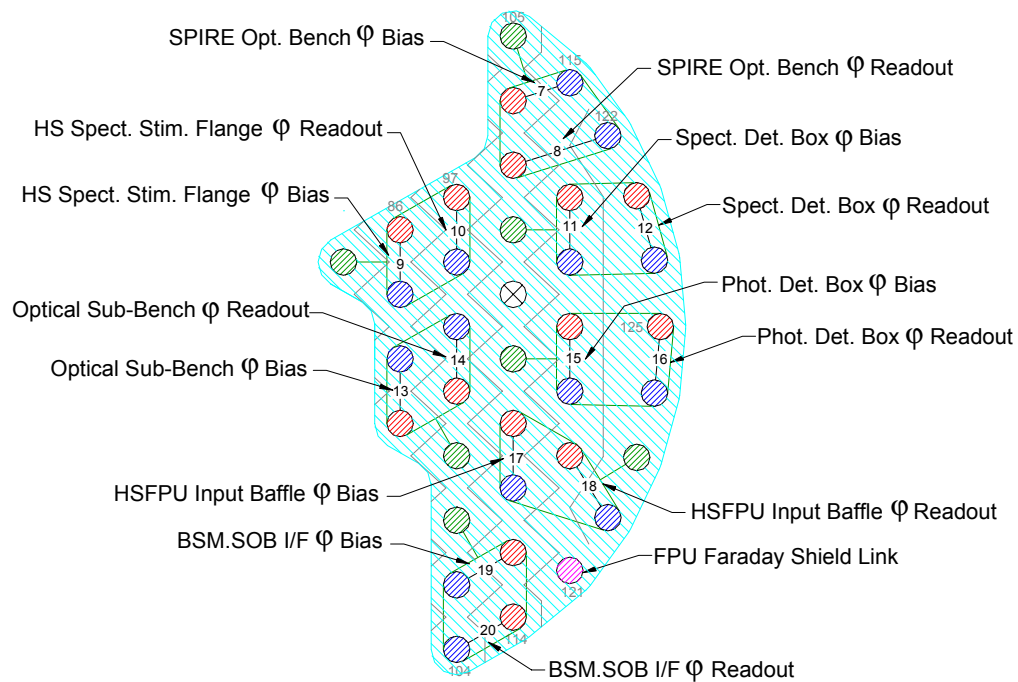
Date: 02/11/01

Page 60 of 174

Details of C10 128-Way Allocation



Shutter Tail (FCU J15)



FPU Thermometry A (J23)



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 61 of 174

Shutter Tail J15

Function	Pin # on J15	Max Current	Wire lay-up	Max Ohms*	128-Way #10 Pin Allocation
Actuator Position Sensor +	1		Insulated screened twisted quad	1000	26
Actuator Position Sensor -	9			1000	37
Latch Sense +	2			1000	38
Latch Sense -	10			1000	49
Sense Shld	3			1000	25
Latch Drive +	11		Insulated screened twisted quad	10	48
Vane Heater+	4			10	60
Stepper Drive Phase A +	12			10	59
Stepper Drive Phase B +	5			10	71
Power Ground / Rtn. as shld	13			10	72
Temp Sensor Bias+	6		Insulated screened twisted quad	1000	94
Vane Temp V+	14			1000	82
Common Temp V	7			1000	95
Actuator Temp V-	15			1000	83
Temp Sensor Bias -/Shld	8			1000	72
Harness Overshield	EMC Backshell				

All 15 ways 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	50
Sorption Pump heater I+ B	2	25 mA		10	62
Sorption Pump heater I- A	14	25 mA		10	61
Sorption Pump heater I- B	15	25 mA		10	51
Sorption Pump Heat Switch heater I+ A	3	1.5 mA	twisted quad	50	27
Sorption Pump Heat Switch heater I+ B	4	1.5 mA		50	39
Sorption Pump Heat Switch heater I- A	16	1.5 mA		50	28
Sorption Pump Heat Switch heater I- B	17	1.5 mA		50	40
Evaporator Heat Switch heater I+ A	5	1.5 mA	twisted quad	50	29
Evaporator Heat Switch heater I+ B	6	1.5 mA		50	41
Evaporator Heat Switch heater I- A	18	1.5 mA		50	30
Evaporator Heat Switch heater I- B	19	1.5 mA		50	42
HS Spect. 4% heater I+ A	7	9 mA	twisted quad	30	53
HS Spect. 4% heater I+ B	8	9 mA		30	64
HS Spect. 4% heater I- A	20	9 mA		30	52
HS Spect. 4% heater I- B	21	9 mA		30	63
HS Spect. 2% heater I+ A	9	7 mA	twisted quad	30	66
HS Spect. 2% heater I+ B	10	7 mA		30	77
HS Spect. 2% heater I- A	22	7 mA		30	65
HS Spect. 2% heater I- B	23	7 mA		30	76
300-mK Thermal Control Heater I+ A	11	2mA	Insulated screened twisted quad	100	73
300-mK Thermal Control Heater I+ B	12	2 mA		100	74
300-mK Thermal Control Heater I- A	24	2 mA		100	84
300-mK Thermal Control Heater I- B	25	2 mA		100	85
300-mK Thermal Control Heater shld.	13			N/A	96
Harness Overshield	EMC Backshell				

25ways used



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 62 of 174

FPU Thermometry Listing A J23

Function	37way J23	Max. current	Wire lay-up	Max Ohms	128Way #10
SPIRE Opt. Bench temperature I+	1	1 μ A	Insulated screened twisted quad	1000	106
SPIRE Opt. Bench temperature V+	2	N/A		1000	107
SPIRE Opt. Bench temperature V-	21	N/A		1000	122
SPIRE Opt. Bench temperature I-	20	1 μ A		1000	115
SPIRE Opt. Bench temperature shld	3	N/A		N/A	105
Spectrometer Det. Box temperature I+	22	1 μ A	Insulated screened twisted quad	1000	116
Spectrometer Det. Box temperature V+	23	N/A		1000	123
Spectrometer Det. Box temperature V-	5	N/A		1000	124
Spectrometer Det. Box temperature I-	4	1 μ A		1000	117
Spectrometer Det. Box temperature shld	24	N/A		N/A	108
Photometer Det. Box temperature I+	6	1 μ A	Insulated screened twisted quad	1000	118
Photometer Det. Box temperature V+	7	N/A		1000	125
Photometer Det. Box temperature V-	26	N/A		1000	126
Photometer Det. Box temperature I-	25	1 μ A		1000	119
Photometer Det. Box temperature shld	8	N/A		N/A	110
Optical SubBench temperature I+	27	1 μ A	Insulated screened twisted quad	1000	89
Optical SubBench temperature V+	28	N/A		1000	100
Optical SubBench temperature V-	10	N/A		1000	99
Optical SubBench temperature I-	9	1 μ A		1000	88
Optical SubBench temperature shld	29	N/A		N/A	101
HSFPU Input Baffle temperature I+	13	1 μ A	Insulated screened twisted quad	1000	111
HSFPU Input Baffle temperature V+	14	N/A		1000	120
HSFPU Input Baffle temperature V-	32	N/A		1000	128
HSFPU Input Baffle temperature I-	31	1 μ A		1000	112
HSFPU Input Baffle temperature shld	12	N/A		N/A	127
BSM/SOB I/F temperature I+	34	1 μ A	Insulated screened twisted quad	1000	113
BSM/SOB I/F temperature V+	35	N/A		1000	114
BSM/SOB I/F temperature V-	16	N/A		1000	104
BSM/SOB I/F temperature I-	15	1 μ A		1000	103
BSM/SOB I/F temperature shld	33	N/A		N/A	102
HS Spect. Stimulus Flange temperature I+	18	1 μ A	Insulated screened twisted quad	1000	86
HS Spect. Stimulus Flange temperature V+	19	N/A		1000	97
HS Spect. Stimulus Flange temperature V-	37	N/A		1000	98
HS Spect. Stimulus Flange temperature I-	36	1 μ A		1000	87
HS Spect. Stimulus Flange temperature shld	17	N/A		N/A	75
FPU Faraday Shield Link	30	NA	Insulated Wire	50	121
Harness Overshield		EMC Backshell			

28 ways + 7 ground shield + 1 FPU Faraday Shield Link = 36 in use out of 37 ways.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 63 of 174

FPU Thermometry Listing B J25

Function	37way J25	Max. current	Wire lay-up	Max Ohms	128Way #10
Sorption Pump temperature I+	1	1 μA	Insulated screened twisted quad	1000	16
Sorption Pump temperature V+	2	N/A		1000	17
Sorption Pump temperature V-	21	N/A		1000	9
Sorption Pump temperature I-	20	1 μA		1000	8
Sorption Pump temperature shld	3	N/A		N/A	1
Evaporator temperature I+	22	1 μA	Insulated screened twisted quad	1000	11
Evaporator temperature V+	23	N/A		1000	19
Evaporator temperature V-	5	N/A		1000	18
Evaporator temperature I-	4	1 μA		1000	10
Evaporator temperature shld	24	N/A		N/A	20
Sorption Pump Heat Switch temperature I+	6	1 μA	Insulated screened twisted quad	1000	6
Sorption Pump Heat Switch temperature V+	7	N/A		1000	13
Sorption Pump Heat Switch temperature V-	26	N/A		1000	12
Sorption Pump Heat Switch temperature I-	25	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+	28	N/A		1000	33
Evaporator Heat Switch temperature V-	10	N/A		1000	32
Evaporator Heat Switch temperature I-	9	1 μA		1000	21
Evaporator Heat Switch temperature shld	29	N/A		N/A	31
Thermal Shunt temperature I+ _A	13	1 μA	Insulated screened twisted quad	1000	24
Thermal Shunt temperature V+ _B	14	N/A		1000	35
Thermal Shunt temperature V- _A	32	N/A		1000	34
Thermal Shunt temperature I- _B	31	1 μA		1000	23
Thermal Shunt temperature shld	12	N/A		N/A	14
HS Spect. 4% temperature I+	34	1 μA	Insulated screened twisted quad	1000	55
HS Spect. 4% temperature V+	35	N/A		1000	56
HS Spect. 4% temperature V-	16	N/A		1000	42
HS Spect. 4% temperature I-	15	1 μA		1000	41
HS Spect. 4% temperature shld	33	N/A		N/A	54
HS Spect. 2% temperature I+	18	1 μA	Insulated screened twisted quad	1000	78
HS Spect. 2% temperature V+	19	N/A		1000	79
HS Spect. 2% temperature V-	37	N/A		1000	68
HS Spect. 2% temperature I-	36	1 μA		1000	67
HS Spect. 2% temperature shld	17	N/A		N/A	90
Harness Overshield	EMC Backshell				

28 ways + 7 ground shield = 35 in use out of 37 ways.

Total number of contacts in use = 15 + 25+35 +35 + harness shield link = 111 contacts.

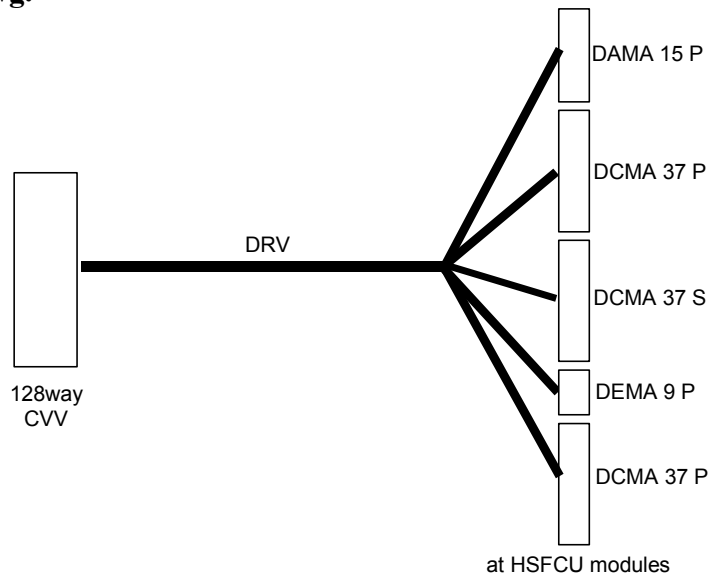


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 64 of 174

4.2.11 I11 HSDCU to CVV11 DRV-P

Overall Mechanical Drwg.



Connector/Backshell Details

DAMA 15 P + ESA/SCC 340102235B (ITT Cannon DA 24658): interface to HSFCU J21 Temperatures
DCMA 37P+ ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J17 SMEC Control
DCMA 37S+ ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J29 SMEC Launch
DEMA 9P + ESA/SCC 340102234B (ITT Cannon DE 24657): interface to HSFCU J13 Photometer Stimulus
DCMA 37P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J19 BSM

Harness Layups

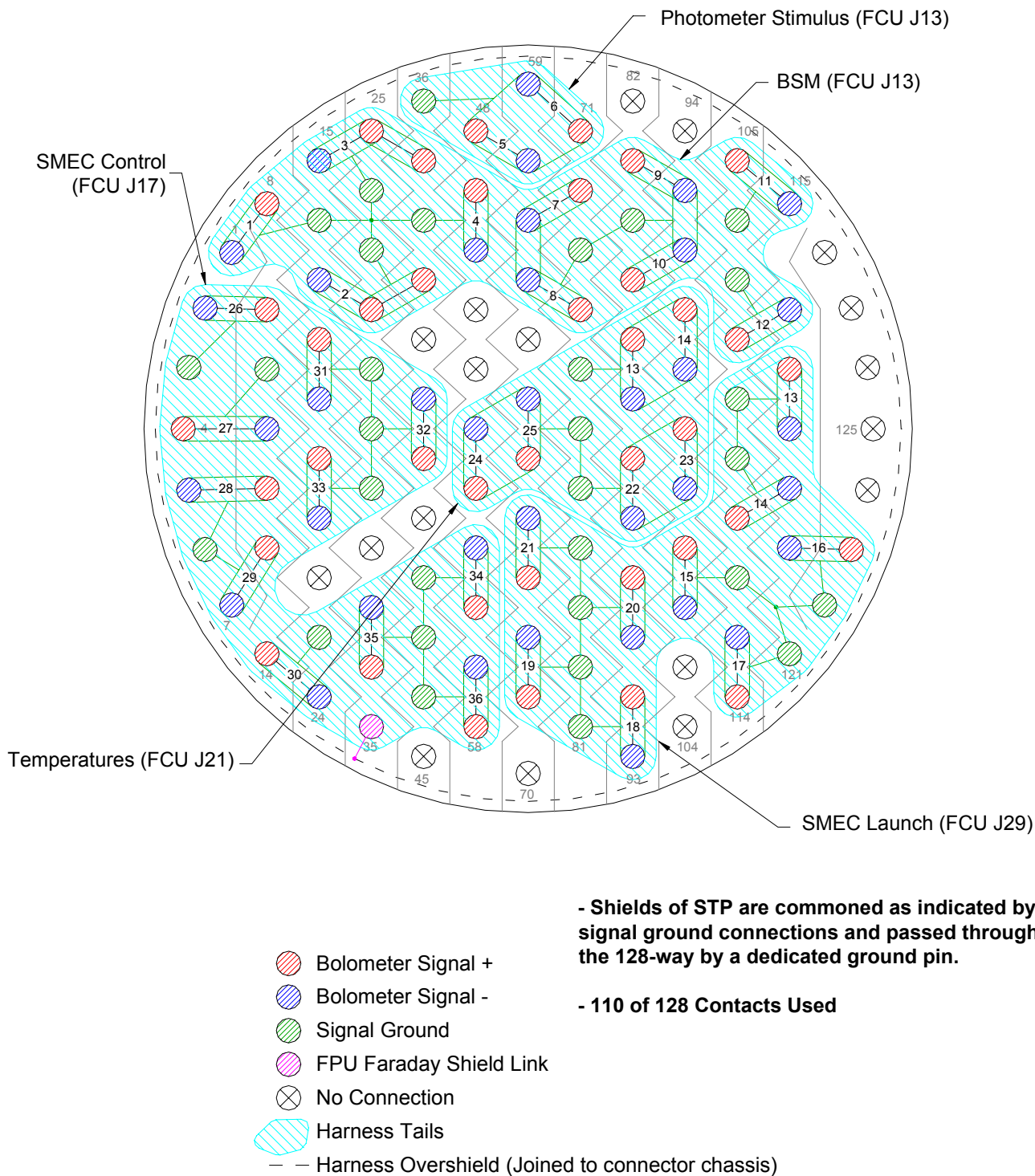
As per tail listings.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 65 of 174

128- Pin Assignment





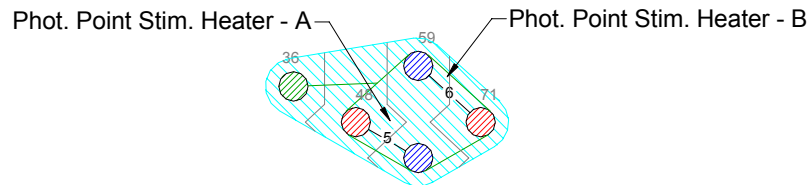
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Doc #: SPIRE-RAL-PRJ-000608

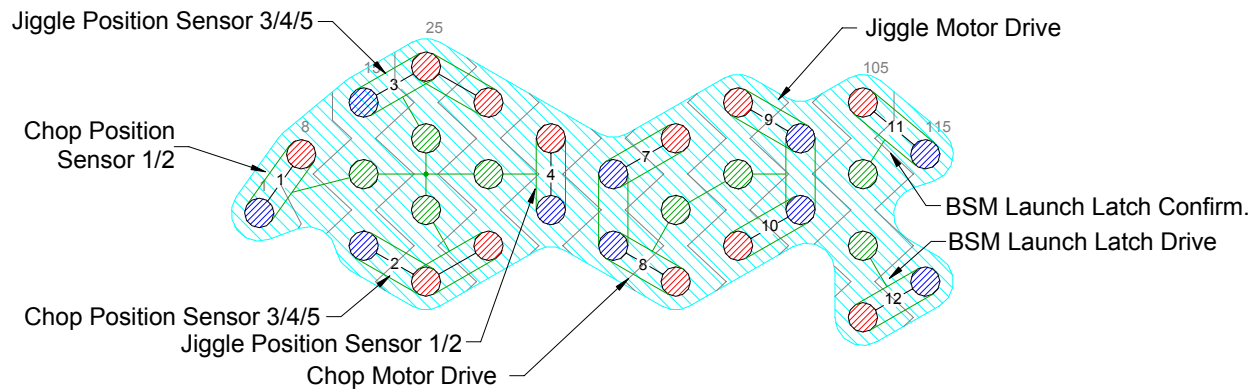
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Date: 02/11/01

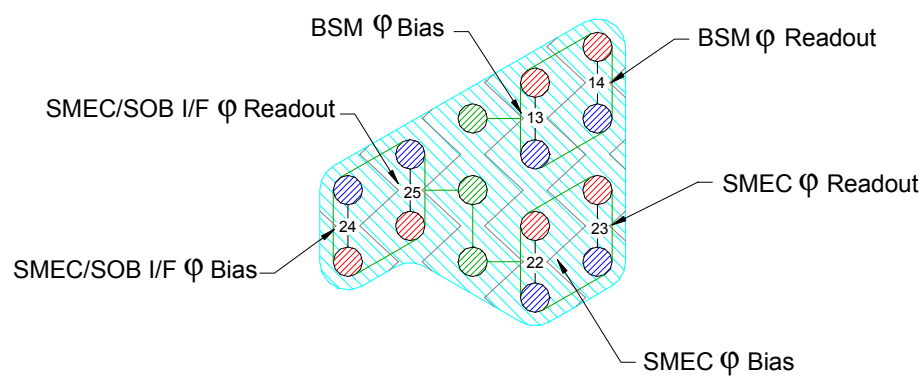
Page 66 of 174



FCU Photometer Stimulus (J13)



FCU BSM (J19)



FCU Temperatures (J21)



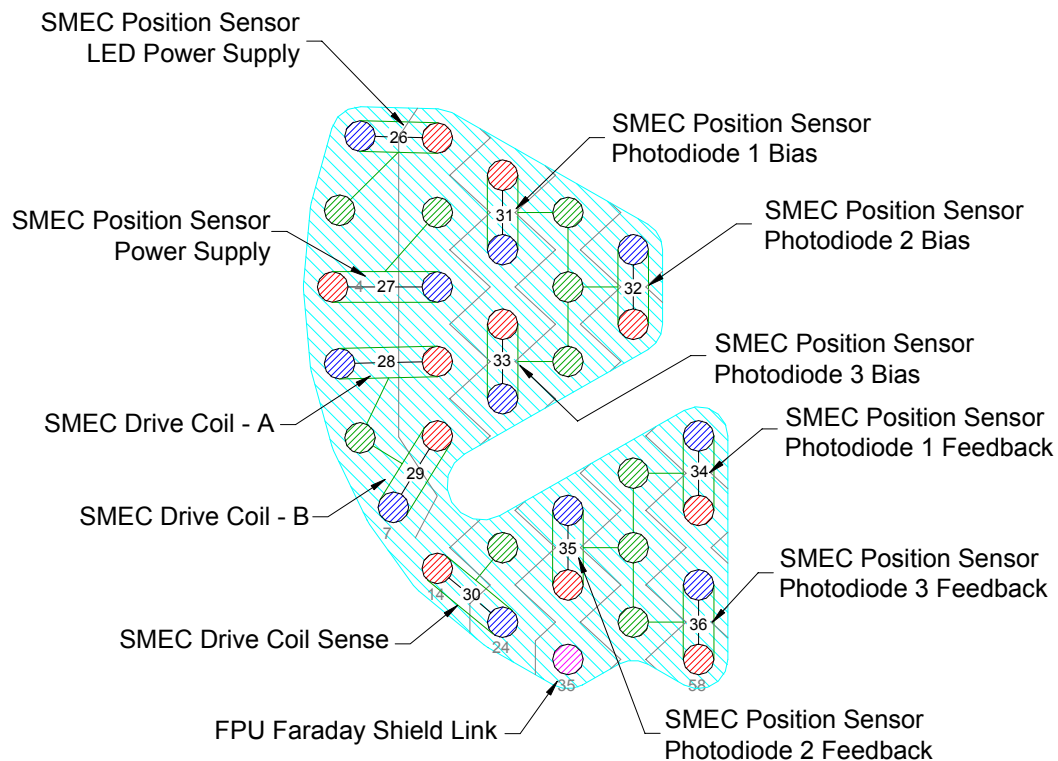
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Doc #: SPIRE-RAL-PRJ-000608

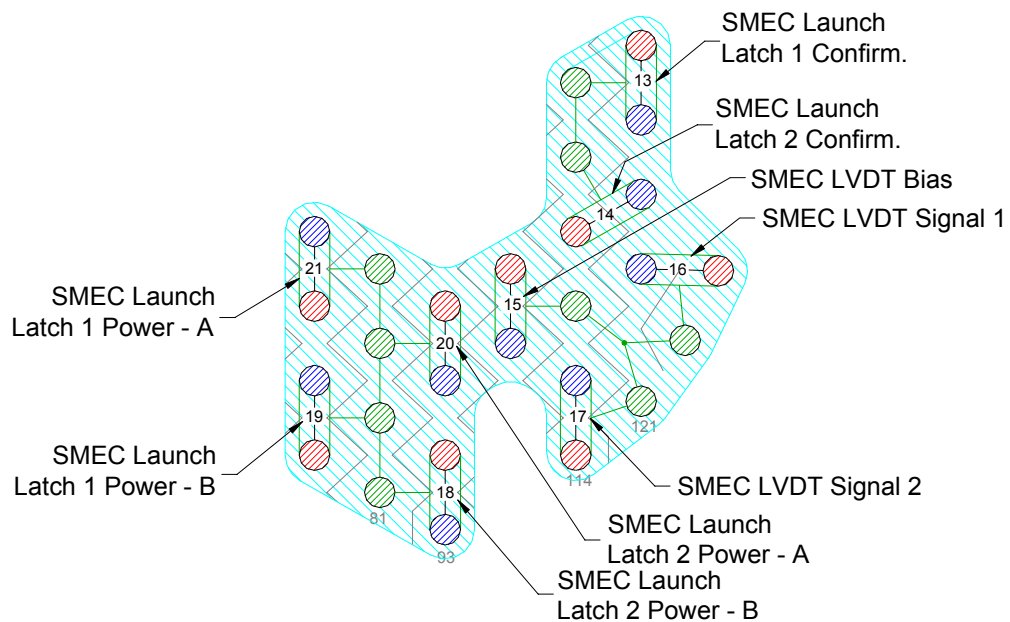
Issue: 0.8

Date: 02/11/01

Page 67 of 174



FCU SMEC Control (J17)



SMEC Launch (J23)



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 68 of 174

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-	17	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

Function	37way J17	Max. current	Wire lay-up	Max Ohms	128Way #11
SMEC Drive Coil I+	1	100mA	Insulated screened twisted pair	5	12
SMEC Drive Coil I-	2	100mA		5	5
SMEC Drive Coil shld	20	N/A		N/A	6
SMEC Drive Coil (Rob) I+	21	100mA	Insulated screened twisted pair	5	13
SMEC Drive Coil (Rob) I-	22	100mA		5	7
SMEC Drive Coil (Rob) shld	3	N/A		N/A	6
SMEC Drive Coil Sense+	4	10 μ A	Insulated screened twisted pair	500	14
SMEC Drive Coil Sense-	5	10 μ A		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 μ A	Insulated screened twisted pair	1000	18
SMEC position sensor photodiode #1 I-	11	20 μ A		1000	19
SMEC position sensor photodiode Shield	29	N/A		N/A	29
SMEC pos. sensor photodiode #1 feedback +	30	10 μ A	Insulated screened twisted pair	1000	56
SMEC pos. sensor photodiode #1 feedback -	31	10 μ A		1000	55
SMEC pos. sensor photodiode feedback Shld	12	N/A		N/A	42
SMEC position sensor photodiode #2 I+	13	20 μ A	Insulated screened twisted pair	1000	42
SMEC position sensor photodiode #2 I-	14	20 μ A		1000	41
SMEC position sensor photodiode Shield	32	N/A		N/A	30
SMEC pos. sensor photodiode #2 feedback +	33	10 μ A	Insulated	1000	34

	SPIRE HARNESS DEFINITION	Doc #: SPIRE-RAL-PRJ-000608 Issue: 0.8 Date: 02/11/01 Page 69 of 174
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SMEC pos. sensor photodiode #2 feedback -	34	10 μ A	screened twisted pair	1000	33
SMEC pos. sensor photodiode feedback Shld	15	N/A		N/A	43
SMEC position sensor photodiode #3 I+	16	20 μ A	Insulated screened twisted pair	1000	20
SMEC position sensor photodiode #3 I-	17	20 μ A		1000	21
SMEC position sensor photodiode Shield	35	N/A		N/A	31
SMEC pos. sensor photodiode #3 feedback +	36	10 μ A	Insulated screened twisted pair	1000	58
SMEC pos. sensor photodiode #3 feedback -	37	10 μ A		1000	57
SMEC pos. sensor photodiode feedback Shld	18	N/A		N/A	44
FPU Faraday Shield Link	31	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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 70 of 174

SMEC Launch Tail Listing

Function	37way J29	Max. current	Wire lay-up	Max Ohms	128Way #11
SMEC launch latch # 1 confirmation +	1	1 mA	Insulated screened twisted pair	5	117
SMEC launch latch # 1 confirmation -	20	1 mA		5	118
SMEC launch latch # 1 confirmation Shield	3	N/A		N/A	109
SMEC launch latch # 2 confirmation + TBC	2	1 mA	Insulated screened twisted pair	5	111
SMEC launch latch # 2 confirmation - TBC	21	1 mA		5	119
SMEC launch latch # 2 confirmation Shld TBC	3	N/A		N/A	110
SMEC launch latch #1 power supply_A	21	400 mA / 50ms	Insulated screened twisted pair	5	67
SMEC launch latch #1 power return_A	22	400 mA / 50ms		5	66
SMEC launch latch #1 power Shield_A	4	N/A		N/A	78
SMEC launch latch #1 power supply_B	5	400 mA / 50ms	Insulated screened twisted pair	5	69
SMEC launch latch #1 power return_B	6	400 mA / 50ms		5	68
SMEC launch latch #1 power Shield_B	23	N/A		N/A	80
SMEC launch latch #2 power supply_A	24	400 mA / 50ms	Insulated screened twisted pair	5	90
SMEC launch latch #2 power return_A	25	400 mA / 50ms		5	91
SMEC launch latch #2 power Shield_A	7	N/A		N/A	79
SMEC launch latch #2 power supply_B	8	400 mA / 50ms	Insulated screened twisted pair	5	92
SMEC launch latch #2 power return_B	9	400 mA / 50ms		5	93
SMEC launch latch #2 power Shield_B	26	N/A		N/A	81
SMEC LVDT primary coil power supply (P)	32	5 mA	Insulated screened twisted pair	5	101
SMEC LVDT primary coil power supply (N)	33	5 mA		5	102
SMEC LVDT primary coil power supply Shld	15	N/A		N/A	112
SMEC LVDT secondary coil # 1signal (P)	35	50 μA	Insulated screened twisted pair	5	127
SMEC LVDT secondary coil # 1 signal (N)	36	50 μA		5	120
SMEC LVDT secondary coil # 1 signal Shield	17	N/A		N/A	128
SMEC LVDT secondary coil # 2 signal (P)	18	50 μA	Insulated screened twisted pair	5	114
SMEC LVDT secondary coil # 2 signal (N)	19	50 μA		5	113
SMEC LVDT secondary coil # 2 signal Shield	37	N/A		N/A	121
Harness Overshield		EMC Backshell			



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 71 of 174

BSM Tail Listing

Function	37way J19	Max. current	Wire lay-up	Max Ohms	128Way #11
Chop Position Sensor 1	1	1 μA	Insulated screened twisted pair	1000	8
Chop Position Sensor 2	20	N/A		1000	1
Chop Position Sensor shld1	to A	N/A		N/A	16 Linked to (26, 27 and 38)
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	N/A		N/A	26 Linked to (16, 27 and 38)
Jiggle Position Sensor 1	4	1 μA	Insulated screened twisteed pair	1000	49
Jiggle Position Sensor 2	23	N/A		1000	50
Jiggle Position Sensor shld1	to B	N/A		N/A	38 Linked to (16, 26, and 27)
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	N/A		N/A	27 Linked to (16, 26 and 38)
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 triple	10	108
BSM Launch latch drive -	32	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	N/A		N/A	73
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	N/A		N/A	83 Linked to 73
Harness Overshield	EMC Backshell				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 72 of 174

4.2.12 I12 HSDCU to CVV12 AUX-R

Overall Mechanical Drwg.

Redundant version of I10, and the same as it

Connector/Backshell Details

Prime side harness

DAMA 15 P + ESA/SCC 340102235B (ITT Cannon DA 24658): interface to HSFCU J16 Shutter

DBMA 25 P + ESA/SCC 340102236B (ITT Cannon DB 24659): interface to HSFCU J12 Cooler, FTS Stimulus, and 300mK Control Heater.

DCMA 37 P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J24 Temperature sensors A

DCMA 37 P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J26 Temperature sensors B

Harness Layup

As I10



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 73 of 174

4.2.13 I13 HSDCU to CVV13 DRV-R

Overall Mechanical Drwg.

Format as I11, maybe differing lengths.

Connector/Backshell Details

Redundant side harness

DAMA 15 P + ESA/SCC 340102235B (ITT Cannon DA 24658): interface to HSFCU J22 Temperatures

DCMA 37P+ ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J18 SMEC Control

DCMA 37S+ ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J30 SMEC Launch

DEMA 9P + ESA/SCC 340102234B (ITT Cannon DE 24657): interface to HSFCU J14 Photometer Stimulus

DCMA 37P + ESA/SCC 340102237B (ITT Cannon DC 24660): interface to HSFCU J20 BSM

Harness Layup

As I11.

Contact Details

As I11



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

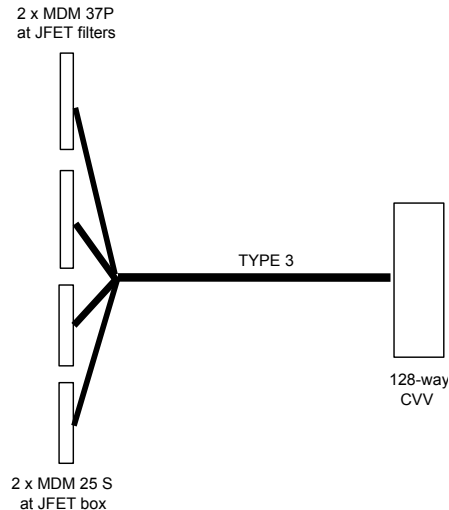
Date: 02/11/01

Page 74 of 174

4.3 Cryogenic Harnesses

4.3.1 C1 CVV1 to HSJFS Type3

Overall Mechanical Drwg.



Connector/Backshell Details:

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFS J5

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFS J6

MDM 37 P + Glenair 507-145 M 37 H: interface to HSJFS J9 bias A

MDM 37 P + Glenair 507-145 M 37 H: interface to HSJFS J10 bias B

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 Filters

13 isolated screened twisted pairs + 3 ground single wires.

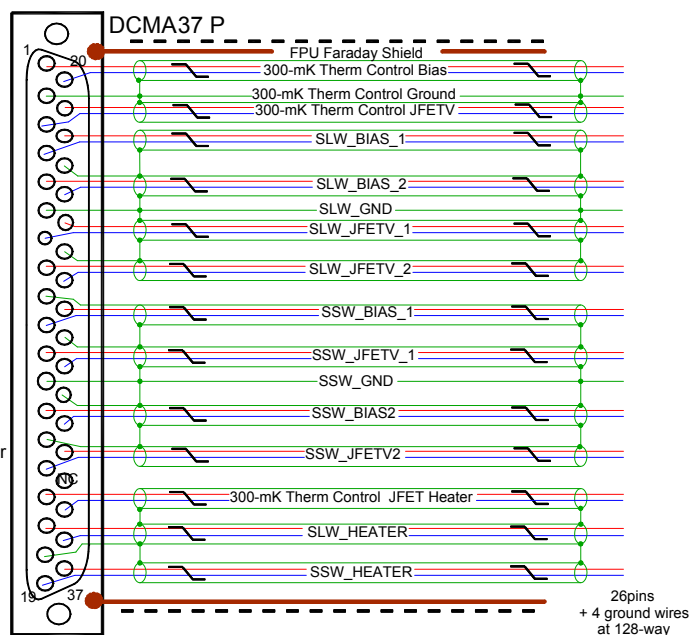
Note SLW and SSW ground separation.

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.

Note that there are A & B versions of this tail.

Heater wires should be current rated for same current as the JFET supplies for which they substitute.



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



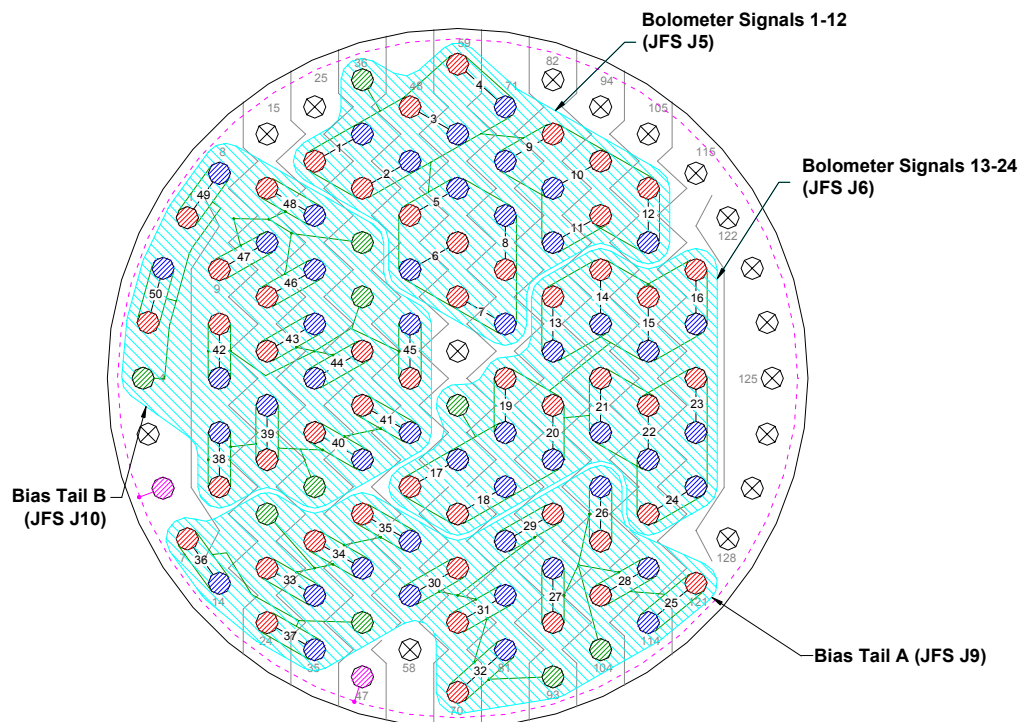
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

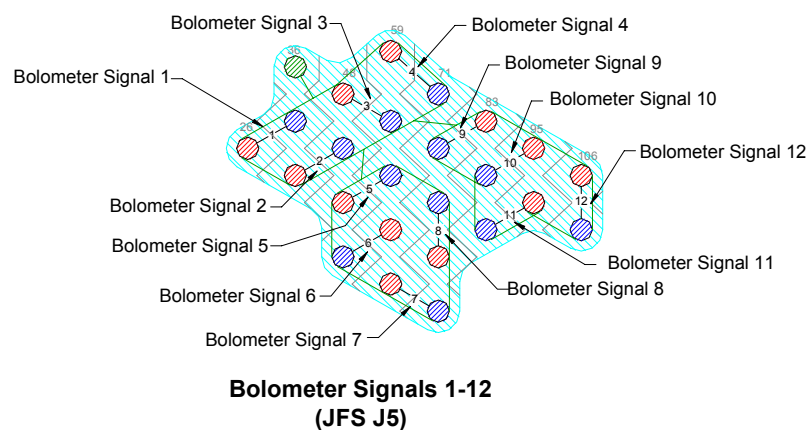
Date: 02/11/01

Page 75 of 174



- 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.





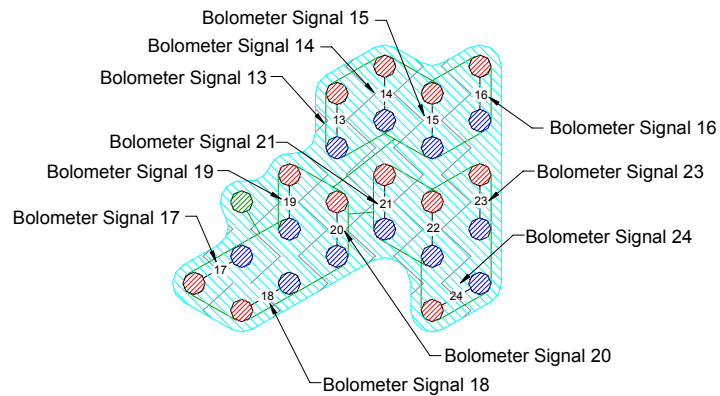
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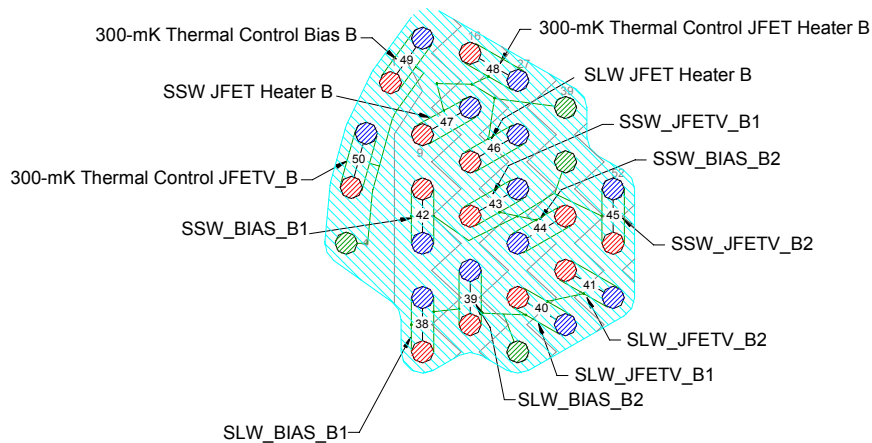
Issue: 0.8

Date: 02/11/01

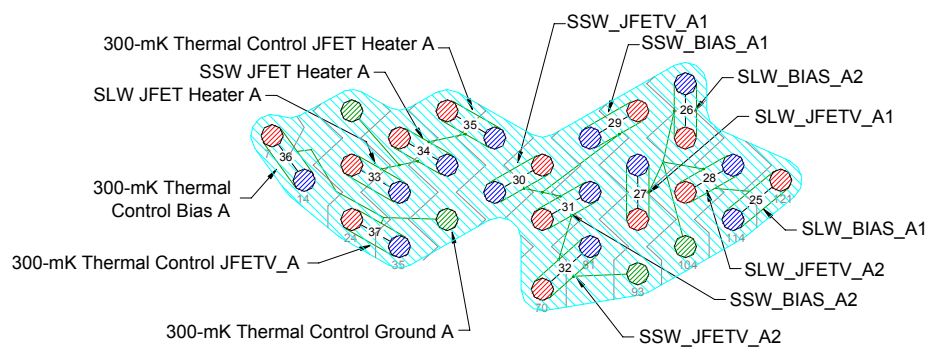
Page 76 of 174



**Bolometer Signals 13-24
(JFS J6)**



**Bias Tail B
(JFS J10)**



**Bias Tail A
(JFS J9)**



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 77 of 174

Contact details

Name	25way A J5	25wayB J6	37way C J9	37way D J10	128Way #1
Channel 1 +	1				26
Channel 1 -	14				37
Channel 1gnd shld	NC				36*
Channel 2 +	2				38
Channel 2 -	15				49
Channel 2gnd shld	NC				36*
Channel 3 +	3				48
Channel 3 -	16				60
Channel 3gnd shld	NC				36*
Channel 4 +	4				59
Channel 4 -	17				71
Channel 4gnd shld	NC				36*
Channel 5 +	5				50
Channel 5 -	18				61
Channel 5gnd shld	NC				36*
Channel 6 +	6				62
Channel 6 -	19				51
Channel 6gnd shld	NC				36*
Channel 7 +	20				36*
Channel 7 -	7				63
Channel 7gnd shld	NC				75
Channel 8 +	21				36*
Channel 8 -	8				74
Channel 8gnd shld	NC				73
Channel 9 +	22				36*
Channel 9 -	9				83
Channel 9gnd shld	NC				72
Channel 10 +	23				36*
Channel 10 -	10				95
Channel 10gnd shld	NC				84
Channel 11 +	24				36*
Channel 11 -	11				96
Channel 11gnd shld	NC				85
Channel 12 +	25				36*
Channel 12 -	12				106
Channel 12gnd shld	NC				107
SSW GND WIRE	13				36*
Channel 13 +		1			86
Channel 13 -		14			87
Channel 1gnd shld		NC			65*
Channel 14 +		2			97
Channel 14 -		15			98
Channel 1gnd shld		NC			65*
Channel 15 +		3			108
Channel 15 -		16			109
Channel 15gnd shld		NC			65*
Channel 16 +		4			116
Channel 16 -		17			117
Channel 16gnd shld		NC			65*
Channel 17 +		5			55
Channel 17 -		18			66
Channel 17gnd shld		NC			65*
Channel 18 +		6			67
Channel 18 -		19			78
Channel 18gnd shld		NC			65*
Channel 19 +		20			65*



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 78 of 174

Name	25way A J5	25wayB J6	37way C J9	37way D J10	128Way #1
Channel 19 -		7			76
Channel 19gnd shld		NC			77
Channel 20 +		21			65*
Channel 20 -		8			88
Channel 1gnd shld		NC			89
Channel 21 +		22			65*
Channel 21 -		9			99
Channel 21gnd shld		NC			100
Channel 22 +		23			65*
Channel 22 -		10			110
Channel 22gnd shld		NC			111
Channel 23 +		24			65*
Channel 23 -		11			118
Channel 23gnd shld		NC			119
Channel 24 +		25			65*
Channel 24 -		12			112
Channel 24gnd shld		NC			120
SSW GND WIRE		13			65*
300-mK TC Bias A +ve			1		7
300-mK TC Bias A -ve			20		14
300-mK TC Bias A Shield			2*		46*
300-mK TC Ground A			2*		46*
300-mK JFETV Bias A +ve			21		24
300-mK JFETV Bias A -ve			3		35
300-mK JFETV Bias A Shield			2*		46*
SLW BIAS A1+ve			22		121
SLW BIAS A1-ve			4		114
SLW BIAS A1 shld			6*		104*
SLW BIAS A2 +ve			5		102
SLW BIAS A2 -ve			24		101
SLW BIAS A2 shld			23		104*
SLW JFETV A1 +ve			25		92
SLW JFETV A1 -ve			7		91
SLW JFETV A1 shld			6*		104*
SLW JFETV A2 +ve			8		103
SLW JFETV A2 -ve			27		113
SLW JFETV A2 shld			6*		104*
SLW GND WIRE A			6*		104*
FPU Faraday Shield Link A			Note 1		47
SSW GND WIRE A			12		93*
SSW BIAS1 A +ve			28		90
SSW BIAS1 A -ve			10		79
SSW BIAS1 A shld			9		93*
SSW JFETV1 A +ve			11		68
SSW JFETV1 A -ve			30		57
SSW JFETV1 A shld			29		93*
SSW BIAS2 A +ve			13		69
SSW BIAS2 A -ve			32		80
SSW BIAS2 A shld			31		93*
SSW JFETV2 A +ve			33		70
SSW JFETV2 A -ve			15		81
SSW JFETV2 A shld			14		93*
S HEATER GROUND WIRE A			NC		22*
SLW JFET HEATER A +ve			17		23
SLW JFET HEATER A -ve			36		34
SLW JFET HEATER A shld			18*		22*
SSW JFET HEATER A +ve			37		33
SSW JFET HEATER A -ve			19		45



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 79 of 174

Name	25way A J5	25wayB J6	37way C J9	37way D J10	128Way #1
SSW JFET HEATER A shld			18*		22*
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*		22*
300-mK TC Bias B +ve				1	1
300-mK TC Bias B -ve				20	8
300-mK TC Bias B Shield				2*	4*
300-mK TC Ground B				2*	4*
300-mK JFETV Bias B +ve				21	3
300-mK JFETV Bias B -ve				3	2
300-mK JFETV Bias B Shield				2*	4*
SLW BIAS B1+ve				22	13
SLW BIAS B1-ve				4	12
SLW BIAS B1 shld				6*	32*
SLW BIAS B2 +ve				5	21
SLW BIAS B2 -ve				24	20
SLW BIAS B2 shld				23	32*
SLW JFETV B1 +ve				25	31
SLW JFETV B1 -ve				7	43
SLW JFETV B1 shld				6*	32*
SLW JFETV B2 +ve				8	42
SLW JFETV B2 -ve				27	54
SLW JFETV B2 shld				6*	32*
SLW GND WIRE B				6*	32*
FPU Faraday Shield Link B				Note 1	6
SSW GND WIRE B				12	40*
SSW BIAS1 B +ve				28	10
SSW BIAS1 B -ve				10	11
SSW BIAS1 B shld				9	40*
SSW JFETV1 B +ve				11	19
SSW JFETV1 B -ve				30	29
SSW JFETV1 B shld				29	40*
SSW BIAS2 B +ve				13	41
SSW BIAS2 B -ve				32	30
SSW BIAS2 B shld				31	40*
SSW JFETV2 B +ve				33	53
SSW JFETV2 B -ve				15	52
SSW JFETV2 B shld				14	40*
S HEATER GROUND WIRE B				NC	4*
SLW HEATER B +ve				17	18
SLW HEATER B -ve				36	28
SLW HEATER B shld				18*	39*
SSW HEATER B +ve				37	9
SSW HEATER B -ve				19	17
SSW HEATER B shld				18*	39*
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*	39*
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.

Pins denoted by * indicate commonig of pins at the connector.

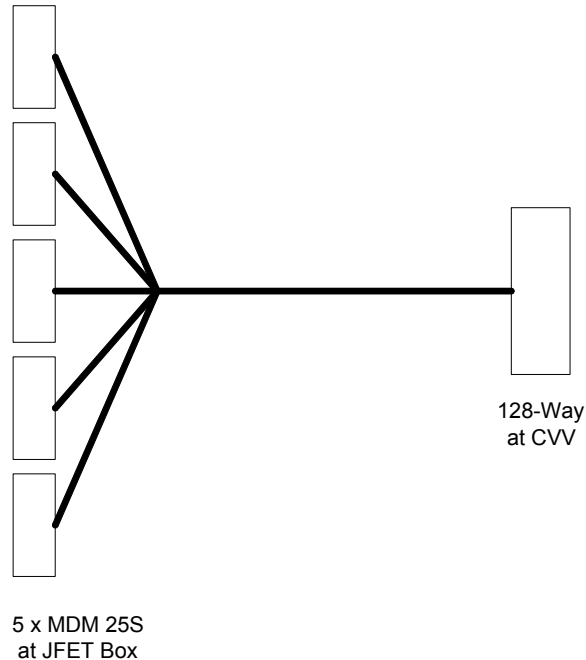


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 80 of 174

4.3.2 C2 CVV2 to HSJFS Type4

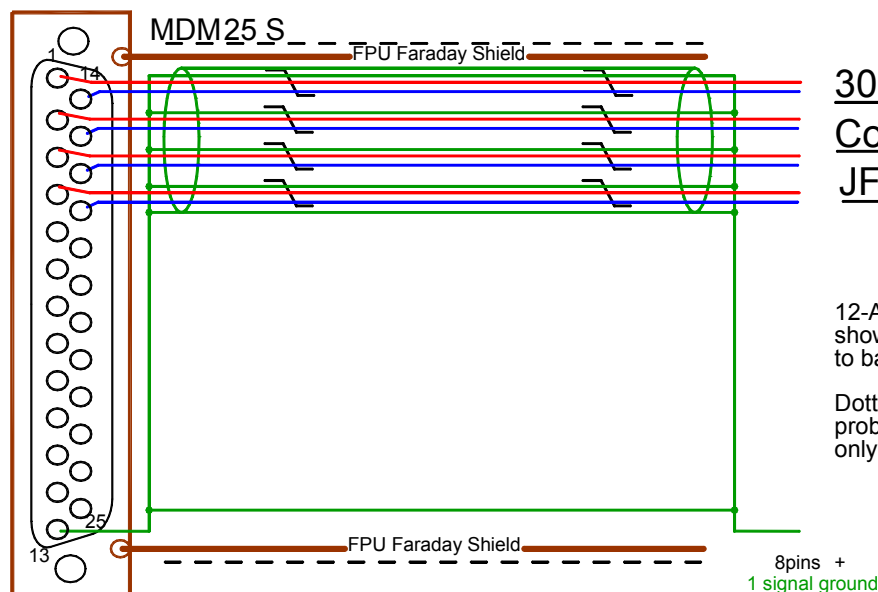
Overall Mechanical Drwg.



Connector/Backshell Details

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFS J1
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFS J2
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFS J3
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFS J4
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFS J7

Harness Layup





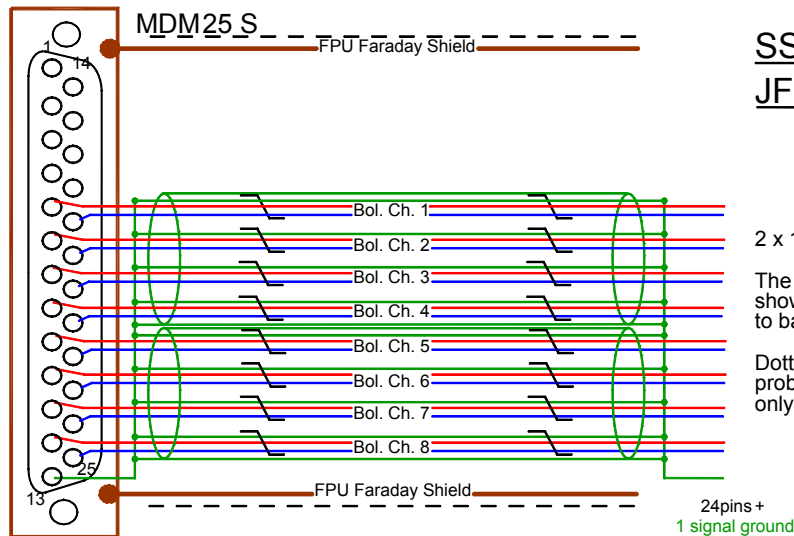
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 81 of 174

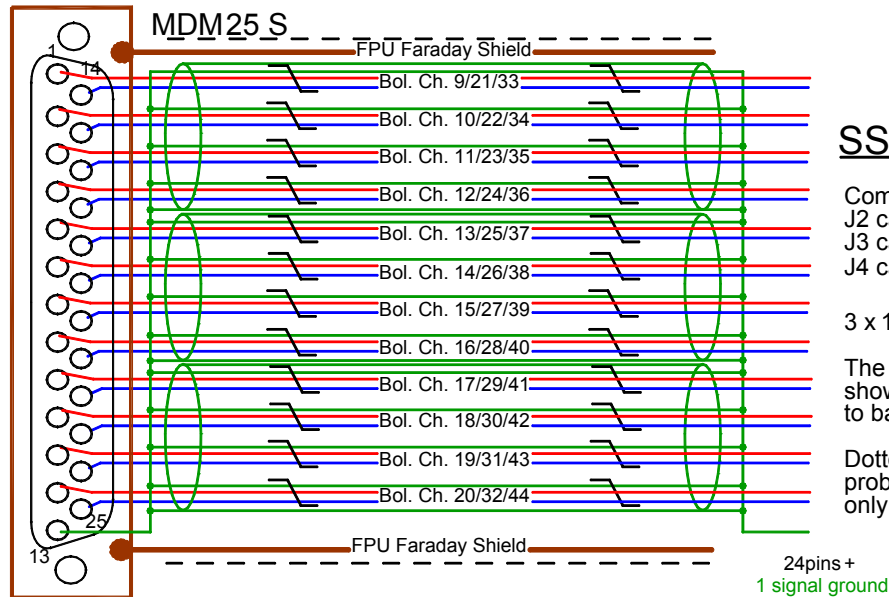


SSW JFET Tail JFS J1

2 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.



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.

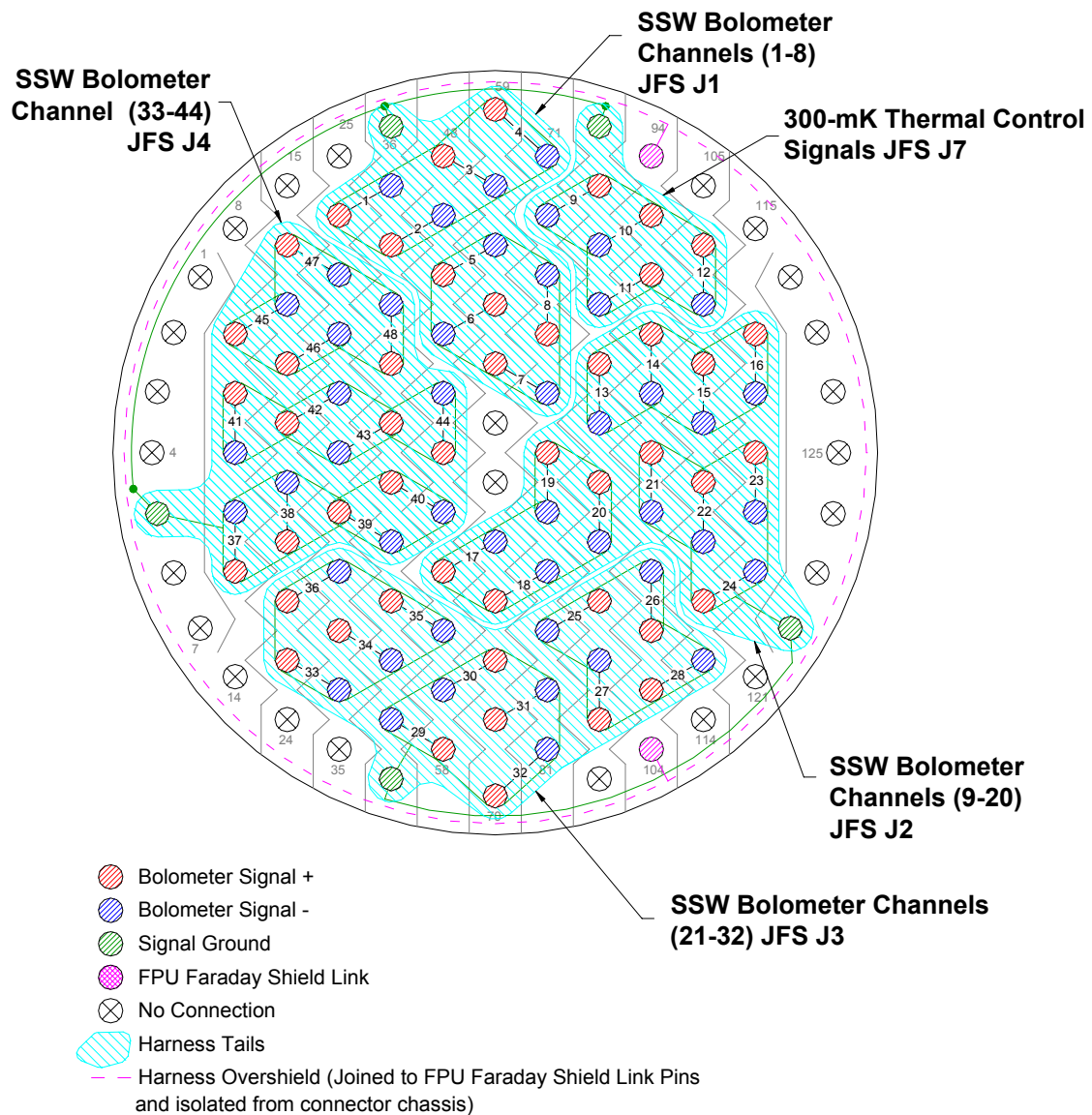
Dotted lines show insulation, probably put around bundles but only strictly needed at clamp points.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 82 of 174

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.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 83 of 174

Name	25way A	25wayB	25Way C	25way D	128Way #4
Bol. Channel 1 +	1				26
Bol. Channel 1 -	14				37
Bol. Channel 1gnd	13*				36*
Bol. Channel 2 +	2				38
Bol. Channel 2 -	15				49
Bol. Channel 2gnd	13*				36*
Bol. Channel 3 +	3				48
Bol. Channel 3 -	16				60
Bol. Channel 3gnd	13*				36*
Bol. Channel 4 +	4				59
Bol. Channel 4 -	17				71
Bol. Channel 4gnd	13*				36*
Bol. Channel 5 +	5				50
Bol. Channel 5 -	18				61
Bol. Channel 5gnd	13*				36*
Bol. Channel 6 +	6				62
Bol. Channel 6 -	19				51
Bol. Channel 6gnd	13*				36*
Bol. Channel 7 +	20				63
Bol. Channel 7 -	7				75
Bol. Channel 7gnd	13*				36*
Channel 8 +	21				74
Channel 8 -	8				73
Channel 8gnd	13*				36*
300-mK TC Channel 1 +	22				83
300-mK TC Channel 1 -	9				72
300-mK TC Channel 1gnd	13*				82*
300-mK TC Channel 2 +	23				95
300-mK TC Channel 2 -	10				84
300-mK TC Channel 2gnd	13*				82*
300-mK TC Channel 3	24				96
300-mK TC Channel 3 -	11				85
300-mK TC Channel 3gnd	13*				82*
300-mK TC Channel 4 +	25				36
300-mK TC Channel 4 -	12				107
300-mK TC Channel 4gnd	13*				82*
GND WIRE	13				36*
Channel 9 +		1			86
Channel 9 -		14			87
Channel 9gnd		13*			36*
Channel 10 +		2			97
Channel 10 -		15			98
Channel 10gnd		13*			36*
Channel 11 +		3			108
Channel 11 -		16			109
Channel 11gnd		13*			36*
Channel 12 +		4			116
Channel 12 -		17			117
Channel 12gnd		13*			36*
Channel 13 +		5			55
Channel 13 -		18			66
Channel 1gnd		13*			128*
Channel 14 +		6			67
Channel 14 -		19			78
Channel 1gnd		13*			128*
Channel 15 +		20			76
Channel 15 -		7			77
Channel 15gnd		13*			128*



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 84 of 174

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 85 of 174

Name	25way A	25wayB	25Way C	25way D	128Way #4
Bol. Channel 35 +				3	31
Bol. Channel 35 -				16	43
Bol. Channel 35gnd				13*	4*
Bol. Channel 36 +				4	42
Bol. Channel 36 -				17	54
Bol. Channel 36gnd				13*	4*
Bol. Channel 37 +				5	10
Bol. Channel 37 -				18	11
Bol. Channel 37gnd				13*	4*
Bol. Channel 38 +				6	19
Bol. Channel 38 -				19	29
Bol. Channel 38gnd				13*	4*
Bol. Channel 39 +				20	41
Bol. Channel 39 -				7	30
Bol. Channel 39gnd				13*	4*
Bol. Channel 40 +				21	53
Bol. Channel 40 -				8	52
Bol. Channel 40gnd				13*	4*
Bol. Channel 41 +				22	9
Bol. Channel 41 -				9	17
Bol. Channel 41gnd				13*	4*
Bol. Channel 42 +				23	18
Bol. Channel 42 -				10	28
Bol. Channel 42gnd				13*	4*
Bol. Channel 43 +				24	16
Bol. Channel 43 -				11	27
Bol. Channel 43gnd				13*	4*
Bol. Channel 44 +				25	40
Bol. Channel 44 -				12	39
Bol. Channel 44gnd				13*	4*
GND WIRE				13	4*
Harness Overshield					

Pins denoted by * indicate commonig of pins at the connector. In Particular, Pins 82, 36, 5 and 128 form a common ground ring for the SSW and 300-mK Thermal Control systems.

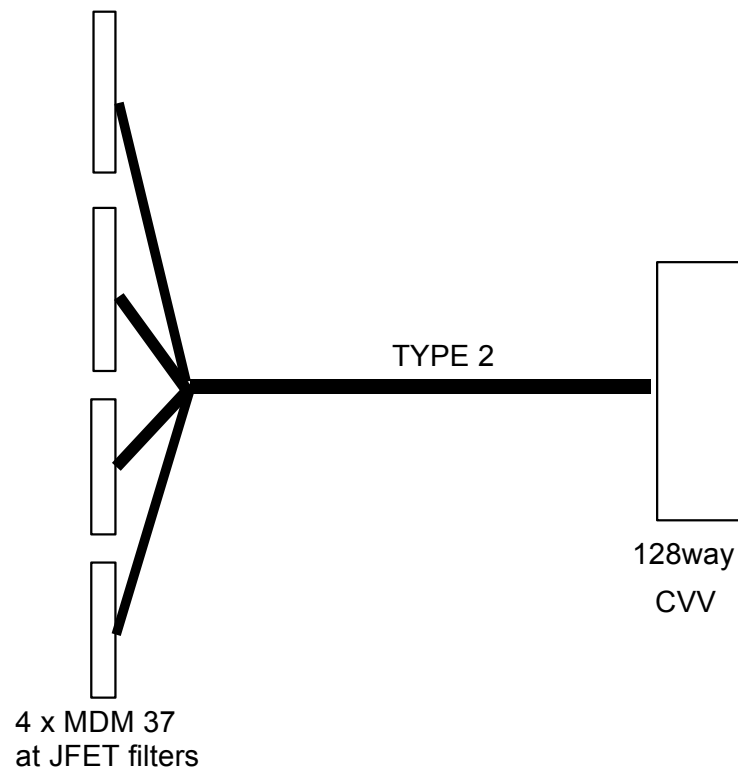


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 86 of 174

4.4 C3 CVV3 to HSJFP Type2

Overall Mechanical Drwg.



Connector/Backshell Details

MDM 37 P + Glenair 507-145 M 25 H: interface to HSJFP J25 PSW BIAS A
MDM 37 P + Glenair 507-145 M 25 H: interface to HSJFP J27 PMW/PLW BIAS A
MDM 37 P + Glenair 507-145 M 25 H: interface to HSJFP J26 PSW BIAS B
MDM 37 P + Glenair 507-145 M 25 H: interface to HSJFP J28 PMW/PLW BIAS B



SPIRE HARNESS DEFINITION

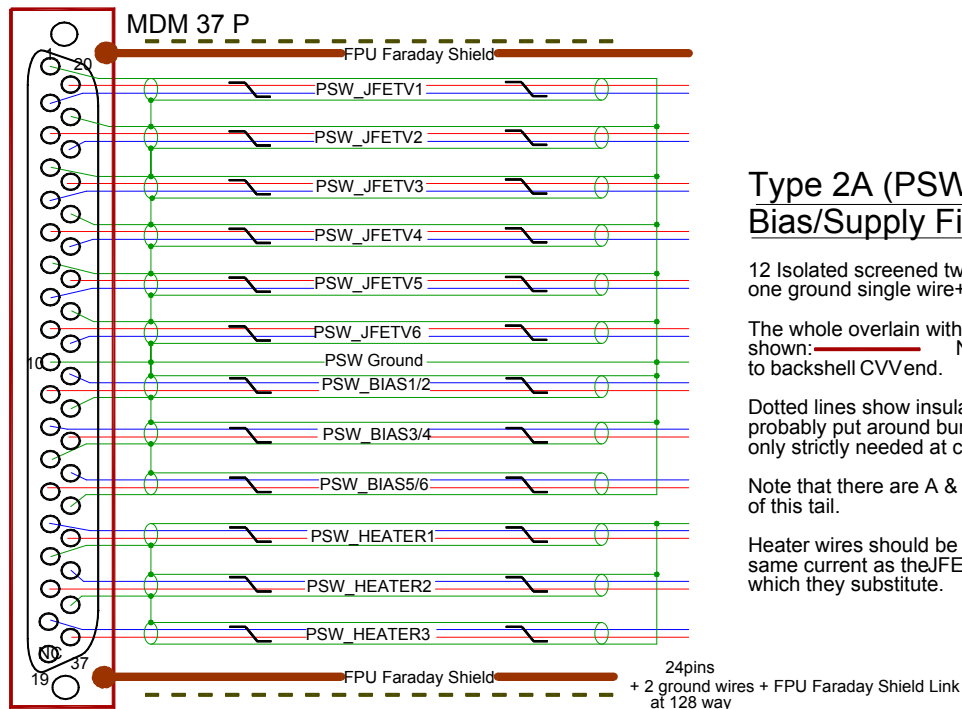
Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 87 of 174

Harness Layup



Type 2A (PSW) Bias/Supply Filters

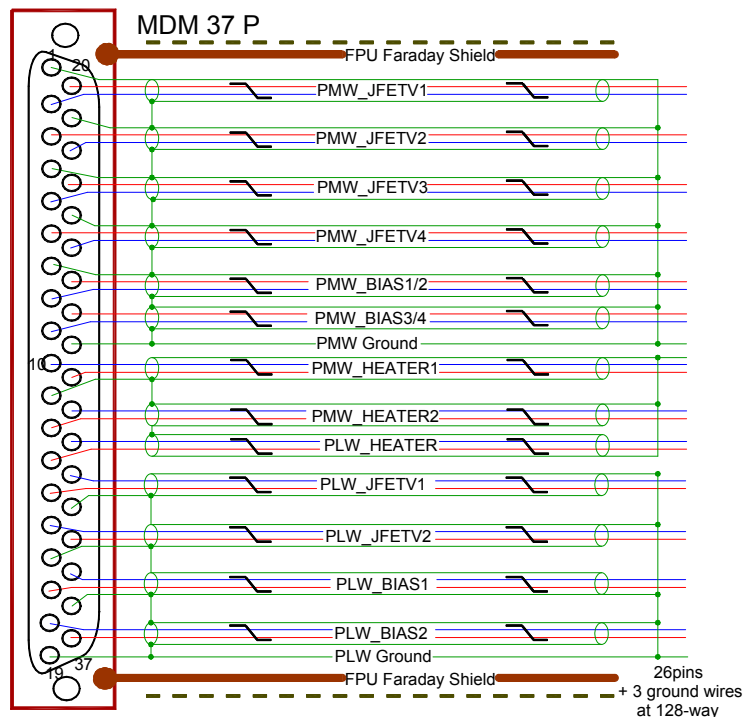
12 Isolated screened twisted pairs with one ground single wire+ shield link.

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.

Note that there are A & B versions of this tail.

Heater wires should be current rated for same current as the JFET supplies for which they substitute.



Type 2B (PLW/PMW) Bias/Supply Filters

13 Isolated screened twisted pairs with one ground single wire

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.

Note that there are A & B versions of this tail.

Heater wires should be rated for same current as the JFET supplies for which they substitute.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 88 of 174

Contact Details

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 89 of 174

Name	37way J25	37way J27	37Way J26	37way J28	128Way #3
PMW BIAS3/4 A -		9			89
PMW BIAS3/4 A shld		28*			65
PMW GND WIRE A		28*			65
PMW HEATER A1 +		29			92
PMW HEATER A1 -		10			104
PMW HEATER A1 shld		11			114
PMW HEATER A2 +		12			102
PMW HEATER A2 -		30			101
PMW HEATER A2 shld		11*			114
PLW HEATER A +		13			103
PLW HEATER A -		31			113
PLW HEATER A shld		11*			114
PLW JFETV1 A +		14			99
PLW JFETV1 A -		32			100
PLW JFETV1 A shld		33			128
PLW JFETV2 A +		34			110
PLW JFETV2 A -		15			111
PLW JFETV2 A shld		16			128
PLW BIAS1 A +		17			118
PLW BIAS1 A -		35			119
PLW BIAS1 A shld		36			128
PLW BIAS2 A +		37			112
PLW BIAS2 A -		18			120
PLW BIAS2 A shld		19*			128
PLW GROUND WIRE A		19*			128
PSW JFETV1 B +			20		42
PSW JFETV1 B -			2		54
PSW JFETV1 B shld			1		1
PSW JFETV2 B +			3		53
PSW JFETV2 B -			22		52
PSW JFETV2 B shld			21		1
PSW JFETV3 B +			23		41
PSW JFETV3 B -			5		30
PSW JFETV3 B shld			4		1
PSW JFETV4 B +			6		10
PSW JFETV4 B -			25		11
PSW JFETV4 B shld			24		1
PSW JFETV5 B +			26		19
PSW JFETV5 B -			8		29
PSW JFETV5 B shld			7		1
PSW JFETV6 B +			9		16
PSW JFETV6 B -			28		27
PSW JFETV6 B shld			27		1
PSW GRND B			10		1
PSW BIAS1/2 B +			11		40
PSW BIAS1/2 B -			29		39
PSW BIAS1/2 B shld			30		1
PSW BIAS3/4 B +			31		18
PSW BIAS3/4 B -			12		28
PSW BIAS3/4 B shld			13		1
PSW BIAS5/6 B +			14		9
PSW BIAS5/6 B -			32		17
PSW BIAS5/6 B shld			33		1
PSW HEATER B1 +			34		13
PSW HEATER B1 -			15		12
PSW HEATER B1 shld			16		5
PSW HEATER B2 +			17		21
PSW HEATER B2 -			35		20



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 90 of 174

Name	37way J25	37way J27	37Way J26	37way J28	128Way #3
PSW HEATER B2 shld			36		5
PSW HEATER B3 +			37		31
PSW HEATER B3 -			18		43
PSW HEATER B3 shld			36*		5
FPU Faraday Shield Link			NC		4
PMW JFETV1 B +				20	7
PMW JFETV1 B -				2	14
PMW JFETV1 B shld				1	6*
PMW JFETV2 B +				3	24
PMW JFETV2 B -				22	35
PMW JFETV2 B shld				21	6*
PMW JFETV3 B +				23	23
PMW JFETV3 B -				5	34
PMW JFETV3 B shld				4	6*
PMW JFETV4 B +				6	33
PMW JFETV4 B -				25	45
PMW JFETV4 B shld				24	6*
PMW BIAS1/2 B +				26	44
PMW BIAS1/2 B -				8	56
PMW BIAS1/2 B shld				7	6*
PMW BIAS3/4 B +				27	22
PMW BIAS3/4 B -				9	32
PMW BIAS3/4 B shld				28*	6*
PMW GND WIRE B				28*	6*
PMW HEATER B1 +				29	55
PMW HEATER B1 -				10	66
PMW HEATER B1 shld				11	91*
PMW HEATER B2 +				12	67
PMW HEATER B2 -				30	78
PMW HEATER B2 shld				11*	91*
PLW HEATER B +				13	90
PLW HEATER B -				31	79
PLW HEATER B shld				11*	91*
PLW JFETV1 B +				14	70
PLW JFETV1 B -				32	81
PLW JFETV1 B shld				33	47*
PLW JFETV2 B +				34	69
PLW JFETV2 B -				15	80
PLW JFETV2 B shld				16	47*
PSW BIAS1 B +				17	68
PSW BIAS1 B -				35	57
PSW BIAS1 B shld				36	47*
PSW BIAS2 B +				37	58
PSW BIAS2 B -				18	46
PSW BIAS2 B shld				19*	47*
PLW GROUND WIRE B				19*	47*
Harness Over-shield	Via Pin 4& 94	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell

Pins denoted by * indicate commonig of pins at the connector.

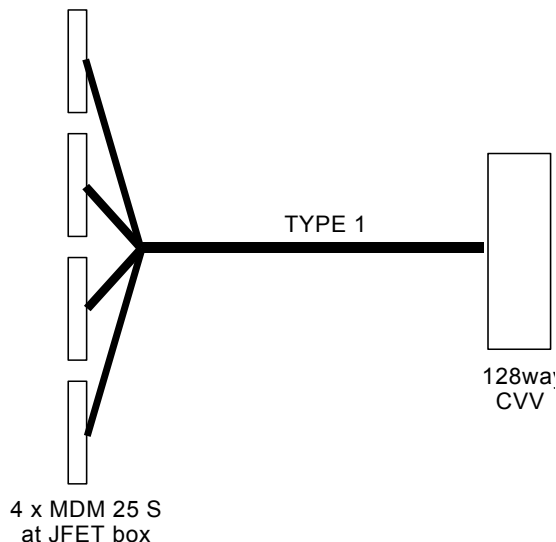


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 91 of 174

4.4.1 C4 CVV4 to HSJFP Type1

Overall Mechanical Drwg.



Connector/Backshell Details

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP11 J21

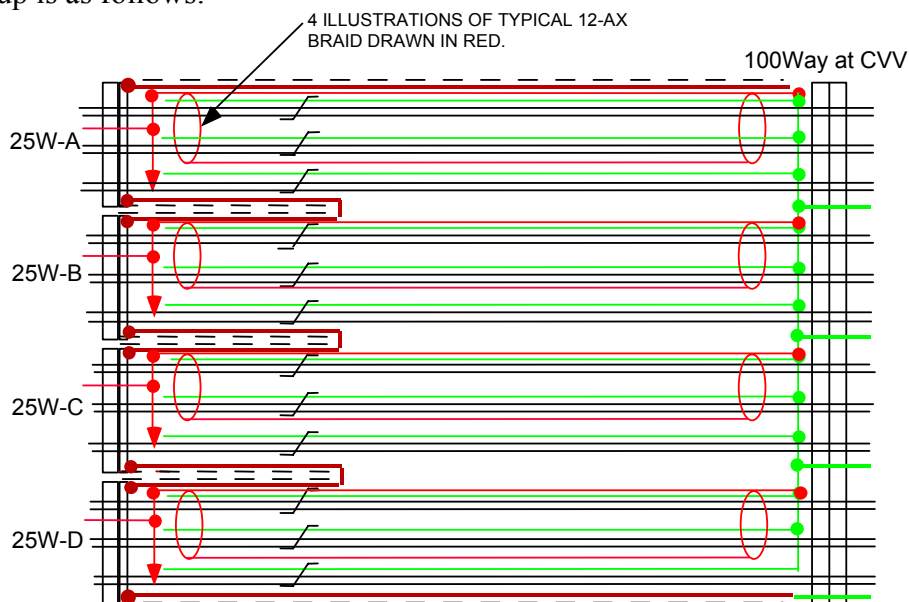
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP11 J22

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP12 J23

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP12 J24

Harness Layout

The total harness layout 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

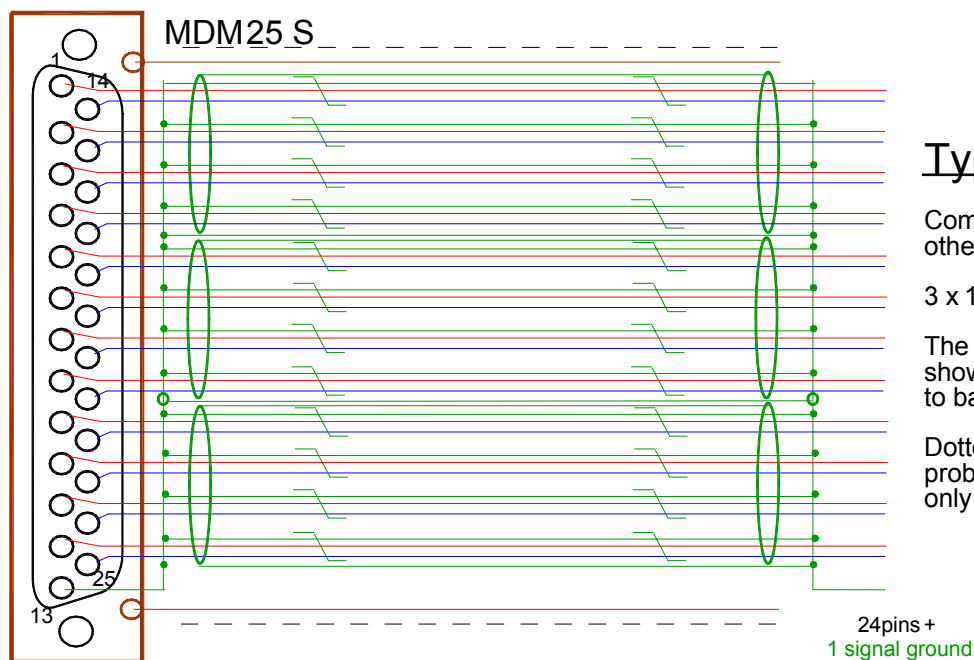
To keep RF screening distinct from low noise bolometer grounds, all of this harness is enclosed in separate outer r.f. screen, seated to connector boots at the JFET end, overwrapped with insulation, and carried on a pin at the 100



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 92 of 174

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.



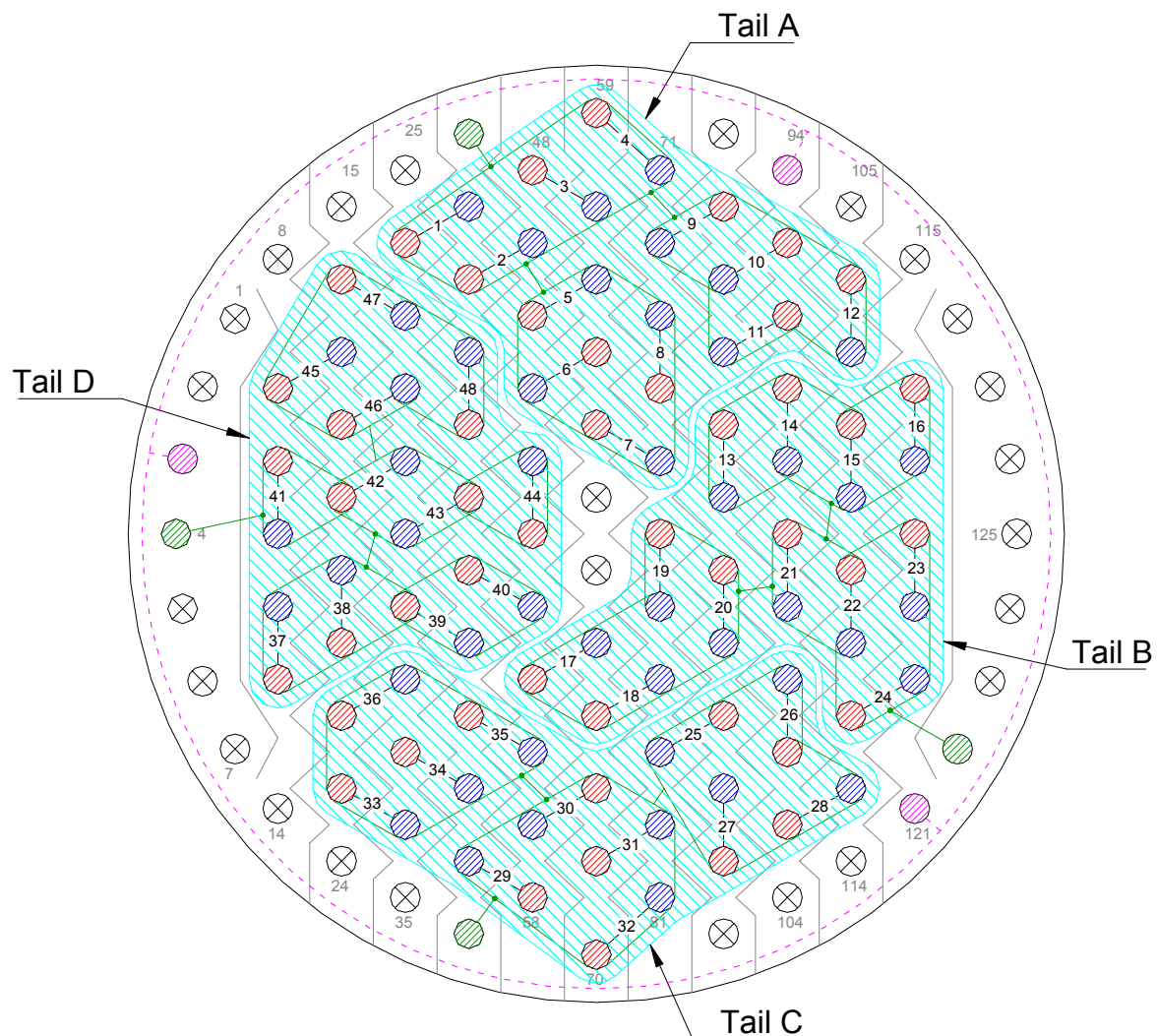
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 93 of 174



- 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.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 94 of 174

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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 95 of 174

Name	25way A	25wayB	25Way C	25way D	128Way #4
Channel 18 -		19			78
Channel 18gnd		13*			128*
Channel 19 +		20			76
Channel 19 -		7			77
Channel 19gnd		13*			128*
Channel 20 +		21			88
Channel 20 -		8			89
Channel 20gnd		13*			128*
Channel 21 +		22			99
Channel 21 -		9			100
Channel 21gnd		13*			128*
Channel 22 +		23			110
Channel 22 -		10			111
Channel 22gnd		13*			128*
Channel 23 +		24			118
Channel 23 -		11			119
Channel 23gnd		13*			128*
Channel 24 +		25			112
Channel 24 -		12			120
Channel 24gnd		13*			128*
GND WIRE		13			128*
Channel 25 +			1		90
Channel 25 -			14		79
Channel 25gnd			13*		128*
Channel 26 +			2		102
Channel 26 -			15		101
Channel 26gnd			13*		128*
Channel 27 +			3		92
Channel 27 -			16		91
Channel 27gnd			13*		128*
Channel 28 +			4		103
Channel 28 -			17		113
Channel 28gnd			13*		128*
Channel 29 +			5		58
Channel 29 -			18		46
Channel 29gnd			13*		128*
Channel 30 +			6		68
Channel 30 -			19		57
Channel 30gnd			13*		128*
Channel 31 +			20		69
Channel 31 -			7		80
Channel 31gnd			13*		128*
Channel 32 +			21		70
Channel 32 -			8		81
Channel 32gnd			13*		128*
Channel 33 +			22		23
Channel 33 -			9		34
Channel 33gnd			13*		4*
Channel 34 +			23		33
Channel 34 -			10		45
Channel 34gnd			13*		4*
Channel 35 +			24		44
Channel 35 -			11		56
Channel 35gnd			13*		4*
Channel 36 +			25		22
Channel 36 -			12		32
Channel 36gnd			13*		4*
GND WIRE			13		4*



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 96 of 174

Name	25way A	25wayB	25Way C	25way D	128Way #4
FPU Faraday Shield Link			NC		104
Channel 37 +				1	13
Channel 37 -				14	12
Channel 37gnd				13*	4*
Channel 38 +				2	21
Channel 38 -				15	20
Channel 38gnd				13*	4*
Channel 39 +				3	31
Channel 39 -				16	43
Channel 39gnd				13*	4*
Channel 40 +				4	42
Channel 40 -				17	54
Channel 40gnd				13*	4*
Channel 41 +				5	10
Channel 41 -				18	11
Channel 41gnd				13*	4*
Channel 42 +				6	19
Channel 42 -				19	29
Channel 42gnd				13*	4*
Channel 43 +				20	41
Channel 43 -				7	30
Channel 43gnd				13*	4*
Channel 44 +				21	53
Channel 44 -				8	52
Channel 44gnd				13*	4*
Channel 45 +				22	9
Channel 45 -				9	17
Channel 45gnd				13*	4*
Channel 46 +				23	18
Channel 46 -				10	28
Channel 46gnd				13*	4*
Channel 47 +				24	16
Channel 47 -				11	27
Channel 47gnd				13*	4*
Channel 48 +				25	40
Channel 48 -				12	39
Channel 48gnd				13*	4*
GND WIRE				13	4*
Harness Overshield	EMC Backshell	EMC Backshell	EMC Backshell	EMC Backshell	Harness Overshield via Pins 3, 94, 121

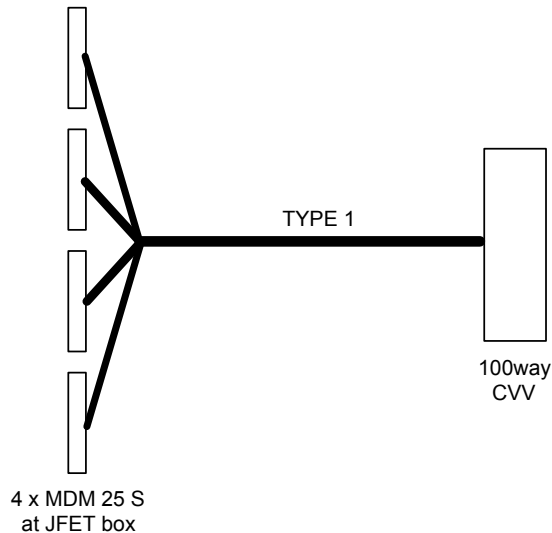


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 97 of 174

4.4.2 C5 CVV5 to HSJFP Type1

Overall Mechanical Drwg.



Connector/Backshell Details

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP9 J17
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP9 J18
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP10 J19
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP10 J20

Harness Layup

As C4.

Contact Details

As C4.

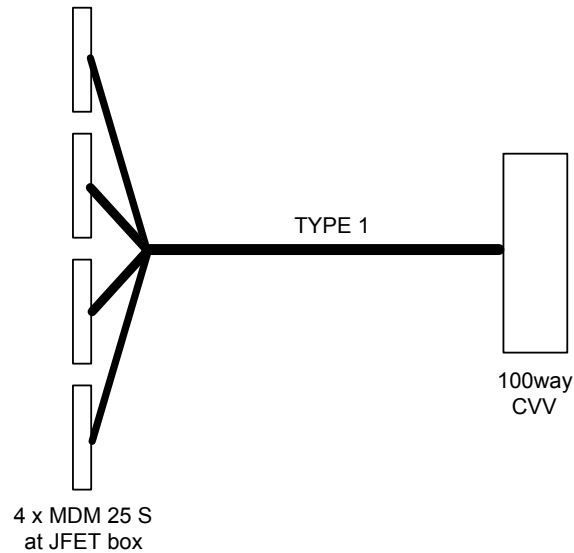


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 98 of 174

4.4.3 C6 CVV6 to HSJFP Type1

Overall Mechanical Drwg.



Connector/Backshell Details

MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP7 J13
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP7 J14
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP8 J15
MDM 25 S + Glenair 507-145 M 25 H: interface to HSJFP8 J16

Harness Layup

As C4.

Contact Details

As C4.

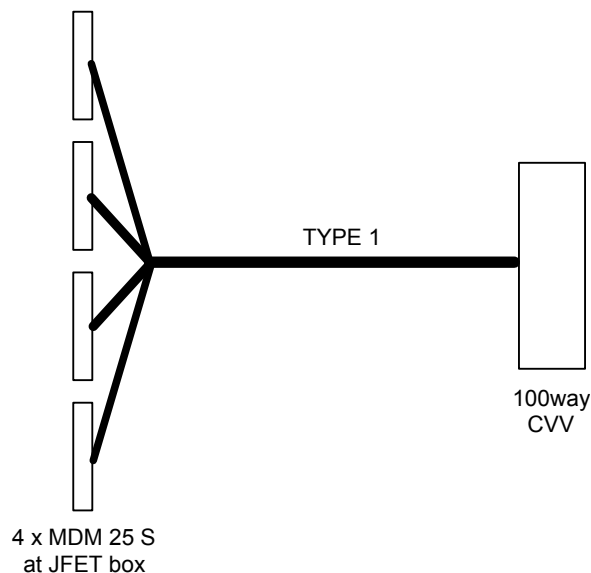


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 99 of 174

4.4.4 C7 CVV7 to HSJFP Type1

Overall Mechanical Drwg.



Connector/Backshell Details

MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP5 J9
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP5 J10
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP6 J11
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP6 J12

Harness Layup

As C4.

Contact Details

As C4.

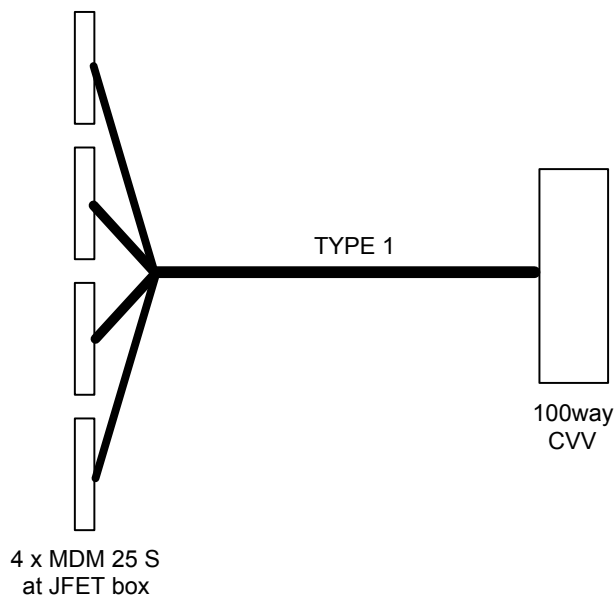


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 100 of 174

4.4.5 C8 CVV8 to HSJFP Type1

Overall Mechanical Drwg.



Connector/Backshell Details

MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP3 J5
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP3 J6
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP4 J7
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP4 J8

Harness Layup

As C4.

Contact Details

As C2

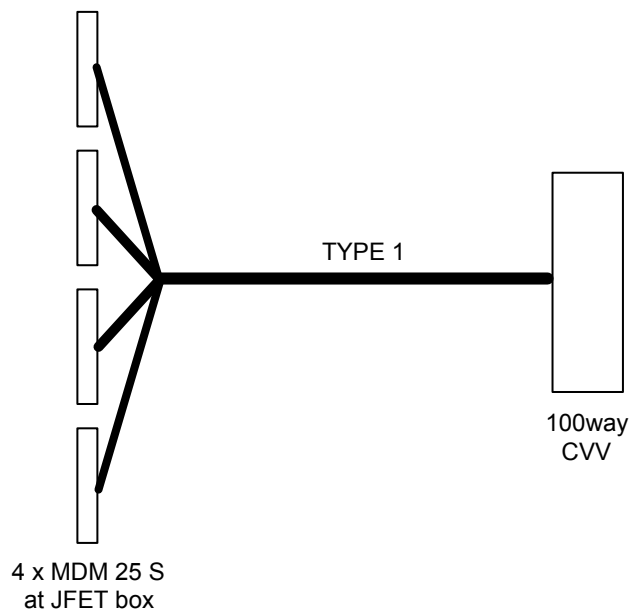


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 101 of 174

4.4.6 C9 CVV9 to HSJFP Type1

Overall Mechanical Drwg.



Connector/Backshell Details

MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP1 J1
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP1 J2
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP2 J3
MDM 25 S +Glenair 507-145 M 25 H: interface to HSJFP2 J4

Harness Layup

As C4.

Contact Details

As C4.

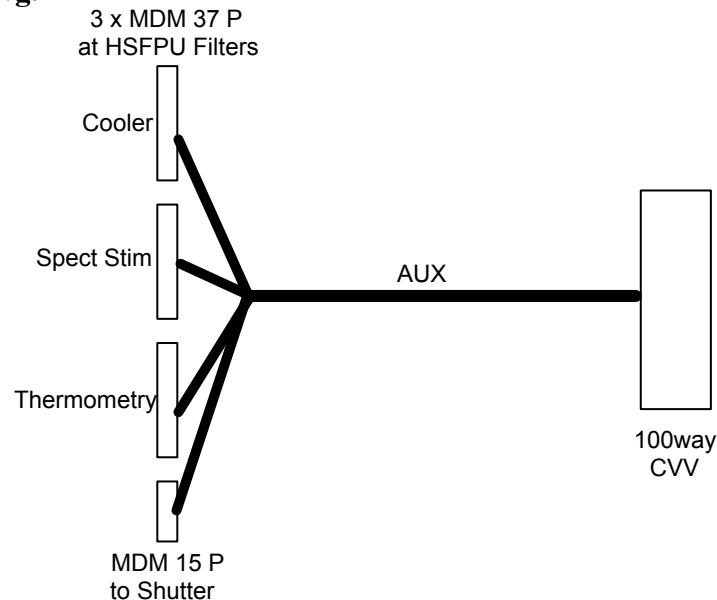


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 102 of 174

4.4.7 C10 CVV10 to HSFPU AUX-P

Overall Mechanical Drwg.



Connector/Backshell Details

Prime side harness

MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FA J19 for Cooler

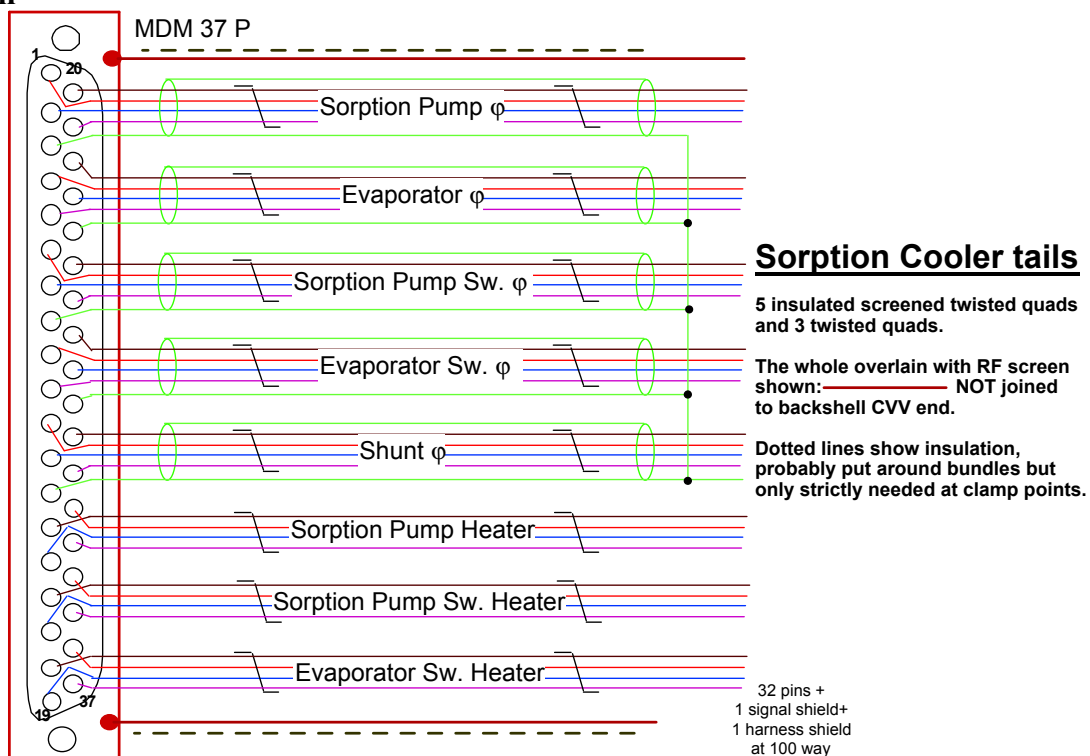
MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FA J21 for Spectrometer Stim

MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FB J23 for Thermometry

MDM 15 P + Glenair 507-145 M 15 H: interface to HSJFS J17 Shutter

Harness Layup

Cooler Tail

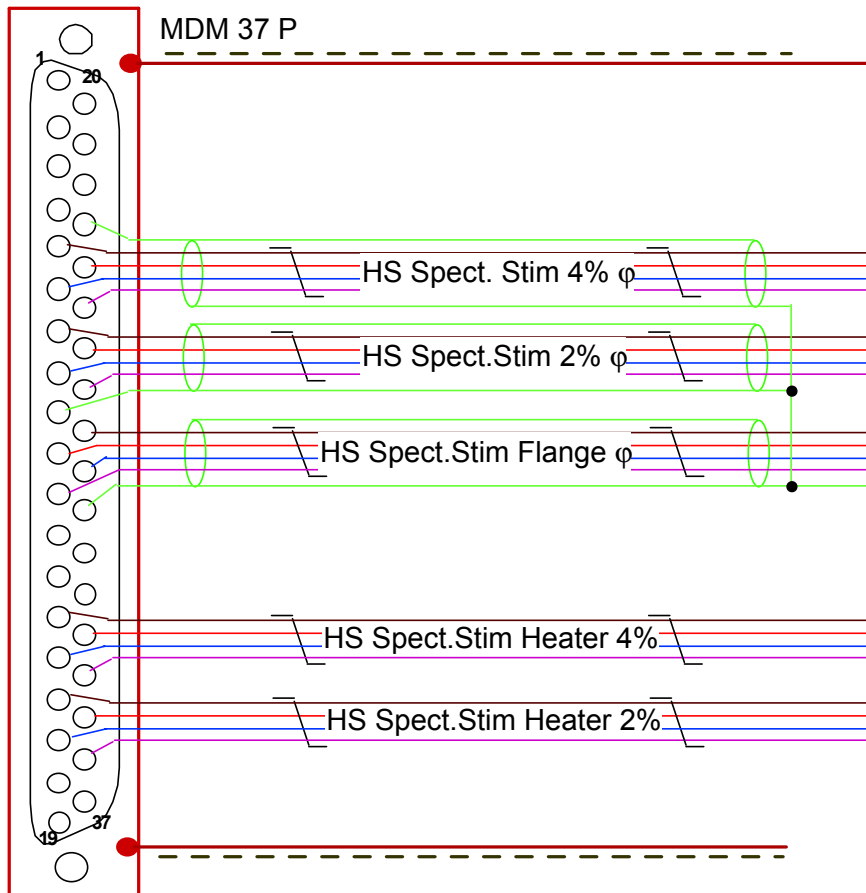




SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 103 of 174

Spect. Stimulus Tail



Spectrometer Stimulus tails

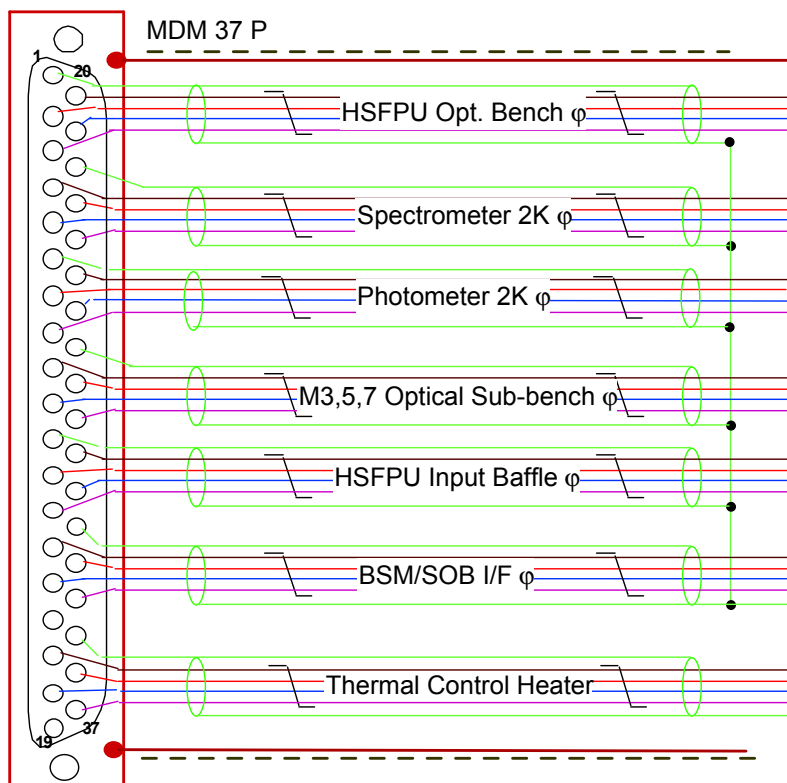
3 insulated screened twisted quads
and 2 insulated twisted quads.

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 +
2 signal grounds+
harness screen
at 100way

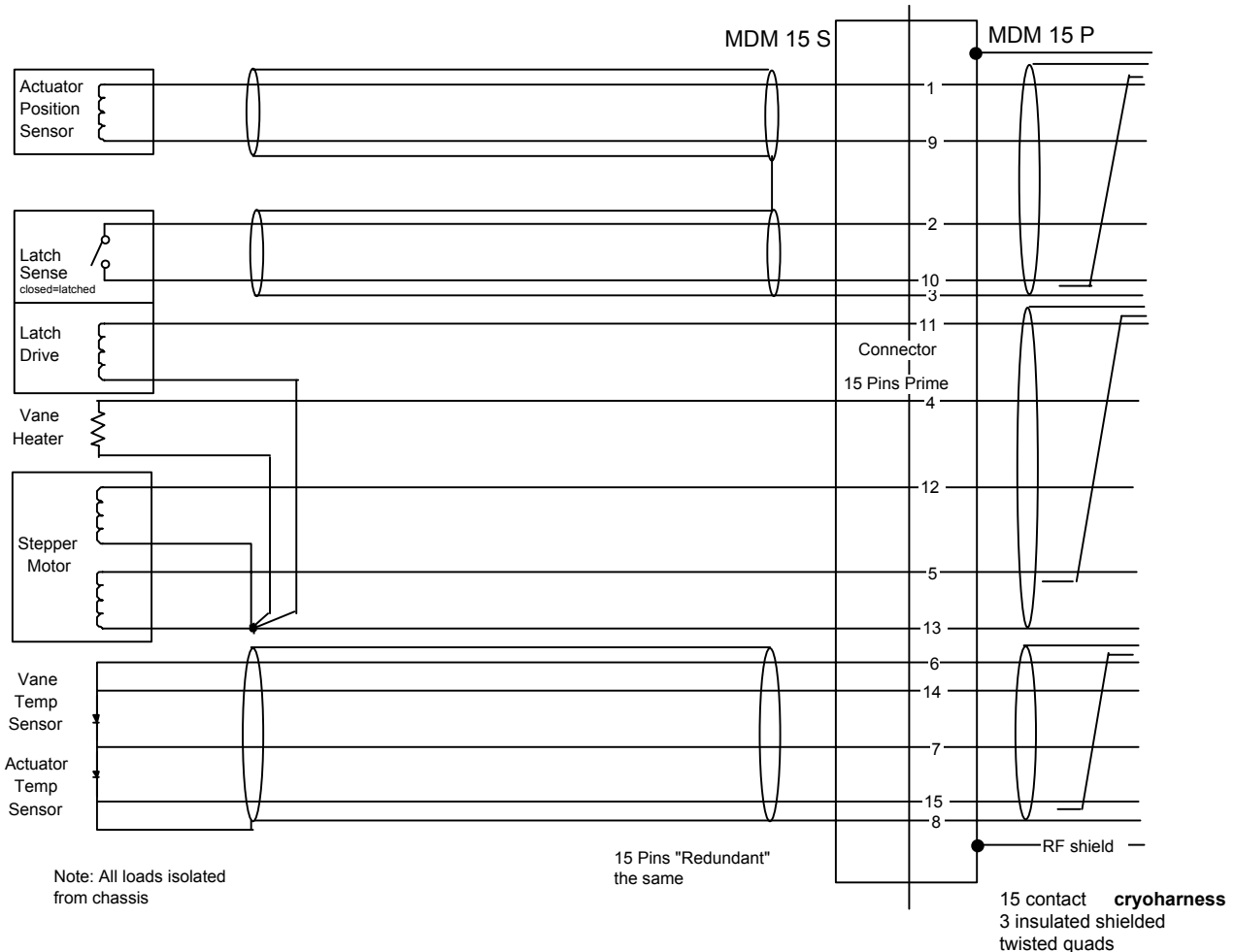


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 104 of 174

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.



The number of wires to pass through the 128 Way accumulates as follows:

Tail Source	"Signals"	Shields etc.	Harness Shld.	
Cooler	32	1	0.25	
Spectrometer Stimulus	20	1	0.25	
Thermometry	28	2	0.25	
Shutter	12	3	0.25	
Total	92	7	1	100 in all!

The C10 harness contacts are tabulated on the following pages. Note that C10 is a PRIME harness and all wires herein (excepting the shutter function) are PRIME, although this is not explicitly written ad nauseam.



SPIRE HARNESS DEFINITION

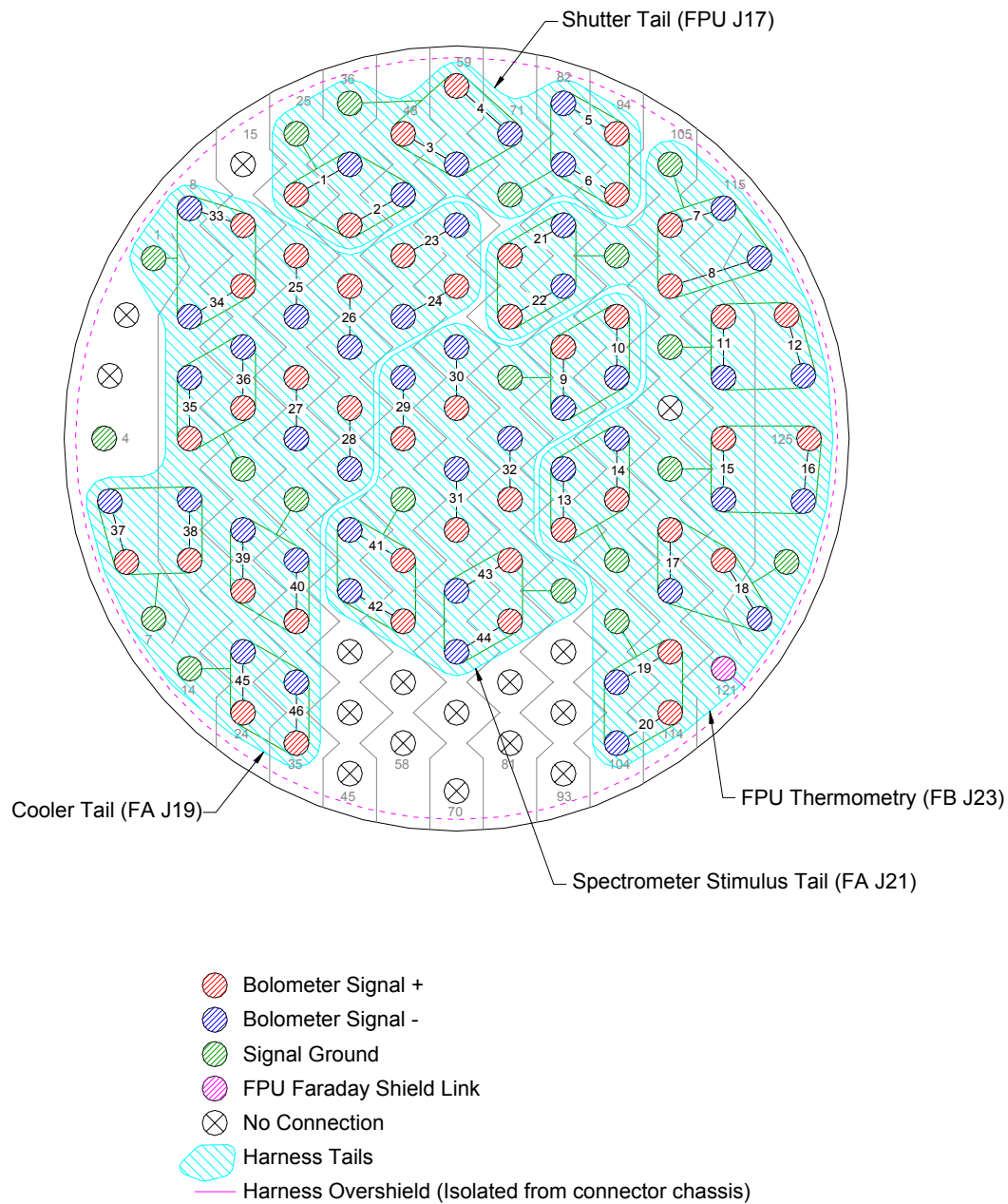
Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 105 of 174

C10 128-Way Connector Pin Allocations





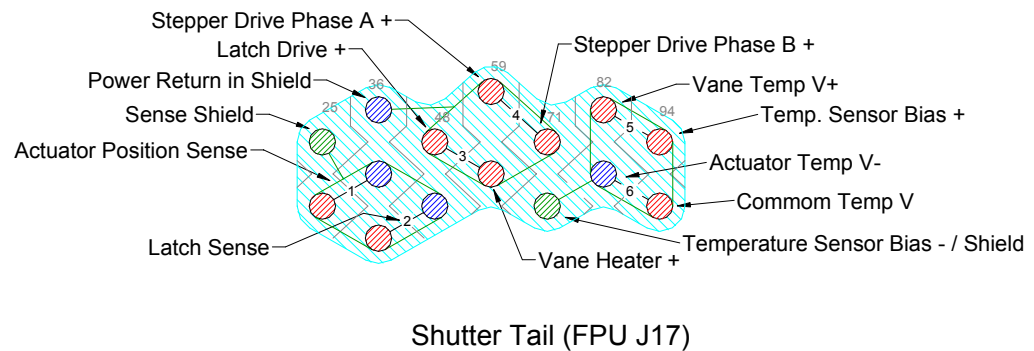
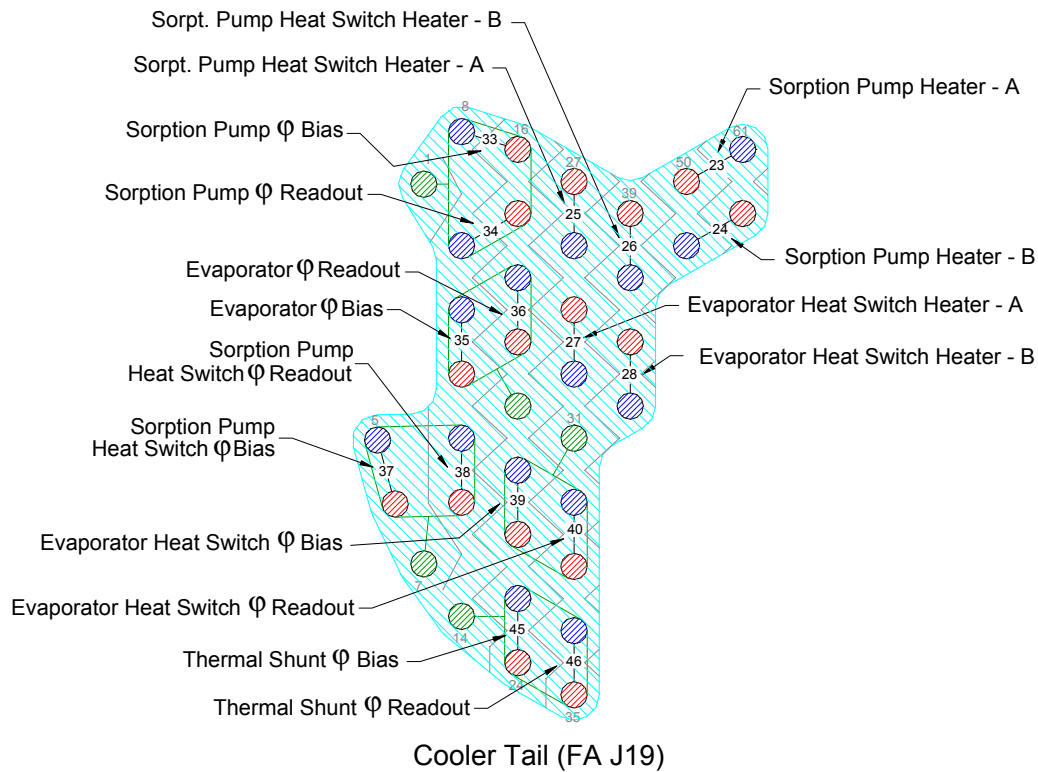
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 106 of 174





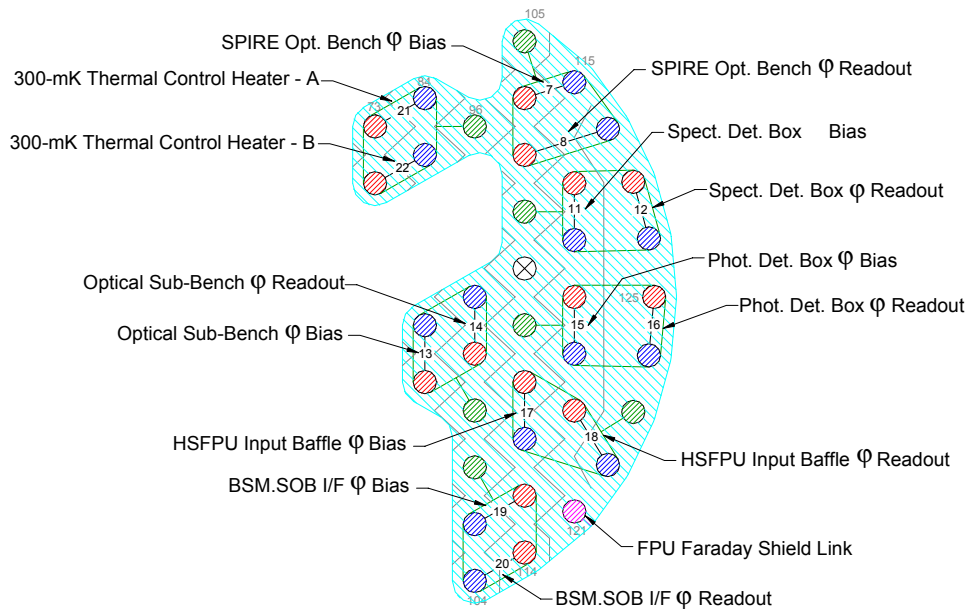
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Doc #: SPIRE-RAL-PRJ-000608

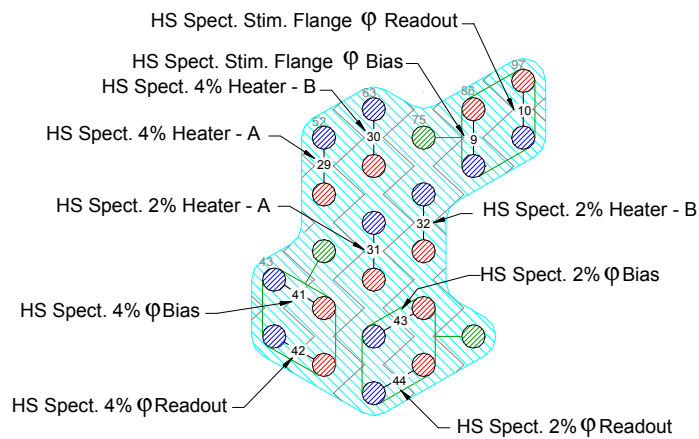
Issue: 0.8

Date: 02/11/01

Page 107 of 174



FPU Thermometry (FB J23)



Spectrometer Stimulus Tail (FA J21)



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 108 of 174

Cooler Tail Listing

Function	37way J19	Max. current	Wire lay-up	Max Ohms	128Way #10
Sorption Pump temperature I+	20	1 μ A	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 μ A		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 μ A	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 μ A		1000	5
Sorption Pump Heat Switch temperature shld	8	N/A		N/A	7
Evaporator Heat Switch temperature I+	27	1 μ A	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 μ A		1000	21
Evaporator Heat Switch temperature shld	29	N/A		N/A	31
Thermal Shunt temperature I+ _A	30	1 μ A	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 μ A		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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 109 of 174

Spectrometer Stimulus Tail Listing

Function	37way J21	Max. current	Wire lay-up	Max Ohms	128Way #10
HS Spect. 4% temperature I+	5	1 μ A	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 μ A		1000	44
HS Spect. 4% temperature shld*	23	N/A		N/A	54
HS Spect. 2% temperature I+	7	1 μ A	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 μ A		1000	67
HS Spect. 2% temperature shld*	9	N/A		N/A	90
HS Spect. Stim Flange temperature I+	10	1 μ A	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 μ A		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

Function	Pin # on J17	Max Current	Wire lay-up	Max Ohms*	128-way #10 Pin Allocation
Actuator Position Sensor +	1		Insulated screened twisted quad	1000	26
Actuator Position Sensor -	9			1000	37
Latch Sense +	2			1000	38
Latch Sense -	10			1000	49
Sense Shld	3			1000	25
Latch Drive +	11		Insulated screened twisted quad	10	48
Vane Heater+	4			10	60
Stepper Drive Phase A +	12			10	59
Stepper Drive Phase B +	5			10	71
Power Ground / Rtn. as shld	13			10	72
Temp Sensor Bias+	6		Insulated screened twisted quad	1000	94
Vane Temp V+	14			1000	82
Common Temp V	7			1000	95
Actuator Temp V-	15			1000	83
Temp Sensor Bias -/Shld	8			1000	72

12wires + 3 shields



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 110 of 174

FPU Thermometry Listing

Function	37way J23	Max. current	Wire lay-up	Max Ohms	128Way #10
SPIRE Opt. Bench temperature I+	20	1 μ A	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 μ A		1000	115
SPIRE Opt. Bench temperature shld	1	N/A		N/A	105
Spectrometer Det. Box temperature I+	4	1 μ A	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 μ A		1000	117
Spectrometer Det. Box temperature shld	22	N/A		N/A	108
Photometer Det. Box temperature I+	25	1 μ A	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 μ A		1000	119
Photometer Det. Box temperature shld	6	N/A		N/A	110
Optical Subench temperature I+	9	1 μ A	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 μ A		1000	88
Optical Subench temperature shld	27	N/A		N/A	101
HSFPU Input Baffle temperature I+	30	1 μ A	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 μ A		1000	112
HSFPU Input Baffle temperature shld	11	N/A		N/A	127
BSM/SOB I/F temperature I+	14	1 μ A	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 μ A		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

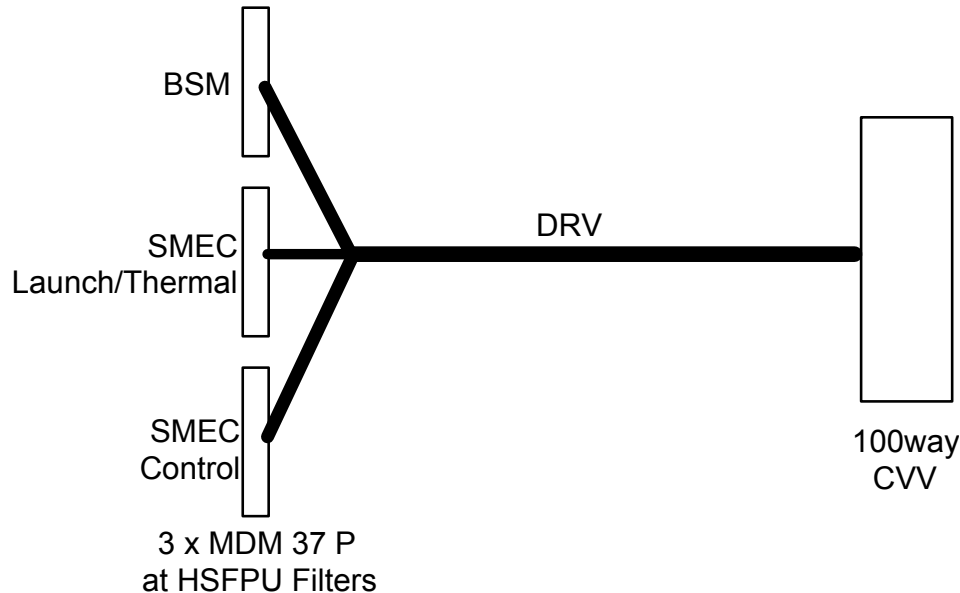


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 111 of 174

4.4.8 C11 CVV11 to HSFPU DRV-P

Overall Mechanical Drwg.



Connector/Backshell Details

Redundant side harness

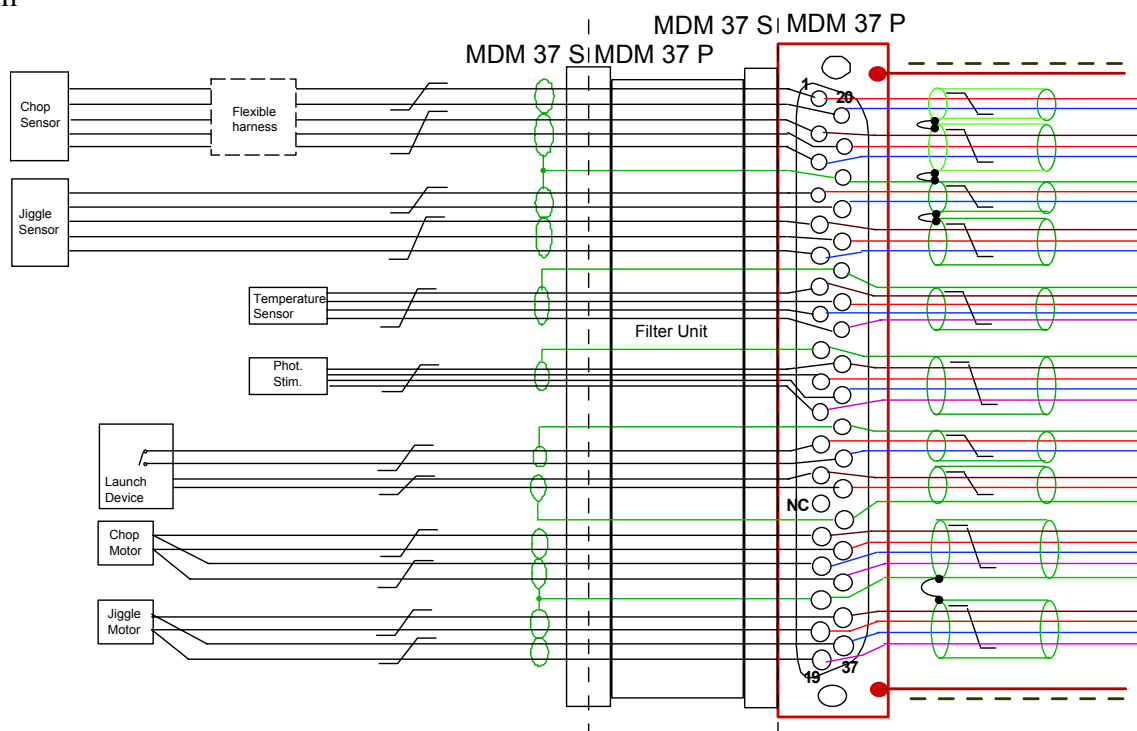
MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FB J25

MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FC J27

MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FC J29

Harness Layout

BSM Tail





SPIRE HARNESS DEFINITION

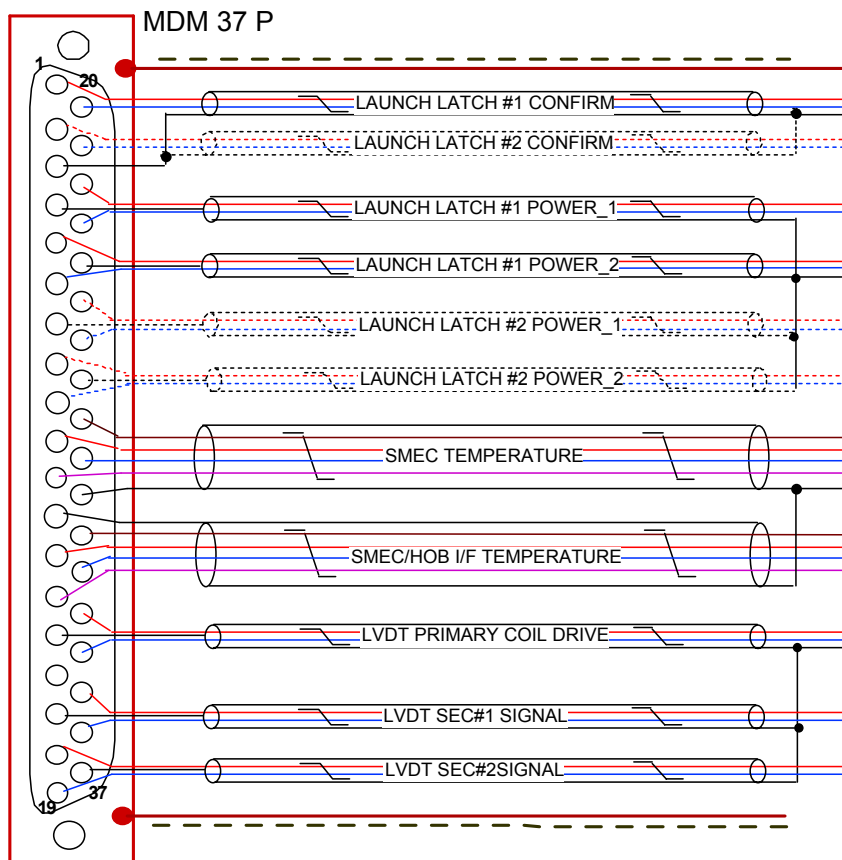
Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 112 of 174

SMEC Launch/Thermal Tail



SMEC Launch/Thermal Tail

9(6) insulated screened twisted pairs
and 2 insulated screened twisted quads.

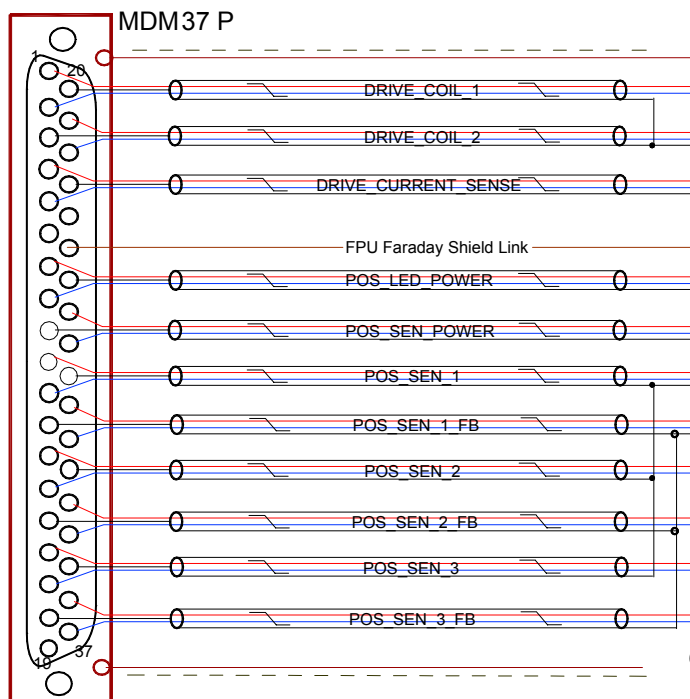
The whole overlain with RF screen
shown: — NOT joined
to backshell CVV end.

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

Dotted conductors are TBC

26 (20) signal pins +
4 signal grounds +
harness screen
at 100way

SMEC Control Tail



SMEC Control Tail

11 insulated screened twisted pairs.

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.

22 signal pins +
6 signal grounds +
harness screen
at 100way



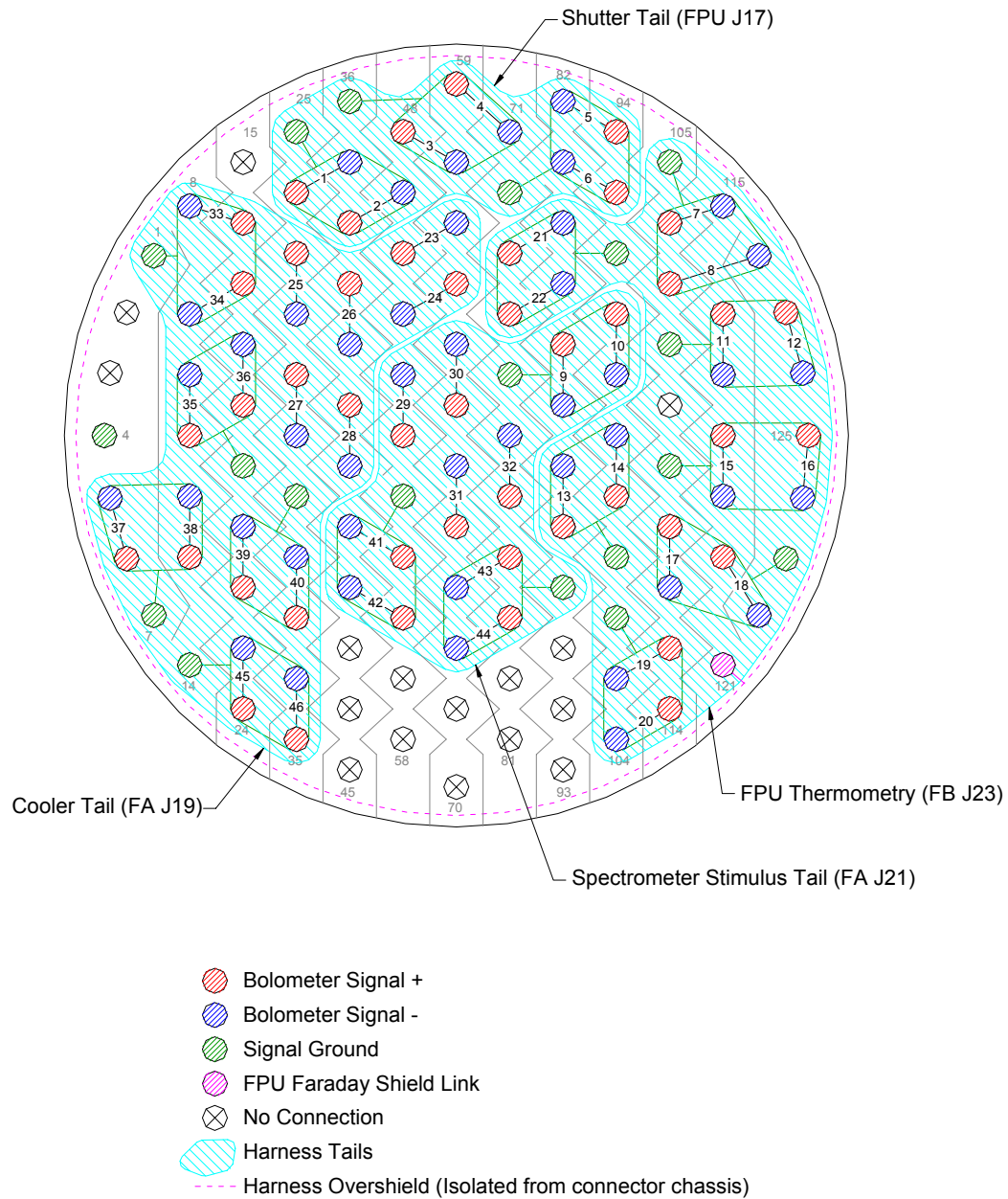
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Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 113 of 174





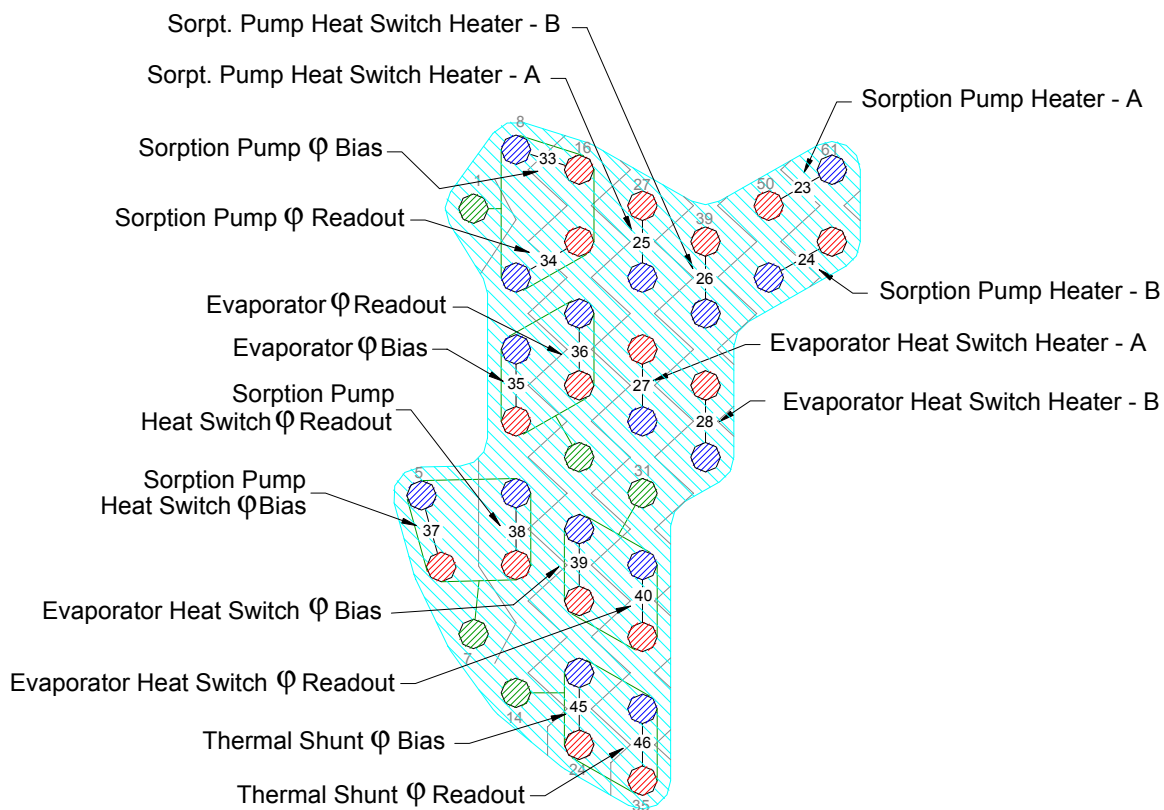
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Doc #: SPIRE-RAL-PRJ-000608

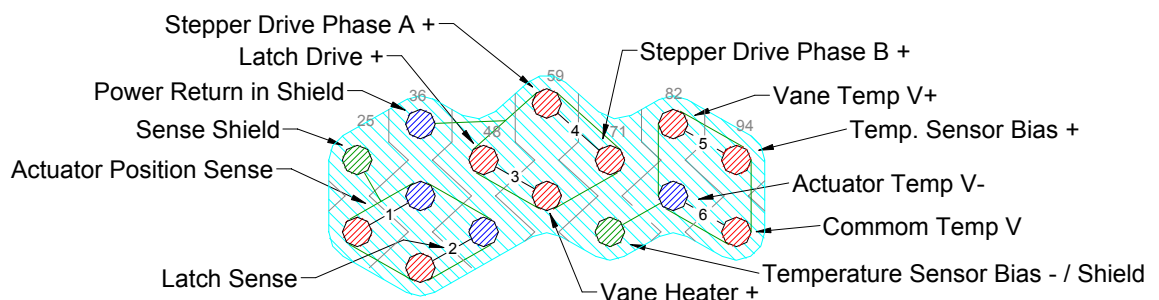
Issue: 0.8

Date: 02/11/01

Page 114 of 174



Cooler Tail (FA J19)



Shutter Tail (FPU J17)



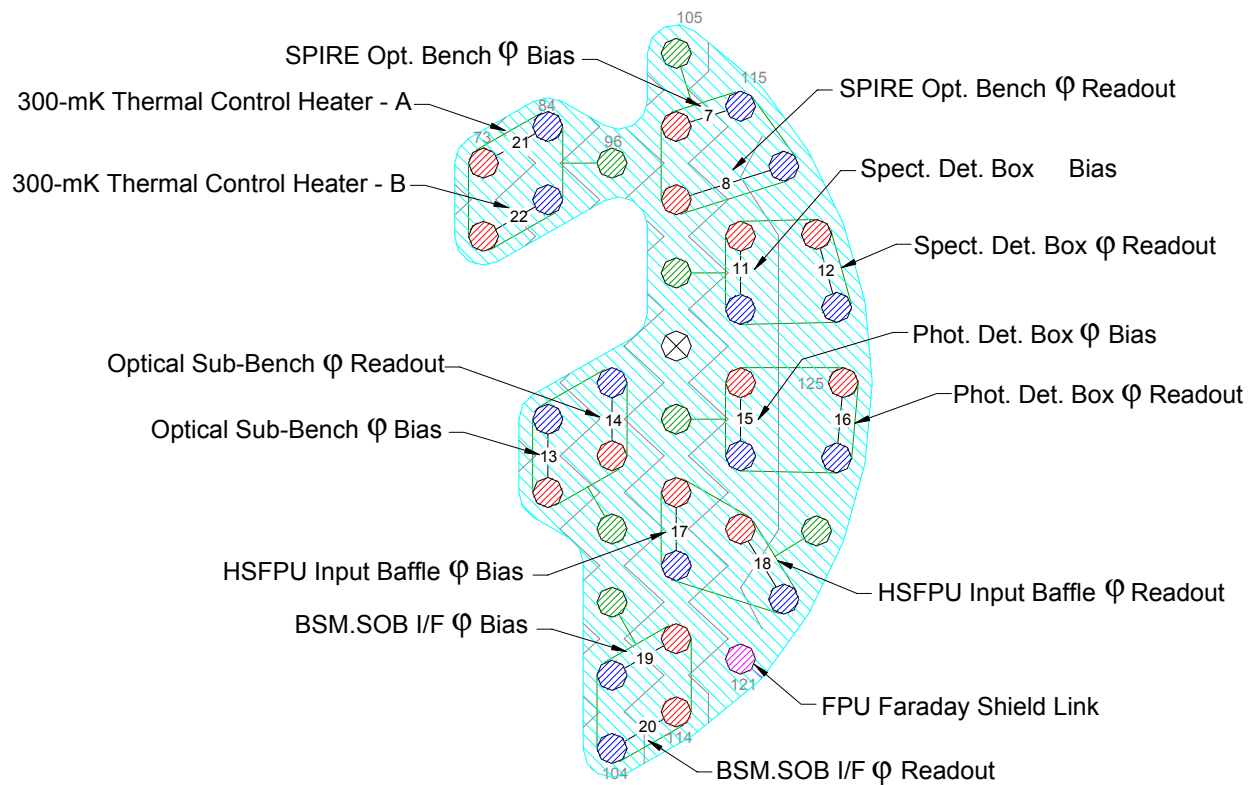
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Doc #: SPIRE-RAL-PRJ-000608

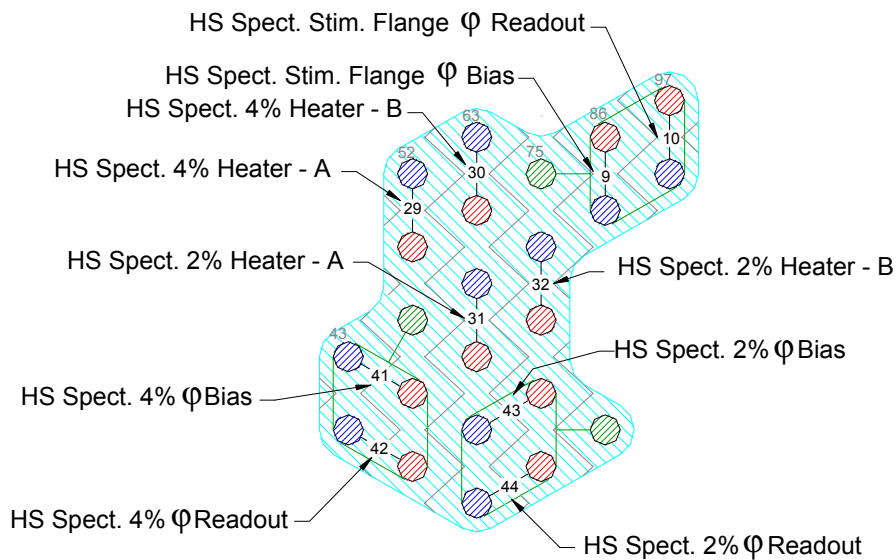
Issue: 0.8

Date: 02/11/01

Page 115 of 174



FPU Thermometry (FB J23)



Spectrometer Stimulus Tail (FA J21)



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 116 of 174

BSM Tail Listing

Function	37way J25	Max. current	Wire lay-up	Max Ohms	128Way #11
Chop Position Sensor 1	1	1 μ A	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 μ A	Insulated screened twisted 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 μ A	Insulated screened twisted quad	1000	
BSM temperature V+	26	N/A		1000	
BSM temperature V-	8	N/A		1000	
BSM temperature I-	27	1 μ A		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 twisted 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 triple	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.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 117 of 174

SMEC Launch/Therm.Tail Listing

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 μ A	Insulated screened twisted quad	1000	
SMEC temperature V+	10	N/A		1000	
SMEC temperature V-	28	N/A		1000	
SMEC temperature I-	11	1 μ A		1000	
SMEC temperature shld	29	N/A		N/A	C
SMEC/SOB I/F temperature I+	30	1 μ A	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 μ A		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 # 1 signal (P)	35	50 μ A	Insulated screened twisted pair	5	
SMEC LVDT secondary coil # 1 signal (N)	36	50 μ A		5	
SMEC LVDT secondary coil # 1 signal Shield	17	N/A		N/A	D
SMEC LVDT secondary coil # 2 signal (P)	18	50 μ A	Insulated screened twisted pair	5	
SMEC LVDT secondary coil # 2 signal (N)	19	50 μ A		5	
SMEC LVDT secondary coil # 2 signal Shield	37	N/A		N/A	D

31 contacts used



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 118 of 174

SMEC Control Tail Listing

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 μ A	Insulated screened twisted pair	500	
SMEC Drive Coil Sense-	5	10 μ A		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 μ A	Insulated screened twisted pair	1000	
SMEC position sensor photodiode #1 I-	11	20 μ A		1000	
SMEC position sensor photodiode Shield	29	N/A		N/A	B
SMEC pos. sensor photodiode #1 feedback +	30	10 μ A	Insulated screened twisted pair	1000	
SMEC pos. sensor photodiode #1 feedback -	31	10 μ A		1000	
SMEC pos. sensor photodiode feedback Shld	12	N/A		N/A	C
SMEC position sensor photodiode #2 I+	13	20 μ A	Insulated screened twisted pair	1000	
SMEC position sensor photodiode #2 I-	14	20 μ A		1000	
SMEC position sensor photodiode Shield	32	N/A		N/A	B
SMEC pos. sensor photodiode #2 feedback +	33	10 μ A	Insulated screened twisted pair	1000	
SMEC pos. sensor photodiode #2 feedback -	34	10 μ A		1000	
SMEC pos. sensor photodiode feedback Shld	15	N/A		N/A	C
SMEC position sensor photodiode #3 I+	16	20 μ A	Insulated screened twisted pair	1000	
SMEC position sensor photodiode #3 I-	17	20 μ A		1000	
SMEC position sensor photodiode Shield	35	N/A		N/A	B
SMEC pos. sensor photodiode #3 feedback +	36	10 μ A	Insulated screened twisted pair	1000	
SMEC pos. sensor photodiode #3 feedback -	37	10 μ A		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".



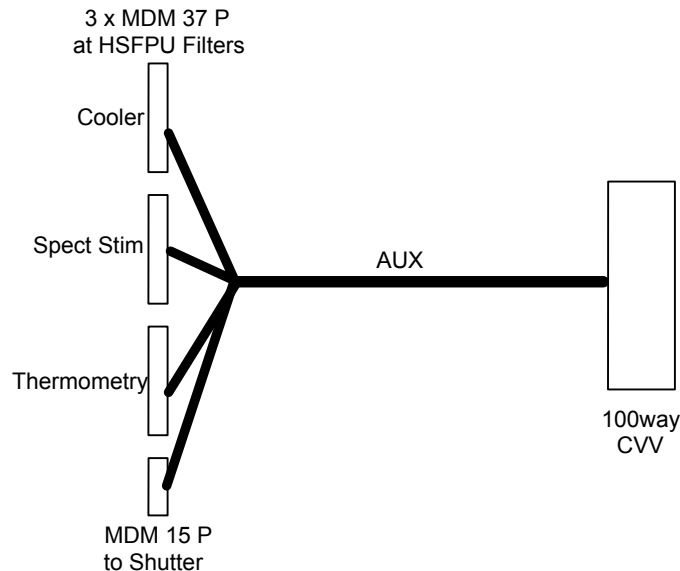
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 119 of 174

4.4.9 C12 CVV12 to HSFPU AUX-R

Overall Mechanical Drwg.

Redundant version of C10, and the same as it



Connector/Backshell Details

Prime side harness

MDM 37 S + Glenair 507-145 M 37 H: interface to HSFPU Filter FD J20 for Cooler

MDM 37 S + Glenair 507-145 M 37 H: interface to HSFPU Filter FD J22 for Spectrometer stimulus

MDM 37 S + Glenair 507-145 M 37 H: interface to HSFPU Filter FE J24 for Thermometry

MDM 15 P + Glenair 507-145 M 15 H: interface to HSJFS J18 Shutter

Harness Layup

Redundant version of C10, and the same as it.

Add one to all the connector numbers compared to C10.



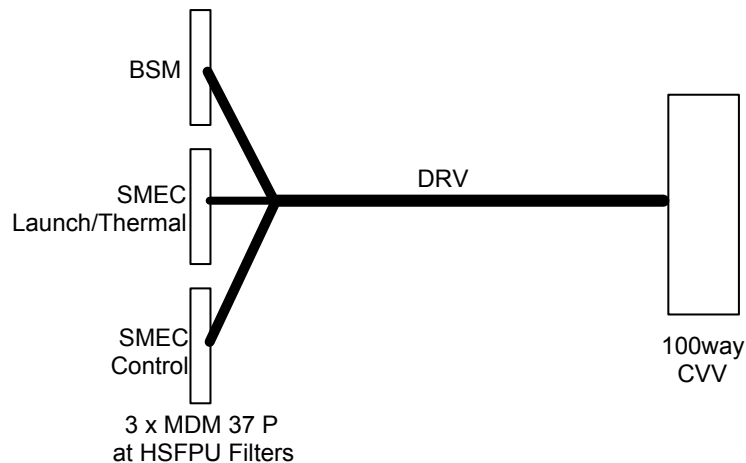
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 120 of 174

4.4.10 C13 CVV13 to HSFPU DRV-R

Overall Mechanical Drwg.

Format as C11, maybe differing length.



Connector/Backshell Details

Redundant side harness

MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FE J26

MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FF J28

MDM 37 P + Glenair 507-145 M 37 H: interface to HSFPU Filter FF J30

Harness Layup

As C11.

Contact Details

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



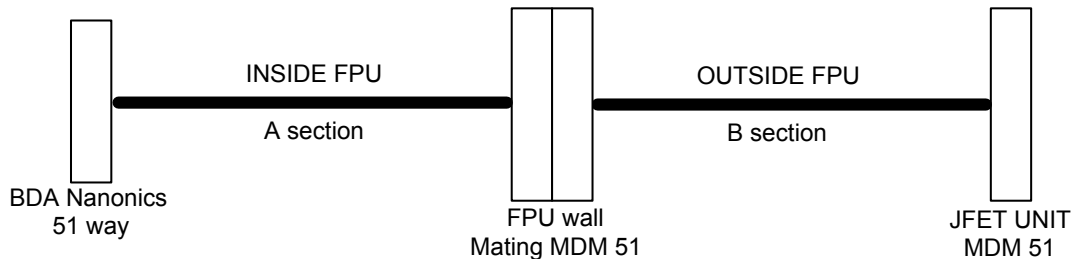
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 121 of 174

4.5 FPU Harnesses

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

Overall Mechanical Drwg.



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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 122 of 174

Function	MDM51 contact	Cable	Nanonics contact
Channel H +	31	12-ax	8
Channel H -	47		33
Channel Hgnd	To 12-ax shield one end		To 12-ax shield one end
Channel I +	30		9
Channel I -	46		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.

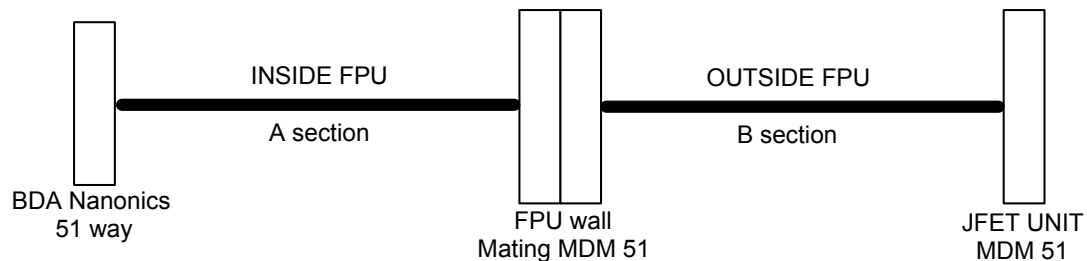


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 123 of 174

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

Overall Mechanical Drwg.



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

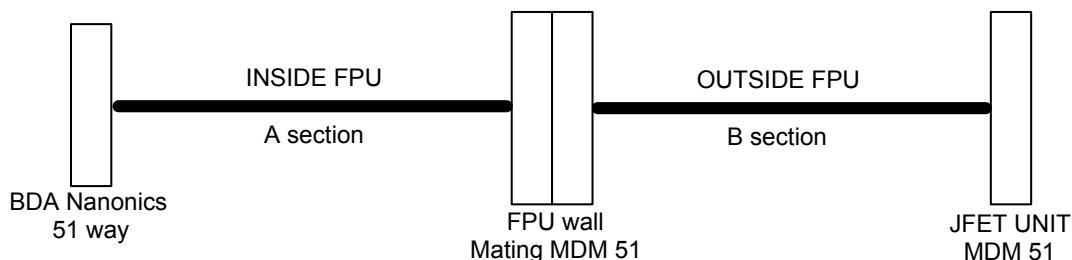


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 124 of 174

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

Overall Mechanical Drwg.



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

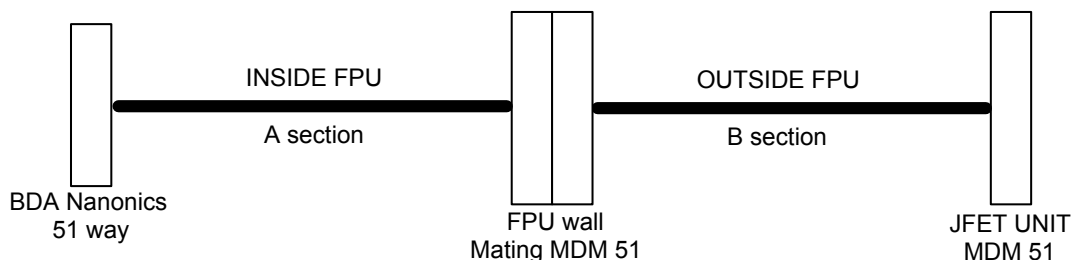


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 125 of 174

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

Overall Mechanical Drwg.



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

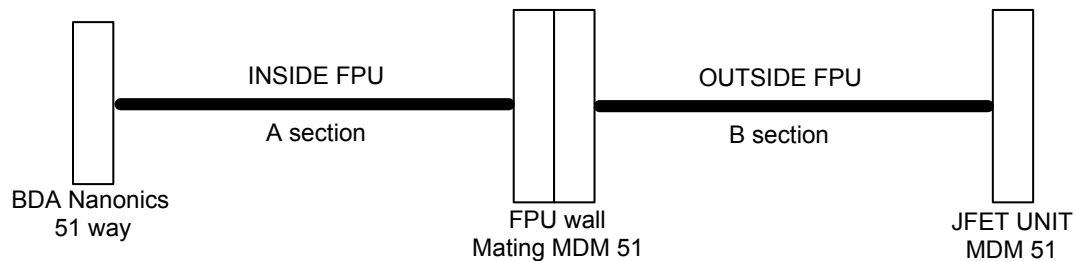


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 126 of 174

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

Overall Mechanical Drwg.



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

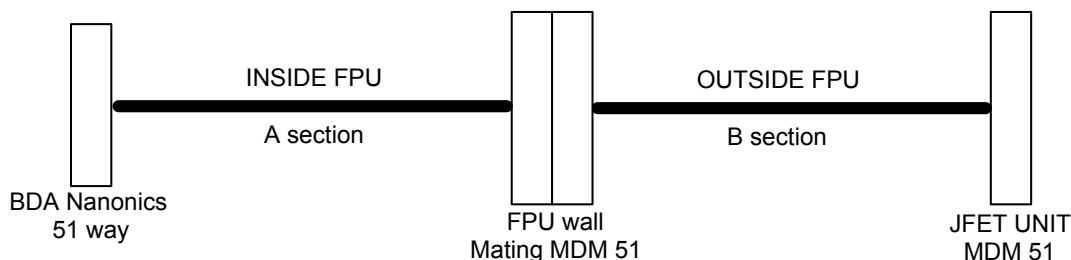


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 127 of 174

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

Overall Mechanical Drwg.



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

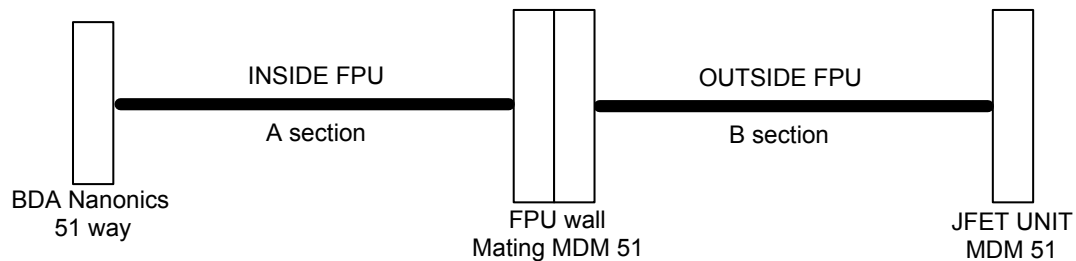


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 128 of 174

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

Overall Mechanical Drwg.



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

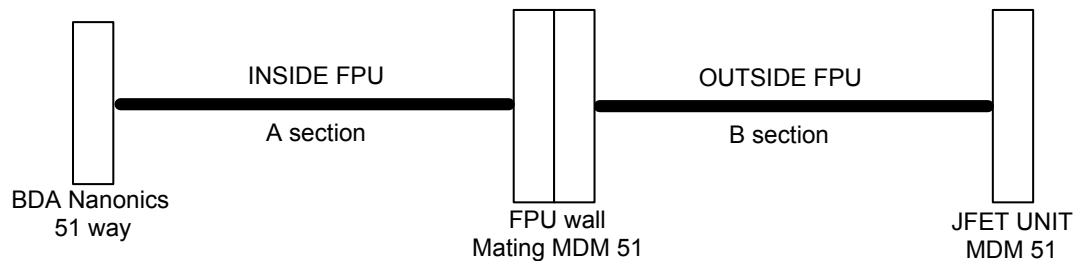


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 129 of 174

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

Overall Mechanical Drwg.



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

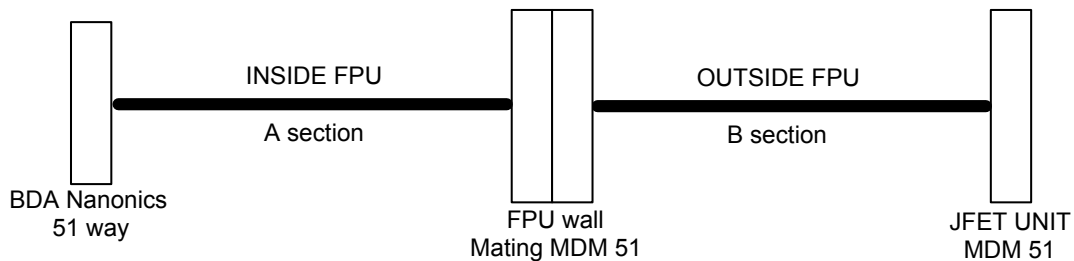


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 130 of 174

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

Overall Mechanical Drwg.



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

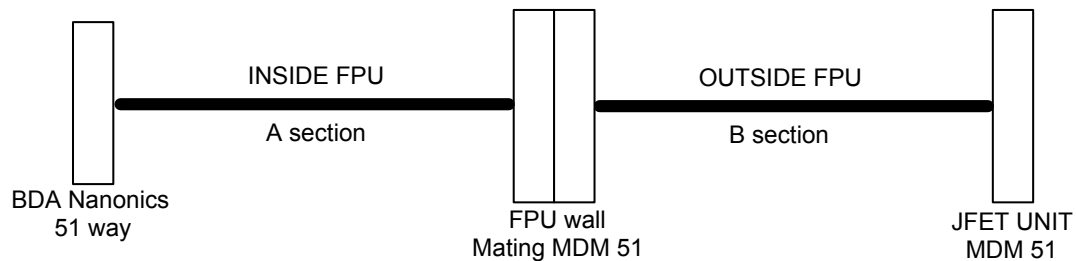


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 131 of 174

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

Overall Mechanical Drwg.



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

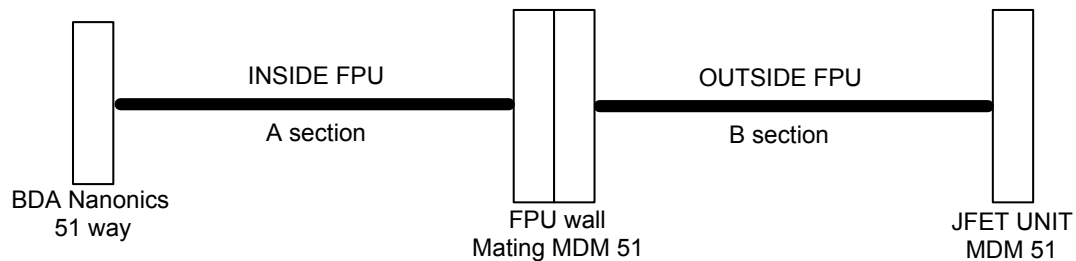


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 132 of 174

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

Overall Mechanical Drwg.



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

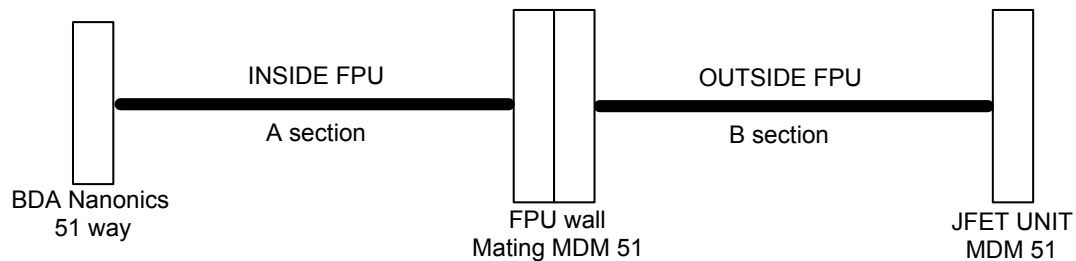


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 133 of 174

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

Overall Mechanical Drwg.



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

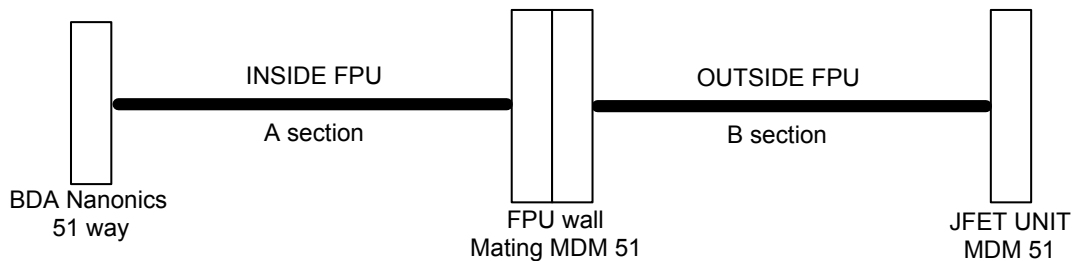


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 134 of 174

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

Overall Mechanical Drwg.



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

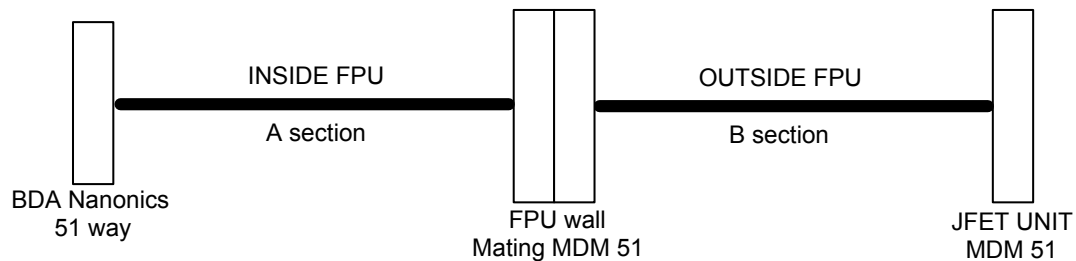


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 135 of 174

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

Overall Mechanical Drwg.



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

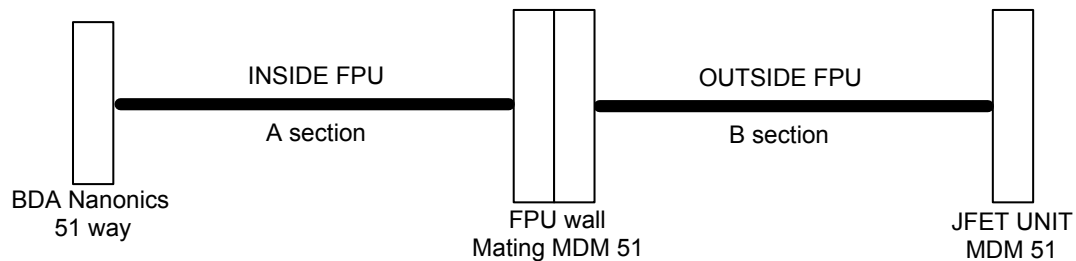


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 136 of 174

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

Overall Mechanical Drwg.



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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 137 of 174

4.5.16 F16 COOLER-P to FA

Overall Mechanical Drwg.

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

Connector/Backshell Details

Harness Layup

As C10 tail layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 138 of 174

4.5.17 F17 COOLER-R to FA

Overall Mechanical Drwg.

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

Connector/Backshell Details

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 139 of 174

4.5.18 F18 SPECT_STIM-P to FA

Overall Mechanical Drwg.

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

Connector/Backshell Details

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 140 of 174

4.5.19 F19 SPECT_STIM-R to FD

Overall Mechanical Drwg.

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

Connector/Backshell Details

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 141 of 174

4.5.20 F20 THERM-P from FA

Overall Mechanical Drwg.

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

Connector/Backshell Details

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 142 of 174

4.5.21 F21 THERM-R from FE

Overall Mechanical Drwg.

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

Connector/Backshell Details

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 143 of 174

4.5.22 F22 BSM-P to FB

Overall Mechanical Drwg.

Connector/Backshell Details

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

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 144 of 174

4.5.23 F23 BSM-R to FE

Overall Mechanical Drwg.

Connector/Backshell Details

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

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 145 of 174

4.5.24 F24 SMECSIG-P to FC

Overall Mechanical Drwg.

Connector/Backshell Details

37 MDMway to SMEC Signal Prime to 37 MDMway on HSFPU Filter FC J1

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 146 of 174

4.5.25 F25 SCECDRV-P to FC

Overall Mechanical Drwg.

Connector/Backshell Details

37 MDMway to SMEC Drive Prime to 37 MDMway on HSFPU Filter FC J2

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 147 of 174

4.5.26 F26 SMECSIG-R to FF

Overall Mechanical Drwg.

Connector/Backshell Details

37 MDMway to SMEC Signal Redundant to 37 MDMway on HSFPU Filter FF J1

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 148 of 174

4.5.27 F27 SMECDRV-P to FF

Overall Mechanical Drwg.

Connector/Backshell Details

37 MDMway to SMEC Drive Prime to 37 MDMway on HSFPU Filter FF J2

Harness Layup

Contact Details



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 149 of 174

4.5.28 F28 300-mK Thermal Control Hardware to HSJFS

Overall Mechanical Drwg.

Connector/Backshell Details

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 d.c. isolated from ground in the JFET box chassis except for 1MOhm antistatic resistors:

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

For the photometer, the $4 \times 37 = 148$ C3 harness contacts cannot accommodate all the $12 \times 14 = 168$ 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/13 and half of C/11. 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.

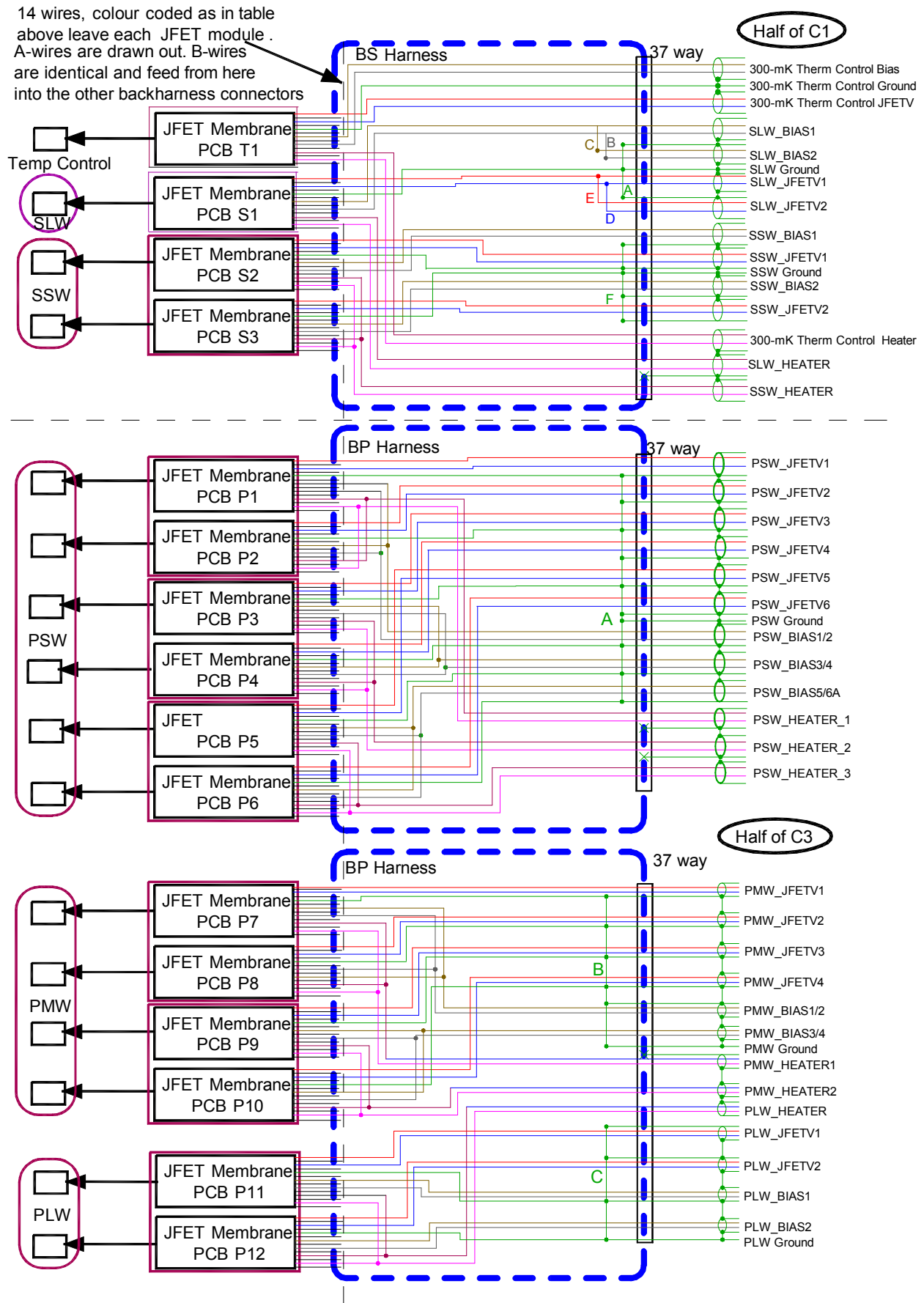
Looking at the table above*, note that the A and B wires for each of these functions must be linked in the HSDCU to maintain cryoharness robustness against single wire breakage, *whether or not* they then split into two again and feed into Prime and Redundant DCU electronics functions. The A and B wires 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.



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 151 of 174



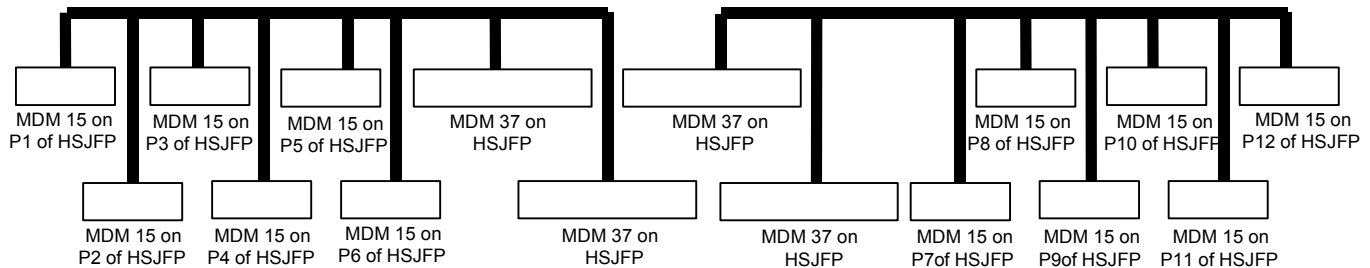


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 152 of 174

4.6.2 BP-Photometer

Overall Mechanical Drwg.



Connector/Backshell Details

JPL to specify.

Harness Layup

The BS harness is all at one temperature. Crimped 28AWG 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 arbitrary because

- 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 contacts are denoted by A in the table below.
- 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 contacts are denoted by B in the table below.
- Within the PMW/PLW Backplane Harness pins 33, 16, 36, 19 on the 37 Way connectors J26 are commoned as a PLW ground. These contacts are denoted by C in the table below.
- 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'



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608

Issue: 0.8

Date: 02/11/01

Page 153 of 174

	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				



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 154 of 174

Name	HSJFP				PSW Backplane Harness						PMW/PLW Backplane Harness					
	J25 37wa y	J26 37wa y	J27 37wa y	J28 37wa y	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 A1 shld		11									No Connection					
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')					



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 155 of 174

Name	HSJFP				PSW Backplane Harness						PMW/PLW Backplane Harness					
	J25 37wa y	J26 37wa y	J27 37wa y	J28 37wa y	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 +				3								14				
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')

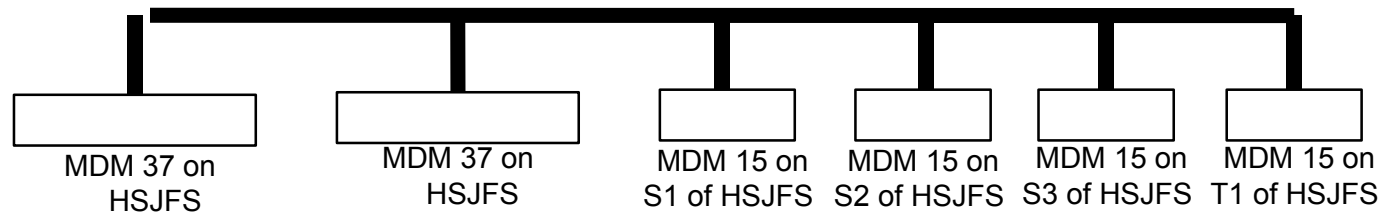


SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 156 of 174

4.6.3 BS-Spectrometer (To be updated)

Overall Mechanical Drwg.



Connector/Backshell Details

JPL to specify.

Harness Layup

The BS harness is all at one temperature. Crimped 28AWG 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

Function	HSJFS		SSW/SLW Backplane Harness			
	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			



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 157 of 174

Function	HSJFS		SSW/SLW Backplane Harness			
	J9 37way	J10 37wayB	SLW S1 15way	SSW S2 15way	SSW S3 15way	T.C. T1 15way
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		
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			



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 158 of 174

Function	HSJFS		SSW/SLW Backplane Harness			
	J9 37way	J10 37wayB	SLW S1 15way	SSW S2 15way	SSW S3 15way	T.C. T1 15way
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	
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)



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 159 of 174

4.7 Test Harnesses

4.7.1 T1 Primary 1553 Bus + System Clock

Overall Mechanical Drwg.

1:1

Connector/Backshell Details

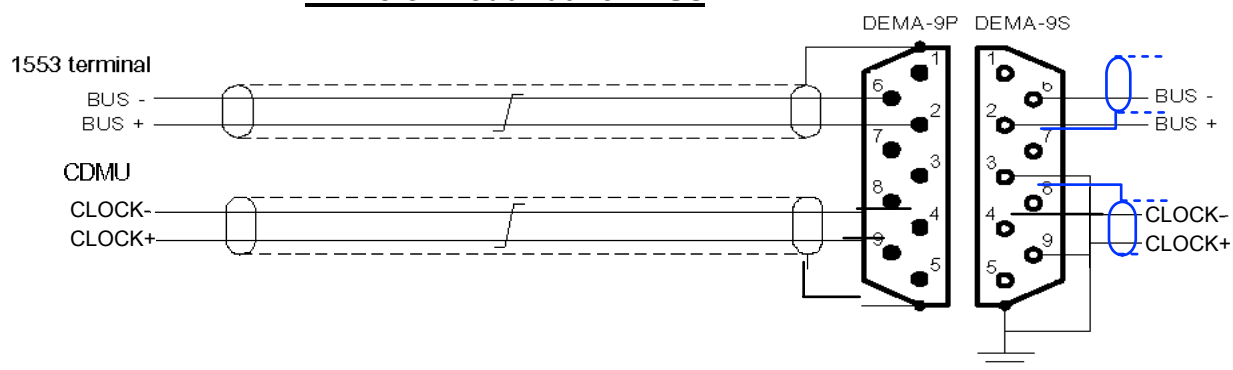
To HSDPU J3 and J5

Harness Layup

Contact Details

As per SPIRE-RAL-COM-000562 Iss2

**1553 + System Clock. to
Prime or Redundant DPUs**





SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 160 of 174

4.7.2 T2 Secondary 1553 Bus

Overall Mechanical Drwg.

1:2

Connector/Backshell Details

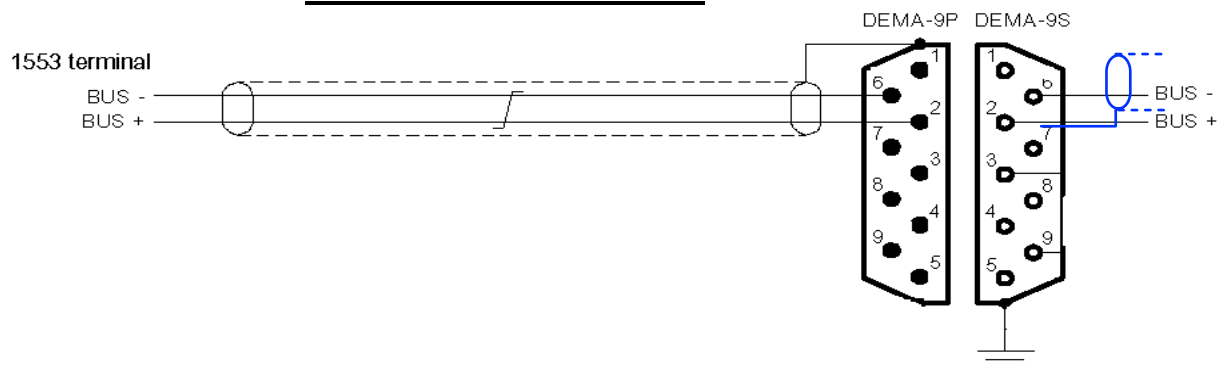
To HSDPU J4and J6

Harness Layup

Contact Details

As per SPIRE-RAL-COM-000562 Iss2 but with Sync. removed.

1553 to
Prime or Redundant DPUs





SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 161 of 174

4.7.3 T3 DPU-P Power

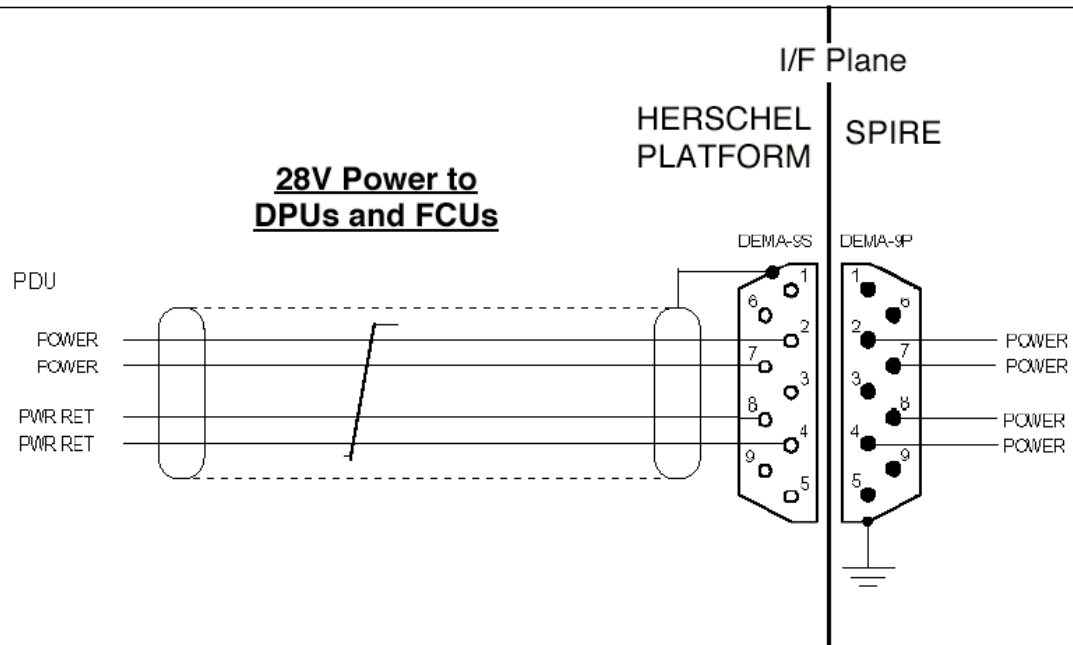
Overall Mechanical Drwg.

Connector/Backshell Details

To HSDPU J1

Harness Layup

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





SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 162 of 174

4.7.4 T4 DPU-R Power

Overall Mechanical Drwg.

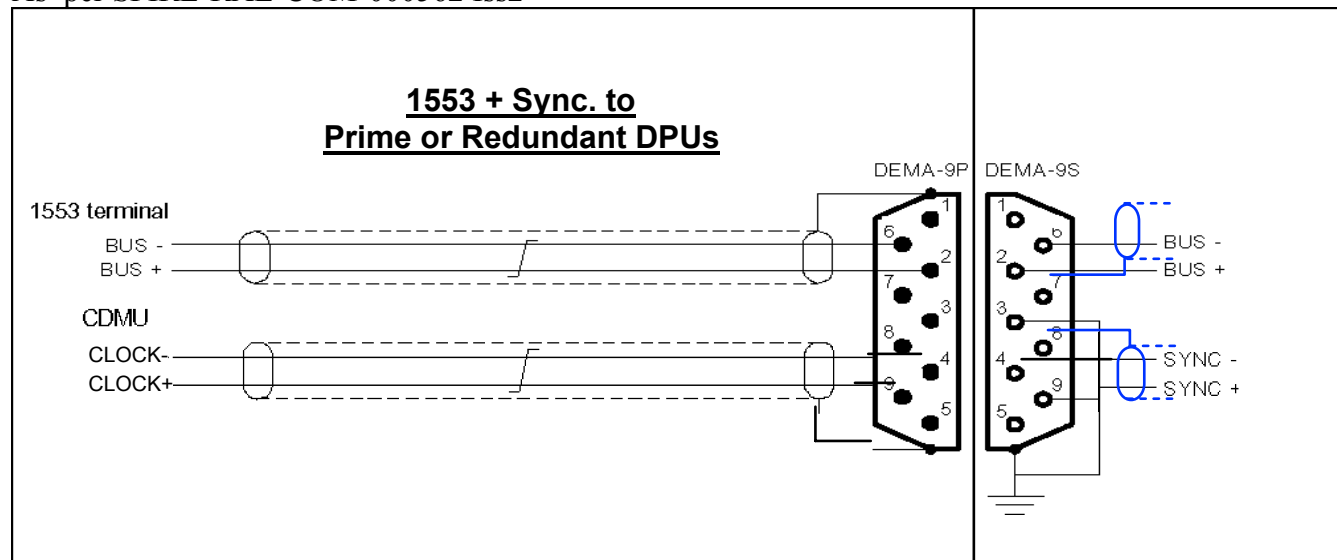
Connector/Backshell Details

To HSDPU J2

Harness Layup

Contact Details

As per SPIRE-RAL-COM-000562 Iss2





SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 163 of 174

4.7.5 T5 FCU-P Power

Overall Mechanical Drwg.

1:1

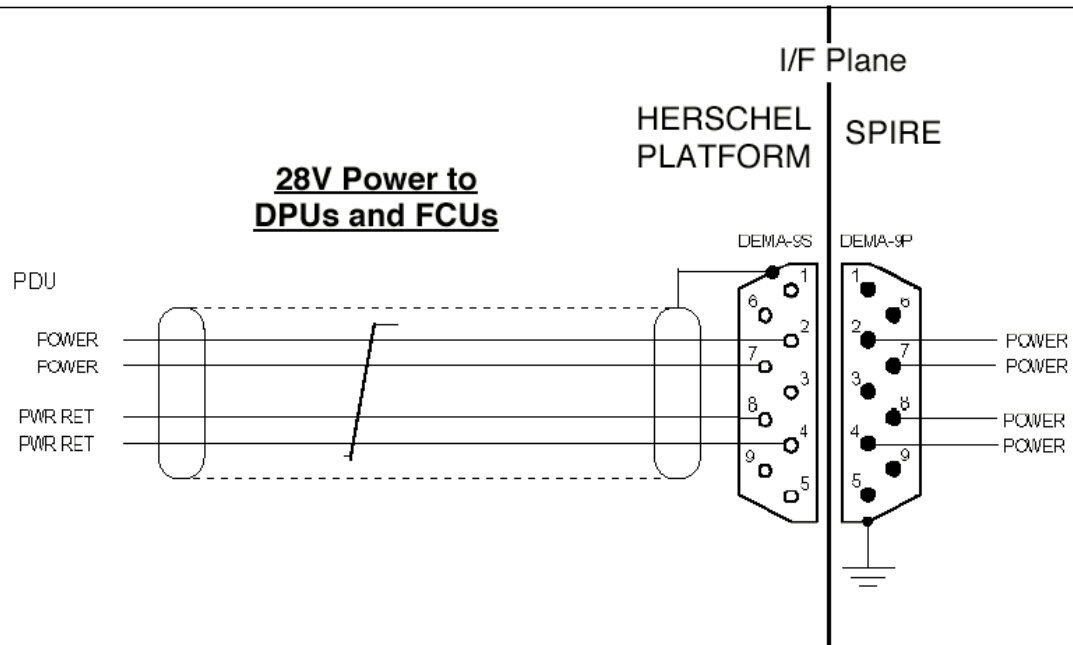
Connector/Backshell Details

To HSFCU J5

Harness Layup

Contact Details

As per SPIRE-RAL-COM-000562 Iss2





SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 164 of 174

4.7.6 T6 FCU-R Power

Overall Mechanical Drwg.

1:1

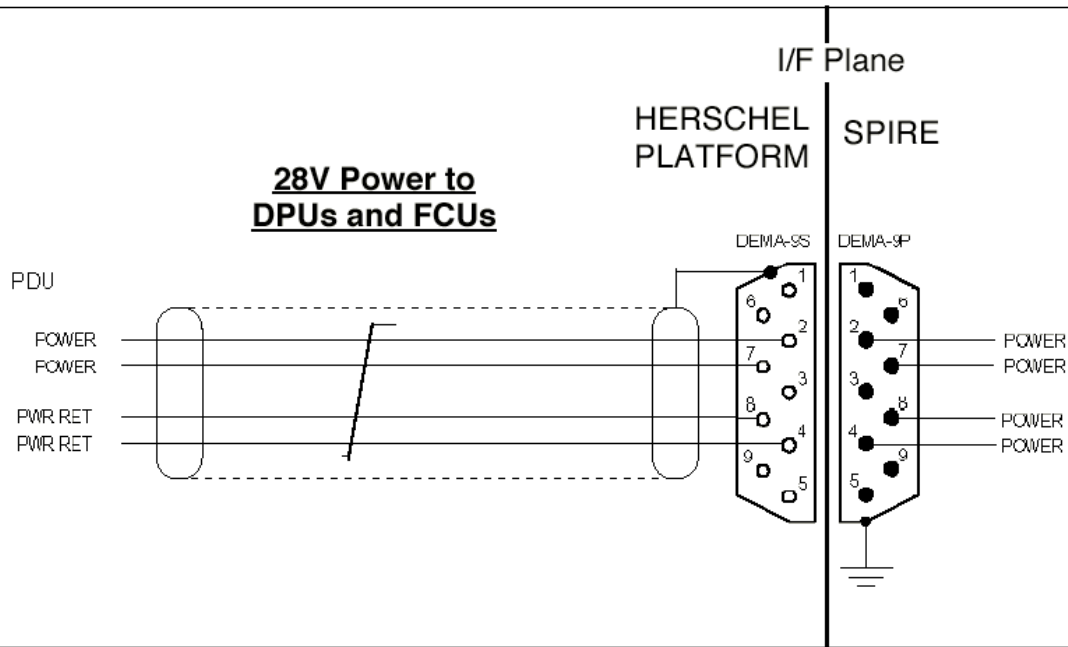
Connector/Backshell Details

To HSFCU J6

Harness Layup

Contact Details

As per SPIRE-RAL-COM-000562 Iss2





SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 165 of 174

4.7.7 T7 SHT via FCU-P

Overall Mechanical Drwg.

Connector/Backshell Details

Harness Layup

Contact Details

This is a prime 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



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 166 of 174

4.7.8 T8 SHT via FCU-R

Overall Mechanical Drwg.

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 (Needs to be updated)

Name	100 Way Connector	FPU/JFS/JFP Connector	C Harness Connector Type	Description	Number of Conductors excl. shlds	Number of Inner Shields	Type	Max. Impedance R (W)	Max. Impedance C(pF)	L(uH)	Max Current per Conductor	Average Current	Duty Cycle t T (t x T)	Max. Volts
C1 Type 3	CWV 1	JFS3 J5	MDM 25S	Bolometer signals from JFS (SLW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFS3 J6	MDM 25S	Bolometer signals from JFS (SLW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFS3 J9	MDM 37P	Spectrometer Bias & JFET Power	22	11	STP	1000/100	1000	0.08	5mA/1uA	1mA/1uA	50% 33% 17%	10
				JFET Heaters	12	1	STP	1000/200	1000	0.08	5mA/1uA	1mA/1uA	50% 33% 17%	10
C2 Type4	CWV 2			Ground Wires	3		Single	50						no
		JFSF J10	MDM 37P	Spectrometer Bias & JFET Power	22	11	STP	1000/100	1000	0.08	5mA/1uA	1mA/1uA	0% 33% 0%	10
				JFET Heaters	12	1	STP	1000/200	1000	0.08	5mA/1uA	1mA/1uA	0% 33% 0%	10
				Ground Wires	3		Single	50						no
C3 Type2	CWV 5	Shield		RF Overshield sealed to both backshells		Outer	>93%			0.01				no
		JFS J1	MDM 25S	Bolometer signals from JFS (SSW)	36	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFS J2	MDM 25S	Ground Wire	1		single	50						no
		JFS J3	MDM 25S	Bolometer signals from JFS (SSW)	36	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
C4 Type1	CWV 4	JFS J4	MDM 25S	Ground Wire	1		single	50						no
		Shield		Bolometer signals from JFS (SSW)	36	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFSP1 J25	MDM 37P	Ground Wire	1		single	50						no
		JFSP2 J26	MDM 37P	Bolometer signals from JFS (SSW)	36	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
C5 Type1	CWV 6	JFSP1 J27	MDM 37P	Ground Wire	1		single	50						no
		JFSP2 J28	MDM 37P	Bolometer signals from JFS (SSW)	36	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		Shield		Bolometer signals from JFS (SSW)	36	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFP1 J21	MDM 25S	Ground Wire	1		single	50						no
C6 Type1	CWV 7	JFP1 J22	MDM 25S	RF Overshield sealed to both backshells		Outer	>93%			0.01				no
		JFP1 J23	MDM 25S	Bolometer bias, JFET Power, Heater	30	15	STP	1000/200/100	1000	0.08	1nA/3mA/1mA	1nA/3mA/1mA	50% 33% 17%	10
		JFP1 J24	MDM 25S	Bolometer bias, JFET Power, Heater	30	15	STP	1000/200/100	1000	0.08	1nA/3mA/1mA	1nA/3mA/1mA	50% 33% 17%	10
		JFP1 J25	MDM 25S	Bolometer bias, JFET Power, Heater	22	11	STP	1000/200/100	1000	0.08	1nA/3mA/1mA	1nA/3mA/1mA	50% 33% 17%	10
C7 Type1	CWV 8	JFP1 J26	MDM 25S	Bolometer bias, JFET Power, Heater	22	11	STP	1000/200/100	1000	0.08	1nA/3mA/1mA	1nA/3mA/1mA	50% 33% 17%	10
		Shield		RF Overshield sealed to both backshells		Outer	>93%			0.01				no
		JFP1 J27	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFP1 J28	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
C8 Type1	CWV 9	JFP1 J29	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFP1 J30	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFP1 J31	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFP1 J32	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
C9 Type1	CWV 10	JFP1 J33	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		JFP1 J34	MDM 25S	Bolometer signals from JFP (PMW)	24+12	3	12-ax	200	1000	0.08	1nA	1nA	50% 33% 17%	0.1
		Shield		RF Overshield sealed to both backshells		Outer	>93%			0.01				no
		FPU J19	MDM 37P	Sorption Pump Heater	4	0	TQ	10			25mA	25mA	6% 33% 2%	no
C10 Aux-P				Heat switch heaters	8	0	TQ	50			1.5mA	1.5mA	100% 33% 33%	33%
				Various cooler thermistors	20	5	STQ	1000			1uA	1uA	100% 33% 33%	33%
		FPU J21	MDM 37P	Spectrometer Stimulus Thermistors	12	3	STQ	1000			1uA	1uA	100% 33% 33%	33%
				Spectrometer Stimulus Heater 4%	4	0	TQ	30			9mA	9mA	50% 33% 17%	17%
		FPU J23	MDM 37P	Spectrometer Stimulus Heater 2%	24	6	STQ	1000			1uA	1uA	100% 33% 33%	33%



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 168 of 174

Name	100 Way Connector	FPU/JFS/JFP Connector	C Harness Connector Type	Description	Number of Conductors excl. shlds	Number of inner Shields	Type	Max. Impedance R (W)	Max. Impedance C(pF)	L(uH)	Max Current per Conductor	Average Current	Duty Cycle t T (t x T)	Max. Volts
C11 Drive-P				300mK Thermal Control Heater	4	1	STQ	30			100uA		50% 33% 17%	
		FPU J17	MDM15P	Actuator position sense + Latch Confirm	4	1	STQ	1000			?		0% 0% 0%	
				Latch-solenoid drives and vane heater	4	1	STQ	10			100mA		0% 0% 0%	10
				Vane thermistor bias and readout	4	1	STQ	1000			1uA		0% 0% 0%	
		Shield		RF Overshield sealed to both backshells		Outer	>93%			0.01				
	CVV 11	FPU J25	MDM 37P	BSM Chopper Sensors	5	2	STI+P	1000			250nA	250nA	100% 33% 33%	no
				BSM Jiggle Sensors	5	2	STI+P	1000			1uA	1uA	100% 33% 33%	0.4
				BSM Temperature	4	1	STQ	1000			1uA	1uA	100% 33% 33%	
				Photometer Stimulus Heater	4	1	STQ	10			7mA	5mA	5% 33% 2%	
				BSM Launch latch sense	2	1	STP	1000				0	0% 0% 0%	
C12 Aux-R				BSM Launch latch solenoid	3	1	STT	10			35mA	0	0% 0% 0%	
				BSM Chop motor drive	4	1	STQ	10			40mA		0% 0% 0%	
				BSM Jiggle motor drive	4	1	STQ	10			40mA		0% 0% 0%	
		FPU J27	MDM 37P	SMEC Thermometry	8	2	STQ	1000			1uA	1uA	100% 33% 33%	
				SMEC LVDT Primary	2	1	STP	500			5mA	5mA	50% 33% 17%	5
				SMEC LVDT Secondary	4	2	STP	500			50uA	50uA	50% 33% 17%	15
				SMEC Launch Latch1 Confirm	4	2	STP	10			400mA/50mS	0	0% 0% 0%	15
				SMEC Launch Latch2	2	1	STP	100			1mA	0	0% 0% 0%	15
				SMEC Launch Latch2 Confirm	4	2	STP	10			400mA/50mS	0	0% 0% 0%	15
		FPU J29	MDM 37P	SMEC Drive Coil	4	2	STP	5			100mA	8mA	50% 33% 17%	15
C13 Drive-R				SMEC Drive coil voltage sensor	2	1	STP	500			10uA	10uA	0% 33% 0%	15
				SMEC Position sensor supplies	4	2	STP	100			1mA	50%	50% 33% 17%	5
				SMEC Position sensor photodiodes	6	3	STP	1000			20uA		50% 33% 17%	5
				SMEC Position sensor photodiodes FB	6	3	STP	1000			10uA		50% 33% 17%	5
		Shield		RF Overshield sealed to both backshells		Outer	>93%			0.01				
	CVV 12	FPU J20	MDM 37P	Sorption Pump Heater	4	0	TQ	10			25mA	25mA	6% 33% 2%	no
				Heat switch heaters	8	0	TQ	50			1.5mA	1.5mA	100% 33% 33%	
				Various cooler thermistors	20	5	STQ	1000			1uA	1uA	100% 33% 33%	
		FPU J22	MDM 37P	Spectrometer Stimulus Thermistors	12	3	STQ	1000			1uA	1uA	100% 33% 33%	
				Spectrometer Stimulus Heater 4%	4	0	TQ	30			9mA			4
C13 Drive-R				Spectrometer Stimulus Heater 2%	4	0	TQ	30			7mA			
		FPU J24	MDM 37P	FPU Thermometry	24	6	STQ	1000			1uA	1uA	50% 33% 17%	
				300mK Thermal Control Heater	4	1	STQ	30			100uA		100% 33% 33%	
		FPU J18	MDM15P	Actuator position sense + Latch Confirm	4	1	STQ	1000			?		0% 0% 0%	
				Latch-solenoid drives and vane heater	4	1	STQ	10			100mA		0% 0% 0%	10
				Vane thermistor bias and readout	4	1	STQ	1000			1uA	1uA	0% 0% 0%	
		Shield		RF Overshield sealed to both backshells		Outer	>93%			0.01				
	CVV 13	FPU J26	MDM 37P	BSM Chopper Sensors	5	2	STI+P	1000			250nA	250nA	100% 33% 33%	no
				BSM Jiggle Sensors	5	2	STI+P	1000			1uA	1uA	100% 33% 33%	0.4
				BSM Temperature	4	1	STQ	1000			1uA	1uA	100% 33% 33%	
C13 Drive-R				Photometer Stimulus Heater	4	1	STQ	10			7mA	5mA	5% 33% 2%	
				BSM Launch latch sense	2	1	STP	1000				0	0% 0% 0%	
				BSM Launch latch solenoid	3	1	STT	10			35mA	0	0% 0% 0%	
				BSM Chop motor drive	4	1	STQ	10			40mA		0% 0% 0%	
				BSM Jiggle motor drive	4	1	STQ	10			40mA		0% 0% 0%	
		FPU J28	MDM 37P	SMEC Thermometry	8	2	STQ	1000			1uA	1uA	100% 33% 33%	
				SMEC LVDT Primary	2	1	STP	500			5mA	5mA	50% 33% 17%	5
				SMEC LVDT Secondary	4	2	STP	500			50uA	50uA	50% 33% 17%	15
				SMEC Launch Latch1 Confirm	4	2	STP	10			400mA/50mS	0	0% 0% 0%	15
				SMEC Launch Latch2	2	1	STP	100			1mA	0	0% 0% 0%	15
C13 Drive-R				SMEC Launch Latch2 Confirm	4	2	STP	100			400mA/50mS	0	0% 0% 0%	15
		FPU J30	MDM 37P	SMEC Drive Coil	2	1	STP	5			100mA	8mA	50% 33% 17%	15
				SMEC Drive coil voltage sensor	2	1	STP	500			10uA	10uA	0% 33% 0%	15
				SMEC Position sensor supplies	4	2	STP	100			1mA		50% 33% 17%	5
				SMEC Position sensor photodiodes	6	3	STP	1000			20uA		50% 33% 17%	5
				SMEC Position sensor photodiodes FB	6	3	STP	1000			10uA		50% 33% 17%	5
		Shield		RF Overshield sealed to both backshells		Outer	>93%			0.01				
														no

	SPIRE HARNESS DEFINITION	Doc #: SPIRE-RAL-PRJ-000608 Issue: 0.8 Date: 02/11/01 Page 169 of 174
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ANNEX 2 – External Cryostat Wiring List (Needs to be updated)

Name	100 Way Connector	SVM Connector	I Harness Connector Type	Description	Number of Conductors excl. shlds	Number of inner Shields	Type	R (W)	Max. Impedance C(pF)	L(uH)	Max Current per Conductor	Average t	Duty Cycle T	(t x T)	Max. Volts
I1 Type3	CVV 1	DCU J27	DCMA37 S	12 ch. SLW Bolometer(1-12)	24	12	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
				Ground Wire	1	0	Single	1000	1000	0.12					
	DCU J28		DCMA37 S	12 ch. SLW Bolometer(13-24)	24	12	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
				Ground Wire	1	0	Single	1000	1000	0.12					
	DCU J33		DCMA37P	Spectrometer Bias (SLW & SSW)	8	4	STP	1000	1500	0.12	1mA	50%	33%	17%	0.1
				JFET Power	8	4	STP	100	1500	0.12	5mA	50%	33%	17%	10
				Heaters (SLW and SSW)	6	3	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				Ground wires	4	0	Single	1000	1500	0.12					
	DCU J34		DCMA37P	Spectrometer Bias (SLW & SSW)	8	4	STP	1000	1500	0.12	1mA	50%	33%	17%	0.1
				JFET Power	8	4	STP	100	1500	0.12	5mA	50%	33%	17%	10
				Heaters (SLW and SSW)	6	3	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				Ground wires	4	0	Single	1000	1500	0.12					
I2 Type4	CVV 2	DCU J23	DCMA37 S	RF Overshield insulated from CVV wall		self	>93%								
				12 ch. SSW Bolometer (1-12)	24	12	STP	200	1500	0.12	1nA	50%	33%	17%	0.1
	DCU J24		DCMA37 S	Ground Wire	1	0	Single	1000	1500	0.12					
				12 ch. SSW Bolometer (13-24)	24	12	STP	200	1500	0.12	1nA	50%	33%	17%	0.1
	DCU J25		DCMA37 S	Ground Wire	1	0	Single	1000	1500	0.12					
				12 ch. SSW Bolometer (25-36)	24	12	STP	200	1500	0.12	1nA	50%	33%	17%	0.1
	DCU J26		DCMA37 S	Ground Wires	1	0	Single	1000	1500	0.12					
				12 ch. SSW Bolometer (37-48 inc.spares)	24	12	STP	200	1500	0.12	1nA	50%	33%	17%	0.1
	Shield			Ground Wires	1'	0	Single	1000	1500	0.12					
				RF Overshield insulated from CVV wall		self	>93%								
I3 Type2	CVV 3	DCU J29	DCMA37P	PSW JFET Power	12	6	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				PSW Bias	6	3	STP	1000	1500	0.12	1mA	50%	33%	17%	0.1
				Heaters	12	6	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				Ground Wire	1	0	Single	1000	1500	0.12					
	DCU J31		DCMA37P	PMW/PLW JFET Power	12	6	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				PMW/PLW Bias	8	4	STP	1000	1500	0.12	1mA	50%	33%	17%	0.1
				Temp. Control Bias	2	1	STP	1000	1500	0.12	1mA	50%	33%	17%	1
				Ground Wire	1	0	Single	1000	1500	0.12					
	DCU J30		DCMA37P	PSW JFET Power	12	6	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				PSW Bias	6	3	STP	1000	1500	0.12	1mA	50%	33%	17%	0.1
I4 Type1	CVV 4	DCU J20	DCMA37P	Heaters	12	6	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				Ground Wire	1	0	Single	1000	1500	0.12					
				PMW/PLW JFET Power	12	6	STP	100	1500	0.12	5mA	50%	33%	17%	0.1
				PMW/PLW Bias	8	4	STP	1000	1500	0.12	1mA	50%	33%	17%	0.1
				Temp. Control Bias	2	1	STP	1000	1500	0.12	1mA	50%	33%	17%	1
				Ground Wire	1	0	Single	1000	1500	0.12					
	Shield			RF Overshield insulated from CVV wall		self	>93%								
				16 ch. PMW (1-16)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
	DCU J21		DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1mA	50%	33%	17%	0.1
				16 ch. PMW (17-32)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
I5 Type1	DCU J22		DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1mA	50%	33%	17%	0.1
				16 ch. PMW (33-48)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
				Ground Wire	2	0	Single	1000	1500	0.12					
				RF Overshield insulated from CVV wall		self	>93%								
	Shield			16 ch. PMW (1-16)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
				Ground Wire	2	0	Single	1000	1500	0.12					
	DCU J17		DDMA 50S	Ground Wire	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
				16 ch. PMW (17-32)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
	DCU J18		DDMA 50S	Ground Wire	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
				16 ch. PMW (17-32)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1

Name	100 Way Connector	SVM Connector	I Harness Connector Type	Description	Number of Conductors excl. shlds	Number of inner Shields	Type	R (W)	Max. Impedance C(pF)	L(uH)	Max.Current per Conductor	Average t	Duty Cycle T	(t x T)	Max. Volts
16 Type1	CVV 6	Shield	DCU J19	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	16 ch. PMW (33-48)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DCU J14	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	RF Overshield insulated from CVV wall	32	self	>93%	1000	1500	0.01	1nA	50%	33%	17%	0.1
			DCU J15	16 ch. PMW (1-16)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
17 Type1	CVV 7	Shield	DCU J16	16 ch. PMW (17-32)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
			DCU J11	16 ch. PMW (33-48)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
			DCU J12	RF Overshield insulated from CVV wall	32	self	>93%	1000	1500	0.01	1nA	50%	33%	17%	0.1
			DDMA 50S	16 ch. PMW (1-16)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
18 Type1	CVV 8	Shield	DCU J13	Ground Wire	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	16 ch. PMW (17-32)	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
			DCU J8	Ground Wire	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	RF Overshield insulated from CVV wall	2	self	>93%	1000	1500	0.01	1nA	50%	33%	17%	0.1
			DCU J9	16 ch. PMW (1-16)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
19 Type1	CVV 9	Shield	DCU J10	16 ch. PMW (17-32)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
			DCU J5	Ground Wire	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	RF Overshield insulated from CVV wall	2	self	>93%	1000	1500	0.01	1nA	50%	33%	17%	0.1
			DCU J6	16 ch. PMW (1-16)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
110 Aux-P	CVV 10	Shield	DCU J7	16 ch. PMW (33-48)	32	16	STP	100	1500	0.12	1nA	50%	33%	17%	0.1
			DDMA 50S	Ground Wire	2	0	Single	1000	1500	0.12	1nA	50%	33%	17%	0.1
			FCU J15	RF Overshield insulated from CVV wall	4	1	STQ	1000	1000	0.01	?	0%	0%	0%	10
			DAMA 15P	Actuator position sense + Latch Confirm	4	1	STQ	10	10		100mA	0%	0%	0%	
			FCU J11	Latch+solenoid drives and vane heater	4	1	STQ	1000	1000		1mA	0%	0%	0%	
			DAMA 15P	Vane thermistor bias and readout	4	0	TQ	10	10	0.12	25mA	6%	1/3	2%	
111 Drive-P	CVV 11	Shield	FCU J13	Sorption pump heat switch heaters	4	0	TQ	50	50	0.12	1.5mA	100%	1/3	33%	
			FCUJ23	Evaporator heat switch heaters	4	0	TQ	50	50	0.12	1.5mA	100%	33.30%	33%	
			DCMA 37P	Spectrometer Stimulator Heater Drives	8	0	TQ	30	30	0.12	9mA	50%	33%	17%	
			FCUJ25	FPU Thermometry A	32	8	STQ	1000	1000	0.12	1µA	100%	33%	33%	
			FCUJ25	300mK Thermal Control Heater	4	1	STQ	30	30	0.12	100uA	50%	33%	17%	
			FCU J21	FPU Thermometry B	28	7	STQ	1000	1000	0.12	1µA	100%	33%	33%	
			DBMA 25P	RF Overshield insulated from CVV wall	12	self	>93%	1000	1000	0.01	1µA	100%	33%	33%	
			FCU J21	FPU Thermometry C	4	3	STQ	1000	1000	0.12	1µA	100%	33%	33%	
			FCU J19	Photometer Stimulus Heater	5	0	TQ	10	10		7mA	100%	33%	33%	0.4
			MDM 37P	BSM Chopper Sensors	5	2	STT+P	1000	1000		250nA	100%	33%	33%	
				BSM Jiggle Sensors	4	0	STT+P	1000	1000		1µA	100%	33%	33%	
				Photometer Stimulus Heater	2	1	STQ	1000	1000		5mA	5%	33%	2%	
				BSM Launch latch sense	3	1	STT	10	10		0	0%	0%	0%	
				BSM Launch latch solenoid	1	1	STT	10	10		35mA	0%	0%	0%	



SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 171 of 174

Name	100 Way Connector	SVM Connector	I Harness Connector Type	Description	Number of Conductors/ excl. shlds	Number of inner Shields	Type	Max. Impedance R (W) C(pF) L(uH)	Max Current per Conductor	Average	t	Duty Cycle T	(t x T) Volts	Max. Volts
I12 Aux-R	FCU J29		MDM 37P	BSM Chop motor drive	4	1	STQ	10	40mA		0%	0%	0%	
				BSM Jiggle motor drive	4	1	STQ	10	40mA		0%	0%	0%	
				SMEC LVDT Primary	2	1	STP	500	5mA	5mA	50%	33%	17%	0
				SMEC LVDT Secondary	4	2	STP	500	50uA	50uA	50%	33%	17%	0
				SMEC Launch Latch1	4	2	STP	10	400mA/50mS	0	0%	0%	0%	0
				SMEC Launch Latch2	2	1	STP	100	1mA	0	0%	0%	0%	0
	FCU J17		MDM 37P	SMEC Launch Latch2 Confirm	4	2	STP	10	400mA/50mS	0	0%	0%	0%	0
				SMEC Launch Coil	2	1	STP	100	1mA	0	0%	0%	0%	0
				SMEC Drive coil voltage sensor	4	2	STP	5	100mA	8mA	50%	33%	17%	0
				SMEC Position sensor supplies	2	1	STP	500	10uA	10uA	0%	33%	0%	
				SMEC Position sensor photodiodes	4	2	STP	100	1mA		50%	33%	17%	
				SMEC Position sensor photodiodes FB	6	3	STP	1000	20uA		50%	33%	17%	
I13 Drive-R	CVV 12	Shield	FCU J16	RF Overshield sealed to both backshells	6	3	STP	1000	10uA		50%	33%	17%	
				Actuator position sense + Latch Confirm	4	Outer	>93%	0.01	?		0%	0%	0%	
				Latch+solenoid drives and vane heater	4	1	STQ	1000	100mA		0%	0%	0%	15
				Vane thermistor bias and readout	4	1	STQ	1000	1mA	1mA	0%	0%	0%	
				Cooler heaters	4	0	TQ	10	25mA		6%	1/3	2%	
				Sorption pump heat switch heaters	4	0	TQ	50	1.5mA		100%	1/3	33%	
	CVV 13	Shield	FCU J12	Evaporator heat switch heaters	4	0	TQ	50	1.5mA		100%	33.30%	33%	
				Spectrometer Stimulator Heater Drives	8	0	TQ	30	9mA		50%	33%	17%	
				FPU Thermometry A	32	8	STQ	1000	1uA	1uA	100%	33%	33%	
				300mK Thermal Control Heater	4	1	STQ	30	100uA		50%	33%	17%	
				FPU Thermometry B	28	7	STQ	1000	1uA	1uA	100%	33%	33%	
				RF Overshield insulated from CVV wall	12	self	>93%	0.01			100%	33%	33%	
I13 Drive-R	CVV 13	FCU J22	DBMA 25P	FPU Thermometry C	4	3	STQ	1000	1uA	1uA	100%	33%	33%	
				Photometer Stimulus Heater	5	0	TQ	10	7mA		100%	33%	33%	0.4
				BSM Chopper Sensors	5	2	STT+P	1000	250nA		100%	33%	33%	
				BSM Jiggle Sensors	4	0	STQ	10	1uA	1uA	100%	33%	33%	
				Photometer Stimulus Heater	2	1	STP	1000	7mA	5mA	5%	33%	2%	
				BSM Launch latch sense	3	1	STT	10	35mA	0	0%	0%	0%	
	FCU J30		MDM 37P	BSM Chop motor drive	4	1	STQ	10	40mA		0%	0%	0%	
				BSM Jiggle motor drive	4	1	STQ	10	40mA		0%	0%	0%	
				SMEC LVDT Primary	2	1	STP	500	5mA	5mA	50%	33%	17%	5
				SMEC LVDT Secondary	4	2	STP	500	50uA	50uA	50%	33%	17%	5
				SMEC Launch Latch1	2	1	STP	10	400mA/50mS	0	0%	0%	0%	15
				SMEC Launch Latch2	4	2	STP	100	1mA	0	0%	0%	0%	15
I13 Drive-R	FCU J18		MDM 37P	SMEC Launch Latch2 Confirm	2	1	STP	10	400mA/50mS	0	0%	0%	0%	15
				SMEC Drive Coil	4	2	STP	5	100mA	8mA	50%	33%	17%	15
				SMEC Drive coil voltage sensor	2	1	STP	500	10uA	10uA	0%	33%	0%	15
				SMEC Position sensor supplies	4	2	STP	100	1mA		50%	33%	17%	5
				SMEC Position sensor photodiodes	6	3	STP	1000	20uA		50%	33%	17%	5
				SMEC Position sensor photodiodes FB	6	3	STP	1000	10uA		50%	33%	17%	5
	Shield			RF Overshield sealed to both backshells	6	Outer	>93%	0.01			50%	33%	17%	

	SPIRE HARNESS DEFINITION	Doc #: SPIRE-RAL-PRJ-000608 Issue: 0.8 Date: 02/11/01 Page 172 of 174
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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.



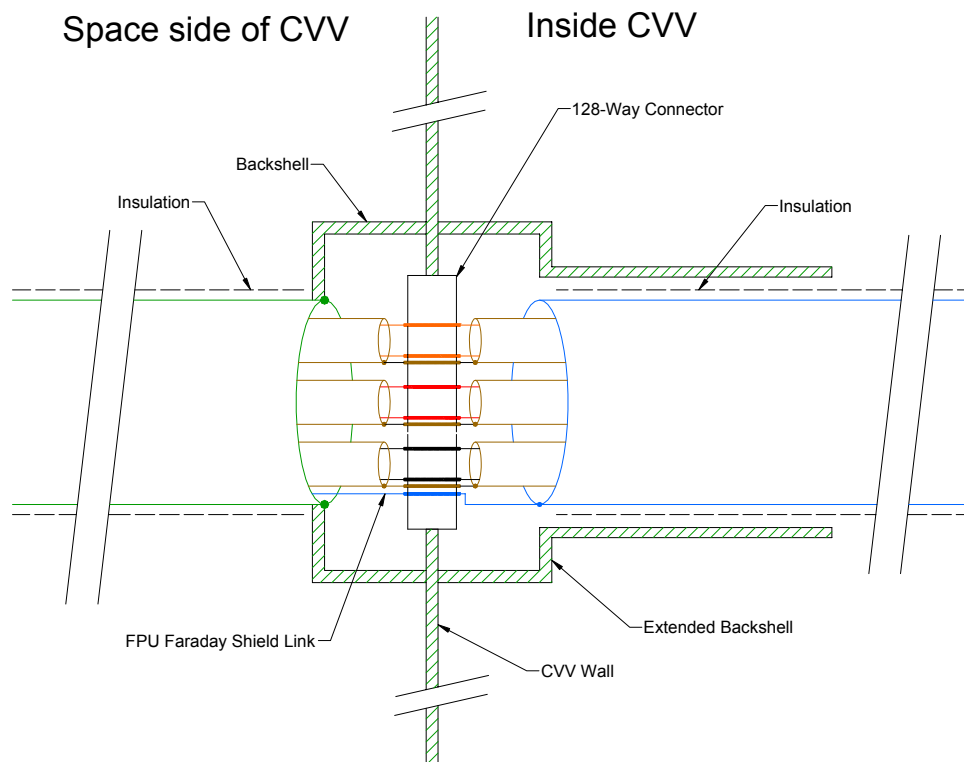
SPIRE HARNESS DEFINITION

Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 173 of 174

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.

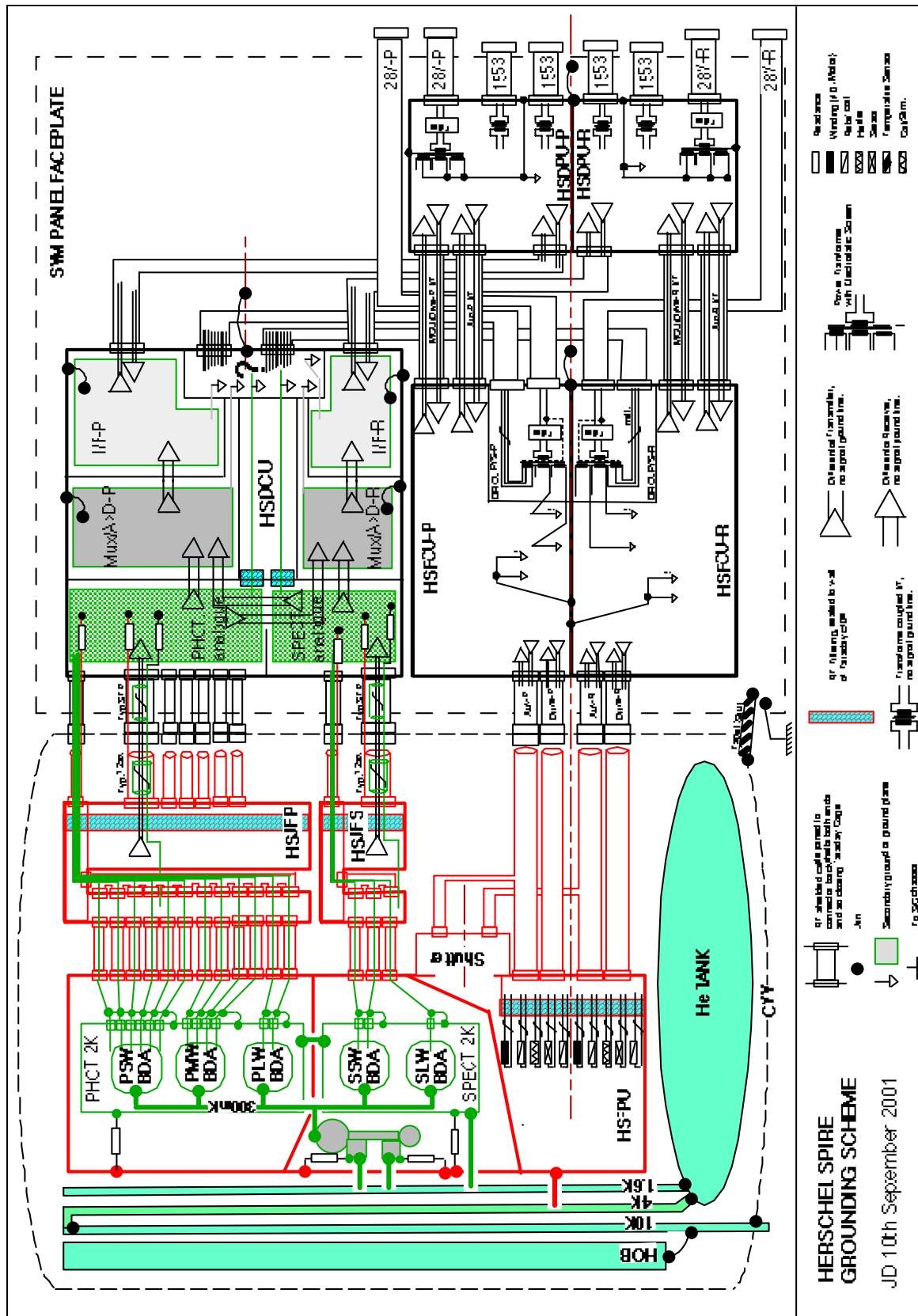




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Doc #: SPIRE-RAL-PRJ-000608
Issue: 0.8
Date: 02/11/01
Page 174 of 174

Annex 7 - SPIRE Grounding Diagram



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