



SPIRE Technical Note

Ref: SPIRE-RAL-NOT-1017

Issue: 0.2

Date: 11/09/03

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SPIRE Cryoharness Shielding – Implementation for PFM
D.Griffin

Background [to issue 0.1](#).

Jeurgen and I had a telecon on Thursday 31 July to flesh out the information contained in the Astrium Fax SPIRE-AST-COM-001752

I have tried to summarise how the detector harnesses C1-C9 will be implemented.

Figure 1: Overall schematic of the SPIRE Cryoharness including the key to the colour coding of the other diagrams.

Figure 2: Detail of the harness near the DCU

Figure 3: Detail near the SVM side of the SVM Connector bracket

Figure 4: Detail between the SVM Connector Bracket and the CVV

Figure 5: Detail inside the cryostat

Figure 6: Schematic representation of the new double shielded 12-ax and STP

Doug Griffin

Thursday, 31 July 2003

[Issue 0.2](#)

[Thursday, 11 September 2003](#)

[RAL Response to Astrium's queries \(Email from Jyergen Lang 6 August and note from Gerhard Peters of 04/08/03\)](#)

[Updates and responses in Blue](#)

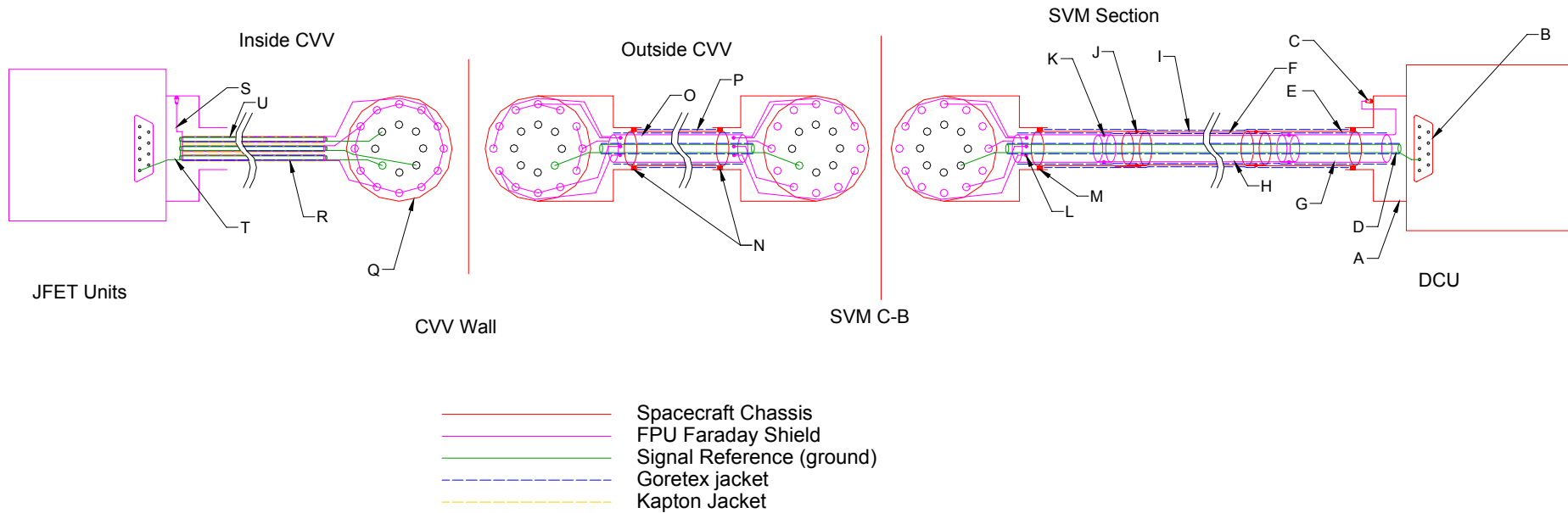


Figure 1 - Overall SPIRE Cryoharness (the detail is difficult to see in this diagram – hopefully the details are clearer in the subsequent diagrams)

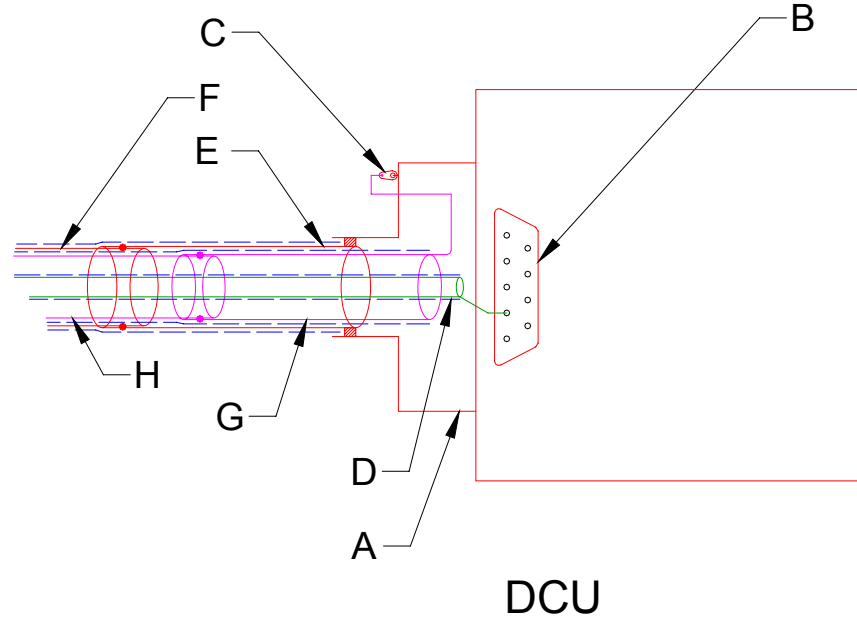
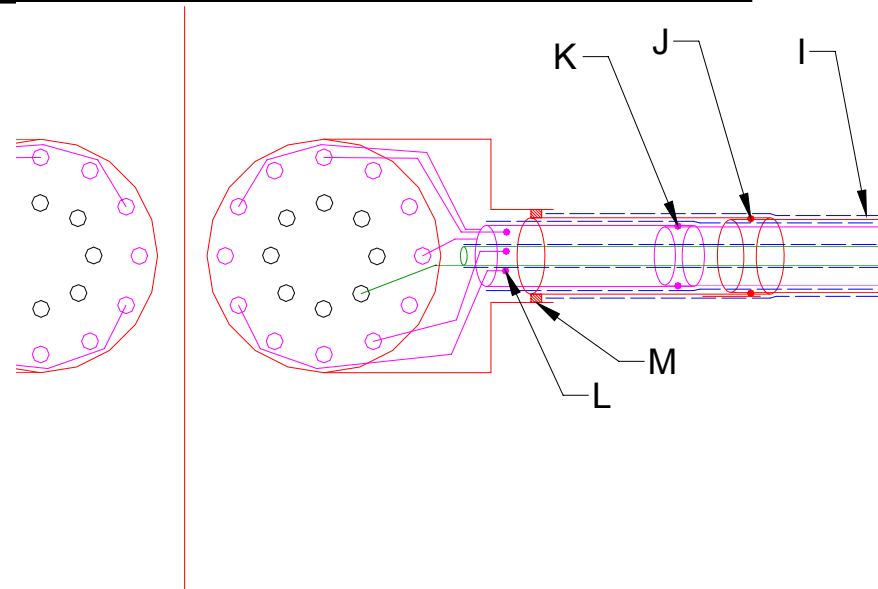


Figure 2 – Detail at DCU

Note	Comment
A	EMC Backshell connected to the Chassis of the SCU
B	D-Sub Connector. Individual pins carry signals (not shown) + signal reference
C	Connection of the FPU Faraday Shield to the chassis of the backshell via bonded lug. The lug allows the verification of the electrical isolation between the FPU Faraday Shield and the bundle overshield (Astrium comment: This connection will be outside the backshell and will be disconnectable to allow for AIV isolation testing)
D	Detector signals and detector bias lines carried on Cortex Kaptan jacketed STPs
E	The harness overshield is connected soldered 360° to the “Camerin” back-shell via a nut and ferrule. This section of the shield is Manganin braid (Astrium Comment: The braid is silver plated copper.) The transition from Aluminium foil to woven braid is approximately 60-100mm long. Care will need to be taken to manage this as it will be close to where the harness is secured/steadied to the side of the DCU)
F	The main section of the overshield is Aluminium foil. A transition from aluminium foil to Manganin braid is made close to the DCU connector.
G	This section of the FPU Faraday shield is in Manganin silver plated copper braid. 38 28/30 AWG SS wires are soldered to the braided shield follower. connect the braid to the backshell. (See Note C)
H	The main section of the FPU Faraday Shield is in Aluminium foil. A transition from aluminium foil to Manganin braid is made close to the DCU connector.



SVM C-B

Figure 3 - Detail view of SVM Connector bracket end of SVM Cryoharness

Note	Comment
I	The SVM has an overall jacket in Goretex. The two harness shields are isolated from each other and from the SVM structure by the use of Goretex binder.
J	A junction between Aluminium foil and Manganin Silver Plated Copper braid similar to that used at the DCU is employed for the Overshield
K	A junction between Aluminium foil and Manganin Silver Plated Copper braid similar to that used at the DCU is employed for the FPU Faraday Shield
L	Five 38 28 AWG SS Silver plated copper wires are soldered to the Manganin braid and are connected / daisy chained onto the outer ring of pins on the 128-Way connector (as defined in SPIRE HDD 1.1)
M	The Manganin over braid is 360° connected (clamped) to the 128-way backshell via ferrule/nut. The back-shell is a Lamp-thread coupling

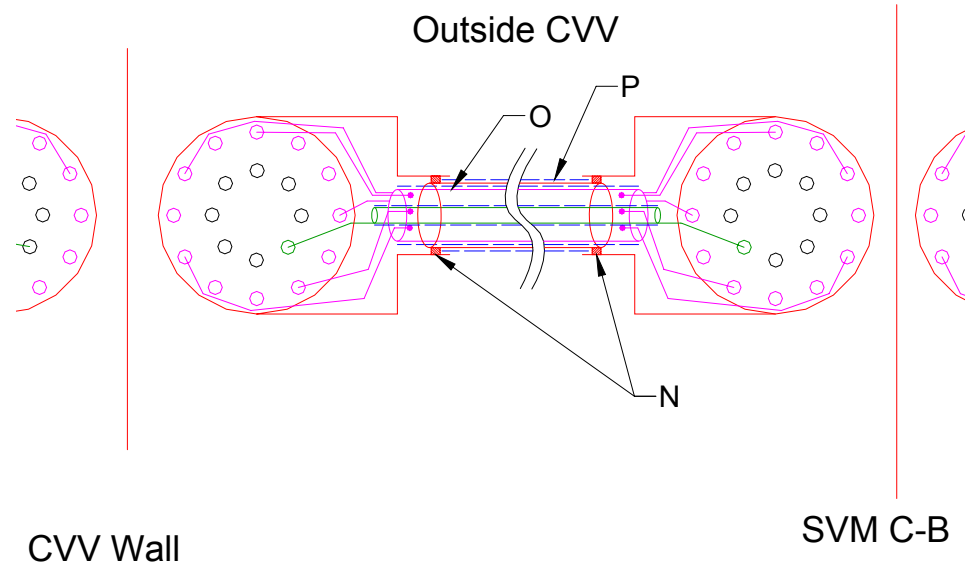


Figure 4 - Detailed view of SVM-CB to CVV section of cryoharness

Note	Comment
N	Overshield 360° terminated to 128-way backshells. The Overshield is made entirely from Manganin braid
O	The FPU Faraday shield is made entirely from Manganin braid. The braid is connected to the out ring of pins on the 128-ways identified in SPIRE HDD 1.1 via five 38 AWG SST wires soldered onto the harness and the pins.
P	Overall Goretex jacket.

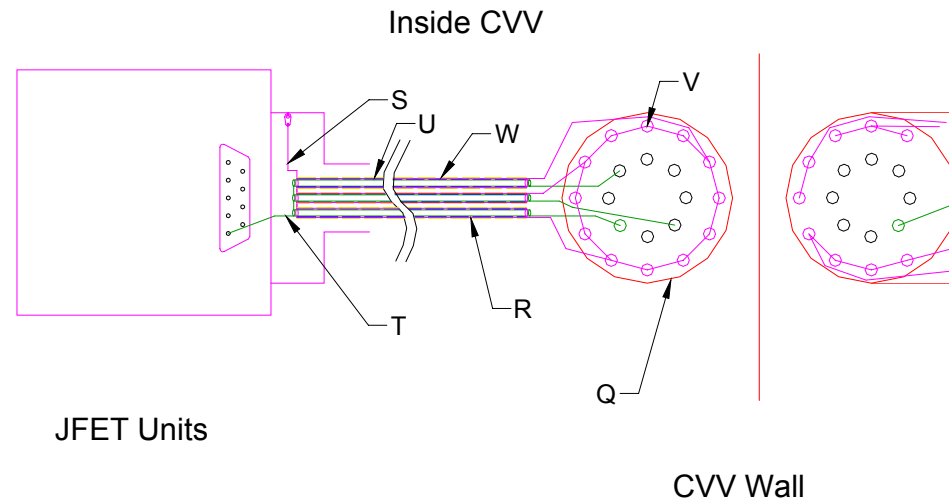


Figure 5 - Details inside CVV

Note	Comment
Q	128-Way connector inside CVV has no EMC tight backshell. On the EQM, a cover at CVV potential is mounted onto the back of the connector. On the PFM, a cover at the same potential as the FPU Faraday shield is used (i.e. PFM the cover is isolated from CVV chassis).
R	The Detector signals and detector bias signals are carried on double shielded cables as defined in Figure 6. The outer shield is connected to the FPU Faraday shield pins on the 128-Way. The Inner shields are connected to the Ground pins on the 128-Way
S	The Faraday shield pins are daisy chained to a single lug on the JFET backshell. <ul style="list-style-type: none"> Using ISO style L-brackets for EQM is not preferred but acceptable Glenair 507-196 modified with a lug thread to attach the FPU Faraday Shield wire is acceptable for PFM
T	The Inner shields carrying the signal reference are daisy chained and terminated on a pin on the MDM connector
U	It is suggested that a metalised foil be wrapped over the wires to minimise the aperture of the backshell. A self-amalgamating tape could be used to provide strain relief.
V	All the FPU Faraday shields are daisy-chained or otherwise connected to all the pins with this name on the connector.
W	It is a requirement that the FPU faraday shield is isolated from CVV Chassis. The FPU Faraday shields may be connected together. (ref: query on thermal potting)

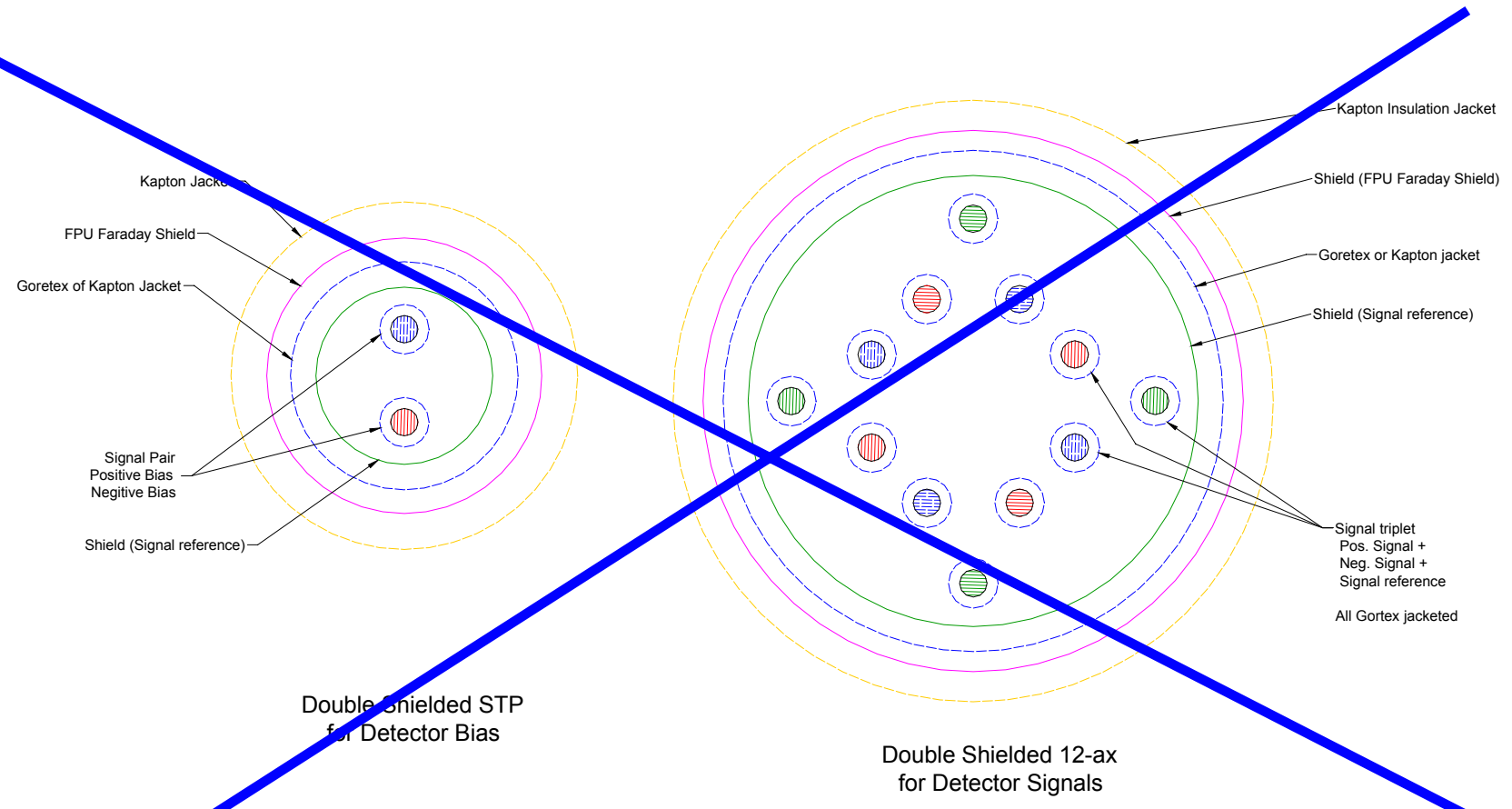


Figure 6 - Form of new cable forms for SPIRE EMC sensitive signals (crossed out because revised form of the STP is shown in Figure 7)



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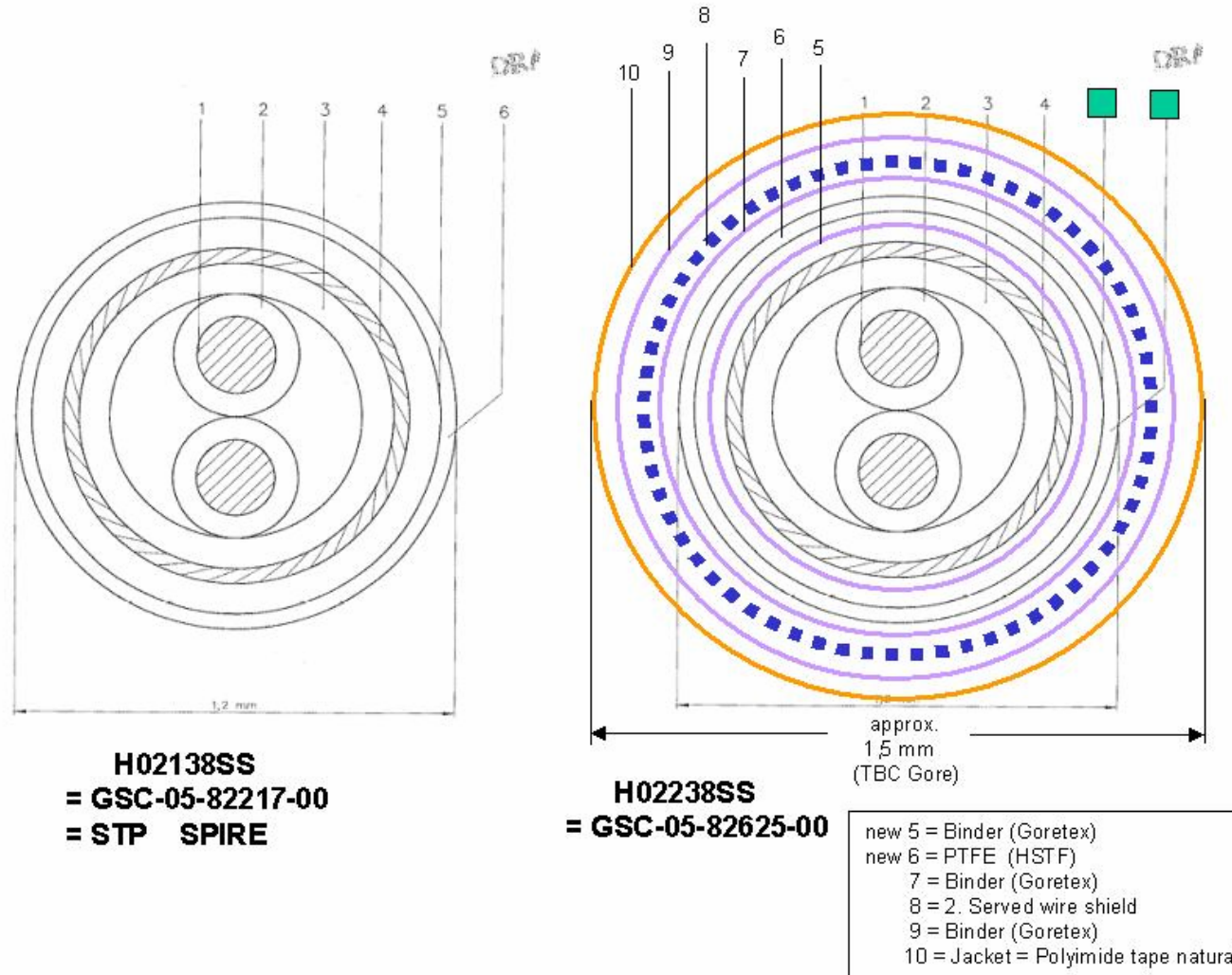


Figure 7 - Form of the new double shielded STP.