



## Test Procedure

Herschel

Title:

PFM CVV internal SPIRE SIH Electrical Integration Procedure

CI-No:

121432-01

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Issue	Date	Sheet	Description of Change	Release
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## 1 Scope

### 1.1 Objective

This document establishes the detailed procedure to be followed for the electrical integration of the SIH to the SPIRE FPU, JFP and JFS. It also covers the mating of the SIH-CS-01 to -13 harnesses to the CVV-FTHR connectors 211121 J22 to J34. As outlined in AD-1 Appendix 1.

The incorporation of the measurement of the balance of I<sub>dd</sub> and I<sub>ss</sub> for the JFET modules is a result of the fact that an extra propagating failure mechanism was discovered during the SPIRE PFM-4 ILT campaign. It is a diagnostic test of the integrity of the entire SPIRE detector system in the warm condition. The chronological SIH connector mating and fixation in final flight configuration and its inspections need, have been edit in the step-by-step procedure too. The final CVV internal inspection to be performed by ASED , Alcatel & ESA after the SPIRE cold-unit and SIH electrical integration is covered here in too.

### 1.2 Flow

- SPIRE FPU, JFS and JFP electrical integration
- CVV int SIH connector mating & locking on FPU, JFS and JFP
- Final SPIRE SIH routing and attachments between OBA & CVV FTHRs
- ASED final SPIRE Cold-unit & SIH routing inspection CVV internal
- ESA final SPIRE Cold-unit & SIH routing inspection CVV internal

## 2 Documents/Drawings

The following documents of the latest issue in effect or as defined herein form a part of this document to the extent specified herein.

### 2.1 End Item Data Package

EID 1	SPIRE PFM End Item Data Package	SPIRE-RAL-PRJ-002017
EID 2	OBA	HP-2-SEN-DP-0004

### 2.2 Applicable Documents

AD 1	SPIRE FPU Handling and Mechanical Integration Procedure	SPIRE-RAL-PRC-002802 Issue: 2
AD 2	Making SPIRE ESD Safe	SPIRE-RAL-NOT-002028
AD 3	ESD-Rules for Herschel PLM & Integration Activities	HP-2-ASED-PR-0062
AD 4	SPIRE Mechanical Interface Drawings P 13 to 26	SPIRE-RAL-DWG-001409
AD 5	L0 Thermal Strap Assembly	DW A1-5264-309A
AD 6	Optical Bench Assembly Drawing	HP-2-ASED-DW-0117-1/2
AD 7	Optical Bench Assembly I/F Drawing	HP-2-ASED-ID-0042-02
AD 8	Optical Bench Assembly I/F Drawing	HP-2-ASED-ID-0042-10
AD 9	Red/Green-Tag Item List for Herschel EPLM	HP-2-ASED-LI-0027
AD 10	PA Plan	HP-2-ASED-PL-0007
AD 11	Contamination Control Plan	HP-2-ASED-PL-0023



### 2.3 Reference Documents

Number	TITLE	Document Number
RD 1	Documentation Identification Procedure and Documentation Management	HP-2-ASED-PR-0001
RD1	Email: Instruments El. Integration Flow (See §4)	NA
RD2	Cryo Harness Interconnection Diagram SPIRE (PFM)	2547-121430-030-01-0B
RD3	Cryo-Harness Interconnection Diagram SPIRE (PFM)	HP-2-ASED-ID-0091-01-0B
RD4	PFM CVV int SPIRE SIH Integration	HP-2-ASED-TP-0050

### 2.4 Other Documents

For abbreviations see RD 1

### 3 Requirements to be verified

## 4 Configuration

### 4.1 PLM Configuration

- The PLM will be fixed to the Integration Dolly in upright position (x-direction upwards) under CR 100 conditions.
- The upper CVV bulkhead, upper thermal shields and OBP shield removed.
- OBP integration of SPIRE FPU & JFETs completed
- SPIRE FPU and JFETs temporary grounding strap and ready for integration.
- CVV int SIH routed between CVV FTTHRs and OBA
- Connectors are covered by safety connectors or black ESD capable dust caps (red tag items)

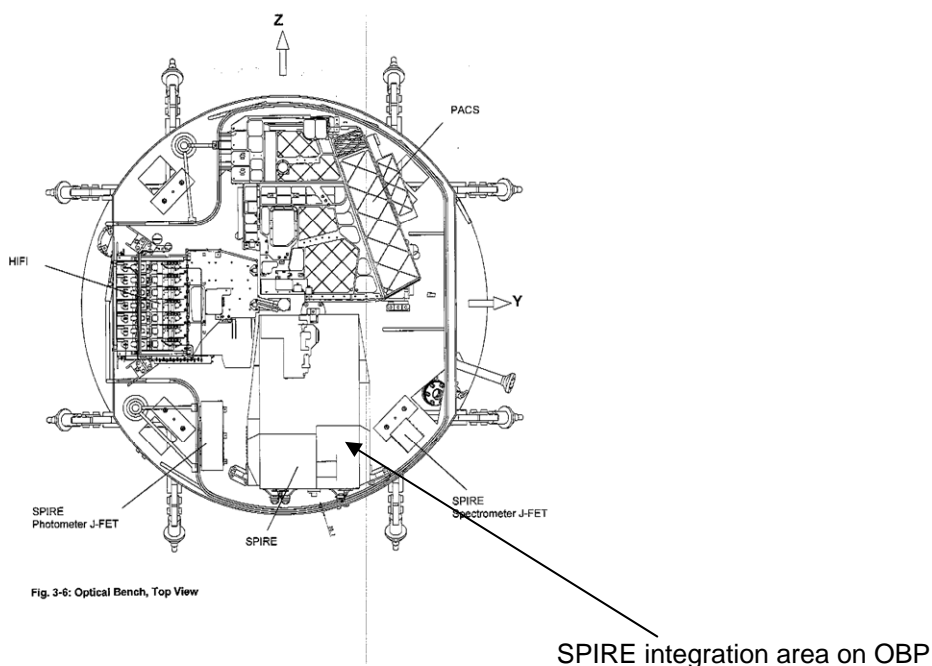


Figure 4.1-1: axis orientation, top view of OBA

#### 4.2 Set-up

Environmental	Nominal	Actual	P	N
Clean Room Class	class 100			
Temperature	22°C ± 3°C			
Rel. Humidity	ambient			
Pressure	40 % - 60 %			

## 5 Conditions

### 5.1 Personnel

Responsibility	Name / Organization
Test Manager	*)
Test Engineer	*)
EGSE Operator	*)
Support Engineer	*)
PA Responsible	*)
Customer Representative	*)

\*) Names and possible additional personal are to be registered prior to the integration activities.

## 5.2 Environmental

See § 4.2

## 5.3 General Precautions and Safety

### 5.3.1 General Safety Requirements, Precautions

- Respect of the standard technical rules for mechanical and electrical integration and test activities are sufficient.
- Other special hazard precautions are not expected, except for the comments mentioned in the step by step procedure for the relevant item
- The flight H/W has to be handled by authorized personnel only
- During non integration phase the flight H/W has to be protected against contamination by appropriate means like blind flanges, caps or protective foils
- The following tasks have to be regarded before start of any integration/test activity:
- IRR has been successfully held to ensure that the relevant procedures, drawings, applicable documents are available, reviewed and approved
- Formal release to start with activity is given by QA
- The necessary GSE and H/W is available, accepted and applicable for use
- Safe working conditions for personnel and H/W are existing and will be applied
- Skilled and authorized personnel is available
- Incoming inspection of H/W have been performed by QA and engineering

### 5.3.2 ESD constraints

During all handling activities of the SPIRE FPU and JFETs attention must be paid to AD 2 (Making SPIRE ESD safe) and RD 2 (ESD rules for Herschel PLM & S/C Integration Activities)

**NOTE:** for SPIRE FPU and JFETs:

All the units are sensitive to ESD.

The SPIRE instrument contains very sensitive detectors that are susceptible to damage by Electro static discharge. On delivery all connectors will be protected by covers or shorting plugs as appropriate.

When handling, all personnel shall wear anti static protection (wrist straps or other suitable method).

When the Cryo harness is not connected to the DRCU and the FPU Faraday Shield Link connected to Backshell at the warm end, then the FPU is electrically floating and prone to ESD damage. To avoid this, the FPU should at all time be connected to an electrical ground, when removed from its container and not bagged in dissipative film.

See also AD-2 & AD-3.

### 5.3.3 Special QA Requirements

QA shall monitor all operations (handlings, transportation and installation) as necessary to assure compliance with this procedure and the applicable sections of the PA Plan (AD 10).

In the course of this procedure QA shall pay particular attention to

- ensure adequate cleanliness conditions
- ensure that all safety aspects are considered
- the application of adequate protections to critical surfaces
- the records in the log sheet
- to ensure that tools and test equipment used is within current calibration cycle

**5.4 GSE**

All GSE and integration equipment is fit checked and carries valid calibration certificates.

Test Equipment List					
Item	Manuf.	Model No.	SN No.	Invent No.	Next Calib.
DVM					

**5.4.1 MGSE**

Qty.	Designation/Manufacturer	Provided by	Drawing/Ident. NR:	Calibr. Date
	Set of tools	ASED		
	Torque wrench to cover 0,33 Nm	ASED		
	Isopropyl alcohol	ASED		

Table 5.4-1: MGSE

**5.4.2 CVSE**

N/A



**5.4.3 EGSE**

Qty.	Designation/Manufacturer	Provided by	Drawing/Ident. NR:	Calibr. Date
1	Digital Volt Meter	ASED		
	IDAS Testadaptors	ASED		
	BOB	ASED		
	SPIRE Termination connectors	ASED		
	ESD protection tools	ASED		

Table 5.4-3: EGSE

## 6 Verification Requirements and Test Criteria

See AD-1

## 7 Step by Step Procedure

Step-No.	Integration-Step-Description	Nominal Value	Tolerance	Actual Value		P	N
01	Perform electrical integration procedure § 9 ( AD-1 )				With implementd ASED SIH integration & control steps		
02	ASED to perform final SPIRE Cold-unit & SIH integration inspection						
03	ESA to perform final SPIRE Cold-unit & SIH integration inspection						
04	Perform picture documentation and add in Annex						
05	Contrerol all steps performed						
06	END						



## 8 Summary Sheets

**8.1 Procedure Variation Summary**

	Test Change	Curr. No.:	
		Date	
		Page	of
Test designation	Test Procedure	Issue	Rev.
Test step changed	Reason for Change		
Prepared by:	Resp. Test Leader	Project Engineer	
PA/QA	Prime	Customer	

Table 8.1-1: Procedure Variation Sheet

**8.2 Non Conformance Report (NCR) Summary**

NCR - No.	NCR - Title	Date	Open Closed	PA sig.

Table 8.2-1: Non-Conformance Record Sheet

**8.3 Sign-off Sheet**

	<b>Date</b>	<b>Signature</b>
<b>Test Manager</b>		
<b>Operator</b>		
<b>PA Responsible</b>		
<b>ESA Representative</b>		

**9 Annex 1: SPIRE-RAL-PRC-002882 Issue: 2** (20 pages)



# SPIRE

**SUBJECT: SPIRE PFM SIH ELECTRICAL INTEGRATION PROCEDURE**

**PREPARED BY: Douglas Griffin**

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## 1. APPLICABLE/REFERENCE DOCUMENTS

Number	TITLE	Document Number	Issue
AD 1	SPIRE FPU Handling and Mechanical Integration Procedure	SPIRE-RAL-PRC-002802	2
AD 2	Making SPIRE ESD Safe	SPIRE-RAL-NOT-002028	2
AD 3	SPIRE FM Warm Functional Test Procedures	SPIRE-RAL-PRC-2422	2.2
AD 4	ESD-Rules for Herschel PLM & Integration Activities	HP-2-ASED-PR-0062	1

Number	TITLE	Document Number	Issue
RD1	Email: Instruments El. Integration Flow (See §4 Appendix 1 – EADS Integration Sequence Email)	NA	NA
RD2	Cryo Harness Interconnection Diagram SPIRE (PFM)	2547-121430-030-01-0B	B
RD3	Cryo-Harness Interconnection Diagram SPIRE (PFM)	HP-2-ASED-ID-0091-01-0B	B
RD4	PFM CVV int SPIRE SIH Integration	HP-2-ASED-TP-0050	1

## 2. SCOPE AND INTRODUCTION

This document establishes the detailed procedure to be followed for the electrical integration of the SIH to the SPIRE FPU, JFP and JFS. It also covers the mating of the SIH-CS-01 to -13 harnesses to the CVV-FTHR connectors 211121 J22 to J34. As outlined in RD 1 (see Appendix 1).

The incorporation of the measurement of the balance of Idd and Iss for the JFET modules is a result of the fact that an extra propagating failure mechanism was discovered during the SPIRE PFM-4 ILT campaign. It is a diagnostic test of the integrity of the entire SPIRE detector system in the warm condition. The chronological SIH connector mating and fixation in final flight configuration and its inspections need, have been edit in the step-by-step procedure too. The final CVV internal inspection to be performed by ASSED, Alcatel & ESA after the SPIRE cold-unit and SIH electrical integration is covered here in too.

### 3. MATING OF SIH-CS-01 TO -13 TO FPU, JFP AND JFS

#### 3.1 Prerequisites

1. The FPU, JFP and JFS are mechanically integrated to the OBA as detailed in AD 1, §6.2.1 through §6.2.4
2. The SIH-CS-XX harnesses have been integrated into the cryostat

#### 3.2 Notes:

1. The Isolation Test detailed in AD 1, §6.2.5 (Isolation Test) is to be completed during the first stage of the procedure. The results must be compliant with the specified pass criteria for the integration to continue.
2. The FPU, JFP and JFS are ESD sensitive. Handling of these units is to be carried out by personnel suitably trained and equipped. Prior to carrying out the mating operations detailed below, the Pxx and Jxx connectors are to put in an ionized air stream for > 30 sec to discharge the harness.
3. The connector mating operations detailed below are to be recorded in the relevant sections of the paper PFM SPIRE EIDP
4. Red tag items removed from the FPU and JFET modules (safeing plugs and ESD caps to be placed in the SPIRE red tag box and stored in the SPIRE transport container)

### 3.3 Detailed Step-by-step Procedure

No:	Activity	Remarks/Results	Sign off
	<b>Grounding check</b>		
1	Carry out the activities in AD 1, §6.2.5	<b>FPU / OBA:</b> <b>Spect. Det. Box / OBA:</b> <b>Phot. Det. Box / OBA:</b> <b>Spect. Det. Box / FPU:</b> <b>Phot. Det. Box / FPU:</b> <b>Phot. Det. Box / Spect. Det. Box:</b>	
2	Remove the ESD covers from the JFP 121210 J25 through JFP J28 and remate the Type-III safeing plugs	Identify removed cold-unit connector-covers as RED-TAG Item & store it in subject cupboard	
	<b>Mating of FPU SIH</b>	The connector codes shall be defined, because E-PLM mating / Demating DB updates	
3	Detailed inspection be performed on FPU J20, J22, J24 & J25 for properly tight screw-lock assies, else fixation bolts to be locally stopped by use of EC2216	( HP-2-ASED-NC-1340 )	
4	Verify that SPIRE Safeing Plug Type-VIII is mated to CVV FTHR 211121 J30. If not installed, then mate	Take Saving-plugs from RED-TAG Item cupboard & record removal	
5	Verify that SPIRE Safeing Plug Type-VIII is mated to CVV FTHR 211121 J29. If not installed, then mate	Take Saving-plugs from RED-TAG Item cupboard & record removal	
6	Verify that SPIRE Safeing Plug Type-VII is mated CVV FTHR 211121 J34. If not installed, then mate	Take Saving-plugs from RED-TAG Item cupboard & record removal	
7	Verify that SPIRE Safeing Plug Type-VII is mated to SVM-CB 312300 J05 CVV FTHR 211121 J33. If not installed, then mate	Take Saving-plugs from RED-TAG Item cupboard & record removal	
8	Remove and store ESD cover from FPU 121100 J23 Mate FPU SIH 121100 P23 (Prime thermometry) Perform torque of 0,33 Nm	Identify removed cold-unit connector shorting-plugs as RED-TAG Item & store it in subject cupboard	

No:	Activity	Remarks/Results	Sign off
9	Remove and store ESD cover from FPU 121100 J24 Inspect FPU J24 jackpost threads Mate FPU SIH 121100 P24 (Red. thermometry) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm Check SIH connector fixation bolts are fit to end, else lock with EC2216		
10	Remove and store ESD cover from FPU J19 Mate FPU SIH 121100 P19 (Prime cooler) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
11	Remove and store ESD cover from FPU 121100 J20 Inspect FPU J20 jackpost threads Mate FPU SIH 121100 P20 (Red. cooler) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm Check SIH connector fixation bolts are fit to end, else lock with EC2216		
12	Remove and store ESD cover from FPU 121100 J25 Inspect FPU J25 jackpost threads Mate FPU SIH 121100 P25 (Prime BSM) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm Check SIH connector fixation bolts are fit to end, else lock with EC2216		
13	Remove and store ESD cover from FPU 121100 J26 Mate FPU SIH 121100 P26 (Red. BSM) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
14	Remove and store ESD cover from FPU 121100 J21 Mate FPU SIH 121100 P21 (Prime S-Cal) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		

No:	Activity	Remarks/Results	Sign off
15	Remove and store ESD cover from FPU 121100 J22 Inspect FPU J22 jackpost threads Mate FPU SIH 121100 P22 (Red. S-Cal) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm Check SIH connector fixation bolts are fit to end, else lock with EC2216		
16	Remove and store safeing plug from FPU 121100 J29 Mate FPU SIH 121100 P21 (Prime SMEC) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
17	Remove and store safeing plug from FPU 121100 J30 Mate FPU SIH 121100 P30 (Red. SMEC) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
18	Remove and store safeing plug from FPU 121100 J27 Mate FPU SIH 121100 P27 (Prime SMEC) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
19	Remove and store safeing plug from FPU 121100 J28 Mate FPU SIH 121100 P28 (Red. SMEC) Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
	<b>Mating of JFS (Spectrometer) SIH</b>		
20	Verify that SPIRE Safeing Plug Type-VI is mated to CVV FTHR 211121 J32. If not installed, then mate	Take Saving-plugs from RED-TAG Item cupboard & record removal	
21	Verify that SPIRE Safeing Plug Type-VII is mated to CVV FTHR 211121 J31. If not installed, then mate	Take Saving-plugs from RED-TAG Item cupboard & record removal	
22	Remove SPIRE Safeing Plug Type-III from JFS 121220 J09		



No:	Activity	Remarks/Results	Sign off
23	Mate JFS SIH 121220 P09 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
24	Remove SPIRE Safeing Plug Type-III from JFS 121220 J10		
25	Mate JFS SIH 121220 P10 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
26	Remove and store ESD cover from JFS 121220 J07 Mate JFS SIH 121220 P07 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
27	Remove and store ESD cover from JFS J05 Mate JFS SIH 121220 P05 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
28	Remove and store ESD cover from JFS 121220 J06 Mate JFS P06 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
29	Remove and store ESD cover from JFS 121220 J02 Mate JFS SIH 121220 P02 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
30	Remove and store ESD cover from JFS 121220 J01 Mate JFS SIH 121220 P01 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		

No:	Activity	Remarks/Results	Sign off
31	Remove and store ESD cover from JFS 121220 J03 Mate JFS SIH 121220 P03 Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
32	Remove and store ESD cover from JFS 121220 J04 Mate JFS SIH 121220 P04 Measure FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
33	Verify that 312300 J1 and J02 Launch-latches are integrated.	N/A for CVVint Integration	
	<b>Mating of JFP SIH ( Photometer )</b>		
34	Verify that SPIRE Safeing Plug Type-V is mated to CVV FTTHR 211121 J26. If not installed, then mate		
35	Verify that SPIRE Safeing Plug Type-VII is mated to CVV FTTHR 211121 J22 . If not installed, then mate		
36	Verify that SPIRE Safeing Plug Type-VII is mated to CVV FTTHR 211121 J23 . If not installed, then mate		
37	Verify that SPIRE Safeing Plug Type-VII is mated to CVV FTTHR 211121 J24. If not installed, then mate		
38	Verify that SPIRE Safeing Plug Type-VII is mated to CVV FTTHR 211121 J25. If not installed, then mate		
39	Verify that SPIRE Safeing Plug Type-VII is mated to CVV FTTHR 211121 J27. If not installed, then mate		
40	Verify that SPIRE Safeing Plug Type-VII is mated to CVV FTTHR 211121 J28. If not installed, then mate		
41	Verify that 312100 J1A and J1B links are integrated.	N/A for CVVint Integration	
42	Remove and store SPIRE Safeing Plug Type-III from JFP 121210 J25	Store Saving-plugs in RED-TAG Item cupboard	

No:	Activity	Remarks/Results	Sign off
43	Mate JFP SIH 121210 P25 to J25 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
44	Remove and store SPIRE Safeing Plug Type-III from JFP 121210 J27	Store Saving-plugs in RED-TAG Item cupboard	
45	Mate JFP SIH 121210 P27 to J27 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
46	Remove and store SPIRE Safeing Plug Type-III from JFP 121210 J26	Store Saving-plugs in RED-TAG Item cupboard	
47	Mate JFP SIH 121210 P26 to J26 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
48	Remove and store SPIRE Safeing Plug Type-III from JFP 121210 J28	Store Saving-plugs in RED-TAG Item cupboard	
49	Mate JFP SIH 121210 P28 to J28 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
50	Remove and store ESD cover from JFP121210 J16 Mate JFP SIH 121210 P16 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
51	Remove and store ESD cover from JFP 121210 J15 Mate JFP SIH 121210 P15 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
52	Remove and store ESD cover from JFP 121210 J13 Mate JFP SIH 121210 P13 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		

No:	Activity	Remarks/Results	Sign off
53	Remove and store ESD cover from JFP 121210 J14 Mate JFP P14 Perform torque of 0,33 Nm		
54	Remove and store ESD cover from JFP 121210 J18 Mate JFP SIH 121210 P18 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
55	Remove and store ESD cover from JFP 121210 J17 Mate JFP P17 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
56	Remove and store ESD cover from JFP 121210 J21 Mate JFP SIH 121210 P21 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
57	Remove and store ESD cover from JFP 121210 J22 Mate JFP SIH 121210 P22 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
58	Remove and store ESD cover from JFP 121210 J24 Mate JFP SIH 121210 P24 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
59	Remove and store ESD cover from JFP 121210 J23 Mate JFP P23 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		

No:	Activity	Remarks/Results	Sign off
60	Remove and store ESD cover from JFP 121210 J19 Mate JFP SIH 121210 P19 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
61	Remove and store ESD cover from JFP 121210 J20 Mate JFP SIH 121210 P20 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
62	Remove and store ESD cover from JFP 121210 J02 Mate JFP SIH 121210 P02 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
63	Remove and store ESD cover from JFP 121210 J01 Mate JFP SIH 121210 P01 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
64	Remove and store ESD cover from JFP 121210 J05 Mate JFP SIH 121210 P05 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
65	Remove and store ESD cover from JFP 121210 J06 Mate JFP SIH 121210 P06 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
66	Remove and store ESD cover from JFP 121210 J10 Mate JFP SIH 121210 P10 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		

No:	Activity	Remarks/Results	Sign off
67	Remove and store ESD cover from JFP 121210 J09 Mate JFP P09 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
68	Remove and store ESD cover from JFP 121210 J11 Mate JFP SIH 121210 P11 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
69	Remove and store ESD cover from JFP 121210 J12 Mate JFP SIH 121210 P12 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
70	Remove and store ESD cover from JFP 121210 J08 Mate JFP SIH 121210 P08 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
71	Remove and store ESD cover from JFP 121210 J07 Mate JFP SIH 121210 P07 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
72	Remove and store ESD cover from JFP121210 J03 Mate JFP P03 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
73	Remove and store ESD cover from JFP 121210 J04 Mate JFP SIH 121210 P04 Measuere FPU Isolation Resistance to OBA structure [ R > 1MΩ ] Perform torque of 0,33 Nm		
74	Record mate/demate activities in paper EIDP log	Record in E-PLM Mating / Demating DB too	

# SPIRE

## Procedure

SPIRE PFM SIH Electrical Integration Procedure

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No:	Activity	Remarks/Results	Sign off
	<b>Verification of Instrument Grounding</b>		
75	Remove SPIRE Safeing Plug Type-V from CVV FTHR 211121 J26		
76	Remove SPIRE Safeing Plug Type-VI from CVV FTHR 211121 J32		
77	Remove SPIRE Safeing Plug Type-VIII from CVV FTHR 211121 J30		
78	Remove SPIRE Safeing Plug Type-VIII from CVV FTHR 211121 J29		
79	Prepare a 128-way BOB with short contacts & mate Short-plug to remove charge		
80	Mate BOB to CVV FTHR 211121 J32		
81	Demate BOB Short-plug		
82	Verify FPU Isolation from OBA by measuring Pin 5 to Chassis: s.b. > 1 MOhm		
83	Verify Analogue Ground Isolation from OBA by measuring Pin 93 to Chassis: s.b. > 1 MOhm		
84	Demate BOB from CVV FTHR 211121 J32		
85	Prepare a 128-way BOB and with short contacts & mate Short-plug to remove charge		
86	Demate BOB Short-plug		
87	Mate BOB to CVV FTHR 211121 J26 312100 J04		
88	Verify FPU Isolation from OBA by measuring Pin 2 to Chassis: s.b. > 1 MOhm		
89	Verify Analogue Ground Isolation from OBA by measuring Pin 36 to Chassis: s.b. > 1 MOhm		
90	Demate BOB from CVV FTHR 211121 J26		
91	Mate SPIRE Safeing Plug Type-V to CVV FTHR 211121 J26		
92	Mate SPIRE Safeing Plug Type-VI to CVV FTHR 211121 J32		
93	Mate SPIRE Safeing Plug Type-VIII to CVV FTHR 211121 J30		
94	Mate SPIRE Safeing Plug Type-VIII to CVV FTHR 211121 J29 SVM-CB 312300 J03.		
95	Perform final srew-lock fixation " prior flight " PA to perform final FPU & JFET SIH inspection		
96	ASED final inspection of SPIRE Cold-unit & SIH integration		
97	RAL final inspection of SPIRE Cold-unit & SIH integration		

# SPIRE

## Procedure

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No:	Activity	Remarks/Results	Sign off
98	AAS-F final inspection of SPIRE Cold-unit & SIH integration		
99	ESA final inspection of SPIRE Cold-unit & SIH integration		
100	End of step by step procedure - CVV internal part		



### SPIRE FPU SIH I/F-Connectors (RD-3)

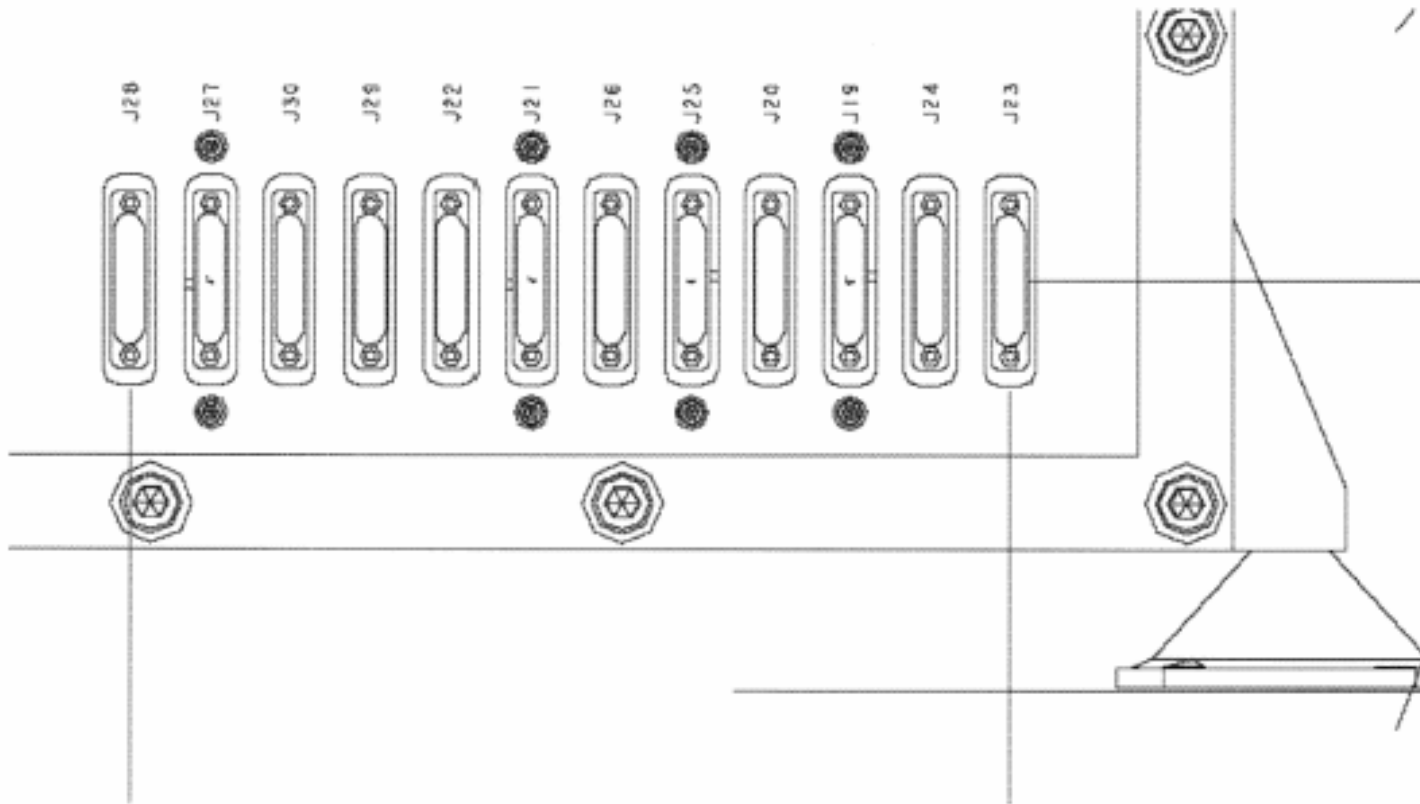


Figure 10.4-2: SPIRE FPU SIH I/F Connectors

### SPIRE JFS SIH I/F-Connectors (RD-3)

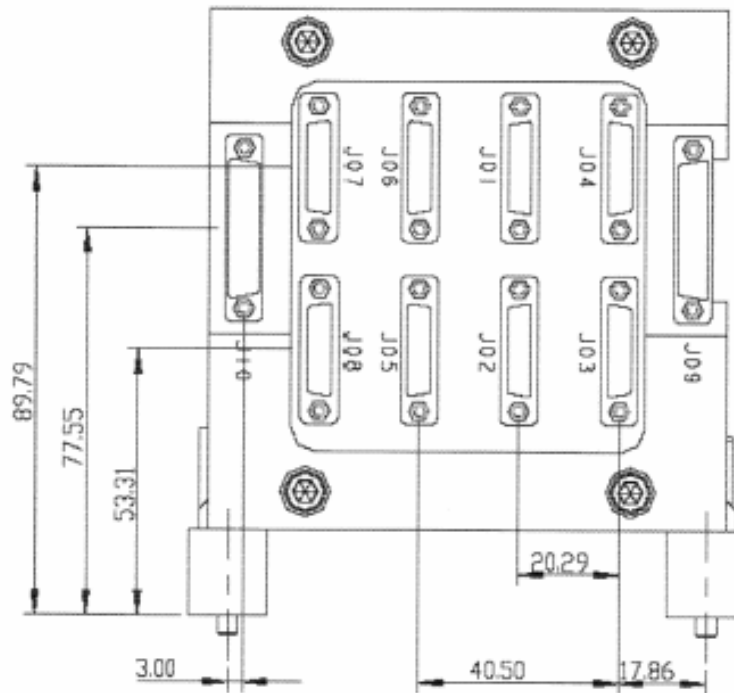


Figure 10.4-4: SPIRE JFS SIH I/F Connectors

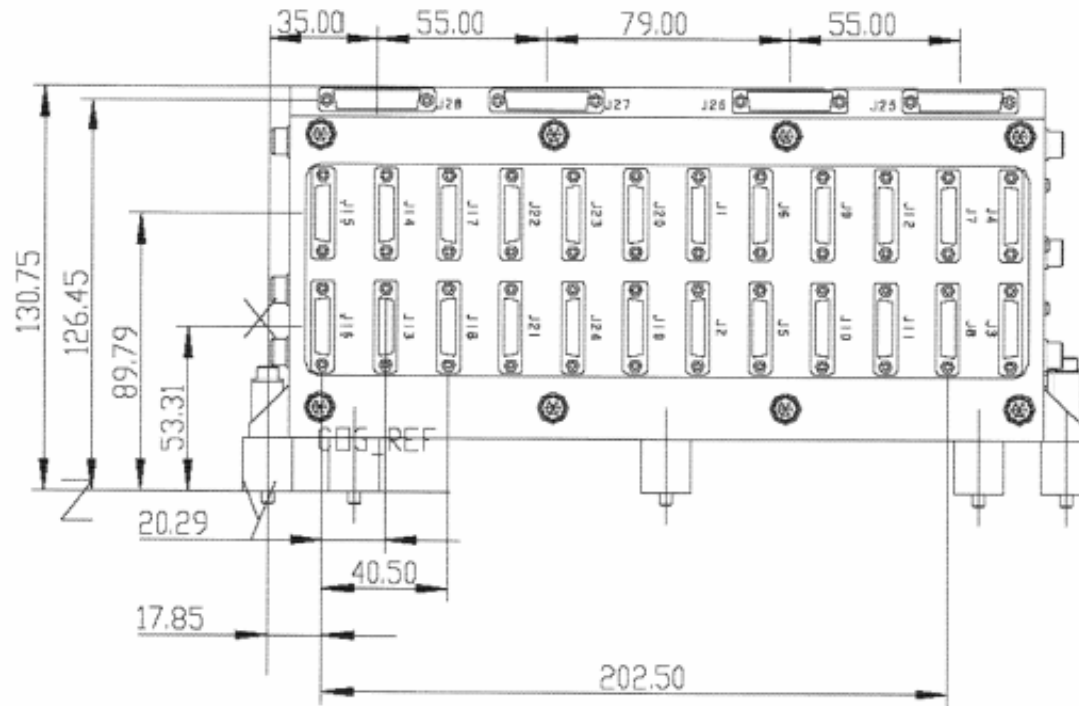


Figure 10.4-6: SPIRE JFP SIH I/F Connectors

**End of CVVint SPIRE PFM FPU , JFET & SIH Electrical Integration Procedure**

#### 4. APPENDIX 1 – EADS INTEGRATION SEQUENCE EMAIL

**From:** Idler, Siegmund [Siegmund.Idler@astrium.eads.net]

**Sent:** 20 March 2007 16:50

**To:** Sawyer, EC (Eric)

**Cc:** Bernard.Collaudin@alcatelaleniastospace.com; Guy.Doubrovik@alcatelaleniastospace.com; Benoit.Gobillot@alcatelaleniastospace.com; King, KJ (Ken); Griffin, DK (Doug);

'carsten.scharmberg@esa.int'; Mueller, Martin; Koppe, Axel; Sonn, Nico; Schink, Dietmar

**Subject:** Instruments El. Integration Flow

Dear Eric,

as agreed during the SPIRE DRB, please find below the instruments electrical integration sequence as currently discussed as option. The major difference to the previous planning is, that - for schedule recovery reasons - the CVV-SVM preliminary mating is cancelled and the first warm test with the integrated instrument is with the evacuated warm CVV. However, the ESA/AAS-F instruction to follow this option is still outstanding! Nevertheless, could you please base your procedures to be delivered on this option since it is the most likely one to be followed.

##### Activities on SVM

1. Integrate WIH on SVM (already done)
2. Integrate WU on SVM
3. Connect WIH to WU
4. Perform el. integration tests of WU
5. Perform WU functional test (via CCS)
6. Close panel

##### Activities on EPLM

7. Integrate FPU on OBA
8. Integrate CVV ext. SIH (and connect SIH to CVV feed throughs)
9. Install termination plugs on open ends of CVV ext. SIH (on SVM CB side)
10. Connect SIH to FPU
11. Perform stand alone test with HIFI FPU (using the FCU EQM)
12. Close and evacuate CVV

##### Activities on S/C

13. Mate CVV with SVM
14. Connect WU to FPU (remove termination plugs and mate SIH at SVM CB)
15. Perform instrument warm functional test

Note: Only those activities are listed which are related to the instrument electrical integration and which support the understanding of it.

Regards

Siegmund

END OF DOCUMENT

	Name	Dep./Comp.		Name	Dep./Comp.
	Alberti von Mathias Dr.	ASG23		Schuler Günter	ASA42
	Baldock Richard	FAE12		Schweickert Gunn	ASG23
	Barlage Bernhard	AED13		Sonn Nico	ASG51
X	Bayer Thomas	ASA42		Steininger Eric	AED32
	Brune Holger	ASA45	X	Stritter Rene	AED11
	Edelhoff Dirk	AED2		Suess Fludi	OTN/ASA44
	Fehringer Alexander	ASG13		Theunissen Martijn	DSSA
X	Fricke Wolfgang Dr.	AED 65		Wagner Klaus	ASG23
	Geiger Hermann	ASA42	X	Wielbrock Walter	AET12
X	Grasl Andreas	OTN/ASA44		Wöhler Hans	ASG23
	Grasshoff Brigitte	AET12	X	Wössner Ulrich	ASE252
	Hamer Simon	Terma			
X	Hendry David	Terma			
	Hengstler Reinhold	ASA42			
	Hinger Jürgen	ASG23			
X	Hohn Rüdiger	AED65			
	Höizle Edgar Dr.	AED32			
	Huber Johann	ASA42			
X	Hund Walter	ASE252			
	Idler Siegmund	AED312			
X CP	Ivány von András	FAE12			
	Jahn Gerd Dr.	ASG23			
X	Kalde Clemens	ASM2			
	Kameter Rudolf	OTN/ASA42			
	Kettner Bernhard	AET42			
X	Knoblauch August	AET32	X	Alcatel Alenia Space Cannes	AAS-F
	Koelle Markus	ASA43		Alcatel Alenia Space Torino	AAS-I
X	Koppe Axel	AED312	X	ESA/ESTEC	ESA
X	Kroeker Jürgen	AED65			
	La Gioia Valentina	Terma		<b>Instruments:</b>	
X	Lang Jürgen	ASE252		MPE (PACS)	MPE
X	Langenstein Rolf	AED15	X	RAL (SPIRE)	RAL
X	Langfermann Michael	ASA41		SRON (HIFI)	SRON
	Martin Olivier	ASA43			
	Maukisch Jan	ASA43			
	Much Christoph	ASA43		<b>Subcontractors:</b>	
	Müller Jörg	ASA42		Alcatel Alenia Space Antwerp	ABSP
X	Müller Martin	ASA43		Austrian Aerospace	AAE
	Peitz Heinz-Willi	ASG13		Austrian Aerospace	AAEM
	Pietroboni Karin	AED65		BOC Edwards	BOCE
	Platzer Wilhelm	AED2		Dutch Space Solar Arrays	DSSA
	Reichle Konrad	ASA42		EADS Astrium Sub-Subsyst. & Equipment	ASSE
	Runge Axel	OTN/ASA44		EADS CASA Espacio	CASA
	Schink Dietmar	AED32		EADS CASA Espacio	ECAS
	Schlosser Christian	OTN/ASA44		European Test Services	ETS
	Schmidt Rudolf	FAE12		Patria New Technologies Oy	PANT
X	Schmidt Thomas	AED15		SENER Ingenieria SA	SEN