

#### **Test Report**

### Herschel

Title:

De-mating of SIH-IS and SIH-SS for SPIRE LPU

Integration

CI-No:

125 200

Prepared by:

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Date:

10.10.07

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10,10,2007

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14/10/2007

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Doc. No:

HP-2-ASED-TR-0216

Issue: Date:

1

10.10.2007

File: HP-2-ASED-TR-0216

Page: of:



### **Test Report**

# Herschel

Issue	Date	Sheet	Description of Change	Release
1	10.10.2007	All	First issue	
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Doc. No:

HP-2-ASED-TR-0216

Issue:

1

Date: 10.10.2007

File: HP-2-ASED-TR-0216



### **Test Report**

# Herschel

# **Table of Content**

1	Scope	4
1.1	Objective	4
2	Test Report Summary	5
2.1	Operations	5
2.2	Test Procedure	5
2.3	Procedure Variations	5
2.4	Non Conformances	5
2.5	Conclusion	5
Anne	ex 1 AS RUN PROCEDURE	6

Doc. No:

HP-2-ASED-TR-0216

Issue:

Date: 10.10.2007

.

Page







### 1 Scope

### 1.1 Objective

This report describes the de-mating of the SPIRE SIH-IS and SIH-SS required for the SPIRE LPU integration at the SVM connector brackets CB 312 100, CB 312 200, CB 312 300, mounted on the SVM upper closure panel.

Doc. No: HP-2-ASED-TR-0216

Issue: 1

Date: 10.10.2007

File: HP-2-ASED-TR-0216

Page

5



### 2 Test Report Summary

#### 2.1 Operations

Execution of step-by-step procedure for the de-mating of the SPIRE SIH-IS and SIH-SS at SVM CBs 312 100, 312 200, 312 300.

#### 2.2 Test Procedure

HP-2-ASED-TP-0166, issue 1

#### 2.3 Procedure Variations

See chapter 10.1 of the as-run procedure

#### 2.4 Non Conformances

None

#### 2.5 Conclusion

The de-mating of the SIH-SS and SIH-IS for the preparation of the SPIRE LPU according to chapter 8 of the step-by-step procedure has been successfully completed.

Note: Chapters 7 and 9 of the as-run-procedure are not applicable for this activity.

Doc. No: HP-2-ASED-TR-0216

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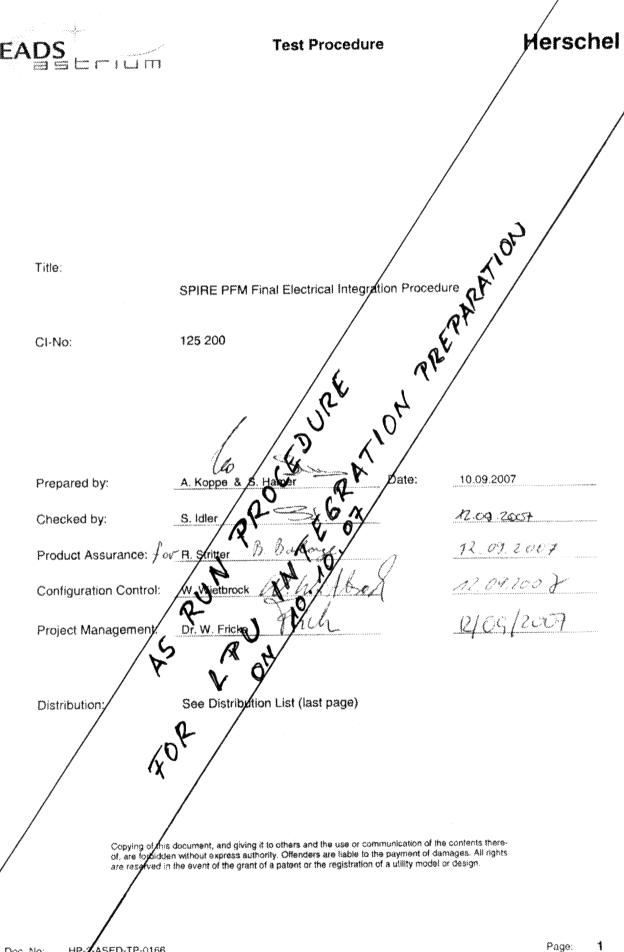




### Annex 1 AS RUN PROCEDURE

Doc. No: HP-2-ASED-TR-0216

Issue:



Doc. No:

ASED-TP-0166

Issue:

10.09.07 Date:

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1.doc



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Issue	Date	Sheet	Description of Change	Release
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Doc. No:

HP-2-ASED-TP-0166

Issue:

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### Herschel

# **Table of Content**

1	Scope		7
2	Documents/Drawings		8
2.1	Applicable Documents		8
2.2	Reference Documents		8
2.3	Other Documents		8
3	Personnel		9
4	Mating of SIH-IS to CVV-CB and SVM-CB		10
4.1	Prerequisites		10
4.2	End State		10
4.3	Notes		10
5	Conditions		11
5.1	Personnel		11
5.2	Environmental		11
5.3	General Precautions and Safety		11
5.4	Special Equipment		12
5.5	Test Configuration		12
6	Verification Requirements and Test Criteria		13
7	Step by Step Procedure		14
8	De-mating of SIH-IS and SIH-SS for LPU Integratio	n	39
8.1	Prerequisites		39
8.2	End State		39
8.3	Notes		39
9	Step by Step Procedure for Mating of SIH-IS and Safter LPU Integration	IH-S	S 43
9.1	Prerequisites		43
9.2	Notes		43
	D-TP-0166	Page	3

Doc. No: issue:

10.09.07 Date:



#### Herschel **Test Procedure**

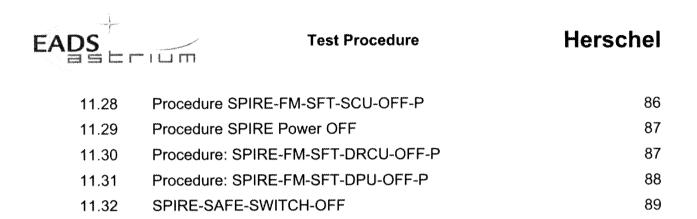
10	Summary Sneets	49
10.1	Procedure Variation Summary	49
10.2	Non Conformance Report (NCR) Summary	50
10.3	Sign-off Sheet	50
11	APPENDICES	51
11.1	Procedure SPIRE Power On	51
11.2	Procedure SPIRE-FM-SFT-DPU-ON-P	51
11.3	Procedure SPIRE-FM-SFT-DRCU-ON-P	53
11.4	Procedure SPIRE-FM-SFT-FUNC-SCU-01-P	55
11.5	Procedure SPIRE-FM-SFT-FUNC-SCU-03-P	56
11.6	Procedure SPIRE-FM-SFT-FUNC-SCU-06-P	58
11.7	Procedure SPIRE-FM-SFT-FUNC-SCU-07-P	60
11.8	Procedure SPIRE-FM-SFT-FUNC-SCU-04-P	62
11.9	Procedure SPIRE-FM-SFT-FUNC-SCU-05-P	63
11.10	Procedure SPIRE-FM-SFT-FUNC-MCU-01-P	64
11.11	Procedure: SPIRE-FM-SFT-FUNC-MCU-02-P	65
11.12	Procedure SPIRE-FM-SFT-FUNC-BSM-01-P	66
11.13	Procedure SPIRE-FM-SFT-BSM-OFF-P	67
11.14	Procedure SPIRE-FM-SFT-FUNC-SMEC-01-P	68
11.15	Procedure SPIRE-FM-SFT-SMEC-OFF-P	69
11.16	Procedure SPIRE-FM-SFT-FUNC-DCU-01-P	70
11.17	Procedure: SPIRE-FM-SFT-FUNC-DCU-04-PHOT-P	71
11.18	Procedure: SPIRE-FM-SFT-PHOT-JFET-ON-01	72
11.19	Procedure: SPIRE-FM-SFT-PHOT-JFET-ON-02	74
11.20	Procedure: SPIRE-FM-SFT-PHOT-JFET-OFF	76
11.21	Procedure: SPIRE-FM-SFT-PLIA-OFF-P	78
11.22	Procedure: SPIRE-FM-SFT-FUNC-DCU-04-SPEC-P	79
11.23	Procedure: SPIRE-FM-SFT-SPEC-JFET-ON-01	80
11.24	Procedure: SPIRE-FM-SFT-SPEC-JFET-ON-02	81
11.25	Procedure: SPIRE-FM-SFT-SPEC-JFET-OFF	82
11.26	Procedure: SPIRE-FM-SFT-SLIA-OFF-P	84
11.27	Procedure SPIRE-FM-SFT-MCU-OFF-P	85

HP-2-ASED-TP-0166 Doc. No:

Issue:

10.09.07 Date:

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1 doc



Doc. No: HP-2-ASED-TP-0166

Issue:

1

Date: 10.09.07

Page



### Herschel



### **List of Tables**

Table 1: Applicable Documents	8
Table 2: Reference Documents	8
Table 10.1-1: Procedure Variation Sheet	49
Table 10.2-1: Non-Conformance Record Sheet	50

Doc. No:

HP-2-ASED-TP-0166

Issue:

1





#### 1 Scope

This document establishes a cover procedure which incorporates the detailed step-by-step procedure, prerequisites and conditions, copied from RD1, to be followed for the final electrical integration of the SPIRE Warm Units and their associated harness on the SVM panel with the SPIRE FPU and its SIH at the CVV CB.

It should be noted that the LPU integration is performed later during the HERSCHEL PFM AIT flow. Therefore, a separate chapter is given for the integration once this unit is available.

The following activities are to be performed:

- Mating of the SIH-IS to CVV-CB and SVM-CB covers the following activities:
  - 1. The mating of the SIH-IS and SIH-CS harnesses at the CVV-CB vacuum feedthrus
  - 2. The mating of the SIH-IS and SIH-SS harnesses at the SVM-CB
  - Integration electrical tests whereby the balance of I<sub>dd</sub> and I<sub>ss</sub> for the JFET modules is measured
- De-mating of SIH-IS and SIH-SS for LPU Integration has been included because it is foreseen that the LPU will have to be integrated after initial electrical integration and UFT of SPIRE. This requires that the SIH-SS-11 is de-mated from the SIH-IS-11 and SIH-SS-13 is de-mated from the SIH-IS-13 at the SVM-CB and the SPIRE SVM panel is opened.
- Step by Step Procedure for Mating of SIH-IS and SIH-SS after LPU Integration has been included to document the procedure for the final mating of the SIH-SS-XX and SIH-IS-XX after integration and test of the LPU.

Doc. No: HP-2-ASED-TP-0166

Issue:



### 2 Documents/Drawings

### 2.1 Applicable Documents

No.	Document Name	Document Number	Iss./Rev.
AD1	SPIRE FPU Handling and Mechanical Integration Procedure	SPIRE-RAL-PRC-002802	2
AD2	Making SPIRE ESD Safe	SPIRE-RAL-NOT-002028	2
AD3	ESD Regeln für HERSCHEL PLM und Integrations-Aktivitäten	HP-2-ASED-PR-0062	1
AD3	PA Plan	HP-2-ASED-PL-0007	2.1

Table 1: Applicable Documents

#### 2.2 Reference Documents

No.	Document Name	Document Number	lss./Rev.
RD1	PFM FINAL SIH ELECTRICAL INTEGRATION/CHECKOUT PROCEDURE	SPIRE-RAL-PRC-2951	2.1
RD2	SPIRE FM SHORT FUNCTIONAL TEST PROCEDURE	SPIRE-RAL-PRC-2494	2.4
RD3	PFM CVV INTERNAL SPIRE-SIH ELECTRICAL INTEGRATION PROCEDURE	HP-2-ASED-TP-0150	1.0
RD4	PFM CVV EXTERNAL CHH AND SIH RE-MATING	HP-2-ASED-TP-0158	1.0

Table 2: Reference Documents

#### 2.3 Other Documents

None

Doc. No:

HP-2-ASED-TP-0166

Issue: Date:

1

10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166  $\,1\,\mathrm{doc}$ 

Page



### Herschel



### 3 Personnel

The attendance of the following personnel is requested for the SPIRE PFM final electrical integration:

- SPIRE Engineer
- ASED Engineer
- ASED PA

Doc. No: HP-2-ASED-TP-0166

Issue:

1

Date: 10.09.07

Page



### 4 Mating of SIH-IS to CVV-CB and SVM-CB

#### 4.1 Prerequisites

- 1. The DCU, FCU and DPU have been mechanically and electrically integrated to the SVM panel and the SIH-SS harnesses are all integrated but not mated to the SVM-CB.
- If the LPU is not integrated to the FCU, make sure that the dummy LPU simulator plugs are mated to FCU P43/P44 once the harness modifications on the SPIRE panel has been made.
- 3. The SIH-CS harnesses have been mated to the SPIRE FPU + JFP/JFS
- 4. The SPIRE SVM panel has been closed
- 5. The PLM has been mechanically integrated to the SVM
- 6. The SIH-IS-XX harnesses (XX = 1....13) are mechanically integrated onto the outside of the cryostat.
  - a. They are mated at the CVV internal FTHR connectors
  - b. They are temporary mechanically integrated to the SVM-CB without electrical termination
- 7. The SPIRE UFT has been successfully completed.
- 8. The Ground strap (red tag) from the FPU shall be removed.

#### 4.2 End State

The electrical integration tests have been completed The instrument is ready for SFT

#### 4.3 Notes

- 1. SPIRE is 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 continuously to discharge the harness.
- 2. If an anomaly is detected during the integration test, then the instrument can be switched off from any state using the procedure in §11.32 SPIRE-SAFE-SWITCH-OFF.

Doc. No: HP-2-ASED-TP-0166

Issue:



#### 5 **Conditions**

#### 5.1 Personnel

The treatment process will be conducted by the following personnel:

Personnel	Date	Name
AIT Manager	10.10.07	H. Hiller
AIT Engineer	10.10.07	A. Koppe
Harness Engineer	10.10.07	7 Lang
SPIRE Representative		
Product Assurance	10.10.07	R. Langenstein

The performers are requested to follow the procedure step-by step and mark the execution of each test step in the allocated column. Results shall be plotted and marked by the concerned test step and figure number. Any deviations which may be necessary shall be described on the assigned pages in chapter 10.1 with a reference at the concerned position in the text where the deviation occurred.

All mating shall be recorded in the test procedure ref. HP-2-ASED-TP-0158 (RD4) too!

#### 5.2 **Environmental**

There are no specific environmental conditions for treatment process other than in the step by step procedure

#### 5.3 **General Precautions and Safety**

All safety precautions concerning the personnel and the hardware and must be observed during the whole test.

All operations have to be in accordance to the ESD rules as per AD2 and AD3.

The test responsible confirms with his signature in chapter 5.1 above that all participants are aware of these precautions.

Doc. No: HP-2-ASED-TP-0166

Issue:



#### 5.4 Special Equipment

Qty.	Equipment	Supplier
1	BoB, 128 way	ASED
1	Resistor, 1 MOhm (5%)	SPIRE
As required	Resistors, 47 Ohm (5%)	SPIRE

#### 5.5 Test Configuration

The following test configuration on the HERSCHEL EGSE shall be selected:

#### CDMU:

- The Bus IF selected on the HCDMU should be for SPIRE PRIME Instrument, (i.e., 27 TM slots allocated for SPIRE telemetry). For the PRIME side tests the BUS Configuration should be SPIRE Prime (i.e. RT=21) and for the REDUNDANT side test the BUS Configuration should be SPIRE Redundant (i.e. RT=22)
- The HCDMU and CCS should be interconnected.

#### CCS & IEGSE:

- The CCS and the IEGSE should be interconnected via the Pipe GW.
- The SPIRE MIB should be imported on the CCS.
- The CCS Handler application software should be running on the IEGSE.
- IEGSE system is up and running.(Database, SCOS, QLA, EGSE Router and Gateway, TM ingestion)

Doc. No:

HP-2-ASED-TP-0166

Issue: Date: 1

10.09.07







### 6 Verification Requirements and Test Criteria

As per step-by-step procedure

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date:

10.09.07



# 7 Step by Step Procedure

Step- No.	Integration-Step-Description	Results/Remarks	Sign Off
	Mating of SIH-IS to SIH-CS		
1	Prepare a 128-way BOB to short all contacts to spacecraft chassis via a 1MOhm resistor	Alternatively a IDAS shorting plug with 1 MOhm to GND can be used	
2	SIH-04 Short contacts of 312100 J03 to spacecraft chassis with BOB		
3	Remove Type-VII safeing plug from 211121 J22		
4	Mate 211121 P22 to J22		
5	Demate BOB from 312110 J03		
6	Mate Type-VII safeing plug to 312100 J03		
7	SIH-05 Short contacts of 312100 J02 to spacecraft chassis with BOB		
8	Remove Type-VII safeing plug from 211121 J23		
9	Mate 211121 P23 to J23		
10	Demate BOB from 312100 J02		
11	Mate Type-VII safeing plug to 312100 J02		
12	SIH-06		
4.0	Short contacts of 312200 J03 to spacecraft chassis with BOB		P-10-10-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-
13	Remove Type-VII safeing plug from 211121 J24		
14	Mate 211121 P24 to J24		
15	Demate BOB from 312200 J03		
16	Mate Type-W1 safeing plug to 312200 J03		
17	SIH-07 Short contacts of 312200 J04 to spacecraft chassis with BOB		
18	Remove Type-VII safeing plug from 211121 J25		
19	Mate 211121 P25 to J25		
c. No:	HP-2-ASED-TP-0166		

Doc. No: HP-2-ASED-TP-0166

Issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1 doc



# Herschel

20	Demate BOB from 312200 J04	
21	Mate Type-VII safeing plug to 312200 J04	
22	SIH-08	
	Short contacts of 312200 J01 to spacecraft chassis with BOB	
23	Remove Type-VII safeing plug from 211121 J27	
24	Mate 211121 P27 to J27	l
25	Demate BOB from 312200 J01	
26	Mate Type-VII safeing plug to 312200 J01	
27	SIH-09	
	Short contacts of 312200 J02 to spacecraft chassis with BOB	
28	Remove Type-VII safeing plug from 211121 J28	
29	Mate 211121 P28 to J28	
30	Demate BOB from 312200 J02	
31	Mate Type-VII safeing plug to 312200 J02	
32	SIH-10	
V4	Short contacts of 312300 J06 to spacecraft chassis with BOB	
33	Remove Type-VII safeing plug from 211121 J34	
34	Mate 211121 P34 to J34	
35	Demate BOB from 312300 J06	
36	Mate Type-VII safeing plug to 312300 J06	
37	SIH-12	
	Short contacts of 312300 J05 to spacecraft chassis with BOB	
38	Remove Type-VII safeing plug from 211121 J33	
39	Mate 211121 P33 to J33	
40	Demate BOB from 312300 J05	
41	Mate Type-VII safeing plug to 312300 J05	
42	SHT-02	
· · ·	Short contacts of 312200 J05 to spacecraft chassis with BOB	
AS	Remove Type-VII safeing plug from 211121 J31	

Doc. No: HP-2-ASED-TP-0166

Issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1.doc

Page



# Herschel

44	Mate 211121 P31 to J31	
45	Demate BOB from 312200 J05	
46	Mate Type-VII safeing plug to 312200 J05	
47	SIH-11	
	Short contacts of 312300 J04 to spacecraft chassis with BOB	
48	Remove Type-VIII safeing plug from 211121 J30	
49	Mate 211121 P30 to J30	
50	Demate BOB from 312300 J04	
51	Mate Type-VIII safeing plug to 312300 J04	
52	SIH-13	
	Short contacts of 312300 J03 to spacecraft chassis with BOB	
53	Remove Type-VIII safeing plug from 211121 J29	
54	Mate 211121 P29 to J29	
55	Demate BOB from 312300 J03	
56	Mate Type-VIII safeing plug to 312300 J03	
57	SIH-01	
	Short contacts of 312200 J06 to spacecraft chassis with BOB	
58	Remove Type-VI safeing plug from 211121 J32	
59	Mate 211121 P32 to J32	
60	Demate BOB from 312200 J06	
61	Mate Type-VI safeing plug to 3/12/200 J06	
62	SIH-03	
	Short contacts of 312100 J04 to spacecraft chassis with BOB	
63	Remove Type-V safeing plug from 211121 J26	
64	Mate 211121 P26 to J26	
65	Demate BOB from 312100 J04	
66	Mate Type-V safeing plug to 312100 J04	
	Idd/Iss measurement Preparation	

Doc. No: HP-2-ASED-TP-0166

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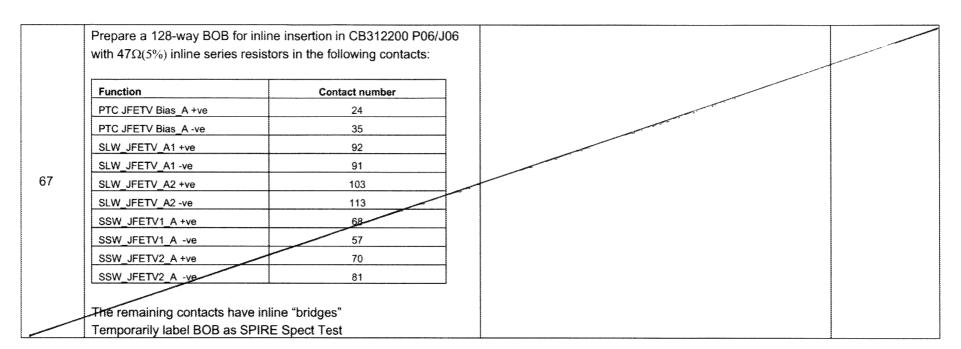
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File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1 doc



### Test Procedure Herschel



Doc. No: HP-2-ASED-TP-0166

Issue:



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		Function	Resistance (Ohm)	
		24		
		35		
		92		
		91		
	Measure and record the resistance of the inline resistors in the BOB	103		
68	prepared for CB312200 P06/J06. The measured resistance is to be	113		
	47±2.3 Ω	68		
		57		
		70		
		81		
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Doc. No: HP-2-ASED-TP-0166

Issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1 doc

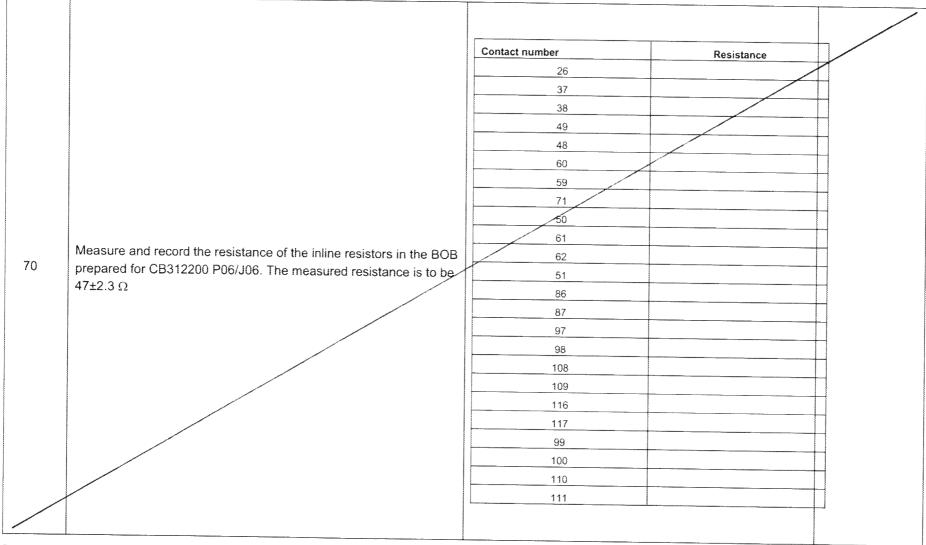


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	Function	Contact number		***************************************	wasserings	PAGE-SIGNED AND ADDRESS OF THE	Topographic and the state of th			
	PSW_JFETV1_A +	26		********		50000000000000000000000000000000000000				
	PSW_JFETV1_A -	37		**********		4 + + + + + + + + + + + + + + + + + + +	***	1		
	PSW_JFETV2_A +	38		-		A CONTRACTOR OF THE CONTRACTOR				
	PSW_JFETV2_A -	49		-			8			
	PSW_JFETV3_A +	48		-						
	PSW_JFETV3_A -	60		e e e e e e e e e e e e e e e e e e e	1					
	PSW_JFETV4_A+	59			***					
	PSW_JFETV4_A -	71		***************************************	***************************************					
	PSW_JFETV5_A+	50	_	apeinsuissas	a a a a a a a a a a a a a a a a a a a					
	PSW_JFETV5_A -	61	_	***************************************						
	PSW_JFETV6_A+	62	_							
69	PSW_JFETV6_A -	51	<b>」</b> /	4	+				<b>Y</b>	
03	PMW_JFETV1_A +	86		************	***	***		As as a second of the second o		
	PMW_JFETV1_A -	87		-			88 00 00 00 00 00 00 00 00 00 00 00 00 0			
	PMW_JFETV2_A +	97	_	***************************************			***************************************	**************************************		
	PMW_JFETV2_A -	98	_	occident and the second						
	PMW_JFETV3_A +	108	_	***************************************	***************************************	F				
	PMW_JFETV3_A -	109	_		***		***			
	PMW_JFETV4_A +	116	_	-				ego		
	PMW_JFETV4_A -	117	_		80 B B B B B B B B B B B B B B B B B B B		8 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -			
	PLW_JFETV1_A+	99	_		***		***************************************	**************************************		
	PLW_JFETV1_A	100	-		0490					
	PLW_JFEDV2_A+	110	_	and the same	10 mm m m m m m m m m m m m m m m m m m		**************************************			
	PLW_JFETV2_A -	111		ekiebbburn.			11			



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Doc. No: HP-2-ASED-TP-0166

Issue:



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Remove SPIRE Safeing Plug Type-VI from SVM-CB 312200 J06.		
Remove SPIRE Safeing Plug Type-VIII from SVM-CB 312300 J04.		
Remove SPIRE Safeing Plug Type-VIII from SVM-CB 312300 J03.		
Prepare a 128-way BOB and short contacts to remove charge		
Mate BOB to 312200 J06		
Verify FPU Isolation from OBA by measuring Pin 5 to Chassis: s.b. > 1 MOhm		
Verify Analogue Ground Isolation from OBA by measuring Pin 93 to Chassis: s b > 1 MOhm		
Verify FPU Isolation from OBA by measuring Pin 2 to Chassis: 5.b.		
> 1 MOhm		
Verify Analogue Ground Isolation from OBA by measuring Pin 36 to		
Chassis:		
s.b. > 1 MOhm		
Demate BOB from 312100 J04		
Mate SPIRE Safeing Plug Type-V to SVM-CB 312100 J04		
Mate SPIRE Safeing Plug Type-VI to SVM-CB 312200 J06.		
Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J04.		
Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J03.		
Subsystem harness mating		
Verify that CB 312300 J01 is mated with CB 312300 P01		
Verify that CB 312300 J02 is mated with CB 312300 P02		
Remove and store protective cover from CB 312300 P06		
	Remove SPIRE Safeing Plug Type-VIII from SVM-CB 312300 J03.  Prepare a 128-way BOB and short contacts to remove charge  Mate BOB to 312200 J06  Verify FPU Isolation from OBA by measuring Pin 5 to Chassis: s.b. > 1 MOhm  Verify Analogue Ground Isolation from OBA by measuring Pin 93 to Chassis: s.b. > 1 MOhm  Demate BOB from 312200 J06  Mate BOB to 312100 J04  Verify FPU Isolation from OBA by measuring Pin 2 to Chassis: s.b. > 1 MOhm  Verify Analogue Ground Isolation from OBA by measuring Pin 36 to Chassis: s.b. > 1 MOhm  Verify Analogue Ground Isolation from OBA by measuring Pin 36 to Chassis: s.b. > 1 MOhm  Demate BOB from 312100 J04  Mate SPIRE Safeing Plug Type-V to SVM-CB 312100 J04  Mate SPIRE Safeing Plug Type-VI to SVM-CB 312300 J04.  Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J04.  Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J03.  Subsystem harness mating  Verify that CB 312300 J01 is mated with CB 312300 P01  Verify that CB 312300 J02 is mated with CB 312300 P02	Remove SPIRE Safeing Plug Type-V from SVM-CB 312100 J04 Remove SPIRE Safeing Plug Type-VIII from SVM-CB 312200 J06. Remove SPIRE Safeing Plug Type-VIII from SVM-CB 312300 J04. Remove SPIRE Safeing Plug Type-VIII from SVM-CB 312300 J03. Prepare a 128-way BOB and short contacts to remove charge Mate BOB to 312200 J06 Verify FPU Isolation from OBA by measuring Pin 5 to Chassis: s.b. > 1 MOhm Verify Analogue Ground Isolation from OBA by measuring Pin 93 to Chassis: s.b. > 1 MOhm Demate BOB from 312200 J06 Mate BOB to 312100 J04 Verify FPU Isolation from OBA by measuring Pin 2 to Chassis: s.b. > 1 MOhm Verify Analogue Ground Isolation from OBA by measuring Pin 36 to Chassis: s.b. > 1 MOhm Verify Analogue Ground Isolation from OBA by measuring Pin 36 to Chassis: s.b. > 1 MOhm Verify Analogue Ground Isolation from OBA by measuring Pin 36 to Chassis: s.b. > 1 MOhm Mate SPIRE Safeing Plug Type-V to SVM-CB 312100 J04 Mate SPIRE Safeing Plug Type-VI to SVM-CB 312200 J06. Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J04. Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J03. Subsystem harness mating Verify that CB 312300 J01 is mated with CB 312300 P01 Verify that CB 312300 J02 is mated with CB 312300 P02

Doc. No:

HP-2-ASED-TP-0166

issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1 doc



# Herschel

91	Remove and store SPIRE Safeing Plug Type-VII from CB 312300 J06	
92	Mate CB 312300 P06 to 312300 J06	
93	Remove and store protective cover from CB 312300 P05	
94	Remove and store SPIRE Safeing Plug Type-VII from CB 312300 J05	
95	Mate CB 312300 P05 to 312300 J05	
96	Remove and store protective cover from CB 312300 P04	
97	Remove and store SPIRE Safeing Plug Type-VIII from CB 312300 J04	
98	Mate CB 312300 P04 to 312300 J04	
99	Remove and store protective cover from CB 312300 P03	
100	Remove and store SPIRE Safeing Plug Type-VIII from CB 312300 J03	
101	Mate CB 312300 P03 to 312300 J03	**
	Spectrometer Initial Mating	
102	Short the contacts of the BOB for 312200 J06/P06 to chassis to remove any charge	
103	Remove and store the protective cover from 312200 P06	
104	Mate the BOB prepared for 312200 J06/P06 to 312200 P06	
105	Demate and store the SPIRE Safeing Plug Type-VI from SVM-CB 312200 J06	
106	Mate the inline BOB prepared for 312200 J06/P06 to 312200 J06	
107	Remove and store the protective cover from 312200 P05	
108	Demate the SPIRE Safeing Plug Type-VII from SVM-CB 312200 J05	
109	Mate 312200 P05 to 312200 J05	
110	Mate 312100 P01A to J01A	
	Photometer Initial Mating	WII.

Doc. No: HP-2-ASED-TP-0166

Issue:



# Herschel

	SIH-03	
111	Short the contacts of the BOB for 312100 J04/P04 to chassis to remove any charge	
112	Remove and store the protective cover from 312100 P04	
113	Mate the BOB prepared for 312100 J04/P04 to 312200 P04	
114	Demate the SPIRE Safeing Plug Type-V from SVM-CB 3122100 J04	
115	Mate the inline BOB prepared for 312100 J04/P04 to 312100 J04	
	SIH-04	
116	Remove and store the protective cover from 312100 P03	
117	Demate the SPIRE Safeing Plug Type-VII from SVM-CB 312100 J03	
118	Mate 312100 P03 to 312200 J03	
119	Mate 312100 P01B to J01B	
	SIH-05	
120	Remove and store the protective cover from 312100 P02	
121	Demate the SPIRE Safeing Plug Type-VII from SVM-CB 312100 J02	
122	Mate 312100 P02 to 312200 J02	
	SIH-06	
123	Remove and store the protective cover from 312200 P03	
124	Demate the SPIRE Safeing Plug Type-VII from SVM-CB 312200 J03	
125	Mate 312200 P03 to 312200 J03	
	SIH-97	
126	Remove and store the protective cover from 312200 P04	
127	Demate the SPIRE Safeing Plug Type-VII from SVM-CB 312200 J04	

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1 doc



# Herschel

128	Mate 312200 P04 to 312200 J04		
	SIH-08		
129	Remove and store the protective cover from 312200 P01		
130	Demate the SPIRE Safeing Plug Type-VII from SVM-CB 312200 J01		
131	Mate 312200 P01 to 312200 J01		
	SIH-09		
132	Remove and store the protective cover from 312200 P02		
133	Demate the SPIRE Safeing Plug Type-VII from SVM-CB 312200 J02		
134	Mate 312200 P02 to 312200 J02		
	Instrument switch-on (Phot. JFETs)		
THE PROPERTY OF THE PROPERTY O		Nominal HK packets:	
		Critical HK packets:	
		THSK refresh:	1
135	Execute Procedure: SPIRE-FM-SFT-DPU-ON-P	TM2N refresh:	1
		TM1N refresh:	1
		SPIRE/CCS time sync:	
		SCOS/THSK/QLA sync:	

Doc. No: HP-2-ASED-TP-0166

Issue:

1



# Herschel

136	Execute Procedure: SPIRE-FM-SFT-DRCU-ON-P	THSK stop: TM2N stop: THSK start: TM2N start: SCUP5V ( $\sim 5.2 \pm 0.5$ V): SCUP9V ( $\sim 9.0 \pm 0.2$ V): SCUM9V ( $\sim -9.0 \pm 0.2$ V): BIASP5V ( $\sim 5.1 \pm 0.5$ V): BIASP9V ( $\sim 9.0 \pm 0.2$ V): BIASM9V ( $\sim -9.0 \pm 0.2$ V):	
137	Execute Procedure: SPIRE-FM-SFT-FUNC-SCU-01-P	SCUFRAMECNT: TM5N:	
138	Execute Procedure: SPIRE-FM-8FT-FUNC-SCU-03-P	SCUPEMPSTAT: PUMPHTRTEMP: PUMPHSTEMP: EVAPHSTEMP: SHUNTTEMP: EMCFILTEMP: SLOTEMP: PLOTEMP: OPTTEMP: BAFTEMP: BSMIFTEMP: SCAL2TEMP: SCAL4TEMP: SCAL4TEMP: SCALTEMP: SMECIFTEMP: SMECTEMP: BSMTEMP:	

Doc. No: HP-2-ASED-TP-0166

issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1.doc



# Herschel

139	Execute Procedure: SPIRE-FM-SFT-FUNC-SCU-06-P	SUBKSTAT:
		SUBKTEMP:
140		SPHSV:
140	Execute Procedure: SPIRE-FM-SFT-FUNC-SCU-07-P	EVHSV:
		SPHTRV:
141	Execute Procedure: SPIRE-FM-SFT-FUNC-SCU-04-P	PCALV:
		PCALCURR:
		SCAL4CURR:
142	Execute Procedure: SPIRE-FM-SFT-FUNC-SCU-05-P	SCAL4V:
	ZNOSAIS , 10004416. OF INE-1 WI-ST 1-1 DIVC-3CO-03-P	SCAL2CURR:
		SCAL2V:
		MCUBITSTAT:
		MCUP5V:
	Execute Procedure: SPIRE-FM-SFT-FUNC-MCU-01-P	MCUP14V:
or or other states		MCUM14V:
143		MCUP15V:
, ,0		MCUM15V:
		MCUMACTEMP:
		MCUSMECTEMP:
		MCUBSMTEMP:
144	Execute Procedure: SPIRE-FM-8FT-FUNC-MCU-02-P	MCUFRAMECNT:
145		CHOPSENSPWR:
140	Execute Procedure: SPIRE-FM-SFT-FUNC-BSM-01-P	JIGGSENSPWR:
146		CHOPSENSPWR:
140	Execute Procedure: SPIRE-FM-SFT-BSM-OFF-P	JIGGSENSPWR:
447		
147	Execute Procedure: SPIRE-FM-SFT-FUNC-SMEC-01-P	SMECENCPWR:
		SMECLVDTPWR:
148	Execute Procedure: SPIRE-FM-SFT-SMEC-OFF-P	SMECENCPWR:
Doc. No:	HP-2-ASED-TP-0166	SMECLVDTPWR:

Doc. No:

HP-2-ASED-TP-0166

Issue:

1



# Herschel

149	Execute Procedure: SPIRE-FM-SFT-FUNC-DCU-01-P	DCUFRAMECNT:	
150	Execute Procedure: SPIRE-FM-SFT-FUNC-DCU-04-PHOT-P	PLIABITSTAT: PLIAP5V: PLIAP9V: PLIAM9V: LIAP1TEMP to LIAP9TEMP:	
151	Execute Procedure: SPIRE-FM-SFT-PHOT-JFET-ØN-01	PSWJFETSTAT: PMLWJFETSTAT: PSWJFET1V: PSWJFET2V: PSWJFET3V: PSWJFET5V: PSWJFET5V: PSWJFET5V: PSWJFET6V: PMWJFET1V: PMWJFET1V: PMWJFET2V: PMWJFET2V: PLWJFET1V: PLWJFET2V: TCJFETV:	
	Photometer and PTC Idd/Iss		

Doc. No: HP-2-ASED-TP-0166

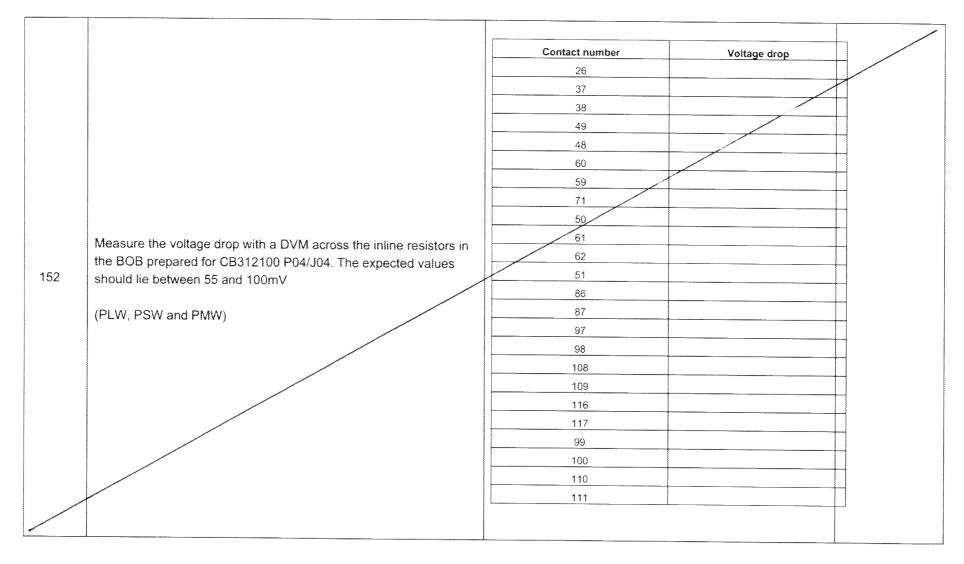
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Date:

10.09.07



### Herschel



Doc. No: HP-2-ASED-TP-0166

Issue:

Date:

1

10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1 doc



# Test Procedure Herschel

153	Measure the voltage drop with a DVM across the inline resistors in the BOB prepared for CB312200 P06/J06. The expected values should lie between 55 and 100mV	Contact number  24  35	Voltage drop	
				<u> </u>

Doc. No:

HP-2-ASED-TP-0166

Issue:

*4* •

Date:

10.09.07



# Herschel

		Contact A	Contact B	Voltage Drop	
		26	42		
		37	54		
		38	53		
		49	52		**************************************
		48	41		
		60	30		
		59	10		
		71	11		7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		50	19		
		61	29		
-	Manager than 11	62	16		
154	Measure the voltage drop along the cryoharness for the PMW/PSW/PLW arrays using the contacts form the BOB prepared for CB312100 P04/J04	51	27		
154		86	7		
		87	14		
		97	24		
and the state of t		98	35		
A A A A A A A A A A A A A A A A A A A		108	23		
PATRICIPATION OF THE PATRICIPA		109	34		o de la descripción de la descripción de la descripción de la dela dela dela dela dela dela del
e se de la constanta de la con		116	33		
		117	45		5 ************************************
		99	70		101001001000
		100	81		
		110	69		9-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
		111	80		
Hilliam				** Editions	
	Measure the voltage drop along the cryoharness for the PTC	Contact A	Contact B	Voltage Drop	
155	arrays using the contacts form the BOB prepared for CB312200	24	3	+ Ottage DIOP	
	P06/J06	35	2		

Doc. No: HP-2-ASED-TP-0166

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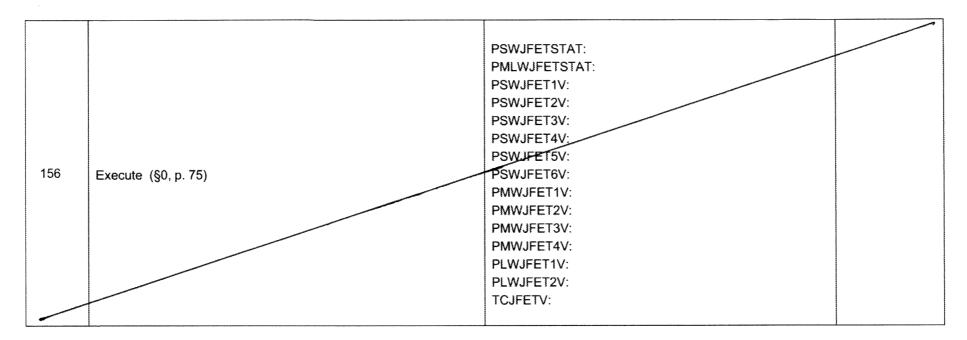
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HP-2-ASED-TP-0166 Doc. No: 1

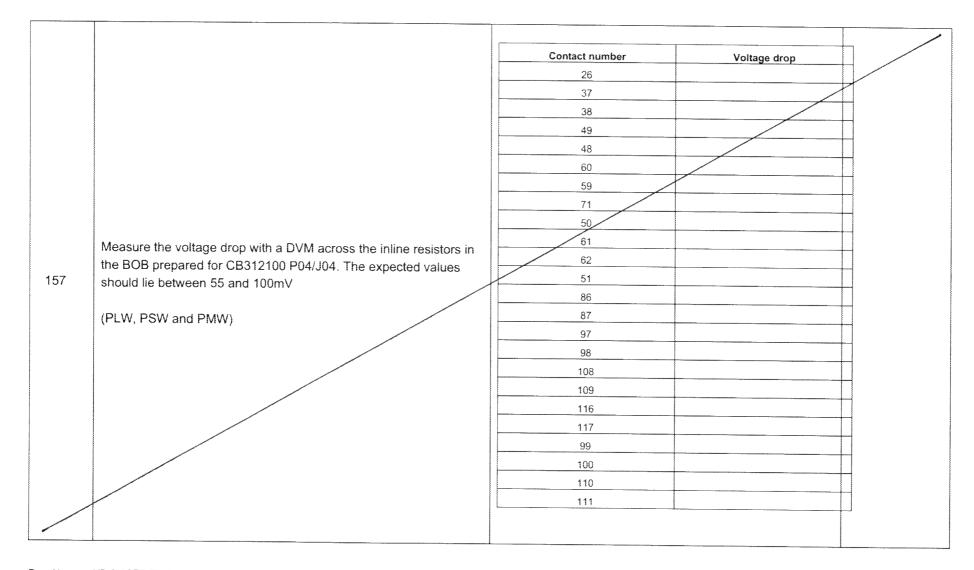
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Date:

10.09.07



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Doc. No: HP-2-ASED-TP-0166

Issue:

7

Date: 10.09.07



# Test Procedure Herschel

	Measure the voltage drop with a DVM across the inline resistors in			
158	the BOB prepared for CB312200 P06/J06. The expected values should lie between 55 and 100mV	Contact number	Voltage drop	
		35		
	(PTC)	1		

Doc. No: HP-2-ASED-TP-0166

Issue:

Date: 10.09.07



# Herschel

		Contact A	Contact B	Voltage Drop	
		26	42		
		37	54		
		38	53	_	
		49	52		
		48	41		
		60	30		
		59	10		
		71	11		District
		50	19		
		61	29		
	Measure the voltage drop along the cryoharness for the PMW/PSW/PLW arrays using the contacts form the BOB prepared for CB312100 P04/J04	62	16		1
450		51	27		distillation
159		86	7		
		87	14		
		97	24		10.00
		98	35		
		108	23	E Para Para Para Para Para Para Para Par	
		109	34		
		116	33		
		117	45	0.000	
T T T T T T T T T T T T T T T T T T T		99	70		
		100	81	· ·	
		110	69	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
		111	80	all residence of the second se	
				***************************************	
	Measure the voltage drop along the cryoharness for the PTC	Contact A	Contact B	Voltage Drop	
160	arrays using the contacts form the BOB prepared for CB312200	24	3	+ ortage Drop	A Company of the Comp
	P06/J06	35	2		delimana

Doc. No:

HP-2-ASED-TP-0166

Issue:

1

Date: 10.09.07



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· · · · · · · · · · · · · · · · · · ·	<b>-</b>	Y	
		PSWJFETSTAT:	
		PMLWJFETSTAT:	
		PSWJFET1V:	
		PSWJFET2V:	
		PSWJFET3V:	
-		PSWJFET4V:	
1		PSWJFET5V:	
161	Execute Procedure: SPIRE-FM-SFT-PHOT-JFET-OFF	PSWJFET6V:	
		PMWJFET1V:	
A.C. C.	The state of the s	PMWJFET2V:	
	**************************************	PMWJFET3V:	
		PMWJFET4V:	
		PLWJFET1V:	
-		PLWJFET2V:	
7		TCJFETV:	
		PLIABITSTAT:	
		PLIAP5V:	
162	Execute Procedure: SPIRE-FM-SFT-PLIA-OFF-P	PLIAP9V:	'
1		PLIAM9V:	
		LIAP1TEMP to LIAP9TEMP:	
		SLIABITSTAT:	
		SLIAP5V:	
163	Execute Procedure: SPIRE-FM-SFT-FUNC-DCU-04-SPEC-P	SLIAP9V:	
		SLIAM9V:	
		LIAS1TEMP to LIAS3TEMP:	
	Measure Spect. Idd/Iss		

Doc. No: HP-2-ASED-TP-0166

Issue:

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Date: 10.09.07



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164	Execute Procedure: SPIRE-FM-SFT-SPEC-JFET-ON-01	SPECJFETSTAT: SSWJFET1V: SSWJFET2V: SLWJFET1V:		
165	Measure the voltage drop with a DVM across the inline resistors in the BOB prepared for CB312200 P06/J06. The expected values should lie between 25 and 50mV for contacts 91, 92, 103 and 113 and between 55 and 100mV for contacts 57, 68, 70 and 81	92 91 103 113 68 57 70 81	Voltage drop	
166	Measure the voltage drep with a DVM between the contacts indicated on the BOB prepared for CB312200 P06/J06.	Contact A Co 92 91 103 113 68 57 70 81	ontact B Voltage Drop  31  43  42  54  19  29  53  52	

Doc. No: HP-2-ASED-TP-0166

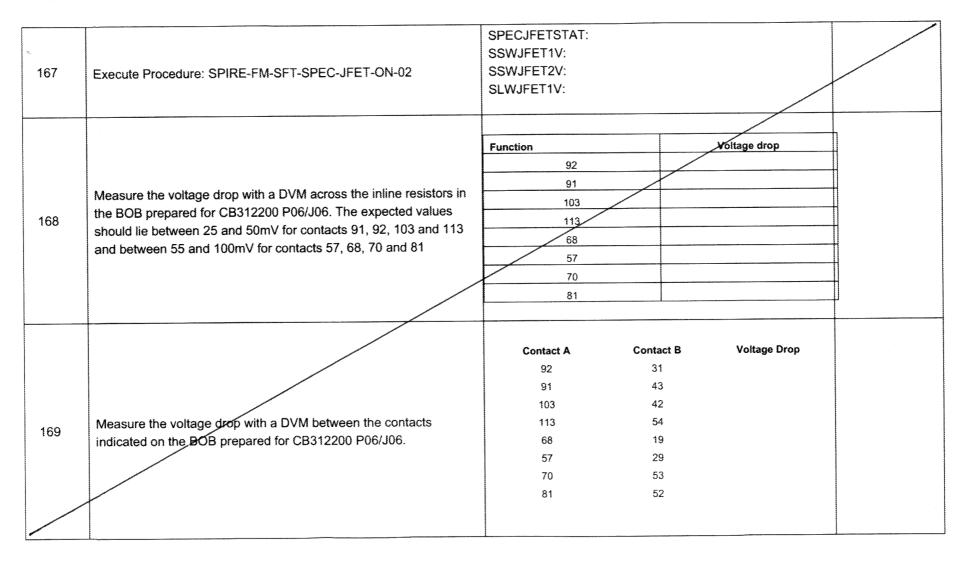
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Issue:

Date: 10.09.07



# Test Procedure Herschel



Doc. No: HP-2-ASED-TP-0166

Issue:

Date: 10.09.07



# Herschel

170	Execute Procedure: SPIRE-FM-SFT-SPEC-JFET-OFF	SPECJFETSTAT: SSWJFET1V: SSWJFET2V: SLWJFET1V:
171	Execute Procedure: SPIRE-FM-SFT-SLIA-OFF-P	SLIABITSTAT SLIAP5V SLIAP9V SLIAM9V
172	Execute Procedure SPIRE-FM-SFT-MCU-OFF-P	MCUBITSTAT
173	Execute Procedure SPIRE-FM-SFT-SCU-OFF-P	SCUTEMPSTAT SUBKSPAT
174	Execute SPIRE-FM-SFT-DRCU-OFF-P	THSK: TM2N:
175	Execute	I IVIZIV.
176	Carry out near real time analysis of the data to verify that: 0% < (Idd-Iss) / Idd < 8%	
	Final Spectrometer Connection	
177	Demate the 128-way BOB from CB 312200 P06	
178	Demate the 128-way BOB from CB 312200 J06	
179	Mate CB 312200 J06/P06	
180	Final Photometer Connection	
181	Demate the 128-way BOB from CB 312100 P04	
182	Demate the 128-way BOB from CB 312100 J04	
183	Mate CB 312100 J04/P04	
184	End of procedure	

Doc. No:

Issue:

Date: 10.09.07

HP-2-ASED-TP-0166

38



#### Herschel **Test Procedure**

#### De-mating of SIH-IS and SIH-SS for LPU Integration 8

#### 8.1 **Prerequisites**

1. The pre-requisites outlined in chapter 4.1 of this procedure have been completed.

#### 8.2 **End State**

The SIH is disconnected at the SVM-CB.

The FPU is protected from ESD damage by the safeing plugs on SVM-CB connectors.

The SPIRE SVM panel has been opened.

#### 8.3 **Notes**

1. SPIRE is 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 continuously to discharge the harness.

Step- No.	Integration-Step-Description	Results/Remarks	Sign Off
1	De-mating of SIH-IS and SIH-SS		
	SIH-SH-03		
	Demate 312100 P04		
	Mate SPIRE Safeing Plug Type-V to SVM-CB 312100 J04		V
	Cover 312100 P04 with ESD dust cover		·
	SIH-SH-01		
	Demate 312200 P06		
	Mate SPIRE Safeing Plug Type-VI to SVM-CB 312200 J06		<u> </u>
oc No	HP.2-ASED-TP-0166		//c, 10, 07 Page <b>39</b>

HP-2-ASED-TP-0166 Doc. No:

Issue:

1

10.09.07 Date:



# Herschel

	Cover 312200 P06 with ESD dust cover	
	SIH-SH-11	
	Demate 312300 P04	./
	Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J04	4
	Cover 312300 P04 with ESD dust cover	
***	Demate 312300 P01	,/
	Cover 312300 P01 with ESD dust cover	
	SIH-SH-13	
	Demate 312300 P03	V
····	Mate SPIRE Safeing Plug Type-VIII to SVM-CB 312300 J03	V
	Cover 312300 P03 with ESD dust cover	V
***************************************	Demate 312300 P02	3/
·····	Cover 312300 P02 with ESD dust cover	~
	SIH-SH-02	y
	Demate 312200 P05	1
***************************************	Mate SPIRE Safeing Plug Type-VII to SVM-CB 312200 J05	./
	Cover 312200 P05 with ESD dust cover	
	Demate 312100 P01A	1/
	Cover 312100 P01A with ESD dust cover	
	SIH-SH-04	

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1.doc

Page 40



# Herschel

	Demate 312100 P01B	✓
	Cover 312100 P01B with ESD dust cover	
	Demate 312100 P03	
	Mate SPIRE Safeing Plug Type-VII to SVM-CB 312100 J03	V
	Cover 312100 P03 with ESD dust cover	
	SIH-SH-05	
	Demate 312100 P02	
	Mate SPIRE Safeing Plug Type-VII to SVM-CB 312100 J02	✓
-	Cover 312100 P02 with ESD dust cover	
	SIH-SH-06	
1	Demate 312 200 P03	
	Mate SPIRE Safeing Plug Type-VII to SVM-CB 312200 J03	/
1	Cover 312200 P03 with ESD dust cover	V
	SIH-SH-07	
	Demate 312/200 P04	
	Mate SPIRE Safeing Plug Type-VII to SVM-CB 312200 J04	V
	Cover 312200 P04 with ESD dust cover	~
	SIH-SH-08	
	Demate 312 200 P01	1
	Mate SPIRE Safeing Plug Type-VII to SVM-CB 312200 J01	✓ ·
l	MILLO OF GIVE CONTROL OF THE CONTROL	14 10 8

Doc. No:

HP-2-ASED-TP-0166

issue:

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166-1.doc

10.10.07

Page **41** 



# Herschel

Cover 312200 P01 with ESD dust cover	4
SIH-SH-09	
Demate 312 200 P02	
Mate SPIRE Safeing Plug Type-VII to SVM-CB 312200 J02	· ·
Cover 312200 P02 with ESD dust cover	12
SIH-SH-10	
Demate 312 300 P06	
Mate SPIRE Safeing Plug Type-VII to SVM-CB 312300 J06	
Cover 312300 P06 with ESD dust cover	
SIH-SH-12	
Demate 312 <b>/</b> 300 P05	
Mate SPIRE Safeing Plug Type-VII to SVM-CB 312300 J05	
Cover 312300 P05 with ESD dust cover	
End of procedure	
	10.10.

Doc. No:

Issue:

Date: 10.09.07

HP-2-ASED-TP-0166





## 9 Step by Step Procedure for Mating of SIH-IS and SIH-SS after LPU Integration

## 9.1 Prerequisites

- 1. The DCU, FCU and DPU have been mechanically and electrically integrated to the SVM panel and the SIH-SS-XX harnesses are all integrated but not mated to the SVM-CB.
- 2. The SIH-CS harnesses are still mated to the SPIRE FPU + JFP/JFS.
- 3. The SPIRE SVM panel has been closed.
- 4. The PLM has been mechanically integrated to the SVM
- 5. The SIH-IS-XX harnesses (XX= 1...13) are mechanically integrated onto the outside of the cryostat.
  - a. They are mated at the CVV internal FTHR connectors.
  - b. They are mated at the CVV-CB.
  - c. They are mechanically integrated to the SVM-I/F-CB's with the designated ESD safeing plugs and the UFT has been successfully completed.
- 6. The LPU Integration has been successfully completed.

### 9.2 Notes

1. SPIRE is 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.

No:	Activity	Remarks/Results	Sign off
## ## ## ## ## ## ## ## ## ## ## ## ##	Mating of SIH-SS to SIH-IS		
1			annichteideliche
2	SIH-SS-12		
2	Remove ESD dust cover from 312300 P05		

Doc. No: HP-2-ASED-TP-0166

issue:

Date: 10.09.07



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No:	Activity	Remarks/Results	Sign off
3	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312300 J05		J.Ig. UII
4	Mate 312300 J05 to P05		
5	SIH-SS-10		
6	Remove ESD dust cover from 3121300 P06		
7	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312300 J06		
8	Mate 312300 J06 to P06		
9	SIH-SS-11		
10	Remove ESD dust cover from 312390 P04		
11	Demate SPIRE Safeing Plug Type-VIII from SVM-CB 312300 J04		
12	Mate 312300-P04 to J04		
13	Remove ESD dust cover from 312300 P01		
14	Mate 312300 P01 to J01		The state of the s

Doc. No: HP-2-ASED-TP-0166

Issue:

Date: 10.09.07



# Herschel

No:	Activity	Remarks/Results	Sign off
15	SIH-SS-13		
16	Remove ESD dust cover from 312300 P03		
17	Demate SPIRE Safeing Plug Type-VIII from SVM-CB 312300 J03		
18	Mate 312300 P03 to J03		
19	Remove ESD dust cover from 312300 P02		
20	Mate 312300 P02 to J01		
21	SIH-SS-04		
22	Remove ESD dust cover from 312100 P01B		
23	Mate 312100 P01B to J01B		
24	Remove ESD dust cover from 312100 P03		
25	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312100 J03		÷.
26	Mate 312100 P03 to J03		

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date:

10.09.07



# Herschel

No:	Activity	Remarks/Results	Sign off
27	SIH-SS-02		
28	Remove ESD dust cover from 312200 P05		
29	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312200 J05		
30	Mate 312200 P05 to J05		
31	Remove ESD dust cover from 312100 P01A		
32	Mate 312100 P01A to J01A		
33	SIH-01		
34	Remove ESD dust cover from 312200 P06		
35	Demate SPIRE Safeing Plug Type-VI from SVM-CB 312200 J06		
36	Mate 312200 706 to J06		
37	SM1-SS-05		
38	Remove ESD dust cover from 312100 P02		

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date: 10.09.07



# Herschel

No:	Activity	Remarks/Results	Sign off
39	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312100 J02		
40	Mate 312100 P02 to J02		
41	SIH-SS-06		
42	Remove ESD dust cover from 3121200 P03		
43	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312200 J03		
44	Mate 312200 P03 to J03		
45	SIH-SS-07		
46	Remove ESD dust cover from 3121200 P04		
47	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312200 J04		
48	Mate 312200 F04 to J04		
49	\$H-SS-08		
50	Remove ESD dust cover from 3121200 P01		

Doc. No: HP-2-ASED-TP-0166

Issue: 1

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1 doc

Page



# Herschel

No:	Activity	Remarks/Results	8ign off
51	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312200 J01		
52	Mate 312200 P01 to J01		
53	SIH-SS-09		
54	Remove ESD dust cover from 3121200 P02		
55	Demate SPIRE Safeing Plug Type-VII from SVM-CB 312200 J02		
56	Mate 312200 P02 to J02		
57	SIH-SS-03		
58	Demate 312100 P04		
59	Mate SPIRE Safeing Plug Type-V to SVM-CB 312100 J04		
60	Mate 312100 P04 to J04		
61	End of procedure		

Doc. No: HP-2-ASED-TP-0166

Issue:

Date: 10.09.07



#### **Summary Sheets** 10

#### **Procedure Variation Summary** 10.1

Herein are all changes of the procedure are shown.

No.	Para.	Variation Description	Action req.
No.	8	Variation Description  Only this chapter of the step-bystep procedure is applicable for demaking of the SIH-IS and SIH-SS for LPU integration	00010000000000000000000000000000000000
AAAAAAAAAA AAAAA			

Table 10.1-1: Procedure Variation Sheet

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date: 10.09.07



#### Non Conformance Report (NCR) Summary 10.2

NCR - No.	NCR - Title	Date	Open Closed	PA sig.
	none			
			711100000000000000000000000000000000000	d'Armananananan
				AND

Table 10.2-1: Non-Conformance Record Sheet

#### 10.3 Sign-off Sheet

This test has been successfully performed and all open issues are covered by NCR's or Procedure Variations.

	Date	Signature
Test Manager	10.10.67	A. Com
Operator	10.10.07	J. PAZ
PA Responsible	10. 10.07	2/1

Doc. No: HP-2-ASED-TP-0166

Issue: 1

Date:

10.09.07



## 11 APPENDICES

## 11.1 Procedure SPIRE Power On

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/ Fail
1	Execute TCL script S102999SCVT005_ASDSFTSPIR_P WR_ON_P.tcl	***************************************			

Note: This script powers up the instrument DPU and DRCU prime. Therefore, the next two procedures, 11.2 and 11.3, are not executed manually.

## 11.2 Procedure SPIRE-FM-SFT-DPU-ON-P

Version	2.3			
Date	28 Aug 2007			
Purpose	To switch on the SPIRE DPU PRIME and start generating housekeeping			
Initial configuration	SPIRE DPU and DRCU PRIME are switched off			
Final configuration	SPIRE DPU PRIME is ON and SPIRE HK is being produced , SPIRE DRCU PRIME is OFF			
Preconditions	<ul> <li>SPIRE FM DPU is electrically integrated with the Herschel Satellite</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>FUNCTIONAL TEST PARAMETERS display is selected on the CCS</li> </ul>			
Duration	5 minutes			
Pass/Fail Criteria	Nominal and critical HK reports start being generated at their nominal rates of 1Hz and 0.5Hz respectively.			

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/ Fail
1	Select DPU AND OBS PARAMETERS display is on the CCS	unannan			wesserratessesserrateinen reministeren her
2	Power ON the SPIRE DPU PRIME unit using the dedicated spacecraft LCL line and configure 1553 Spacecraft bus for SPIRE DPU PRIME (RT = 21)				
3	Wait for the boot software to produce at least 2 event packets (5,1)				

Doc. No: HP-2-ASED-TP-0166

Issue:

1

Date: 10.09.07



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Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/ Fail
4	Execute TCL script SPIRE-FM-SFT-DPU-START-P-SP.tcl			Anthrop	C PP C C I I I I I I I I I I I I I I I I
5	Check that Nominal and Critical HK packets are arriving at the CCS:  SPIRE Nominal HK:  • (type ,subtype): (3,25)  • APID: 0x502  SPIRE Critical HK:  • (type ,subtype): (3,25)  • APID: 0x500				
6	Check that THSK parameter is refreshing every second	THSK	Refreshing @ 1 Hz	1000000	
7	Check that TM2N parameter is incrementing by 1 every second	TM2N	Incrementing by 1 @ 1Hz	морьог	
8	Check that TM1N parameter is incrementing by 1 every 2 second	TM1N	Incrementing by 1 @ 0.5Hz		остиничниканирово 1133
Test R	lesult (Pass/Fail):				

<sup>\*</sup>Assuming that OBT is provided by the HCDMU is TAI, there should be a 33 second difference between OBS and CCS time (assuming CCS is using UTC). In the case the HCDMU is using UTC to specify the on board time, there should be no difference between THSK and the CCS/IEGSE system time.

Doc. No: HP-2-ASED-TP-0166

Issue: 1

10.09.07 Date:





#### Procedure SPIRE-FM-SFT-DRCU-ON-P 11.3

Version	2.3			
Date	28 <sup>nd</sup> August 2007			
Purpose	To switch on the SPIRE DRCU PRIME and start generating housekeeping			
Initial configuration	SPIRE DPU PRIME is ON and DRCU PRIME is switched OFF			
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced			
Preconditions	<ul> <li>SPIRE FM DRCU is electrically integrated with the Herschel Satellite</li> <li>SPIRE DRCU is switched OFF</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>FUNCTIONAL TEST PARAMETERS display is selected on the CCS</li> </ul>			
Duration	4 minutes			
Pass/Fail Criteria	DRCU voltages show expected 'ON' values			

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date:

1 10.09.07 Page



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Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Success/ Failure
	Execute TCL script SPIRE- FM-SFT-DRCU-START-P- STEP1.tcl				and the second s
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing		A CONTRACTOR OF THE CONTRACTOR
3	Check that TM2N parameter is not incrementing anymore	TM2N	Not incrementing	*****	<del>and Conference (Conference Conference Confe</del>
4	Power ON the SPIRE DRCU PRIME unit using the dedicated spacecraft LCL line.	akasing			
5	Execute TCL script SPIRE- FM-SFT-DRCU-START-P- STEP2.tcl			*****	Penniumani ilikkoobbi oobisi o
6	Check that THSK parameter is again refreshing every second	THSK	Refreshing @ 1Hz		Processor Section Control of Cont
7	Check that TM2N parameter is again incrementing every second	TM2N	Incrementing by 1 @ 1Hz		NOCO POR PORTEGUIS (SISTEMENTAL AND
8	Check that the SCU/DCU voltages show nominal values	SCUP5V SCUP9V SCUM9V BIASP5V BIASP9V BIASM9V	~ 5.2 ± 0.5V ~ 9.0 ± 0.2V ~-9.0 ± 0.2V ~ 5.1 ± 0.5V ~ 9.0 ± 0.2V ~-9.0 ± 0.2V		
Test Re	esult (Pass/Fail):	Моннования по применения п	<del>плодента а с</del> е се	naan na maranga	niceonario con reconstruire de la constantina della constantina de

Doc. No: HP-2-ASED-TP-0166

10.09.07

Issue: 1

Date:





#### Procedure SPIRE-FM-SFT-FUNC-SCU-01-P 11.4

Version	2.3
Date	28 <sup>nd</sup> August 2007
Purpose	SCU science packet generation check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
Final configuration	Unchanged
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	3 minutes
Pass/Fail Criteria	Specified SCU HK parameters show expected increment.

### **Procedure Steps:**

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure		
1	Execute TCL script SPIRE-FM-SFT-	SCUFRAMECNT	0/31				
	FUNC-SCU-01-P.tcl	TM5N	0x3FFF/1	L	20100000000000000000000000000000000000		
Test F	Test Result (Pass/Fail):						

Doc. No: HP-2-ASED-TP-0166

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Issue:

10.09.07 Date:



#### Procedure SPIRE-FM-SFT-FUNC-SCU-03-P 11.5

Version	2.3
Date	28 <sup>nd</sup> August 2007
Purpose	SCU DC thermometry check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and DC thermometry is ON
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	8 minutes
Pass/Fail Criteria	DC Thermometry channels show temperature readings according to the actual instrument temperature*  *: At warm temperatures all channels should show short circuit RAW readings of -32768

## Procedure Steps:

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE- FM-SFT-FUNC-SCU-03- P.tcl			*******	******
2	Wait for the parameter BBFULLTYPE to get set to SCU_DC_Therm				
3	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	0/FFFF/FFF		
4	If the instrument is warm:  Configure the SFT	PUMPHTRTEMP PUMPHSTEMP EVAPHSTEMP	-		
The state of the s	PARAMETERS display to show the RAW values of SCU DC thermometry	SHUNTTEMP EMCFILTEMP SLOTEMP	- -		
	Record the RAW values of SCU DC thermometry	PLOTEMP OPTTEMP BAFTEMP BSMIFTEMP	-		

Doc. No:

HP-2-ASED-TP-0166

Issue:

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Date: 10.09.07 Page



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Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
gagaga, ayan ayan arin arinda da d	channels.	SCAL2TEMP	sa.		
	Nominal values should	SCAL4TEMP	**		
	show a short circuit status	SCALTEMP	100		***************************************
	(or RAW -32768).	SMECIFTEMP	**		
	Non Nominal (Open	SMECTEMP	niet		
	Circuit Criterion): RAW reading in the range [0,-100]	BSMTEMP	-		

HP-2-ASED-TP-0166 Doc. No:

Issue: 1

Date: 10.09.07







## 11.6 Procedure SPIRE-FM-SFT-FUNC-SCU-06-P

Version	2.3
Date	28 <sup>nd</sup> August 2007
Purpose	SCU AC thermometry check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	2 minutes
Pass/Fail Criteria	AC Thermometry channel shows temperature readings according to the actual instrument temperature

Procedure Steps:

Doc. No: HP-2-ASED-TP-0166

Issue: 1

Date: 10.09.07



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Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM- SFT-FUNC-SCU-06-P.tcl	*****			**************************************
2	Wait for the parameter BBFULLTYPE to get set to SCU_AC_Therm				NAMES OF THE PROPERTY OF THE P
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	0/1/1		***************************************
4	If the instrument is warm:  Configure the SFT PARAMETERS display to show the RAW values of SCU AC thermometry channel.  Only record the values of SCU AC thermometry channel if it indicates an open circuit.  Open Circuit Criterion: RAW reading in the range [0, -100]	SUBKTEMP	***************************************		
Test F	l Result (Pass/Fail):				

HP-2-ASED-TP-0166 Doc. No:

Issue: 1

10.09.07 Date:

Page







## 11.7 Procedure SPIRE-FM-SFT-FUNC-SCU-07-P

Version	2.2
Date	2 <sup>nd</sup> January 2007
Purpose	Sorption Cooler Heater Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
handedikadeedikaseebaseebaseananssaanankankkkungankkkkkkkkkk	and DC thermometry is ON
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
	and AC/DC thermometry is ON
Constraints	SPIRE DRCU PRIME is switched ON
SPIRE MIB PRIME is imported in the CCS database.	
	CCS is up and running
	<ul> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	5 minutes
Pass/Fail Criteria	Sorption cooler heat switches and pump heater show expected voltages

**Procedure Steps:** 

Doc. No: HP

HP-2-ASED-TP-0166

Issue:

Date:

10.09.07

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Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM- SFT-FUNC-SCU-07-P.tcl	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1000000	30000000	occidente
2	Wait for the parameter BBFULLTYPE to get set to Cooler_Htr_Chk	BBFULLTYPE	Cooler_Htr_Ch k	***************************************	
3	Record the value of parameter SPHSV – the Sorption Pump Heat Switch Voltage. This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.	SPHSV - mV	0/~323/0		
4	Record the value of parameter EVHSV the Evaporator Heat Switch Voltage. This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.	EVHSV - mV	0/~323/0		
5	Record the value of parameter SPHTRV – the Sorption Pump Heater Voltage.  This voltage stays on for ~20 seconds. Wait for the voltage to go to zero to continue.	SPHTRV - V	0/~8.8/0		
Test	Result (Pass/Fail):		NATIONAL STATE OF THE STATE OF	эллэрэлсэн таас стаарын нассын нассын на	адалунуальны адага на 1866 година сейно сейн

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date:

10.09.07

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#### Procedure SPIRE-FM-SFT-FUNC-SCU-04-P 11.8

Version	2.3
Date	28 <sup>nd</sup> August 2007
Purpose	Photometer Calibration Check (PRIME)
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON
минициния министительной положений при	and AO/DC thermometry is ON
Final configuration	Unchanged
Constraints	SPIRE DRCU PRIME is switched ON
	SPIRE MIB PRIME is imported in the CCS database.
	CCS is up and running
	SFT PARAMETERS display is selected on the CCS
Duration	3 minutes
Pass/Fail Criteria	PCAL voltage and current agree with expected values

### **Procedure Steps:**

1 Execute TCL script SPIRE-FM- SFT-FUNC-SCU-04-P.tcl PCALV – V 0.0/0.1/0.0 The expected values during the test should be monitored when parameter BBFULLTYPE in the SFT PARAMETERS display is set to PCAL_Check. This usually	Step	Description	Parameter Name - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
SFT PARAMETERS display is set	1	SFT-FUNC-SCU-04-P.tcl  The expected values during the				
happens about 30 seconds from the start of test execution.		parameter BBFULLTYPE in the SFT PARAMETERS display is set to PCAL_Check. This usually happens about 30 seconds from	BBFULLTYPE	PCAL_Check		

Doc. No: HP-2-ASED-TP-0166

Issue: 1

Date: 10.09.07





#### Procedure SPIRE-FM-SFT-FUNC-SCU-05-P 11.9

Version	2.3		
Date	28 <sup>nd</sup> August 2007		
Purpose	Spectrometer Calibration Check (PRIME)		
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON		
Final configuration	Unchanged		
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>		
Duration	5 minutes		
Pass/Fail criteria	SCAL2 and SCAL4 voltage and currents agree with expected values		

## **Procedure Steps:**

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure	
1	Execute TCL script SPIRE-FM- SFT-FUNC-SCU-05-P.tcl		***************************************		MATCHES AND THE STATE OF THE ST	
2	Wait for the parameter BBFULLTYPE to get set to SCAL4_Check	BBFULLTYPE	SCAL4_Check			
3	A few seconds later record the value of parameters SCAL4CURR and SCAL4V These parameters are set back to 0 after ~20 seconds	SCAL4CURR - mA SCAL4V - V	0.0/0.10/0.0			
4	Wait for the parameter BBFULLTYPE to get set to SCAL2_Check	BBFULLTYPE	SCAL2_Check			
5	A few seconds later record the values of parameters SCAL2CURR and SCAL2V These parameters are set back to 0 after ~20 seconds	SCAL2CURR - mA SCAL2V - V	0.0/0.10/0.0			
Test F	Test Result (Pass/Fail):					

HP-2-ASED-TP-0166 Doc. No:

1

Issue:

Date: 10.09.07



## 11.10 Procedure SPIRE-FM-SFT-FUNC-MCU-01-P

Version	2.3			
Date	28 <sup>th</sup> August 2007			
Purpose	MCU (PRIME) Boot Check			
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced			
**************************************	and AC/DC thermometry is ON			
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produce			
ана в серения на применения на применения на применения на применения на применения на применения на применени В применения на применения	and AC/DC thermometry is ON and MCU PRIME is booted.			
Constraints				
	<ul> <li>SPIRE MIB PRIME is imported in the CCS database.</li> </ul>			
	CCS is up and running			
Medicial (Michigraphic (Michigraphic Michigraphic Michigr	<ul> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>			
Duration	5 minutes			
Pass/Fail criteria	MCU voltages and board temperatures show expected 'ON' values			

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure	
1	Execute TCL script SPIRE-FM- SFT-FUNC-MCU-01-P.tcl	******	*******	**************************************	**************************************	
2	Check that the MCU is booted up successfully.	MCUBITSTAT	0/1/1	generalistici (si si s	APPOORING SCHURUSSKIRHING ARABOA AAAA OO	
3	Check MCU HK parameter values and ensure that the values are refreshing.	MCUP5V MCUP14V MCUM14V MCUP15V MCUM15V  MCUMACTEMP MCUSMECTEMP MCUBSMTEMP	~ 5.0 ± 0.2V ~ 14.0 ± 0.5V ~ -14.0 ± 0.5V ~ 15.0 ± 0.5V ~ -15.0 ± 0.7V ~300K ~300K ~300K			
Test Result (Pass/Fail):						

Doc. No: H

Issue:

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Date: 10.09.07





#### Procedure: SPIRE-FM-SFT-FUNC-MCU-02-P 11.11

Version	2.2		
Date	2 <sup>nd</sup> January 2007		
Purpose	MCU Nominal Frame Generation Check		
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.		
Final configuration	Unchanged.		
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>		
Duration	5 minutes		
Pass/Fail criteria	Specified MCU HK parameters show expected increment		

## **Procedure Steps:**

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure	
1	Execute TCL script SPIRE-FM- SFT-FUNC-MCU-02-P.tcl	MCUFRAMECNT	FM : 0/297	connected	1992-1990	
Test F	Test Result (Pass/Fail):					

Doc. No:

HP-2-ASED-TP-0166

Issue:

10.09.07 Date:

Page



#### 11.12 Procedure SPIRE-FM-SFT-FUNC-BSM-01-P

Version	2.3			
Date	28 <sup>nd</sup> August 2007			
Purpose	BSM (PRIME) Chop/Jiggle Sensor Check.			
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced			
antinintinintinintinintinintina oo kata oo kata oo ka oo	and AC/DC thermometry is ON and MCU PRIME is booted.			
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced			
	and AC/DC thermometry is ON and MCU PRIME is booted. BSM			
миникачинкоминичиний	Chop/Jiggle sensors are ON.			
Constraints				
	SPIRE MCU PRIME is booted.			
	SPIRE MIB PRIME is imported in the CCS database.			
	CCS is up and running			
and the company of th	SFT PARAMETERS display is selected on the CCS			
Duration	3 minutes			
Pass/Fail criteria	HK Parameters CHOPSENSPWR and JIGGSENSPWR show expected			
Sabatasabathisabatasabathisabathisabathisabathisabathisabathisabathisabathisabathisabathisabathisabathisabathi	ON values.			

### **Procedure Steps:**

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM- SFT-FUNC-BSM-01-P.tcl		annero annero de la companio del companio del companio de la companio del companio de la companio del companio de la companio del companio de la companio del companio de la companio del	********	######################################
2	Check that the Chop and Jiggle sensors have switched on	CHOPSENSPWR JIGGSENSPWR	0/1/1 0/1/1	оносон <b>(</b>	ni jacobarra kanana
Test Result (Pass/Fail):					

HP-2-ASED-TP-0166 Doc. No:

Issue: 1

Date: 10.09.07



#### Procedure SPIRE-FM-SFT-BSM-OFF-P 11.13

Version	2.3			
Date	28 <sup>nd</sup> August 2007			
Purpose	SM (PRIME) Switch OFF			
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are ON.			
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. BSM Chop/Jiggle sensors are OFF.			
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MCU PRIME is booted.</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>			
Duration	3 minutes			
Pass/Fail criteria	HK Parameters CHOPSENSPWR and JIGGSENSPWR show expected OFF values.			

### **Procedure Steps:**

Step	Description	Parameter Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure		
1	Execute SPIRE-FM-SFT-BSM- OFF-P.tcl	******	******	14000000ki			
2	Check that the power to the BSM sensors is switched off	CHOPSENSPWR JIGGSENSPWR	1/-/0 1/-/0				
Test F	Test Result (Pass/Fail):						

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date:

10.09.07

1



#### 11.14 Procedure SPIRE-FM-SFT-FUNC-SMEC-01-P

Version	2.3			
Date	28 <sup>th</sup> August 2007			
Purpose	MEC (PRIME) Encoder/LVDT Sensor Check.			
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.			
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.			
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MCU PRIME is booted.</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>			
Duration	3 minutes			
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected ON values.			

### **Procedure Steps:**

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure		
1	Execute TCL script SPIRE-FM- SFT-FUNC-SMEC-01-P.tcl		Openhors	BHADHHISONIAGAADAGGAADAGGAAGAGAAGAGAAGAGAAGAGAAGA			
2	Check that power to the SMEC LED and LVDT sensor is on	SMECENCPWR	0/-/1	<del>neen na marina and an </del>			
		SMECLVDTPWR	0/1/1				
Test F	Test Result (Pass/Fail):						

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date: 10.09.07

1

Page

69



#### Procedure SPIRE-FM-SFT-SMEC-OFF-P 11.15

Version	2.3
Date	28 <sup>th</sup> August 2007
Purpose	SMEC (PRIME) Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are ON.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. SMEC Encoder and LVDT are OFF.
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MCU PRIME is booted.</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	3 minutes
Pass/Fail criteria	HK Parameters SMECENCPWR and SMECLVDTPWR show expected OFF values.

### **Procedure Steps:**

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure		
1	Execute SPIRE-FM-SFT-SMEC- OFF-P.tcl	*******	******	ASSOCIATES	10000000		
2	Check that the power to the SMEC sensors is switched off	SMECENCPWR	1/-/0				
		SMECLVDTPWR	1/-/0	UNIVERSE DE LES CONTRACTOR DE SERVICION DE LE CONTRACTOR DE LA CONTRACTOR DE LA CONTRACTOR DE LA CONTRACTOR DE			
Test F	Test Result (Pass/Fail):						

HP-2-ASED-TP-0166 Doc. No:

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Issue:

10.09.07 Date:





## 11.16 Procedure SPIRE-FM-SFT-FUNC-DCU-01-P

Version	2.2				
Date	2 <sup>nd</sup> January 2007				
Purpose	DCU science packet generation check for all Photometer and				
	Spectrometer packet types (PF, PSW, PMW, PLW, SF, SSW and SLW)				
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced				
	and AC/DC thermometry is ON and MCU PRIME is booted.				
Final configuration	Unchanged				
Constraints	SPIRE DRCU PRIME is switched ON				
	SPIRE MIB PRIME is imported in the CCS database.				
	CCS is up and running				
	<ul> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>				
Duration	5 minutes				
Pass/Fail criteria	Specified DCU HK parameter shows expected increment				

### **Procedure Steps:**

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure		
1	Execute TCL script SPIRE-FM-SFT- FUNC-DCU-01-P.tcl	DCUFRAMECNT	0/700				
Test F	Test Result (Pass/Fail):						

Doc. No: HP-2-ASED-TP-0166

1

Issue:

Page 71



#### Procedure: SPIRE-FM-SFT-FUNC-DCU-04-PHOT-P 11.17

Version	2.4
Date	10 <sup>th</sup> September 2007
Purpose	Photometer LIAs PRIME Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. Photometer LIAs are ON
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>Photometer LIAs are OFF</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>DCU PARAMETERS &amp; SFT PARAMETERS displays are selected on the CCS</li> </ul>
Duration	5 minutes
Pass/Fail criteria	Specified Photometer LIA HK parameters show expected ON values

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT- FUNC-DCU-04-PHOT-P.tcl	PLIABITSTAT	0/1/1		
2	Check Photometer LIA HK parameter values and ensure that the values are refreshing	PLIAP5V PLIAP9V PLIAM9V	0.0/-/ 5.2 ± 0.2V 0.0/-/ 11.5 ± 0.5V 0.0/-/-11.5 ± 0.5V	майосованного и поченено се	
3	On the DCU PARAMETERS display check that the LIA temperatures are slowly warming up. At switch-on it is possible that some of the LIA temperatures will be in soft or even hard limits. No action is required.	LIAP1TEMP to LIAP9TEMP	~ 290-300 K		
4	Wait for ~3 minutes before continuing with the SFTs	4308AN)	*******	PERSONAL	Sile for de la

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date:

10.09.07





#### 11.18 Procedure: SPIRE-FM-SFT-PHOT-JFET-ON-01

Version	1.1				
Date	10 <sup>th</sup> September 2007				
Purpose	Photometer JFET's Switch On				
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced				
	AC/DC thermometry is ON				
	MCU PRIME is booted				
	Photometer LIAs are ON				
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced				
	AC/DC thermometry is ON				
	MCU PRIME is booted				
	Photometer LIAs are ON				
SOUD TO SOUD TO THE TO THE TOTAL THE	Photometer JFETs are ON				
Constraints	SPIRE DRCU PRIME is switched ON				
	SPIRE MIB PRIME is imported in the CCS database.				
	CCS is up and running     DCU PARAMETERS display is salested on the CCS.				
	DCU PARAMETERS display is selected on the CCS				
Duration	5 minutes				
Pass/Fail criteria	Photometer JFET HK parameters show expected ON values				

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-PHOT-JFET-ON-01.tcl			******	1001566
	Wait for the script to finish executing before proceeding with the next step				

Doc. No: HP-2-ASED-TP-0166

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Step	Description	Parameter	Expected Values	Actual Values	Success/ Failure
			Before/	Before	ranure
				/After	
**********			After	/AILEF	<u>ьдидарьдыннян ницияничники инкличическ</u>
2	On the DCU PARAMETERS display	PSWJFETSTAT	0x3F		
	check the JFET HK parameters	PMLWJFETSTAT	0x7F		
		PSWJFET1V	-1.49 ± 0.1 V		
		PSWJFET2V	-1.49 ± 0.1 V		
		PSWJFET3V	-1.49 ± 0.1 V		
		PSWJFET4V	-1.49 ± 0.1 V		
		PSWJFET5V	-1.49 ± 0.1 V		
		PSWJFET6V	-1.49 ± 0.1 V		
		PMWJFET1V	-1.49 ± 0.1 V		
		PMWJFET2V	-1.49 ± 0.1 V		
		PMWJFET3V	-1.49 ± 0.1 V		
		PMWJFET4V	-1.49 ± 0.1 V		
		PLWJFET1V	-1.49 ± 0.1 V		
		PLWJFET2V	-1.49 ± 0.1 V		
			,		
		TCJFETV	-1.49 ± 0.1 V		
	Check with Instrument Team				
	before proceeding with the next				
	test.				
Test F	Result (Pass/Fail):	<u>Бальнаральнага намага кразуруну какиза дуких очиного при правина положена на</u>	<b>Дезаразование сельностью политический пос</b>	Tarumarakki 1666 Miliaso Miliaso Miliaso Miliaso Milia	<del>rooman contransministratura (na abbatecia)</del>

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File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1.doc



Page 74



#### 11.19 Procedure: SPIRE-FM-SFT-PHOT-JFET-ON-02

Version	1.1	
Date	10 <sup>th</sup> September 2007	
Purpose	Photometer JFETs Switch On	
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced	
	AC/DC thermometry is ON	
	MCU PRIME is booted	
маразарал прозадлява за алиментичний на наментичний на наментичний на наментичний на наментичний на наментичний	Photometer LIAs are ON	
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced	
	AC/DC thermometry is ON	
	MCU PRIME is booted	
	Photometer LIAs are ON	
зиникерпияериникериникериникериникериникериникериникериникериникериникериникериникериникериникериникериникерин	Photometer JFETs are ON	
Constraints	SPIRE DRCU PRIME is switched ON	
	SPIRE MIB PRIME is imported in the CCS database.	
	<ul><li>CCS is up and running</li><li>DCU PARAMETERS display is selected on the CCS</li></ul>	
Duration	5 minutes	
Pass/Fail criteria		

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-PHOT-JFET-ON-02.tcl			ACCEPTANCE OF THE PROPERTY OF	
	Wait for the script to finish executing before proceeding with the next step				

Doc. No: HP-2-ASED-TP-0166

Issue:

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10.09.07 Date:



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Step	Description	Parameter	Expected	Actual	Success/
			Values	Values	Failure
			Before/	Before	
			After	/After	
2	On the DCU PARAMETERS display	PSWJFETSTAT	0x3F		
	check the JFET HK parameters	PMLWJFETSTAT	0x7F		
	·				
		PSWJFET1V	-1.68 ± 0.02 V		
		PSWJFET2V	-1.59 ± 0.02 V		
		PSWJFET3V	-1.59 ± 0.02 V		
		PSWJFET4V	-1.68 ± 0.02 V		
		PSWJFET5V	-1.78 ± 0.02 V		
		PSWJFET6V	-1.68 ± 0.02 V		
		PMWJFET1V	-1.68 ± 0.02 V		
		PMWJFET2V	-1.88 ± 0.02 V		
		PMWJFET3V	-1.59 ± 0.02 V		
		PMWJFET4V	-1.88 ± 0.02 V		
		PLWJFET1V	-1.78 ± 0.02 V		
		PLWJFET2V	-1.59 ± 0.02 V		
		TCJFETV	-1.49 ± 0.02 V		
	Check with Instrument Team				
	before proceeding with the next				
	test.				

Doc. No:

HP-2-ASED-TP-0166

Issue:

1

Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1.doc

Page



### Procedure: SPIRE-FM-SFT-PHOT-JFET-OFF 11.20

Version	1.0	
Date	29 <sup>th</sup> August 2007	
Purpose	Photometer JFETs Switch Off	
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced	
	AC/DC thermometry is ON	
	MCU PRIME is booted	
	Photometer LIAs are ON	
	Photometer JFETs are ON	
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced	
	AC/DC thermometry is ON	
	MCU PRIME is booted	
	Photometer LIAs are ON	
ANIINSI SASSANISSANI INNI SANIANDAAN JAMAA SANIANDAAN JAMAA SANIAN JAMAA SANIAN JAMAA SANIAN JAMAA SANIAN JAMAA	Photometer JFETs are OFF	
Constraints	SPIRE DRCU PRIME is switched ON	
	SPIRE MIB PRIME is imported in the CCS database.	
	CCS is up and running  BOURDARY TERM distribution to the control of the cont	
	DCU PARAMETERS display is selected on the CCS	
Duration	5 minutes	
Pass/Fail criteria	Photometer JFET HK parameters show expected OFF values	

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT- PHOT-JFET-OFF.tcl			ADDROGRAM SERVICE SERV	
	Wait for the script to finish executing before proceeding with the next step				

Doc. No: HP-2-ASED-TP-0166

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Step	Description	Parameter	Expected	Actual	Success/
			Values	Values	Failure
			Before/	Before	
			After	/After	
2	On the DCU PARAMETERS display	PSWJFETSTAT	0		
	check the JFET HK parameters	PMLWJFETSTAT	0		
		PSWJFET1V	0.0 V		
		PSWJFET2V	0.0 V		
		PSWJFET3V	0.0 V		
		PSWJFET4V	0.0 V		
		PSWJFET5V	0.0 V		
		PSWJFET6V	0.0 V		
		PMWJFET1V	0.0 V		
		PMWJFET2V	0.0 V		
		PMWJFET3V	0.0 V		
		PMWJFET4V	0.0 V		
		PLWJFET1V	0.0 V		
		PLWJFET2V	0.0 V		
		TCJFETV	0.0 V		
	Check with Instrument Team				
	before proceeding with the next				
	test.				
Toet F	Result (Pass/Fail):	<u></u>		Contract the contr	

HP-2-ASED-TP-0166 Doc. No:

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Issue:



#### 11.21 Procedure: SPIRE-FM-SFT-PLIA-OFF-P

Version	2.4		
Date	10 <sup>th</sup> September 2007		
Purpose	Photometer LIAs PRIME Switch OFF		
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. Photometer LIAs are ON		
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. Photometer LIAs are OFF		
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>Photometer LIAs are ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>		
Duration	2 minutes		
Pass/Fail criteria	Specified Photometer LIA HK parameters show expected OFF values		

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT- PLIA-OFF-P.tcl	PLIABITSTAT	1/-/0		
2	Check Photometer LIA HK parameter values	PLIAP5V PLIAP9V PLIAM9V	5.2 ± 0.2V/-/0.0 11.5 ± 0.5V/-/0.0 -11.5 ± 0.5V/-/0.0		
Test F	tesult (Pass/Fail):	hnkidääthinääänhnköhnuusanниоорнизаанииаанния	uuruuuura maanaan ka	andoonnusoonnusoonnusoonnus	миния в при

Doc. No: HP-2-ASED-TP-0166

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10.09.07

Issue:

Date:



79

Page

### **Test Procedure**



#### Procedure: SPIRE-FM-SFT-FUNC-DCU-04-SPEC-P 11.22

Version	2.4
Date	10 <sup>th</sup> September 2007
Purpose	Spectrometer LIAs PRIME Check
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. Spectrometer LIAs are ON
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>Spectrometer LIAs are OFF</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS &amp; DCU PARAMETERS displays are selected on the CCS</li> </ul>
Duration	5 minutes
Pass/Fail criteria	Specified Spectrometer LIA HK parameters show expected ON values

### **Procedure Steps for FM:**

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM- SFT-FUNC-DCU-04-SPEC-P.tcl	SLIABITSTAT	0/1/1		
2	Check Spectrometer LIA HK parameter values and ensure that the values are refreshing	SLIAP5V SLIAP9V SLIAM9V	0.0/-/ 5.2 ± 0.2V 0.0/-/ 11.5 ± 0.5V 0.0/-/-11.5 ± 0.5V		
3	On the DCU PARAMETERS display check that the LIA temperatures are slowly warming up. At switch-on it is possible that some of the LIA temperatures will be in soft or even hard limits. No action is required.	LIAS1TEMP to LIAS3TEMP	~ 290-300 K		
4	Wait for ~3 minutes before continuing with the SFTs	***************************************	Laprace	passanta	444700004
Test Res	ult (Pass/Fail):				

HP-2-ASED-TP-0166 Doc. No:

Issue: 1



#### 11.23 Procedure: SPIRE-FM-SFT-SPEC-JFET-ON-01

Version	1.1	
Date	10 <sup>th</sup> September 2007	
Purpose	Spectrometer JFETs Switch On	
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced	
**************************************	AC/DC thermometry is ON	
	MCU PRIME is booted	
annin da	Spectrometer LIAs are ON	
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced	
	AC/DC thermometry is ON	
	MCU PRIME is booted	
	Spectrometer LIAs are ON	
одновательного при температичного при температичного при температичного при температичного при температичного п	Spectrometer JFETs are ON	
Constraints	SPIRE DRCU PRIME is switched ON	
	SPIRE MIB PRIME is imported in the CCS database.	
	<ul> <li>CCS is up and running</li> <li>DCU PARAMETERS display is selected on the CCS</li> </ul>	
Duration	5 minutes	
Pass/Fail criteria	Spectrometer JFET HK parameters show expected ON values	

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-SPEC-JFET-ON-01.tcl  Wait for the script to finish executing before proceeding with the next step				
2	On the DCU PARAMETERS display check the JFET HK parameters  Check with Instrument Team	SPECJFETSTAT  SSWJFET1V  SSWJFET2V  SLWJFET1V	7 -1.49 ± 0.1 V -1.49 ± 0.1 V -1.49 ± 0.1 V		
поприментация приментация прим	before proceeding with the next test. Result (Pass/Fail):			опплосополоромина в материали промина в материали п	MANIFESSANINOS SELECTOR SELECT

HP-2-ASED-TP-0166 Doc. No: 1

Issue:

81

Page



#### Procedure: SPIRE-FM-SFT-SPEC-JFET-ON-02 11.24

Version	1.1				
Date	10 <sup>th</sup> September 2007				
Purpose	Spectrometer JFETs Switch On				
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced				
	AC/DC thermometry is ON				
	MCU PRIME is booted				
	Spectrometer LIAs are ON				
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced				
	AC/DC thermometry is ON				
	MCU PRIME is booted				
	Spectrometer LIAs are ON				
	Spectrometer JFETs are ON				
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>DCU PARAMETERS display is selected on the CCS</li> </ul>				
Duration	5 minutes				
Pass/Fail criteria	Spectrometer JFET HK parameters show expected ON values				

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT-SPEC-JFET-ON-02.tcl  Wait for the script to finish executing before proceeding with the next step				
2	On the DCU PARAMETERS display check the JFET HK parameters	SPECJFETSTAT  SSWJFET1V  SSWJFET2V  SLWJFET1V	7 $-1.68 \pm 0.02 \text{ V}$ $-2.07 \pm 0.02 \text{ V}$ $-1.59 \pm 0.02 \text{ V}$		
	Check with Instrument Team before proceeding with the next test.				

Doc. No: HP-2-ASED-TP-0166

1

Issue:





#### 11.25 Procedure: SPIRE-FM-SFT-SPEC-JFET-OFF

Version	1.0			
Date	29 <sup>th</sup> August 2007			
Purpose	Spectrometer JFETs Switch Off			
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced			
	AC/DC thermometry is ON			
	MCU PRIME is booted			
	Spectrometer LIAs are ON			
	Spectrometer JFETs are ON			
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced			
	AC/DC thermometry is ON			
	MCU PRIME is booted			
	Spectrometer LIAs are ON			
алимадария в при	Spectrometer JFETs are OFF			
Constraints	SPIRE DRCU PRIME is switched ON			
	SPIRE MIB PRIME is imported in the CCS database.			
	CCS is up and running     DCU PARAMETERS display is coloated on the CCS.			
	DCU PARAMETERS display is selected on the CCS      minutes			
Duration	5 minutes			
Pass/Fail criteria	Spectrometer JFET HK parameters show expected OFF values			

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT- SPEC-JFET-OFF.tcl				***************************************
negotida postida produ kinika	Wait for the script to finish executing before proceeding with the next step				

Doc. No: HP-2-ASED-TP-0166

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Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
2	On the DCU PARAMETERS display check the JFET HK parameters	SPECJFETSTAT  SSWJFET1V  SSWJFET2V  SLWJFET1V	0 0.0 V 0.0 V		
	Check with Instrument Team before proceeding with the next test.	SLVVJPETIV	0.0 V		
Test F	l Result (Pass/Fail):	<u> </u>			Seeningeenaagaan agaal ahaa ahaa ahaa ahaa ahaa ahaa aha

Doc. No:

HP-2-ASED-TP-0166

Issue:

Date:

10.09.07

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File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1 doc

Page 83





### 11.26 Procedure: SPIRE-FM-SFT-SLIA-OFF-P

Version	2.4				
Date	10 <sup>th</sup> September 2007				
Purpose	pectrometer LIAs PRIME Switch OFF				
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. Spectrometer LIAs are ON				
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted. Spectrometer LIAs are OFF				
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>Spectrometer LIAs are ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>				
Duration	2 minutes				
Pass/Fail criteria	Specified Spectrometer LIA HK parameters show expected OFF values				

Step	Description	Parameter	Expected Values Before/ After	Actual Values Before /After	Success/ Failure
1	Execute TCL script SPIRE-FM-SFT- SLIA-OFF-P.tcl	SLIABITSTAT	1/-/0		
2	Check Photometer LIA HK parameter values	SLIAP5V SLIAP9V SLIAM9V	5.2 ± 0.2V/-/0.0 11.5 ± 0.5V/-/0.0 -11.5 ± 0.5V/-/0.0		
Test F	Result (Pass/Fail):	receptive paracopprocess process proce		marendadebildebildebildebild	

Doc. No:

HP-2-ASED-TP-0166

Issue:

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85

Page



#### Procedure SPIRE-FM-SFT-MCU-OFF-P 11.27

Version	2.3			
Date	28 <sup>nd</sup> August 2007			
Purpose	MCU PRIME Switch OFF			
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is booted.			
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON and MCU PRIME is OFF.			
Constraints	<ul> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MCU PRIME is ON.</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>			
Duration	2 minutes			
Pass/Fail criteria	Specified MCU HK Parameter shows expected value.			

### **Procedure Steps:**

Step	Description	Parameter – Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute SPIRE-FM-SFT-MCU- OFF-P.tcl			4000400M	***************************************
2	Check that the MCU is switched off	MCUBITSTAT	1/-/0		
Test F	Result (Pass/Fail):				

Doc. No: HP-2-ASED-TP-0166

Issue:

10.09.07 Date:



### Procedure SPIRE-FM-SFT-SCU-OFF-P 11.28

Version	2.3
Date	28 <sup>nd</sup> August 2007
Purpose	SCU PRIME Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
***************************************	and AC/DC thermometry is ON.
Final configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced
MHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH	and AC/DC thermometry is OFF
Constraints	SPIRE DRCU PRIME is switched ON
	SPIRE MIB PRIME is imported in the CCS database.
	CCS is up and running
SUBSTRACTION OF THE PROPERTY O	<ul> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	2 minutes
Pass/Fail criteria	Specified SCU HK Parameters show expected value.

### **Procedure Steps:**

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM- SFT-SCU-OFF-P.tcl		ossassassassassassassassassassassassassa	Andrew Andrews (Street Street	***************************************
2	A few seconds later record the value of parameter SCUTEMPSTAT	SCUTEMPSTAT	FFFF/-/0		
3	A few seconds later record the value of parameter SUBKSTAT	SUBKSTAT	1/-/0		
Test F	Result (Pass/Fail):	ander in 18 en de 1900 de 1900 Inscripción de 1900 de	нез <sup>8</sup> анизонноонникозонна ана на сентра в се	и по	Посетинення применення применення применення применення применення применення применення применення применення

Doc. No: HP-2-ASED-TP-0166

Issue: 1

10.09.07 Date:



### **Procedure SPIRE Power OFF** 11.29

Step	Description	Parameter	Expected Values Before/After	Actual Values Before/After	Pass/ Fail
1	Execute TCL script S102999SCVT007_ASDSFTSPIR_P WR_OFF_P.tcl		******	******	

Note: This script powers down the instrument DPU and DRCU prime. Therefore, the next two procedures, 11.30 and 11.31, are not executed manually.

#### Procedure: SPIRE-FM-SFT-DRCU-OFF-P 11.30

Version	2.2
Date	2 <sup>nd</sup> January 2007
Purpose	DRCU PRIME Switch OFF
Initial configuration	SPIRE DPU and DRCU PRIME are ON and SPIRE HK is being produced and AC/DC thermometry is ON.
Final configuration	SPIRE DPU PRIME is ON, SPIRE DRCU PRIME is OFF and SPIRE HK is not being produced .
Constraints	<ul> <li>SPIRE-FM-SFT-SCU-OFF has been executed.</li> <li>SPIRE DRCU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	5 minutes
Pass/Fail criteria	THSK and TM2N stop refreshing/incrementing

Step	Description	Parameter - Unit	Expected Values Before/ During/ After	Actual Values Before/ During/ After	Success/ Failure
1	Execute TCL script SPIRE-FM- SFT-DRCU-OFF.tcl		- Carlotteria	- outstanding	
2	Check that THSK parameter is not refreshing anymore	THSK	Not refreshing		
3	Check that TM2N parameter is not incrementing anymore	TM2N	Not incrementing	*******	
4	Power OFF the SPIRE DRCU PRIME unit.		***************************************	*****	
Test f	Result (Pass/Fail):		eciminas sun proprio de la compansa		

Doc. No:

HP-2-ASED-TP-0166

Page

87

Issue:

Date:

10.09.07





#### 11.31 Procedure: SPIRE-FM-SFT-DPU-OFF-P

Version	2.2
Date	2 <sup>nd</sup> January 2007
Purpose	DPU PRIME Switch OFF
Initial configuration	SPIRE DPU PRIME is ON but not generating HK.
Final configuration	SPIRE DPU PRIME is OFF.
Constraints	<ul> <li>SPIRE-FM-SFT-DRCU-OFF has been executed.</li> <li>SPIRE DPU PRIME is switched ON</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>SFT PARAMETERS display is selected on the CCS</li> </ul>
Duration	5 minutes
Pass/Fail criteria	Power to SPIRE DPU PRIME is OFF

### **Procedure Steps:**

Step	Description	Parameter – Unit	Expected	Actual	Success/
	-		Values	Values	Failure
			Before/	Before/	
			During/	During/	
hhiddhanddanauanna	MANUSCRIMINISHINIAAAAAA AAAAAAAAAAAAAAAAAAAAAAAAAAAAA		After	After	
1	Power OFF the SPIRE DPU PRIME unit.	***************************************	70103aa		<del>ом</del> иничнос <del>ь і за вызовання в</del>
Test F	Result (Pass/Fail):	9999-194 <mark>0</mark> 0-194-19-00-00-00-00-00-00-00-00-00-00-00-00-00	наянналагиалеського основого основний правительного объебе	у поставання при	<b>R</b> agoonininkinjirikkapandoodinino <del>odinink</del> i

HP-2-ASED-TP-0166 Doc. No:

Issue: 1

Date: 10.09.07 Page



#### SPIRE-SAFE-SWITCH-OFF 11.32

Version	2.3
Date	10 <sup>th</sup> September 2007
Purpose	To switch OFF the SPIRE instrument if an anomaly should occur
Initial configuration	SPIRE can be on ANY configuration as specified on the procedure steps
Final configuration	SPIRE is OFF
Preconditions	<ul> <li>SPIRE FM DPU is electrically integrated with the Herschel Satellite</li> <li>SPIRE MIB PRIME is imported in the CCS database.</li> <li>CCS is up and running</li> <li>FUNCTIONAL TEST PARAMETERS display is selected on the CCS</li> </ul>
Duration	~5-8 minutes
Pass/Fail Criteria	SPIRE is OFF. All instrument subsystems are completely powered OFF.

### Note:

All HK parameters relevant to this procedure can be located on the FUNCTIONAL TEST PARAMETERS CCS display. The exact name of the script to be executed at each step depends on whether the Prime or Redundant instrument is switched on.

Step	Description	Parameter - Unit	Display	Actual value before/ after
1	Check to see if the Photometer LIAs are on			
	If PLIABITSTAT=1 then execute SPIRE-FM-SFT-PLIA-OFF- <p r="">.tcl</p>	PLIABITSTAT	0 or 1	
2	Check to see if the Spectrometer LIAs are on			
	If SLIABITSTAT=1 then execute SPIRE-FM-SFT-SLIA-OFF- <p r="">.tcl</p>	SLIABITSTAT	0 or 1	

Doc. No:

HP-2-ASED-TP-0166

Issue:

10.09.07 Date:



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Step	Description	Parameter - Unit	Display	Actual value before/ after
3	Switch off the Phot and Spec JFETs:			
Account of the Control of the Contro	Execute SPIRE-FM-SFT-PHOT- JFET-OFF.tcl	-	age .	-
	Execute SPIRE-FM-SFT-SPEC- JFET-OFF.tcl			
4	Check to see if the BSM is on		Ф	**************************************
POWER PROPERTY OF THE POWER POWER PROPERTY OF THE POWER POWER PROPERTY OF THE POWER POWER POWER PROPERTY OF THE POWER POWER POWER POWER POWER POWER POWER	If CHOPSENSPWR=1 or JIGGSENSPWR=1, then execute SPIRE-FM-SFT-BSM-OFF- <p r="">.tcl</p>	CHOPSENSPWR JIGGSENSPWR	0 or 1 0 or 1	
5	Check to see if the SMEC is on  If SMECENCPWR=1 or SMECLVDTPWR=1, then execute SPIRE-FM-SFT-SMEC-OFF- <p r="">.tcl</p>	SMECENCPWR SMECLVDTPWR	0 or 1 0 or 1	
6	Check to see if the MCU is on  If MCUBITSTAT=1 then execute SPIRE-FM-SFT-MCU-OFF- <p r="">.tcl</p>	MCUBITSTAT	0 or 1	
7	Check to see if the SCU DC/AC thermometry is on			
	If SUBKSTAT=1 or SCUTEMPSTAT≠0, then execute SPIRE-FM-SFT-SCU-OFF- <p r="">.tcl</p>	SUBKSTAT SCUTEMPSTAT	0 or 1 ≠ 0	
8	Execute Procedure SPIRE-FM- SFT-DRCU-OFF- <p r="">.tcl</p>	TM2N THSK	Should stop updating	
9	Execute Procedure SPIRE-FM- SFT-DPU-OFF- <p r="">.tcl</p>	n/a	n/a	

HP-2-ASED-TP-0166 Doc. No:

Issue: 1



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Doc. No:

HP-2-ASED-TP-0166

Issue:

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**********	Name	Dep./Comp.	1	Name	Dep./Comp
	Alberti von Mathias Dr.	ASG23		Schmidt Thomas	AED15
****	Baldock Richard	FAE12	I	Schuler Günter	ASA42
-	Barlage Bernhard	AED13		Schweickert Gunn	ASG23
	Bayer Thomas	ASA42		Sonn Nico	ASG51
*************	Brune Holger	ASA45		Steininger Eric	AED32
	Edelhoff Dirk	AED2	Х	Stritter Rene	AED11
**********	Fehringer Alexander	ASG13		Suess Rudi	OTN/ASA4
*****	Fricke Wolfgang Dr.	AED 65		Theunissen Martijn	DSSA
	Geiger Hermann	ASA42		Vascotto Riccardo	AED11
	Grasl Andreas	OTN/ASA44		Wagner Klaus	ASG23
Χ	Grasshoff Brigitte	AET12	Х	Wietbrock Walter	AET12
Χ	Hamer Simon	Terma		Wöhler Hans	ASG23
******	Hendrikse Jeffrey	HE Space		Wössner Ulrich	ASE252
Χ	Hendry David	Terma		Zumstein Armin	ASQ42
mananana	Hengstler Reinhold	ASA42			***************************************
	Hinger Jürgen	ASG23			***************************************
	Hohn Rüdiger	AED65			According to the control of the cont
	Hölzle Edgar Dr.	AED32			
	Hopfgarten Michael	AED32	-	A DESCRIPTION OF THE PROPERTY	***************************************
**********	Huber Johann	ASA42	***************************************		***************************************
	Hund Walter	ASE252			***************************************
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	Jahn Gerd Dr.	ASG23		The second secon	***************************************
	Kalde Clemens	ASM2			***************************************
	Kameter Rudolf	OTN/ASA42	Х	ESA/ESTEC	ESA
*********	Kettner Bernhard	AET42	Х	Thales Alenia Space Cannes	TAS-F
	Knoblauch August	AET32		Thales Alenia Space Torino	TAS-I
Χ	Koelle Markus	ASA43		The state of the s	
Χ	Koppe Axel	AED312	***************************************	Instruments:	***************************************
	Kroeker Jürgen	AED65		MPE (PACS)	MPE
*********	La Gioia Valentina	Terma	Х	RAL (SPIRE)	RAL
********	Lang Jürgen	ASE252		SRON (HIFI)	SRON
**********	Langenstein Rolf	AED15			Pro-Service de la constantina del constantina de la constantina del constantina de la constantina de la constantina de la constantina del constantina
	Langfermann Michael	ASA41			***************************************
	Martin Olivier	ASA43		Subcontractors:	***************************************
	Maukisch Jan	ASA43		Austrian Aerospace	AAE
HOOGANNAA.	Much Christoph	ASA43	***************************************	Austrian Aerospace	AAEM
	Müller Jörg	ASA42	***************************************	BOC Edwards	BOCE
************	Müller Martin	ASA43	***************************************	Dutch Space Solar Arrays	DSSA
	Peltz Heinz-Willi	ASG13	***************************************	EADS Astrium Sub-Subsyst. & Equipn	*********
**********	Pietroboni Karin	AED65	***************************************	EADS CASA Espacio	CASA
***********	Platzer Wilhelm	AED2		EADS CASA Espacio	ECAS
	Reichle Konrad	ASA42	*******************	European Test Services	ETS
	Runge Axel	OTN/ASA44		Patria New Technologies Oy	PANT
	Sauer Maximilian Dr.	AED65		SENER Ingenieria SA	SEN
	Schink Dietmar	AED32	***************************************	Thales Alenia Space, Antwerp	TAS-ETCA

Doc. No: HP-2-ASED-TP-0166

Issue: 1 Date: 10.09.07

File: SPIRE PFM Final Electrical Integration Procedure HP-2-ASED-TP-0166 1 doc



## **Test Report**

# Herschel

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Doc. No:

HP-2-ASED-TR-0216

Issue:

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Date: 10.10.2007

7



# **Test Report**

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	Alberti von Mathias Dr.	ASG23		Schweickert Gunn	ASG23
	Baldock Richard	FAE12		Sonn Nico	ASG51
*************	Barlage Bernhard	AED13		Steininger Eric	AED32
	Bayer Thomas	ASA42	Х	Stritter Rene	AED11
***********	Brune Holger	ASA45		Suess Rudi	OTN/ASA44
	Edelhoff Dirk	AED2		Theunissen Martijn	DSSA
***************************************	Fehringer Alexander	ASG13		Vascotto Riccardo	HE Space
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	Grasl Andreas	OTN/ASA44		Wöhler Hans	ASG23
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-	Hendrikse Jeffrey	HE Space			The state of the s
	Hendry David	Terma			***************************************
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	Hinger Jürgen	ASG23			
	Hohn Rüdiger	AED65	- hhra annountiquence		**************************************
	Hölzle Edgar Dr.	AED32	***************************************		***************************************
	Hopfgarten Michael	AED32			***************************************
************	Huber Johann	ASA42	***************************************		**************************************
*****	Hund Walter	ASE252	***************************************		
Х	Idler Siegmund	AED312	******************************		
	lvády von András	FAE12	***************************************		***************************************
**********	Jahn Gerd Dr.	ASG23	The second second second	**************************************	***************************************
-	Kalde Clemens	ASM2		historia	
	Kettner Bernhard	AET42	Х	ESA/ESTEC	ESA
****	Knoblauch August	AET32	Х	Thales Alenia Space Cannes	TAS-F
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X	Koppe Axel	AED312			
Χ	Kroeker Jürgen	AED65		Instruments:	
	La Gioia Valentina	Terma		MPE (PACS)	MPE
X	Lang Jürgen	ASE252	Х	RAL (SPIRE)	RAL
P.P.P	Langenstein Rolf	AED15		SRON (HIFI)	SRON
	Langfermann Michael	ASA41	***************************************	The state of the s	***************************************
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************	Maukisch Jan	ASA43		Subcontractors:	THE STATE OF THE S
-	Much Christoph	ASA43	***************************************	Austrian Aerospace	AAE
***************	Müller Jörg	ASA42		Austrian Aerospace	AAEM
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DEFENDANT	Peltz Heinz-Willi	ASG13		Dutch Space Solar Arrays	DSSA
************	Pietroboni Karin	AED65		EADS Astrium Sub-Subsyst. & Equipment	ASSE
*******	Platzer Wilhelm	AED2	***************************************	EADS CASA Espacio	CASA
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