

Minutes of Meeting

Date:	17.12.04	Herschel
Doc.-No.:	HP-2-ASED-MN-0836	
Meeting place:	Otn	Chairman: Lamprecht
Date/Time:		Secretary
Agenda dated:	IRR Std. Agenda on annex 1	Close of Meeting:

Subject: IRR for Spire integration to PLM EQM

Participants:	H. Pinter-Krainer (ESTEC) <i>[Signature]</i> C. Scharnberg (ESTEC) <i>[Signature]</i> E. Sawyer (RAL) <i>[Signature]</i> A. Pearce (RAL) <i>[Signature]</i> S. Idler (ASED) <i>[Signature]</i> P. Mack (ASED) <i>[Signature]</i> T. Bayer (ASED) <i>[Signature]</i> E. Lamprecht (ASED) <i>[Signature]</i>	Additional Distribution: ESA, ASP <i>[Signature]</i>
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Page: 1 of 8 Page(s)

<input type="checkbox"/> Brief-Minutes (except following sheets)	<input type="checkbox"/> Summary of Results of Sheets 2 till
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Summary and Conclusion:

The release for integration have been given upon successful completion of open works as defined in chapter 8.



Reference	Results	Remarks
	<p>IRR Agenda :</p> <p>1. H/W Identification (Model, SN#, CI#, CIL) -PLM EQM CI: 150000</p> <p>-SPIRE CQM FPU + 2 JFET HS/ FPU CQ, CI: 142512-01, 142512-02, 142512-021, 142512-022</p> <p>2. Qualification / Acceptance Reference / Status of H/W to be integrated -Spire incoming and bench test successful performed SPIRE CQM FPU + 2 JFET are qualified in point of view to mechanical/ thermal and functional behaviour. Reports are included in the delivered EIDP. During incoming inspection a bench test was performed successful and therefore it is stated by RAL the SPIR is ready for integration to the PLM</p> <p>3. H/W ABCL Reference / Status -for ISO PLM EQM see HP-2-ASED-MN-0252 see Annex 1 S/N of major components -or Spire there was an action to update the ABCL which have been performed closed by the document SPIRE-RAL-DOC-001971 issue 4.2 which has been handed over to ASED today.</p> <p>4. H/W ADP EIDP Reference / Status -for ISO PLM EQM see HP-2-ASED-MN-0252 - CCH: HP-2-CASA-DP-0005 - CIH: HP-2-CASA-DPÜ-0006 - OBA: HP-2-SEN-DP-0005 - OBHCL: HP-2-AIRL-DP-0008</p>	



Reference	Results	Remarks
	<p>- MLI: HP-2-AAEM-DP-0002 - Electrical ring: HP-2-APCO-DP-0032 - Upper bulkhead: HP-2-APCO-DP-0043 - Delta TS: HP-2-AIRS-DP-0003 - SPIRE: RAL-PRJ-001898 (Final issue 2 will be delivered by RAL at mid of December 2004) -Delta tubing : HP-RILAM-ADP-0001</p> <p>5. Integration Procedure / Status -EQM integration Part 1: HP-2-ASED-PR-0013, working copy -EQM integration Part 2: HP-2-ASED-PR-0014, working copy -EQM piping modification: HP-2-ASED-PR-0067, working copy -AXT Lo HP-2-ASED-TP-0033, working copy -OBA Harness HP-ASED-PR-0037, working copy -The OBA integration will be performed according to: OBA integration procedure HP-2-ASED-PR-0026, draft version available on site</p> <p>-SPIRE integration procedure: SPIRE-RAL-PRC-001923 available on site</p> <p>-ASED Spire integration procedure not yet available, to be formalized by procedure variation sheet or test change.</p> <p>HIFI, PACS harness rails not yet available on site in OTN therefore it shall be checked to change the integration sequence in order to integrate first the OBA to the PLM and afterwards the instrument to the already integrated OBA.</p> <p>Closed: possible as checked by ASED</p>	<p>AI ASED</p>



Reference	Results	Remarks
	<p>6. DRB MoM</p> <p>The SPIRE DRB was performed on 11/ 12. 11. 2004 see H-P-ASP-5613 Review of action from the DRB see attached AI list AI 1: closed, JFET has been delivered AI 2: closed. LO strap will be delivered by SPIRE until the 15. of January 2005 AI 3: AI open the closure is announced for 15.december AI 4: Closed by document MSSL/ SPIRE/ PA016.01 which has been handed over to ASED today AI 5: Closed by the updated open work and shipping list which has been handed over to ASED today ,see attachment. AI 6: SPIRE EIDP log due date 15.12.04 AI still open AI 7: same as AI 6 AI 8: closed by document: SPIRE-RAL-DOC-001971 issue 4.2 AI 9: AI still open new due date 15. of December (AI ESA) AI 10: closed by the attachment SPIRE-RAL-REP-002237, issue 1 AI 11: verifications report provided, see SPIR-RAL-REP-002095 issue 1.0 AI closed AI 12: Qualification reference has been updated see SPIRE-RAL-DOC-002165; iss. 2, AI closed AI 13: Mistake in the Mom related AI list, since already same action as mentioned on AI 11 AI 14: Open until end of December AI 15: New due date agreed: 15. of December AI 16: Electrical bench test procedure not included in the EIDP, see update SPIRE RAL-NOT-002216 handed over today. AI closed AI 17: No response received; AI stays open, new due date 31.01.2004 AI 18: Alignment cube has been delivered and fitted to the FPU, AI to be formally closed until 15.12.04. AI SPIRE, update of the EIDP AI 19: ASED will provide a screw and grounding wire for each warm unit . AI considered closed! but AI to be transferred to the PLM EQ AI list! AI 20: AI closed (IDAS database verification test still to be performed not before end of February end of SPIRE PFM 1 ILT) AI 21: Same as AI8 (already closed)</p>	



Reference	Results	Remarks
	<p>AI 22: # 25 due date 15./ 12: still open AI 26: closed by PACS-MPE-MN-209; 23.11.2004 AI 27: open due date 25.12.</p> <p>see list of EIDP content SPIRE-RAL-PRJ-001898- Issue 2.0 attached to the moM</p> <p>All DRB related AI which could have affected the mechanical integration are closed!</p> <p>7. NCR's potentially affecting integration (H/W side, EPLM side) see attached NCR list</p> <p>THE PMIS NCR have been checked about NCR which could impact the SPIRE</p> <ul style="list-style-type: none"> - HR-SP-RAL-NCR-092 (see annex) ASED clarified, that implementation of adapter (Ref. SPIRE-RAL-MoM-0022433) on the JFET's is not possible, due to missing clearance. Has to be finalized prior WU integration. Does not impact the mechanical integration of SPIRE - ASED-0565 "OBA PFM cooling loop interference with FPA and LLP" Related to PFM, no impact to PLM EQM - ASED-0569 "Mass of thermal links out of specification" No impact for SPIRE since related only to HIFI and PACS - AIRL-0434 "Flexible thermal links cannot be elongated as required" no impact for SPIRE integration since the NCR is related to HIFI and PACS red detectors only no impact to SPIRE, only related to HIFI and PACS - AIRL-0499 "T 103 changed due to hardware failure no Impact for SPIRE integration 	



Reference	Results	Remarks
	<p>- ASED-0528 "OBA cooling line in interference with the filling port" New brackets delivered and mounted as agreed, adoption of He line to be performed → open no Impact for SPIRE integration</p> <p>-AIRL-0537: NC to be closed since related NCRs from AIRL are agreed and formally closed no Impact for SPIRE integration</p> <p>-AIRL-0570: gas porous in weld seam: technically closed, NCR to be formally closed no Impact for SPIRE integration</p> <p>-ASED 0601: Connector T235 cannot be mounted, status open no Impact for SPIRE integration</p> <p>-ASED 0603: Harness rails cannot be mounted since interface does not fit, status open, no Impact for SPIRE integration</p> <p>8. Open Work Status Open actions to be performed prior to mounting of SPIRE The following integration sequence is proposed:</p> <ul style="list-style-type: none"> -Check availability of all items which are needed for integration of SPIRE -Fit check of SPIRE on OBA and verification of exchangeability of LO struts (with SPIRE support) -Remove SPIRE -Preparation of optical bench plate for harness rail integration -Integration of OBA (planned for Friday) -Integration of SPIRE (planned for Tuesday but without SPIRE support tbc) -Pre-integration of washers and screws from underneath the OBA in order to allow later integration of the HIFI rail as workaround solution for NCR 0603 	



Reference	Results	Remarks																																
	<p>Open actions which blocks not the integration of SPIRE but which have to transferred to the EQM Open work list</p> <ul style="list-style-type: none"> -Leak test of OBA tubing -Finalisation of OBA harness, T233, T235, T236, T244, 4 L3, T249 # T252 repair according to NCR 0601 to be performed -Visual inspection of I/F connectors from SPIRE tbd (after dismantling of short circ. Connectors) -See AI 2 of SPIRE open work list: LO strap will be delivered by SPIRE until the 15. of January 2005 and therefore have to be exchanged on the PLM EQM <p>9. Cleanliness / Inspection Report / Reference</p> <ul style="list-style-type: none"> -The Molecular contamination of Spire QM have been measured/ evaluated by wipe test sample = $2,2 \times 10^{-7} \text{ g/ cm}^2$ (inside the planned budget of = $5 \times 10^{-5} \text{ g/cm}^2$ as per Contamination plan) -Visual inspection of SPIRE by using UV light successfully performed -Clean room Class 100 Molecular; max: $1,3 \text{ E-}09$, Requirement $<5,0\text{E-}08$ <p>Actual values</p> <table border="1" data-bbox="421 1109 1061 1417"> <thead> <tr> <th>Sample</th> <th>Molec. overall</th> <th>days</th> <th>Mol./ day</th> </tr> </thead> <tbody> <tr> <td>y2</td> <td>5,8E-08</td> <td>43</td> <td>1,3E-09</td> </tr> <tr> <td>004/A</td> <td>4,1E-08</td> <td>44</td> <td>9,3E-10</td> </tr> <tr> <td>002/A</td> <td>4,3E-08</td> <td>51</td> <td>8,4E-10</td> </tr> <tr> <td>003/A</td> <td>3,8E-08</td> <td>66</td> <td>5,8E-10</td> </tr> <tr> <td>005/A</td> <td>4,8E-08</td> <td>58</td> <td>8,3E-10</td> </tr> <tr> <td>007/A</td> <td>4,7E-08</td> <td>64</td> <td>7,3E-10</td> </tr> <tr> <td>008/A</td> <td>3,9E-08</td> <td>83</td> <td>4,7E-10</td> </tr> </tbody> </table>	Sample	Molec. overall	days	Mol./ day	y2	5,8E-08	43	1,3E-09	004/A	4,1E-08	44	9,3E-10	002/A	4,3E-08	51	8,4E-10	003/A	3,8E-08	66	5,8E-10	005/A	4,8E-08	58	8,3E-10	007/A	4,7E-08	64	7,3E-10	008/A	3,9E-08	83	4,7E-10	
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y2	5,8E-08	43	1,3E-09																															
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005/A	4,8E-08	58	8,3E-10																															
007/A	4,7E-08	64	7,3E-10																															
008/A	3,9E-08	83	4,7E-10																															



Reference	Results				Remarks
	00/X	1,1E-08	64	1,7E-10	
	009/A	7,0E-08	155	4,5E-10	
	007/A	5,4E-08	177	3,1E-10	
	008/A	4,0E-08	167	2,4E-10	
	006/A	6,0E-08	174	3,4E-10	
	004/A	1,6E-07	169	9,5E-10	
	006/A	7,3E-08	170	4,3E-10	
	009/A	7,7E-08	125	6,2E-10	
	008/A	7,5E-08	107	7,0E-10	
	005/A	5,8E-08	98	5,9E-10	
	004/A	5,5E-08	87	6,3E-10	
	002/A	4,8E-08	97	4,9E-10	
	008/A	7,5E-08	112	6,7E-10	
	010/A	5,5E-08	109	5,0E-10	
	009/A	5,8E-08	173	3,4E-10	
	007/A	9,0E-07	252	3,6E-09	
<p>Particular contamination inside 1,5 ppM per day as valid for Class 100</p> <p>10. Safety Constraints No specific safety constraints, ESD requirements as mentioned/ applicable according to the document CDS-PDB002-IN-D are fully applicable</p> <p>11. AOB None</p> <p>12. Release for Integration The release for integration have been given upon successful completion of open works as defined in chapter 8.</p>					

Agenda : Standard Agenda for Integration Readiness Review

(Corresponding documentation must be available)

- 1. H/W Identification (Model, SN#, CI#, CIL)**
- 2. Qualification / Acceptance Reference / Status of H/W to be integrated**
- 3. H/W ABCL Reference / Status**
- 4. H/W ADP Reference / Status**
- 5. Integration Procedure / Status**
- 6. DRB MoM**
- 7. NCRs potentially affecting integration (H/W side, EPLM side)**
- 8. Open Work Status**
- 9. Cleanliness / Inspection Report / Reference**
- 10. Safety Constraints**
- 11. AOB**
- 12. Release for Integration**

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121400 Cryostat Electrical Assembly											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121431-ASED-NC-0024	1	21-MAY-03	Incoming inspection: Damages like pins bended, tin coating contaminated	QM	Closed	QM	Major		Repair	13-AUG-03	
HP-121431-ASED-NC-0058	1	08-JUL-03	Incoming inspection: Damages like pins & sold. terminals bended, tin coating delaminated	QM	Closed	QM	Major		Repair	13-AUG-03	
HP-121431-ASED-NC-0020	2	30-APR-03	Incoming inspection: Damages like pins & sold. terminals bended, tin coating delaminated	QM	Closed	EQM	Major		Repair	02-JUL-04	
121130 Cryostat Cover and Baffle											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-2-AAE-NC-0001-0267	1	04-JUN-04	CVV Upper Bulkhead Plate pin holes drilled too deep	EQM	Closed	01	Minor		Repair	13-JUL-04	
HP-2-AAE-NC-0433	5	28-SEP-04	Interference between CVV Top Plate and DEM Baffle	QM	Closed	EQM S/N01	Major	Major	Repair	15-NOV-04	
121140 Optical Bench Assembly											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121140-SEN-NC-0314	1	08-JUL-04	Position of SFW I/F out of spec	EQM	Closed		Major	Major	"As is"	10-AUG-04	
HP-121140-SEN-NC-0315	0	08-JUL-04	Alignment Cube offset out of spec	PFM	Closed	PFM + EQM	Major		"As is"	16-AUG-04	
HP-121140-SEN-NC-0313	1	08-JUL-04	Flatness of FPU I/F out of spec	EQM	Closed		Major	Major	"As is"	23-SEP-04	
HP-121140-SEN-NC-0312	1	08-JUL-04	Threaded inserts of FPU I/F out of spec	PFM	Closed	PFM + EQM	Major	Major	"As is"	21-OCT-04	
HP-121140-SEN-NC-0455	3	20-AUG-04	OBHCL I/F'S LOCATION OUT OF TOLERANCE	PFM	Closed		Minor		"As is"	16-NOV-04	
121111 CVV Upper Bulkhead											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121111-APCO-NC-0246	0	19-MAY-04	Dimensions out of tolerances	PFM	Open	SN 01	Major	Major	Fix	12-NOV-04	
HP-121111-APCO-NC-0243	0	18-MAY-04	Roughness of UB Top Plate seal grooves	PFM	Open	SN 01	Major	Major	Fix	03-DEC-04	
HP-121111-APCO-NC-0390	2	08-SEP-04	Sunshield I/F, M6 helicoil	PFM	Open	SN 01	Major		"As is"	16-NOV-04	
HP-121111-APCO-NC-0364	2	17-AUG-04	TP-UB connecting screws M6	PFM	Open	SN 01	Major	Major	Repair	16-NOV-04	

NCR listing for project: Herschel-Planck

Last Updated After :

Status List Report for All Elements

121111 CVV Upper Bulkhead											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121111-APCO-NC-0245	0	19-MAY-04	Minimum thickness on Top Plate	FM	Closed	SN 01	Minor		"As is"	06-OCT-04	
HP-121111-APCO-NC-0436	0	30-SEP-04	Machining non conformance on PFM UB	PFM	Open	SN 01	Major	Minor	Rework	19-OCT-04	
121112 CVV Cylinder											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121112-APCO-NC-0351	0	04-AUG-04	Skin underthickness, oversized thread	FM	Closed	SN 01	Minor		"As is"	06-AUG-04	
HP-121112-APCO-NC-0189	0	08-MAR-04	Scratch in strap attachment	PFM	Closed	SN 01	Minor		Repair	03-AUG-04	
HP-121112-APCO-NC-0362	3	10-AUG-04	Black anodising shade variation	FM	Open	SN 01	Major	Major	"As is"	16-NOV-04	
HP-121112-APCO-NC-0361	0	06-AUG-04	Dimensions out tol. as per 3D report	FM	Closed	SN 01	Major	Minor	"As is"	20-OCT-04	
HP-121112-APCO-NC-0359	1	05-AUG-04	Helicoils M8x1 on lower flange, M6 on tubing bracket	FM	Closed	SN 01	Major	Minor	"As is"	30-SEP-04	
HP-121112-APCO-NC-0297	0	24-JUN-04	Dimensions out of tolerances	FM	Closed	SN 01	Major	Minor	"As is"	19-OCT-04	
HP-121112-APCO-NC-0358	0	05-AUG-04	Visual inspection after black anodising	FM	Closed	SN 01	Minor		Repair	30-SEP-04	
HP-121112-APCO-NC-0219	0	19-APR-04	Hole M8x1 on section AH-AH	PFM	Closed	SN 01	Minor		Repair	07-OCT-04	
HP-121112-APCO-NC-0326	0	13-JUL-04	Scratch marks on the surface around FT I/F	PFM	Closed	SN 01	Major	Major	"As is"	04-OCT-04	
HP-121112-APCO-NC-0197	0	24-MAR-04	Tooling marks on STRAP I / F surface	PFM	Closed	SN 01	Major	Minor	Rework	04-OCT-04	
HP-121112-APCO-NC-0356	0	05-AUG-04	Groove roughness	FM	Closed	SN 01	Major	Minor	"As is"	04-OCT-04	
HP-121112-APCO-NC-0327	1	14-JUL-04	Thickness measurement at FT I/F after rework asked by HP-121112-APCO-NC-326	PFM	Closed	SN 01	Major	Major	"As is"	04-OCT-04	
HP-121112-APCO-NC-0198	0	24-MAR-04	Oversize chamfer on a 5H7 hole	PFM	Closed	SN 01	Major	Major	"As is"	07-OCT-04	
HP-121112-APCO-NC-0357	0	05-AUG-04	Stain appearances	FM	Closed	SN 01	Minor		Repair	20-OCT-04	
121113 CVV Lower bulkhead											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121113-APCO-NC-0352	0	04-AUG-04	M4 helicoils length 1.5 D	FM	Closed	SN 01	Minor		"As is"	04-AUG-04	
HP-121113-APCO-NC-0353	0	04-AUG-04	Skin thickness out of tolerance	FM	Closed	SN 01	Minor		"As is"	04-AUG-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121113 CVV Lower bulkhead											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121113-APCO-NC-0296	0	24-JUN-04	Liquid penetrant indications	FM	Closed	SN 01	Minor		"As is"	11-AUG-04	
HP-121113-APCO-NC-0220	0	19-APR-04	Damaged R10 on lower Bulkhead	PFM	Closed	SN 01	Minor		"As is"	07-OCT-04	
HP-121113-APCO-NC-0525	0	15-NOV-04	Marks on I/F Flange on PFM LB	FM	Open	SN 01	Minor		Rework	15-NOV-04	
121121 Tank Strap Lower and Upper											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121121-ECD-NC-0074	0	25-AUG-03	Lenght of chain loops 1 too short by 0,3 # 0,4mm	FM	Closed	1,2,3,4,5,6,7,8	Major		"As is"	21-OCT-03	
121122 Spatial Framework											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
H-P_121122_HTSZ_NC-0060	1	23-JUL-03	Deviation on QM Frame	QM	Closed		Minor		"As is"	08-AUG-03	
H-P_121122_HTSZ_NC-0061	1	16-JUL-03	Conductance of Struts	QM	Closed	11, 12	Major		"As is"	23-FEB-04	
H-P_121122_HTSZ_NC-0071	1	20-AUG-03	Deviations on FM Frame	FM	Closed		Major		Rework	27-OCT-03	
H-P_121122_HTSZ_NC-0075	1	27-AUG-03	Surface roughness not acc. to drawing	FM	Closed		Minor		"As is"	05-NOV-03	
H-P_121122_HTSZ_NC-0077	1	28-AUG-03	Deviation on Valve Bracket	FM	Closed		Minor		"As is"	19-SEP-03	
H-P_121122_HTSZ_NC-0078	1	29-AUG-03	Observations and Dispositions for Bones and Struts after Inspection	FM	Closed		Minor		"As is"	22-SEP-03	
H-P_121122_HTSZ_NC-0081	1	09-SEP-03	Deviations on FM Lower Frame	FM	Closed		Minor		"As is"	19-SEP-03	
H-P_121122_HTSZ_NC-0082	1	09-SEP-03	Washer Modification on FM Upper Frame Assembly	FM	Closed		Minor		Repair	19-SEP-03	
H-P_121122_HTSZ_NC-0083	3	09-SEP-03	Overheating of bones during bake out	FM	Closed		Major	Major	"As is"	23-FEB-04	
H-P_121122_HTSZ_NC-0084	1	11-SEP-03	Scratched edge after surface treatment on FM lower frame	FM	Closed		Minor		Repair	22-SEP-03	
H-P_121122_HTSZ_NC-0085	1	11-SEP-03	TSS pass holes on FM lower frame out of tolerance	FM	Closed		Minor		"As is"	19-SEP-03	
H-P_121122_HTSZ_NC-0015	1	16-APR-03	Corrosion of MoS2 Coating	QM	Closed		Major		Rework	24-JUL-03	
H-P_121122_HTSZ_NC-0053	3	02-JUL-03	Damage to MoS2 coating of HTT bearing after 200 cycles	QM	Closed		Major	Major	"As is"	23-FEB-04	
HP-121122-ASED-NC-0129	1	01-DEC-03	SFW delivery: Shock indicators released,	PFM	Closed	001	Minor		Rework	19-OCT-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121122 Spatial Framework											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
121121-04 Strap Pretensioning Devices											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121121-ECD-NC-0153	3	23-JAN-04	Cracks detected in the welding seam of pretensioner bellows	QM	Closed	see A1& 2	Major	Major	Rework	03-AUG-04	
121122-01 Upper spatial Framework											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121122-ASED-NC-0481	1	22-OCT-04	Helicoil of one upper SFW strut damaged	PFM	Open	S04	Minor		Return to supplier	25-OCT-04	
121131 Cryostat Cover											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-2-AAE-NC-0316	2	08-JUL-04	Deviation of Geometry at Cooling Loop & Johnston Coupling	QM	Closed		Major		"As is"	11-AUG-04	
HP-2-AAE-NC-0268	5	27-MAY-04	Valve spring anomaly (Johnston coupling in cooling loop)	FM	Open		Major		Repair	18-NOV-04	
HP-2-AE-NC-0406	4	22-SEP-04	Cover Heat Shield damaged	PFM	Closed	02, 03	Major	Major	Scrap	16-NOV-04	
HP-2-AAE-NC-0391	1	09-SEP-04	Interference of Door Structure to Kick Springs	EQM	Closed		Major		Rework	11-NOV-04	
HP-121131-ASED-0526	0	16-NOV-04	Cover Heat Shield SN 03 manufacturing deficiencies	QM	Closed	SN 03	Minor		"As is"	16-NOV-04	
HP-2-AAE-NC-0310	8	07-JUL-04	Qualification of NED	QM	Open		Major	Major	"As is"	03-DEC-04	
121132 Cryostat Baffle											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-2-AAE-NC-0405	4	22-SEP-04	Cryostat Baffle: Manufacturing Deviations	PFM	Open	01	Major	Major	Repair	16-NOV-04	
HP-2-AAE-NC-0438	6	30-SEP-04	Cryostat Baffle broken weld	PFM	Open	01	Major	Major	Repair	29-NOV-04	
121141 Optical Bench Plate											

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121141 Optical Bench Plate										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121140-SEN-NC-0305	1	30-JUN-04	The location of the positioning holes for PACS FPU is out of tolerance	PFM	Closed	N/A	Major		"As is"	16-AUG-04
HP-121140-SEN-NC-0456	3	23-SEP-04	Alignment cube disbonding and orientation out of tolerance	PFM	Closed		Minor		"As is"	11-NOV-04
HP-121140-SEN-NC-0454	3	20-AUG-04	Accuracy of alignment cube measurement is out of tolerance	PFM	Closed	PFM + EQM	Minor		"As is"	11-NOV-04
121142 Optical Bench Shield(Incl Entrance ,LOU Baffle)										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121142-SEN-NC -0311	1	08-JUL-04	Shape of OBS dome out of spec	PFM	Closed	EQM+ PFM	Major		"As is"	09-AUG-04
121143 Optical Bench Helium Cooling Loops(inclu mounting brackets)										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121143-ASED-NC--0565	0	29-NOV-04	OBA PFM cooling loop interference with FPA and LLP	PFM	Open		Major		Repair	29-NOV-04
HP-121140-AIRL-NC-0536	2	18-NOV-04	Gas porous with size out of spec detected in weld seam S7, S4 on OBHCL 2&3	PFM	Closed		Major		Repair	30-NOV-04
HP-121140-AIRL-NC-0570	0	30-NOV-04	Gas porous size out of spec on weld seams	EQM	Open		Major		Repair	30-NOV-04
121144 Thermal Interface Links to scientific instrument										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121144-AIRL-NC-0434	3	29-SEP-04	Flexibles thermal links cannot be elongated as required	PFM	Open	S/N 01 and S/N 0			"As is"	16-NOV-04
HP-121140-SEN-NC-0395	2	13-SEP-04	Small degradation of the gold plating	PFM	Closed		Major	Minor	"As is"	20-OCT-04
121210 Helium 2 tank										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121210-AIR-NC-0132	0	03-DEC-03	wrong thread of one hole on HTT upper bulkhead	FM	Closed	LB-01	Major	Minor	Repair	23-APR-04
HP-121210-AIR-NC-0133	0	03-DEC-03	Dimension non compliant on HTT Lower Bulkhead	FM	Closed	LB01	Major		"As is"	30-MAR-04

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121210 Helium 2 tank											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121210-ASED-NC-0272	0	11-JUN-04	Pressure sensors drop down	PFM	Open	510211	Major		"As is"	21-OCT-04	
HP-121210-ASED-NC-0256	0	27-MAY-04	Damages found on helicoflex rings, Deviations to the designed status	PFM	Closed	01	Minor		"As is"	13-JUL-04	
HP-121210-AIR-NC-0320	0	09-JUL-04	Test criteria partially achieved	PFM	Closed	PFM01	Minor		"As is"	22-JUL-04	
HP-121210-AIR-NC-0170	0	04-FEB-04	Lack of welding penetration during test sample welding	DM	Closed	Welding sample	Minor		"As is"	21-JUL-04	
HP-121210-AIR-NC-0269	1	08-JUN-04	Lack of welding penetration (welding between IB & UB)	PFM	Closed	01	Major		"As is"	11-AUG-04	
HP-121210-AIR-NC-0270	0	08-JUN-04	Lack of welding penetration (welding between LB & IB + UB)	PFM	Closed	01	Major		"As is"	11-AUG-04	
HP-121210-ASED-NC-0571	0	30-NOV-04	Damaged helicoils on rigid pod interfaces for SPIRE and PACS	PFM	Open		Minor		Rework	30-NOV-04	
121230 Liquid Helium Valves											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121230-ASIP-NC -0065	13	06-AUG-03	Imin for opening higher than spec.	QM	Closed	QM2/SN2	Major	Major	Repair	28-APR-04	
HP-121230-ASED-NC-0011	0	14-MAR-03	Type of used interface glands different: Hope glands used instead VCR cajon	QM	Closed	QM/ FM	Major		Repair	13-AUG-03	
HP-121230-ASIP-NC -0017	3	29-APR-03	Type of used interface glands different: Hope gland used instead VCR cajon	QM	Closed	QM/FM	Major		"As is"	27-APR-04	
HP-121230-ASIP-NC-0018	0	29-APR-03	Amount of particles detected after Run- In cycles by factor 100 too high	QM	Closed	QM1	Major		Repair	22-SEP-03	
HP-121230-ASIP-NC-0019	2	29-APR-03	I min current for valve opening too high (>400mA)	QM	Closed	QM1	Major		Repair	22-SEP-03	
HP-121230-ASIP-NC-0021	5	14-MAY-03	Crack detected during EB welding qualification Cajon VCR 316L glands	QM	Closed	QM weld. sample	Major		"As is"	22-SEP-03	
HP-121230-ASIP-NC-0029	4	26-MAY-03	The valve does not switch at 4.2K with 600mA (req. <500mA)	QM	Closed	QM1	Major		Repair	13-JAN-04	
HP-121230-ASIP-NC-0238	0	07-MAY-04	Summary NCR: Test interrupted due to destroyed testcryostat	QM	Closed	SN2R/QM3	Major		Repair	17-MAY-04	
HP-121230-ASIP-N-01	4	16-JUL-02	Damaged area on guiding bush found during visual inspection after disassembly	EM	Closed	EM 48 (ISO- FS)	Major		Rework	20-MAY-03	
HP-121230-ASIP-N-02	3	19-JUL-02	Dimensional deviation due to drawing error occurred on guiding pin	FM	Closed	QM & FM valves	Major		Rework	20-MAY-03	
HP-121230-ASIP-NC-0241	0	17-MAY-04	Summary NCR: Measured external leakrates out of spec	QM	Closed	SN2R/QM3	Major		Rework	17-MAY-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121230 Liquid Helium Valves											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121230-ASIP-N-03	1	10-SEP-02	Filter mesh delivered from wrong material used without sufficient qualification performed	FM	Closed	QM & FM valves	Major	Major	Repair	25-SEP-03	
HP-121230-ASIP-N-04	2	18-OCT-02	Cracks in welding seams detected during EB9 qualification: VCR gland316 to housing	FM	Closed	QM	Major		Repair	20-MAY-03	
HP-121230-ASIP-NC -0107	0	08-OCT-03	SN 48-EM l-min exceeds the requirement	EM	Closed	SN 48	Major		Rework	13-JAN-04	
HP-121230-ASIP-N-05	1	14-NOV-02	Spring force of valve poppet lower as required	EM	Closed	48	Major		Repair	14-MAY-03	
HP-121230-ASIP-N-06	0	03-DEC-02	Dimensional deviation occurred on guiding bush i.e., cylindrical area to small	PFM	Closed	QM /FM all S/N	Major	Major	Rework	26-SEP-03	
HP-121230-ASIP-N-07	1	12-DEC-02	Contamination like burr found in gaps	QM	Closed	QM / FM parts	Major	Major	Rework	27-JAN-04	
HP-121230-ASIP-NC-0177	0	12-FEB-04	Deviation found during magneticforce& stroke measurements	QM	Closed	QM3	Major		Repair	26-APR-04	
HP-121230-ASIP-N-08	1	05-FEB-03	Imperfections found on VCR couplings sealing areas	QM	Closed	QM & FM	Major		Repair	22-SEP-03	
HP-121230-ASIP-NC-0242	0	17-MAY-04	Summary NCR: Scatter of l op, l cl too high	QM	Closed	2R, QM3	Major		Rework	24-MAY-04	
HP-121230-ASIP-NC -0244	1	19-MAY-04	Statically radiated H-Field emission out of requirement	QM	Closed	SN2R-QM3	Major		"As is"	24-SEP-04	
HP-121200-ASED-NC-0531	0	17-NOV-04	Pull-in current scatter unormal high	FM	Open	08	Minor		Rework	07-DEC-04	
121250 Helium 1 Tank											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121250-ASED-NC-0212	0	07-APR-04	Problems with mounting RD724 to HOT	PFM	Closed	HOT-PFM2	Minor		Rework	19-APR-04	
HP-121250-AIR-NC-0214	0	13-APR-04	Translation of the 4 pads fixation holes location	PFM	Closed	PFM02	Minor		"As is"	13-APR-04	
HP-121250-AIR-NC-0134	0	09-DEC-03	error of dimension of holes for helicoils - HOT lower bulkhead	PFM	Closed	LB01	Major	Major	Scrap	27-APR-04	
HP-121250-AIR-NC-0135	0	09-DEC-03	Depth of 4 holes out of dimension - HOT lower bulkhead	PFM	Closed	LB01	Major	Major	Scrap	27-APR-04	
HP-121250-AIR-NC-0150	0	23-DEC-03	Welding defect on HOT	FM	Closed	LB01	Major	Major	Scrap	27-APR-04	
HP-121250-AIR-NC-0169	0	03-FEB-04	Displacement between internal and external posture on HOT lower bulkhead	PFM	Closed	LB02	Minor		Repair	01-JUL-04	
HP-121250-AIR-NC-0167	0	02-FEB-04	Improper machining of the stiffeners thickness for HOT upper bulkhead	PFM	Closed	UB 02	Major		Scrap	29-JUL-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121250 Helium 1 Tank											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
121221 Passive Phase Separator											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121220-ASED-NC-0124	0	12-NOV-03	Screw torque too low, no metallic contact of flanges after tightening	PFM	Closed	PFM, FM, FS	Minor		"As is"	26-JAN-04	
HP-121221-LIND-NC-0092	0	23-SEP-03	Deviations from calibrated temperature sensor values detected	PFM	Closed	1	Major		"As is"	23-JAN-04	
HP-121223-LIND-NC-0055	0	05-JUL-03	The required level of 22.5 g during sinusoidal cold vibration could not be reached	PFM	Closed	1 (PFM)	Major		Repair	23-OCT-03	
121222 Direct Liquid Content Measurement Device											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121220-ASED-NC-0124	0	12-NOV-03	Screw torque too low, no metallic contact of flanges after tightening	PFM	Closed	PFM, FM, FS	Minor		"As is"	26-JAN-04	
HP-121222-LIND-NC-0076	0	28-AUG-03	Required sinus cold vibration level not reached, additional warm sine dwell test performed	PFM	Closed	01	Major		Repair	19-OCT-03	
HP-121222-LIND-NC-0091	0	23-SEP-03	Deviations in temperature sensor calibration detected	PFM	Closed	1, 2, 3	Major		Repair	23-JAN-04	
121225 Rupture Discs (RD 124-RD 724)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121225-ASED-NC-0063	1	28-JUL-03	Leakage during test at RT out of spec.	FM	Closed	0210158/13	Major		Scrap	11-SEP-03	
HP-121225-ASED-NC-0086	1	11-SEP-03	Micro cracks in welding seam	FM	Closed	0210158/1-25	Major		Scrap	21-APR-04	
121228 Filling Port (with SV 121 and OD101-S101-Y201)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121228-LIND-NC-0115	1	30-OCT-03	violation of allowable stresses at the internal filling port	PFM	Closed	01	Major		Repair	13-MAY-04	
HP-121228-LIND-NC-0152	0	13-JAN-04	Requirements for leaktightness and thermal performance cannot be met with the actual design and manufactured	PFM	Closed		Major		Scrap	12-JUL-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121228 Filling Port (with SV 121 and OD101-S101-Y201)										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121228-LIND-NC-0322	1	11-JUL-04	Interface deviation of internal filling port detected	PFM	Closed	01	Major		Rework	15-AUG-04
HP-121220-LIND-NC-0274	0	13-JUN-04	Imperfections detected on PFM weldingseams	PFM	Closed		Major		Rework	16-AUG-04
HP-121228-LIND-NC-0387	0	01-SEP-04	Damage occured on Oscillation damper membrane	PFM	Closed	01 PFM	Major		Repair	23-SEP-04
HP-121220-LIND-NC-0275	1	13-JUN-04	Functional dimensional diameter out of req after honing	PFM	Closed	01, 02	Major		Rework	21-NOV-04
HP-121228-LIND-NC-0546	0	22-NOV-04	Fillingport I/F tubes to external tubing to weak designed	PFM	Open		Major		Repair	22-NOV-04
HP-121220-LIND-NC-0548	0	22-NOV-04	SV pressure plate: Hard coated functional area partly disappeared	PFM	Open	02	Minor		Repair	29-NOV-04
HP-121220-LIND-NC-0545	0	22-NOV-04	SV 121: Set press. test val. too low, detect. during Acc. test: Perf Rework	FM	Closed	02, plug 03, 04	Major		Repair	27-NOV-04
121223-01 Helium 2 level Probes(L 101-L 102)										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121223-LIND-NC-0013	2	07-APR-03	No operation downwards with specified exitation current	QM	Closed	01, 02, 03	Major		Rework	07-SEP-04
121223-02 Helium 1 Level Probes (L 701-702)										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121223-LIND-NC-0012	2	07-APR-03	No operation downwards with specified exitation current	QM	Closed	01, 02, 03	Major		Repair	30-OCT-03
HP-121223-LIND-NC-0054	0	05-JUL-03	The required level of 22.5 g during sinusoidal cold vibration could not be reached	PFM	Closed	1 # 3	Major		Repair	19-OCT-03
121224-02 Tank heaters (H 103-104-701-702)										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121224-ASED-NC-0411	1	27-SEP-04	Deviations btw. Qual. Plan and TP/R for HOT/HTT depletion heaters	PFM	Open	FM01, 02, 03, 04	Minor		"As is"	16-NOV-04
121224-03 Ventline Unit (H 501-S501-V502-S502)										

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121224-03 Ventline Unit (H 501-S501-V502-S502)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121224-LIND-NC-0213	1	13-APR-04	Dimensional deviation of I/F ventline heater housing to H501	FM	Closed	1(FM) & 2(FS)	Major		Repair	27-APR-04	
HP-121224-LIND-NC-0276	0	13-JUN-04	Dimensional deviation of ventline heater H501	PFM	Closed	01, 02	Major		Rework	21-JUN-04	
HP-121224-LIND-NC-0470	1	20-OCT-04	Interfacetube with VCR broken/ disappeared during vibrationtest	PFM	Open	01	Major	Major	Repair	15-NOV-04	
HP-121224-LIND-NC-0306	3	01-JUL-04	Temperature sensor TI507 failed after bake- out performed	FS	Closed	S/N 02	Major		Repair	27-OCT-04	
121226-01 Safety Valves Helium 2 high Mass Flow (SV 123-SV723)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121226-ASED-NC-0025	1	21-MAY-03	High particulate contamination found in SV123/723	FM	Closed	FM2	Major		Rework	12-SEP-03	
HP-121226-ASED-NC-0026	1	21-MAY-03	High particulate contamination found in SV123/723	QM	Closed	QM	Major		Rework	12-SEP-03	
HP-121226-ASED-NC-0027	0	23-MAY-03	Deviations detected during qualification testing of SV123/723	QM	Closed	QM	Minor		"As is"	23-MAY-03	
HP-121226-ASED-NC-0052	1	26-JUN-03	High valve seat leak rate at RT on SV 123/723	FM	Closed	all, FM FS QM SP	Major	Major	Repair	23-APR-04	
HP-121226-ASED-NC-0348	1	02-AUG-04	SV 123 flange I/F contamination by vacuum grease	PFM	Open	FM 1	Minor		Rework	09-AUG-04	
HP-121226-ASED-NC-0182	1	24-FEB-04	High leak rate at RT after refurbishment of SV 123/723	QM	Closed	VQM	Minor		Rework	21-JUL-04	
HP-121226-ASED-NC-0335	1	21-JUL-04	Test adapters of SV123/723 broken during vibration	QM	Open	QM2 (VQM)	Minor		Repair	16-AUG-04	
HP-ASED-NC-0485	0	26-OCT-04	Mass of SV123//23 out of spec.	FM	Closed	FM & FS	Minor		"As is"	26-OCT-04	
HP-121226-ASED-NC-0484	0	25-OCT-04	Set pressure at 4.2K and leak rate at RT for SV 123 VQM out of spec.	QM	Open	VQM	Minor		"As is"	17-NOV-04	
121226-03 Safety Valves CVV (SV921-SV922)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121226-ASED-NC-0016	2	16-APR-03	Observation at start of Qual. & acceptance test: Housing bended, torque applied too high, O-ring groove too small	QM	Closed	01- 05	Major		Scrap	08-OCT-03	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121231 Internal Liquid Helium Valves											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121230-ASIP-NC-0360	0	06-AUG-04	Unexpected temperature increase in the cryostat during night	FM	Closed	SN6R/FM4	Minor		"As is"	10-AUG-04	
HP-121230-ASIP-NC -0341	1	28-JUL-04	Test interruption during the Acceptance Test of FM 4	FM	Closed	SN6R/FM4	Major		"As is"	10-AUG-04	
HP-121230-ASED-NC-0471	0	21-OCT-04	PT1000 has been destroyed by human error	FM	Closed	6R	Major		Repair	21-OCT-04	
HP-121230-ASIP-NC -0468	0	19-OCT-04	Synthetic material gasket in the connector partially broken & disappeared	FM	Closed	SN6R	Minor		"As is"	20-OCT-04	
HP-121231-ASIP-NC-0568	0	30-NOV-04	Magnetic holding force too high in open state	FM	Open	16	Major		Rework	30-NOV-04	
HP-121231-ASED-NC-0530	1	17-NOV-04	Pull-In current scatter high and with increasing tendency	FM	Open	07	Minor		Rework	07-DEC-04	
121241-01 HE 2 tank Tubing (HTT) with supports											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121240-AIRT-NC-0206	0	02-APR-04	Dimensional discrepancies on the HST mock-up for HTT tubing	PFM	Closed	01	Minor		Rework	23-JUL-04	
HP-121241-AIRT-NC-0486	0	27-OCT-04	Additional welding on spare tube	SPARE	Closed	S/N02	Minor		"As is"	13-NOV-04	
HP-121241-AIR-NC-0278	0	15-JUN-04	impossibility to directly integrate the dummy SFV 123 on HTT	PFM	Open	NA	Major		Rework	14-NOV-04	
HP-121241-AIR-NC-0279	0	15-JUN-04	Impossibility to connect the SFV 123 to HTT line 3 and tooling line	PFM	Closed	01	Major		Rework	13-NOV-04	
HP-121240-AIR-NC-0273	0	11-JUN-04	Interface problem in the integration of HTT tubing lines	PFM	Closed	01	Major		Rework	13-NOV-04	
HP-121241-AIR-NC-0277	0	15-JUN-04	Impossibility to connect HTT line 3 to pressure sensor	PFM	Open	01	Major		Rework	14-NOV-04	
121241-02 He 1 Tank Tubing (HOT) with supports											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121241-AIRT-NC-0307	0	02-JUL-04	Problem of pressure sensor mounting on the HOT tubing	PFM	Open	01	Minor		Rework	14-NOV-04	
121310 Lower Bulkhead Thermal Shields											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	

NCR listing for project: Herschel-Planck

Last Updated After :

Status List Report for All Elements

121310 Lower Bulkhead Thermal Shields											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121300-AIRS-NC-0203	1	30-MAR-04	Presence of micro-cracks in the qualification welding sample	PFM	Closed	N.A (sample)	Major	Major	Rework	10-AUG-04	
121320 Cylinder Thermal shield (incl tubing)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121300-AIRS-NC-0203	1	30-MAR-04	Presence of micro-cracks in the qualification welding sample	PFM	Closed	N.A (sample)	Major	Major	Rework	10-AUG-04	
HP-121320-AIRS-NC-0512	0	08-NOV-04	Height of shield 1 below tolerance	FM	Open		Major		Rework	12-NOV-04	
HP-121320-AIRS-NC-0449	0	11-OCT-04	Porosities in TIG AL/AL welding	FM	Open		Major		Repair	07-DEC-04	
HP-121320-AIRS-NC-0443	0	04-OCT-04	Non conformance of welding on venting lines (Te part location)	FM	Closed	01	Major		Repair	18-NOV-04	
HP-121320-AIRS-NC-0399	0	16-SEP-04	Clearance between pipes and shield too low\ risk of contamination	PFM	Closed	01	Major		Repair	18-NOV-04	
HP-121320-AIRS-NC-0515	0	10-NOV-04	Cracks in spot welding on shield 1	FM	Closed		Major		"As is"	12-NOV-04	
HP-121320-AIRS-NC-0488	0	27-OCT-04	Additional bending on Inlet stainless steel tube	FM	Closed		Minor		Scrap	27-OCT-04	
HP-121320-ASED-NC-0483	0	25-OCT-04	Cut-outs marked on templates do not fit to as-built cut-outs in cyl. TS	FM	Closed		Minor		Rework	25-OCT-04	
HP-121320-AIRS-NC-0480	0	21-OCT-04	Height of cylinder 2 out of tolerance	FM	Open		Major		Repair	13-NOV-04	
HP-121320-AIRS-NC-0511	1	08-NOV-04	Implementation of peelables shims to tune brackets	FM	Open		Minor		Repair	18-NOV-04	
HP-121320-AIRS-NC-0503	0	03-NOV-04	Rivets not mounted on shields 3 and 1	FM	Closed		Minor		Rework	12-NOV-04	
HP-121320-AIRS-NC-0487	1	27-OCT-04	Impossibility to realize automatic TIG welding on inlet stainless tube	FM	Closed		Minor		Repair	12-NOV-04	
HP-121320-AIRS-NC-0400	1	16-SEP-04	Clearance between shieldpipes and shield structure too low	PFM	Closed		Major		Rework	18-NOV-04	
HP-121320-AIRS-NC-0513	0	08-NOV-04	alignement defect in stainless steel tube after welding	FM	Closed		Major		"As is"	12-NOV-04	
HP-121320-AIRS-NC-0479	0	21-OCT-04	Interference between brackets shield 2 and shield 3	FM	Open		Minor		Rework	18-NOV-04	
HP-121320-AIRS-NC-0451	0	11-OCT-04	cracks in spot resistance welding on shield 2 and 3	FM	Closed		Major		"As is"	17-NOV-04	
HP-121320-AIRS-NC-0534	0	17-NOV-04	Pollution inside venting lines after final integration	FM	Open	PFM	Major	Major	Rework	25-NOV-04	
HP-121320-AIRS-NC-0529	0	17-NOV-04	doubt on TIG stainless steel welding C2	FM	Closed	PFM	Major	Minor	Repair	25-NOV-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121320 Cylinder Thermal shield (incl tubing)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121320-AIRS-NC-0502	0	03-NOV-04	Impossibility to mount an upper bracket without constraint	FM	Closed		Major		"As is"	02-DEC-04	
HP-121320-AIRS-NC-0450	4	11-OCT-04	Porosity on TIG Alu/Alu welding	FM	Open		Major		"As is"	03-DEC-04	
121330 Upper Bulkhead Thermal shields (Incl.entrance and LOU Baffle											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121300-AIRS-NC-0203	1	30-MAR-04	Presence of micro-cracks in the qualification welding sample	PFM	Closed	N.A (sample)	Major	Major	Rework	10-AUG-04	
HP-121330-AIRS-NC-0552	0	25-NOV-04	Modification of thickness for parts for Entrance Baffle	FM	Open		Minor		"As is"	25-NOV-04	
121342 Cylinder Thermal shield MLIs											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121320-ASED-NC-0483	0	25-OCT-04	Cut-outs marked on templates do not fit to as-built cut-outs in cyl. TS	FM	Closed		Minor		Rework	25-OCT-04	
121410 Cryostat Control Unit											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-2-PANT-NC-0192	0	19-MAR-04	Increased Pressure During Temperature Rising	EQM	Closed	00492	Minor		"As is"	07-JUL-04	
HP-2-PANT-NC-0208	0	02-APR-04	Conductive Suspectibility CS-01	EQM	Closed	00492	Major		"As is"	07-JUL-04	
HP-2-PANT-NC-0130	0	02-DEC-03	FPGA A54SX32A-1CQ208M Anomaly	EQM	Closed	00492	Major		"As is"	09-JUL-04	
HP-2-PANT-NC-0196	0	22-MAR-04	Levels of performed shock tests (SRS) deviates from the required level	EQM	Closed	00492	Minor		"As is"	09-JUL-04	
HP-2-PANT-NC-0207	0	02-APR-04	Radiated Emission RE-01	EQM	Closed	00492	Major		"As is"	09-JUL-04	
HP-2-PANT-NC-0209	0	02-APR-04	Radiated susceptibility RS-02 H field	EQM	Closed	00492	Major		"As is"	12-JUL-04	
HP-2-PANT-NC-0227	0	26-APR-04	Short term stability of MIL-Std-1553 bit transfer rate.	EQM	Closed	00492	Major		"As is"	09-JUL-04	
HP-2-PANT-NC-0226	0	26-APR-04	Conducted emission CE-01, differential current	EQM	Closed	00492	Major		"As is"	12-JUL-04	
HP-2-PANT-NC-0559	0	29-NOV-04	FPGA component reliability problem, EA-2004-EEE-07-A	FM	Open	02143	Major			07-DEC-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121430 PLM Cryostat Harness											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121240-ASED-NC-0165	3	30-JAN-04	Inc. inspection: dent in O-ring groove, pins damaged, contamination, lockingrivets damaged, missing	PFM	Closed	see annex 2& 4	Major		Repair	09-AUG-04	
HP-121430-ASED-NC-0144	2	12-DEC-03	Incoming inspection: scratches in O-ring groove, pins damaged, contamination, lockingrivets damaged	PFM	Closed	1# 23, 25# 30	Major	Major	Scrap	09-AUG-04	
HP-121431-ASED-NC-0028	2	21-MAY-03	Delamination of tin coating detected after thermalcycles performed	QM	Closed	QM	Major		Scrap	09-AUG-04	
HP-121430-ASED-NC-0146	3	18-DEC-03	Incoming inspection: scratches in O-ring groove, pins damaged, contamination, lockingrivets damaged	EQM	Closed	1-#24, 25#30	Major		Rework	09-AUG-04	
121421-01 C 100 Temperature sensors											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121421-ASED-NC-0172	0	06-FEB-04	Manufacturing deficiencies on C100 temperature sensors	EQM	Closed	JX66-JX75	Major		Repair	23-APR-04	
HP-121421-ASED-NC-0414	2	27-SEP-04	Deviation in calibration readings before and after vibration test	QM	Open	JW 54, 55	Minor		"As is"	16-NOV-04	
121421-02 PT 1000 temperature Sensors											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121421-ASED-NC-0154	0	26-JAN-04	Manufacturing deficiencies on PT 1000 temperature sensors	EQM	Closed	JG 54,55,57,58	Minor		"As is"	27-JAN-04	
HP-121421-ASED-NC-0171	1	06-FEB-04	Manufacturing deficiencies on PT 1000 temperature sensors	PFM	Closed	JM02-04, 06-12	Major		Repair	23-APR-04	
HP-121421-ASED-NC-0057	0	09-JUL-03	Unacceptable Quality of PT1000 QM sensors in housing	QM	Closed	IE01, ID12	Major	Major	Rework	23-APR-04	
HP-121421-ASED-NC-0354	1	04-AUG-04	T701, connector fixation screw broken	FM	Closed	KO 05	Minor		Repair	10-AUG-04	
HP-121421-ASED-NC-0504	1	03-NOV-04	Broken fixation screw at Pt 1000 Nano connector on T422	PFM	Closed	KU 02	Minor		Rework	03-NOV-04	
121422-01 Pressures sensors Type 101, 501, 701											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121200-ASED-N-04	1	25-JUL-02	Incoming inspection: sealing ring damaged, surface bad, welding points	EM	Closed	see below	Minor		Scrap	20-MAY-03	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121422-01 Pressures sensors Type 101, 501, 701										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121200-ASED-N-08	4	20-SEP-02	Pressure sensor out of function at 260K	EM	Closed	XST-190-5A235-10	Minor		Scrap	14-MAY-03
HP-121422-ASED-NC-0056	1	08-JUL-03	Resistance increase of excitation line at temp below 20K	QM	Closed		Major		Rework	23-APR-04
HP-121422-ASED-NC-0413	1	27-SEP-04	Non-linearity and hysteresis req not met for FS2, FS3 internal P-Sensors	FS	Closed	FS2, FS3	Minor		"As is"	27-SEP-04
HP-121422-ASED-NC-0442	0	04-OCT-04	Interface Deviation btw. P 101 / 701 and internal CCH	PFM	Open		Major		Repair	16-NOV-04
HP-121422-ASED-NC-0412	1	27-SEP-04	FS2 pressure sensor P-501 deviation from zero-point requirement	FS	Closed	FS2	Minor		"As is"	21-OCT-04
HP-121422-ASED-NC-0333	1	20-JUL-04	Pressure transducer failure FM3, type P101, P501, P701	FM	Closed	S/N 510213	Major		Scrap	04-NOV-04
121431 Cryostat Control Harness										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121400-ASED-NC-0110	1	10-OCT-03	During incoming inspection performed it was found the length of the major threads may be too short by ~0,9mm	EQM	Closed	01# 30	Major		Scrap	21-JAN-04
HP-121431-ASED-NC-0111	3	20-OCT-03	Connectors cannot be mounted leaktight caused by too short centering diameter	EQM	Closed		Major		Rework	18-JUN-04
121431-02 CCH CVV External Harness										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121430-CASA-NC-0184	3	27-FEB-04	Connector 197DC0325, defects on CASA inc insp. (1)	PFM	Closed	See description	Major	Major	Rework	20-AUG-04
HP-121430-CASA-NC-0217	3	15-APR-04	Connector 197DC0325, defects on CASA inc insp. (2)	PFM	Closed	See description	Major	Major	Rework	20-AUG-04
HP-121430-CASA-NC-0222	2	20-APR-04	Connector 197DC0252, defects on CASA inc insp. (3)	PFM	Closed	See description	Major	Major	Rework	28-OCT-04
121431-03 CCH SVM Internal Harness										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121431-ASED-NC-0343	1	29-JUL-04	Wrong CCH end item interconnection wiring	PFM	Closed	DCE 28, DCE 29	Major		Rework	02-AUG-04
121432-01 SIH CVV Internal Harness										

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121432-01 SIH CVV Internal Harness											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121432-CASA-NC-0159	3	27-JAN-04	Broken pin in connector 197 011 P22 35P 429	EQM	Closed	52	Major	Major	Return to supplier	20-AUG-04	
HP-121432-CASA-NC-0236	2	05-MAY-04	Broken pin in connector 197 011 P24 35P 429H,DC0346,SN016	PFM	Closed	DC0346,SN016	Major	Major	Scrap	20-AUG-04	
121432-02 SIH CVV External Harness											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-121430-CASA-NC-0222	2	20-APR-04	Connector 197DC0252, defects on CASA inc insp. (3)	PFM	Closed	See description	Major	Major	Rework	28-OCT-04	
HP-121430-CASA-NC-0217	3	15-APR-04	Connector 197DC0325, defects on CASA inc insp. (2)	PFM	Closed	See description	Major	Major	Rework	20-AUG-04	
HP-2-ASSE-NC-0002-0378	0	16-MAY-03	Notches on steel AWG38 wire surface	EQM	Closed	DC 4202	Minor		"As is"	27-OCT-04	
HP-2-ASSE-NC-0003-0379	0	20-MAY-03	Manufacturing of qualif. samples acc. to the specified sketch not possible	DM	Closed		Minor		"As is"	27-OCT-04	
HP-2-ASSE-NC-0004-0380	0	03-DEC-03	Discrepancies in Pin Allocation Lists	DM	Closed		Minor		"As is"	27-OCT-04	
HP-2-ASSE-NC-0001-0377	0	12-MAY-03	Pretinning quality on Brass Wire AWG38 samples not sufficient	EQM	Closed	DC: 4902	Minor		"As is"	27-OCT-04	
HP-2-ASSE-NC-0005-0381	0	19-JAN-04	Shrinkable Sleeve Protection at solid wire contact top	EQM	Closed		Minor		Repair	27-OCT-04	
HP-2-ASSE-NC-0006-0382	0	21-JAN-04	Length of pretinned area too short	EQM	Closed		Minor		Rework	27-OCT-04	
HP-2-ASSE-NC-0007-0590	0	02-DEC-04	EQM SVM Back Shell Cable Entry too small	EQM	Open		Major			02-DEC-04	
HP-2-ASSE-NC-0008-0596	0	02-DEC-04	PFM SVM Back Shell Cable Entry too small	PFM	Open		Major			02-DEC-04	
121550 HIFI Waveguide Assembly											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-2-RYM-NC-0001-0439	1	30-SEP-04	Insertion Loss of Waveguide Run 4A out of spec	PFM	Closed	001	Major		"As is"	22-NOV-04	
HP-2-RYM-NC-0002--0507	1	04-NOV-04	First eigenfrequency	PFM	Open	001	Major	Major	"As is"	30-NOV-04	
HP-2-RYM-NC-0003--0572	0	30-NOV-04	Deviation of the accelerometer response due to difficulty of control	PFM	Open	001	Major		"As is"	30-NOV-04	
121560 Waveguide Support Brackets											

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

121560 Waveguide Support Brackets										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-121560-ASED-NC-0347	4	02-AUG-04	Waveguide Brackets manufacturing deficiencies	PFM	Closed		Major		Rework	14-NOV-04
142300 EPLM CVSE										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-142300-ASED-NC-0010	0	04-MAR-03	Incoming inspect: No ADP, Pipe disconnected, forklifhigh too low, barred window damaged	FM	Closed	01 (each)	Minor		Rework	05-JUL-04
142150 Miscellaneous										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-142150-WEKA-NC-0098	0	25-SEP-03	He- Leakrate measured during acceptance test out of spec	EQM	Closed	EQM	Minor		Rework	04-MAY-04
142220 Cryo SCOE										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-142220-ASED-NC-0374	0	23-AUG-04	Error on EQM Cryo SCOE SCAU Board 1	EQM	Open		Minor		Return to supplier	23-AUG-04
142240 PLM SCOE										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-142240-ASED-NC-0205	0	01-APR-04	PLM SCOE can not be powered anymore	NA(GS E)	Closed		Minor		Repair	27-MAY-04
142310-03 High Vacuum Pumping Unit										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-142300-BOCE-NC-0022	0	16-MAY-03	Measured air speed of vacuum pump is below specified value	FM	Closed	01	Minor		"As is"	17-MAY-03
HP-142300-BOCE-N-01	0	23-JAN-03	Vacuum pump motor does not running due to destruction of control electronic	FM	Closed	01	Minor		Repair	14-MAY-03
HP-142300-BOCE-N-02	1	06-FEB-03	Measured air speed of vacuum pump is below specified value	FM	Closed	01	Minor		"As is"	14-MAY-03

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

142310-03 High Vacuum Pumping Unit											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-142300-BOCE-NC-0014	0	14-APR-03	Incoming inspection: Transport container not marked, cover plates missing	FM	Closed	001	Minor		Repair	15-AUG-04	
HP-142300-BOCE-N-03	0	07-FEB-03	Specified vacuum not reached during acceptance test	FM	Closed	01	Minor		Rework	16-AUG-04	
HP-142300-BOCE-NC-0023	0	16-MAY-03	Specified vacuum not reached during acceptance test	FM	Closed	01	Minor		Repair	08-SEP-04	
142310-08 Transfer lines											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-142310-DEMA-NC-0233	0	30-APR-04	Ice spot detected on Johnston Coupling during Acceptance test	NA(GSE)	Closed	Y0241-1/ Y0242-1	Minor		Repair	15-NOV-04	
142511-02 HIFI Local Oscillator Unit											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-2-PROT-NC-0001-0409	2	23-SEP-04	Deviation in MTD HIFI LOU Bottom Plate	STM	Open		Major		Repair	11-NOV-04	
151000 PLM EQM											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-151000-ASED-NC-0211	0	06-APR-04	Internal leakage of SV123 out of spec (ISO QM SV123)	QM	Closed	13076/1	Minor		"As is"	27-APR-04	
HP-150000-ASED-NC-0345	0	30-JUL-04	Valve V102 and V701 out of function	EQM	Closed		Minor		Rework	16-AUG-04	
HP-150000-ASED-NC-0346	0	30-JUL-04	Harness routing changed on 1th, 2nd 3rd bulkhead	EQM	Closed		Minor		"As is"	16-AUG-04	
HP-150000-ASED-NC-0309	0	04-JUL-04	Deviation to the as designed status	EQM	Closed	EQM	Minor		"As is"	15-NOV-04	
151140 Optical Bench Assembly											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-151143-AIRL-NC-0537	2	18-NOV-04	Gas porous size out of spec detect/ dimensional defects on welding seams	EQM	Open		Minor		Repair	29-NOV-04	
HP-NC-151100-ASED-0528	1	16-NOV-04	OBA coolingline in interference with He-tubing	EQM	Open		Major		Repair	08-DEC-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

151111 Cryostat Upper Bulkhead										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-151111-APCO-NC-0051	0	20-JUN-03	Elongation value in ST direction on formed head	EQM	Closed	21025-30 SN 03	Minor		"As is"	08-MAR-04
HP-151111-2-APCO-NC-0121	0	06-NOV-03	Dimensions out of tolerances	EQM	Closed	SN 01	Minor		"As is"	27-APR-04
HP-151111-2-APCO-NC-0122	1	06-NOV-03	Roughness of seal groove	EQM	Closed	SN 01	Major		"As is"	27-APR-04
HP-151111-APCO-NC-0300	0	25-JUN-04	Machining non conformances revealed during 3D control	EQM	Closed	SN 01	Minor		"As is"	07-JUL-04
HP-2-151111-APCO-NC-0292	0	21-JUN-04	PT indications on the weld	EQM	Closed	SN 01	Minor		"As is"	01-JUL-04
HP-151111-APCO-NC-0298	0	24-JUN-04	Brackets material temper	EQM	Closed	SN 01	Major		"As is"	01-JUL-04
HP-151111-APCO-NC-0299	0	25-JUN-04	Hole 6.60 on I/F SSD Brackets	EQM	Closed	SN 01	Minor		"As is"	25-JUN-04
HP-151111-APCO-NC-0168	0	03-FEB-04	Hole 6H7 out of tolerances	EQM	Closed	SN 01	Minor		Repair	29-JUN-04
HP-151111-APCO-NC-0221	0	20-APR-04	Holes for harness support rail / alignment cube	EQM	Closed	SN 01	Minor		"As is"	01-JUL-04
HP-151111-APCO-NC-0291	0	21-JUN-04	Overthickness, dim. out of tol. and blind tool hole at telescope I/F	EQM	Closed	SN 01	Minor		"As is"	07-JUL-04
HP-151111-APCO-NC-0293	0	21-JUN-04	Skin deformation, sections A0-A0 & A3-A3	EQM	Closed	SN 01	Major		"As is"	04-AUG-04
HP-151111-APCO-NC-0156	0	27-JAN-04	Hole in EQM UB	EQM	Closed	SN 01			Repair	04-AUG-04
HP-151111-APCO-NC-0435	1	30-SEP-04	Holes M6 on UB top plate	EQM	Open	SN 02	Major		Repair	16-NOV-04
151112 Intermediate Ring										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-151112-APCO-NC-0088	0	17-SEP-03	Liquid penetrant indications	EQM	Closed	SN 01	Minor		"As is"	19-FEB-04
HP-151112-APCO-NC-0035	B	13-JUN-03	Machining error on 100 pins connector feed-through	EQM	Closed	SN 01	Minor		Repair	10-OCT-03
HP-151112-APCO-NC-0109	0	10-OCT-03	Type of helicoils	EQM	Closed	SN 01	Minor		"As is"	10-OCT-03
HP-151112-ASED-NC-0095	0	24-SEP-03	Incoming inspection: helicoils without stop, curregations, no ADP, protectionplates missing	EQM	Closed		Minor		Rework	18-JUN-04
HP-151112-APCO-NC-0089	1	17-SEP-03	Ring height	EQM	Closed	SN01			Repair	01-OCT-04
151141 Optical Bench Assembly										

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

151141 Optical Bench Assembly											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-151143-AIRL-NC-0537	2	18-NOV-04	Gas porous size out of spec detect/ dimensional defects on welding seams	EQM	Open		Minor		Repair	29-NOV-04	
151143 Optical Bench Helium Cooling Loops (incl Mounting Brackets)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-151143-ASED-NC-0194	0	19-MAR-04	Welding quality of Al welding qualification samples not as required/ needed due to insufficient penetration	QM	Closed	weld qual samp.	Major		Rework	13-JUN-04	
HP-121300-AIRS-NC-0203	1	30-MAR-04	Presence of micro-cracks in the qualification welding sample	PFM	Closed	N.A (sample)	Major	Major	Rework	10-AUG-04	
HP-151140-ASED-NC-0482	0	24-OCT-04	HIFI / Spire pump LO required positioning accuracy not met	EQM	Closed	EQM	Minor		Rework	15-NOV-04	
HP-151143-AIRL-NC-0537	2	18-NOV-04	Gas porous size out of spec detect/ dimensional defects on welding seams	EQM	Open		Minor		Repair	29-NOV-04	
HP-NC-151100-ASED-0528	1	16-NOV-04	OBA coolingline in interference with He-tubing	EQM	Open		Major		Repair	08-DEC-04	
151210 Helium Auxiliary Tank											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-151210-BIER-NC-0188	1	04-MAR-04	Internal cleanliness verification out of spec	EQM	Closed	1	Minor		Rework	09-MAR-04	
HP-151210-BIER-NC-0237	0	06-MAY-04	External molecular level out of requirement	EQM	Closed	1	Minor		Repair	13-MAY-04	
HP-151210-BIER-NC-0228	0	27-APR-04	He-II test not successful on AXT tank (fillinglevel too low, leakrate out of req.)	EQM	Closed	01	Minor		"As is"	07-JUN-04	
HP-151210-BIER-NC-0179	1	16-FEB-04	I/F of liquid level sensors not He- leaktight on AXT tank	EQM	Closed	EQM	Minor		Repair	07-JUN-04	
HP-151210-BIER-NC-0193	1	19-MAR-04	I/F of liquid level sensor not leaktight on AXT tank after repair performed	EQM	Closed	EQM	Minor		Repair	07-JUN-04	
HP-2-151200-ASED-NC-0294	1	21-JUN-04	Flight connectors /cables wrong conn to level liquid sensors/ pins bended	EQM	Closed	1	Minor		Rework	20-JUL-04	
151240 ISO QM modified Filling Port (incl SV 121)											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-151200-ASED-NC-0255	0	27-MAY-04	Inlet and outletpipe are integrated in 180 degree turned status	EQM	Closed	EQM	Major		Rework	12-JUL-04	

NCR listing for project: Herschel-Planck

Status List Report for All Elements

Last Updated After :

151240 ISO QM modified Filling Port (incl SV 121)										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
151430 EQM PLM cryostat Harness										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-151400-ASED-NC-0308	0	04-JUL-04	Contamination detected on AXT harness, and other bundles	EQM	Closed	i.e. 21-1, -2, 3	Minor		Rework	23-SEP-04
HP--151430-ASED-NC-0334	0	20-JUL-04	Metallic particles found on AXT Harness shrinktubes	EQM	Closed	EQM	Minor		Rework	15-AUG-04
HP-151431-ASED-NC-0509	0	01-NOV-04	During verif. of CCH some deviations have been detected	EQM	Closed		Minor		"As is"	17-NOV-04
HP-151431-ASED-NC-0508	0	01-NOV-04	V. heat. glued to wr. valves, theref. labell. of I/F conn. d. not corresp.	EQM	Closed		Minor		"As is"	29-NOV-04
HP-151430-ASED-NC-0603	0	07-DEC-04	Harness rails cannot be mounted to the OBA, hole interface does not fit	EQM	Open		Major		Repair	07-DEC-04
151431 Cryostat Control Harness										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-151431-ASED-NC-0396	0	14-SEP-04	Harness feedthrough cannot be mounted as requested	EQM	Closed	J13/ J11	Minor		Rework	23-SEP-04
HP-151431-ASED-NC-0500	0	01-NOV-04	During verif. of CCH some deviations have been detected	EQM	Closed		Minor		"As is"	12-NOV-04
HP-151431-ASED-NC-0497	0	01-NOV-04	Washers below connector fixation screws are missing	EQM	Closed		Minor		"As is"	12-NOV-04
HP-151431-ASED-NC-0498	0	01-NOV-04	V104 versus V702 changed due to failure in EICD	EQM	Open		Minor		Fix	29-NOV-04
151431-01 CCH CVV Internal Harness										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update
HP-151431-01-ASED-NC-049	0	01-NOV-04	T103 pins changed due to hardware failure	EQM	Open		Minor		Repair	29-NOV-04
HP-151431-ASED-NC-0601	0	06-DEC-04	I/F connector can't be connected to T235 tempsensor due to damaging	EQM	Open		Minor		Repair	08-DEC-04
155220 ISO Modified filling port airlock										
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update

NCR listing for project: Herschel-Planck

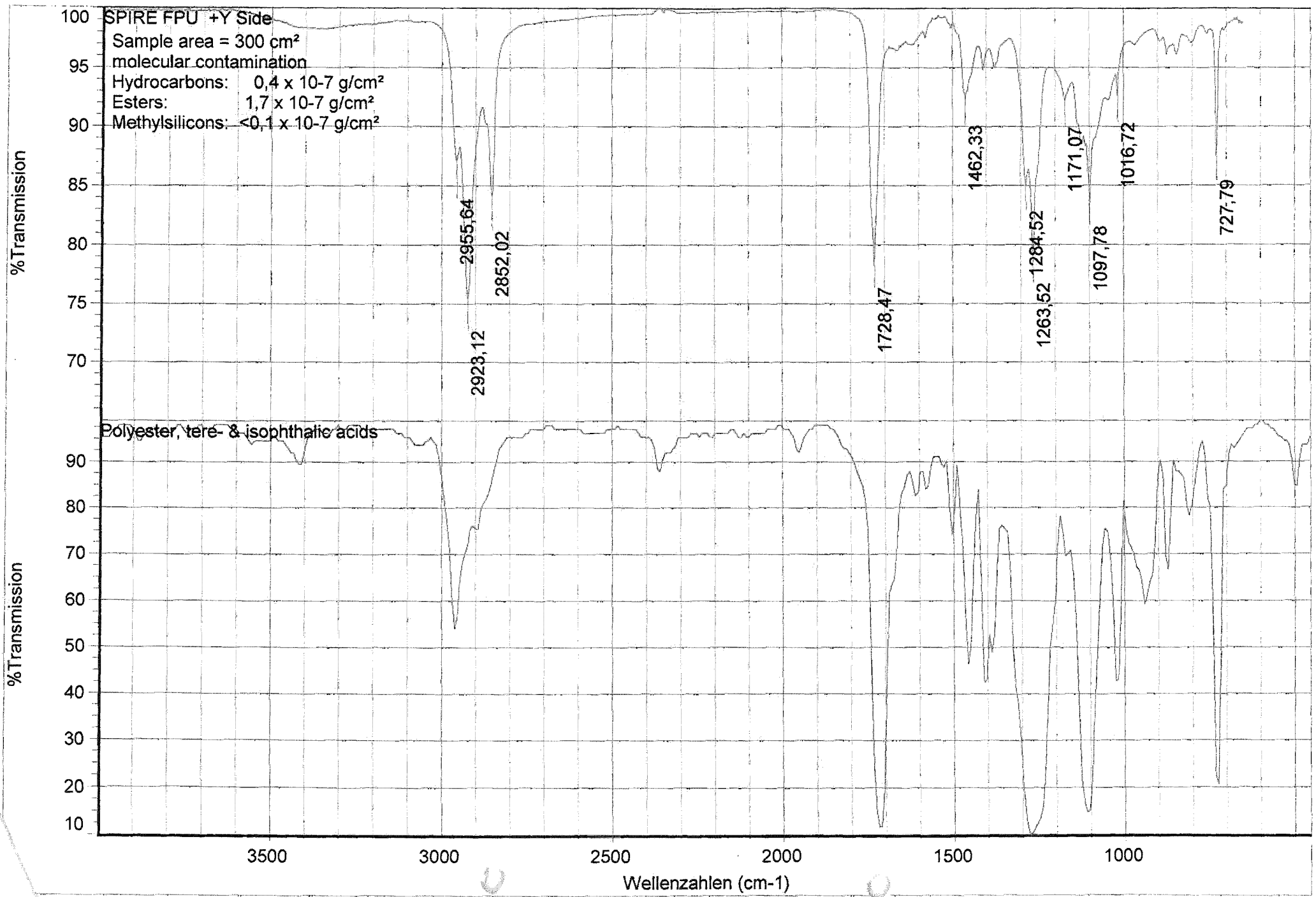
Last Updated After :

Status List Report for All Elements

155220 ISO Modified filling port airlock											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-ASED-155200-ASED-0181	1	19-FEB-04	Incoming inspection: Imperfections detected during X-ray inspection, slight scratch on sealing area	EQM	Closed	EQM	Minor		Repair	25-MAR-04	
HP-121228-ASED-NC -0059	1	14-JUL-03	Dim. deviation of I/F inletfilter guidingtube to fillingport detected during incoming inspection	QM	Closed	01	Minor		Repair	26-APR-04	
150000 HERSCHEL PLM EQM											
NCR Number	NCR Rev	Initiated	NCR Title	NCR Model	Status	Serial Number	Initiator Class	Customer Class	Disposition	Last Update	
HP-150000-ASED-N-01	1	07-MAY-02	Deviations found during verification measurements ie infinite resistance	EM	Closed	QM	Minor		"As is"	20-MAY-03	
HP-150000-ASED-N-02	0	06-JUN-02	Values for Particle fallout rate out of spec	EM	Closed	EQM	Minor		Rework	13-MAR-03	
HP-150000-ASED-N-03	1	27-JUN-02	L 102 interface wire broken	EM	Closed	EQM	Minor		"As is"	21-FEB-03	
HP-150000-ASED-N-05	0	26-JUL-02	Leakage occured on PLM during ISO testcampaign, influence to PLM QM	EM	Closed	QM	Minor		Rework	20-MAY-03	
HP-150000-ASED-N-06	0	31-JUL-02	Req. value for temperature in CR 100 exceeded, ie temp out of spec & not recorded	EM	Closed	EQM	Minor		"As is"	20-MAY-03	
HP-150000-ASED-N-07	0	17-SEP-02	Required values for cleanroom CR 100 exceeded: particular & temp limits exceeded	EM	Closed	QM	Minor		Rework	20-MAY-03	
HP-150000-ASED-N-09	0	28-JAN-03	CR100 monitoring unit out of order for 12 days	EQM	Closed	QM	Minor		"As is"	14-MAY-03	
HP-150000-ASED-NC-0099	0	26-SEP-03	PFO Cleanliness monitoring values exceeded:	EQM	Closed		Minor		Rework	16-AUG-04	
HP-150000-ASED-NC-0566	0	29-NOV-04	Connector delivered for P701/ A-02 with cd surface plating	EQM	Open		Minor		Repair	29-NOV-04	
HP-ASED-NC-0602	0	07-DEC-04	MGSE part one pod foot cannot. be mounted thread n. inserted as req	SPARE	Open		Minor		Repair	07-DEC-04	

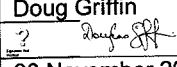


Astrium GmbH PROJECT: Herschel	CONTAMINATION CONTROL WIPE TEST LOG-SHEET	CONTAMINATION CONTROL LOG-BOOK DATE : SHEET:
Contamination Control Log-Sheet : Molecular Wipe Test Molecular Wipe Test analysis acc. ESA PSS-01-705		
Wipe Test related information		
[Redacted]	[Redacted]	[Redacted]
[Redacted] SPIRE FPU + Y Side		
[Redacted] of hardware, surface, performed cleaning processes, etc. :	[Redacted]	
Analysis related information		
Hydrocarbon-equivalent [10^{-7} g/cm ²] :	$0,4 \times 10^{-7}$	Remark :
Ester -equivalent [10^{-7} g/cm ²] :	$1,7 \times 10^{-7}$	Remark :
Methylsilicone-equivalent [10^{-7} g/cm ²] :	$< 0,1 \times 10^{-7}$	Remark :
Σ molecular contamination [10^{-7} g/cm ²]:	$2,2 \times 10^{-7}$	Remark :
Analyst : Testlab :	Forstner TP 35	Signature : Date :
		Forstner 25.11.04



NCR Number:

HR-SP-RAL-NCR-092

Spacecraft / Project	HERSCHEL	Originator's Name	Doug Griffin	
Experiment / Model	SPIRE	Signature		
Sub-System	FPU/JFP/JFS	Date	30 November 2004	
Assembly		Level (Highlight if applicable)	Major	Minor
Sub-Assembly				
Item		NRB Reference		
Serial Number				

NCR Occurred During (Highlight if applicable)	Manufacture	Inspection	Test	Integration	Other
---	-------------	------------	------	-------------	-------

NCR Title	SPIRE EQM Electrical Interface Bench Test Anomalies
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NCR Description	
See Attachment One	
Cause of NCR	
To be determined.	
Disposition / Corrective Action	
Document or Drawing Affected (Title, Number & Issue)	Estimated COST OF NCR (cost of : correction, Materials, Resource, and delay to Project etc.)

NCR CLOSED	Name	Sign & Date	
		Approved	Rejected
Engineering:			
Product Assurance:			
CCB-Chairman:			
Principle Investigator			
Product Assurance:			
Co-Investigator			
Prime Contractor			
ESA Project Office			

NON-CONFORMANCE REPORT (NCR)

PRODUCT ASSURANCE
Space Science and Technology
Department

NCR Number:

HR-SP-RAL-NCR-092

Pin	Function	Implemented
24	SLW_BIAS -ve	Yes
25	SLW_JFETV +ve	Yes
26	SLW_JFETV shld	No
27	SLW_JFETV -ve	Yes
28	SSW_BIAS1 +ve	Yes
29	SSW_JFETV1 shld	No
30	SSW_JFETV1 -ve	Yes
31	SSW_BIAS2 shld	No
32	SSW_BIAS2 -ve	Yes
33	SSW_JFETV2 +ve	Yes
34	None	No
35	PTC_JFET_HEATER -ve	Yes
36	SLW_JFET_HEATER -ve	Yes
37	SSW_JFET_HEATER +ve	Yes

Table 3 - Ground scheme correcting connector for JFP J27 and JFP J28

Pin	Funtion	Implemented
1	PSW_JFETV1 shld	No
2	PSW_JFETV1 -	Yes
3	PSW_JFETV2 +	Yes
4	PSW_JFETV3 shld	No
5	PSW_JFETV3 -	Yes
6	PSW_JFETV4 +	Yes
7	PSW_JFETV5 shld	No
8	PSW_JFETV5 -	Yes
9	PSW_JFETV6 +	Yes
10	PSW GRND	No
11	PSW_BIAS1/2 +	Yes
12	PSW_BIAS3/4 -	Yes
13	PSW_BIAS3/4 shld	No
14	PSW_BIAS5/6 +	Yes
15	PSW_HEATER -	Yes
16	PSW_HEATER shld	No
17	PSW_HEATER +	Yes
18	PSW_HEATER -	Yes
20	PSW_JFETV1 +	Yes
21	PSW_JFETV2 shld	No
22	PSW_JFETV2 -	Yes
23	PSW_JFETV3 +	Yes
24	PSW_JFETV4 shld	No
25	PSW_JFETV4 -	Yes
26	PSW_JFETV5 +	Yes
27	PSW_JFETV6 shld	No
28	PSW_JFETV6 -	Yes
29	PSW_BIAS1/2 -	Yes
30	PSW_BIAS1/2 shld	No
31	PSW_BIAS3/4 +	Yes
32	PSW_BIAS5/6 -	Yes
33	PSW_BIAS5/6 shld	No
34	PSW_HEATER +	Yes
35	PSW_HEATER -	Yes
36	PSW_HEATER shld	No
36	PSW_HEATER shld	No
37	PSW_HEATER +	Yes

NON-CONFORMANCE REPORT (NCR)

PRODUCT ASSURANCE
Space Science and Technology
Department

NCR Number:

HR-SP-RAL-NCR-092

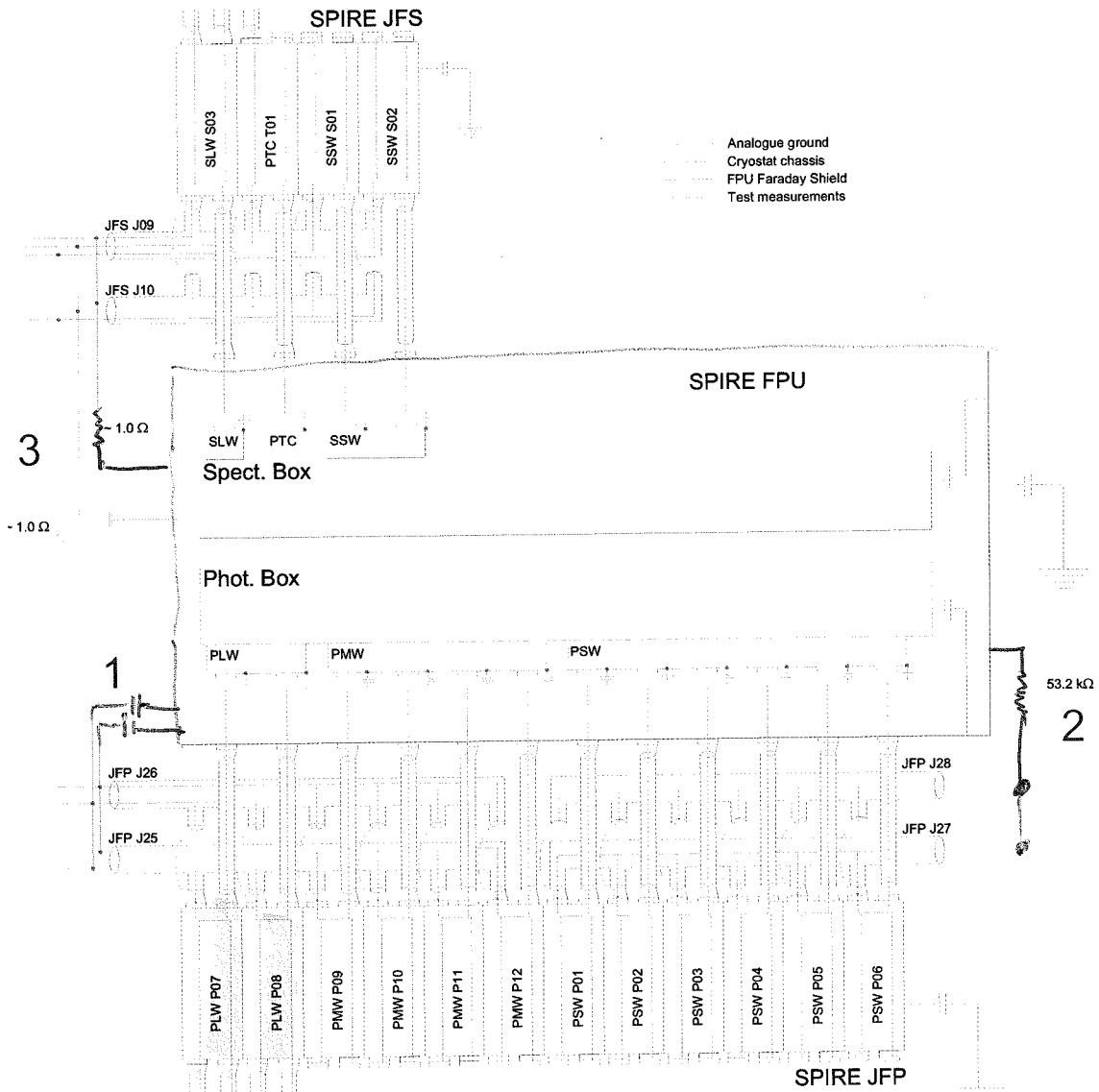


Figure 1 - Schematic illustration of the SPIRE grounding scheme within the cold plane units. Signal wires are not shown. For description, see Table 1. The PLW and PMW grounds (1) are correctly isolated. PSW ground (2) is connected to FPU Chassis by 53.2kΩ. SSW and SLW grounds (3) are hard shorted to ground via ~1.0Ω and PTC ground is correctly isolated.

NON-CONFORMANCE REPORT (NCR)

PRODUCT ASSURANCE
Space Science and Technology
Department

NCR Number:

HR-SP-RAL-NCR-092

Attachment One: NCR Description/Cause

The bench test of the FPU/JFP/JFS carried out during the incoming inspection of CQM SPIRE for the satellite level EQM test campaign revealed several anomalies. The test procedure and test results are listed in SPIRE-RAL-NOT-002216, Issue 3.0. The anomalies are listed and described in Table 1.

Table 1 - Summary of issues found during SPIRE CQM bench test

Number	Comment / Description
1	<ul style="list-style-type: none"> ▪ Pins 3 and 22 on JFP J26 (redundant PSW JFET Bias 2) are open circuit. The corresponding pins on the prime Backharness are not open circuit. ▪ This function is not used during the test campaign. The fault could either be in the internal wiring within the STM JFET module or within the back harness. ▪ No meaningful diagnostic can be carried out with the JFP mated to the FPU. The problem is to be reviewed when the instrument is returned to RAL at the conclusion of the EQM programme.
2	<ul style="list-style-type: none"> ▪ PSW analogue ground is shorted via 53.2kΩ to the chassis of the JFP. This can be seen in Figure 1 which illustrates the part of the bench test which verifies isolation between FPU Faraday Shield and analogue ground. This violates the SPIRE grounding scheme.
3	<ul style="list-style-type: none"> ▪ SLW and SSW analogue grounds are shorted to chassis of JFS via approximately 1.0 Ω.

The error in the grounding scheme (Numbers 2 and 3 above) can be corrected by inserting MWDM37 way adaptors on JFP J27, JFP J28, JFS J09 and JFS J10. These adaptors would break the ground links for the PSW and JFP/JFS and are specified in Table 2 and Table 3. The adaptors would have the same physical envelope as a connector saver.

Table 2 Ground scheme correcting connector for JFS J09 and JFS J10

Pin	Function	Implemented
1	PTC Bias +ve	Yes
2	PTC Ground	No
3	PTC JFETV Bias -ve	Yes
4	SLW_BIAS-ve	Yes
5	SLW_BIAS +ve	Yes
6	SLW_GND WIRE	No
7	SLW_JFETV -ve	Yes
8	SLW_JFETV +ve	Yes
9	SSW_BIAS1 shld	No
10	SSW_BIAS1 -ve	Yes
11	SSW_JFETV1 +ve	Yes
12	SSW_GND WIRE	No
13	SSW_BIAS2 +ve	Yes
14	SSW_JFETV2 shld	No
15	SSW_JFETV2 -ve	Yes
16	PTC_JFET_HEATER +ve	Yes
17	SLW_JFET_HEATER +ve	Yes
18	SLW_JFET_HEATER shld	No
19	SSW_JFET_HEATER -ve	Yes
20	PTC Bias -ve	Yes
21	PTC JFETV Bias +ve	Yes
22	SLW_BIAS+ve	Yes
23	SLW_BIAS shld	No

SPIRE

SUBJECT: SPIRE FPU Handling and Integration Procedure

PREPARED BY: E Sawyer

DOCUMENT No: SPIRE-RAL-PRC-001923

ISSUE: 3

Date: 6/12/04

CHECKED BY:

Date:

APPROVED BY:

Date:

SPIRE

Project Document

SPIRE FPU Handling and Integration
Procedure

Ref: SPIRE-RAL-PRC-
001923

Issue: 3

Date: 6/12/04

Page: 2 of 35

Distribution

Change Record

ISSUE	DATE	
Draft	3/12/03	First draft
Draft 2	15/12/03	Additions from MSSL Inclusion of electrical integration procedure
1	20/5/04	Comments from ASSED incorporated as appropriate Drawings added
2	21/10/04	Revised §6.2 to comply with doc. " <i>Making SPIRE ESD Safe - SPIRE-RAL-NOT-002028</i> , Issue 1.0" Deleted Cryoharness Crosstalk test
3	6/12/04	Section 5.1 and 5.2 Deleted requirement to purge during AIT phases

Table of Contents

CHANGE RECORD	3
TABLE OF CONTENTS	4
GLOSSARY	6
REFERENCES	7
APPLICABLE DOCUMENTS.....	7
1. INTRODUCTION	7
2. SCOPE.....	9
3. DELIVERY CONDITION.....	9
3.1 SHOCK RECORDERS	9
4. TRANSPORT.....	9
4.1 IN DEDICATED EXPERIMENT CONTAINERS.....	9
4.2 AFTER INTEGRATION ON THE SPACECRAFT (IN SPACECRAFT CONTAINER)	9
5. STORAGE.....	10
5.1 IN DEDICATED EXPERIMENT CONTAINER.....	10
5.2 OUT OF CONTAINER (IN RR100 CLEANROOM, AWAITING INTEGRATION)	10
6. HANDLING	10
6.1 GENERAL.....	10
6.2 ESD PROTECTION.....	11
6.3 UNPACKING FROM DEDICATED EXPERIMENT CONTAINER	11
6.4 PREPARATION FOR INTEGRATION	11
6.5 PREPARATION FOR PACKING.....	12
6.6 PACKING IN CONTAINERS.	13
7. INTEGRATION.....	13
7.1 REQUIRED TOOLS/MGSE	13
7.2 MECHANICAL INTEGRATION TO SPACECRAFT	14
7.3 ELECTRICAL INTEGRATION.....	15
7.3.1 <i>General</i>	15
7.3.2 <i>Cold Units pre-Integration Electrical Checkout</i>	15
7.3.3 <i>Cryo-harness Cross talk checks (now obsolete)</i>	16
7.3.4 <i>Cryo-Harness grounding check</i>	16
7.3.5 <i>Warm electronics mechanical integration</i>	16
7.3.6 <i>Initial electrical integration of Warm Electronics</i>	17
7.3.7 <i>Electrical Connection (Mating of DRCU and Cold Plane Units)</i>	18
7.3.7.1 Connection of Internal Cryoharness (SIH-CS) to SPIRE Cold Plane Units	18
7.3.7.2 Connection of SVM Cryoharness (SIH-SS) to SPIRE DRCU and SIH-IS to CVV-CB	19
7.3.8 <i>SIH EICD Cross-check and Instrument Sign-off</i>	26
7.4 ELECTRICAL DISCONNECTION.....	26
7.5 REMOVAL FROM SPACECRAFT	26
8. RED TAG ITEMS	26



Project Document

SPIRE FPU Handling and Integration
Procedure

Ref: SPIRE-RAL-PRC-001923
Issue: 3
Date: 6/12/04
Page: 5 of 35

9. GREEN TAG ITEMS..... 27

ANNEX A - DRAWINGS OF SPIRE FPU MGSE..... 28

ANNEX B - L0 THERMAL STRAP ASSEMBLY..... 34

Glossary

Cold Units	SPIRE FPU, JFP and JFS
CQM	Cold Qualification Model
DCU	Detector Control Unit
DPU	Digital Processing Unit
DRCU	SPIRE DCU and FCU, i.e the two units with interfaces with the SIH-SS
ESD	Electro static Discharge
FCU	Focal plane Control Unit
FPU	Focal Plane Unit
HOB	Herschel Optical Bench
JFP	Herschel Spire JFET Photometer Module
JFS	Herschel Spire JFET Spectrometer Module
JFET	Junction Field Effect Transistor
L0	Level 0 (Zero)
MSSL	Mullard Space Science Laboratory
OBA	Optical Bench Assembly
PFM	Proto Flight Model
RAL	Rutherford Appleton Laboratory
SIH-CS	Cryogenic Cryoharness between CVV-CB and Instrument
SIH-IS	Intermediate Cryoharness between CVV-CB and SVM-CB
SIH-SS	SVM Cryoharness between SVM-CB and DRCU
SPIRE	Spectral and Photometric Imaging REceiver
TBC	To Be Confirmed
Warm Units	SPIRE DPU, FCU and DCU
WIH	(SPIRE) Warm Interconnection Harness

References

Applicable Documents

AD1	SPIRE-RAL-DOC-001132	SPIRE warm electronics integration plan
AD 2		Obsolete
AD 3	SPIRE-RAL-DOC-000608	SPIRE Harness Definition Document
AD 4	SPIRE-RAL-PRC-002181	SPIRE Warm Electronics Handling and Integration Procedure

Reference Documents

RD 1	“ <i>Making SPIRE ESD Safe</i> - SPIRE-RAL-NOT-002028, Issue 1.0”	
RD 2	SPIRE INSTRUMENT BLOCK DIAGRAM - SPIRE-RAL-DWG-000646, Issue: 5.8	
RD 3	HP-2-ASED-MN-0753	

1. INTRODUCTION

The general AIT flow for the integration of the instrument (Cold Plane Units and Warm Units) is indicated in Figure 1.

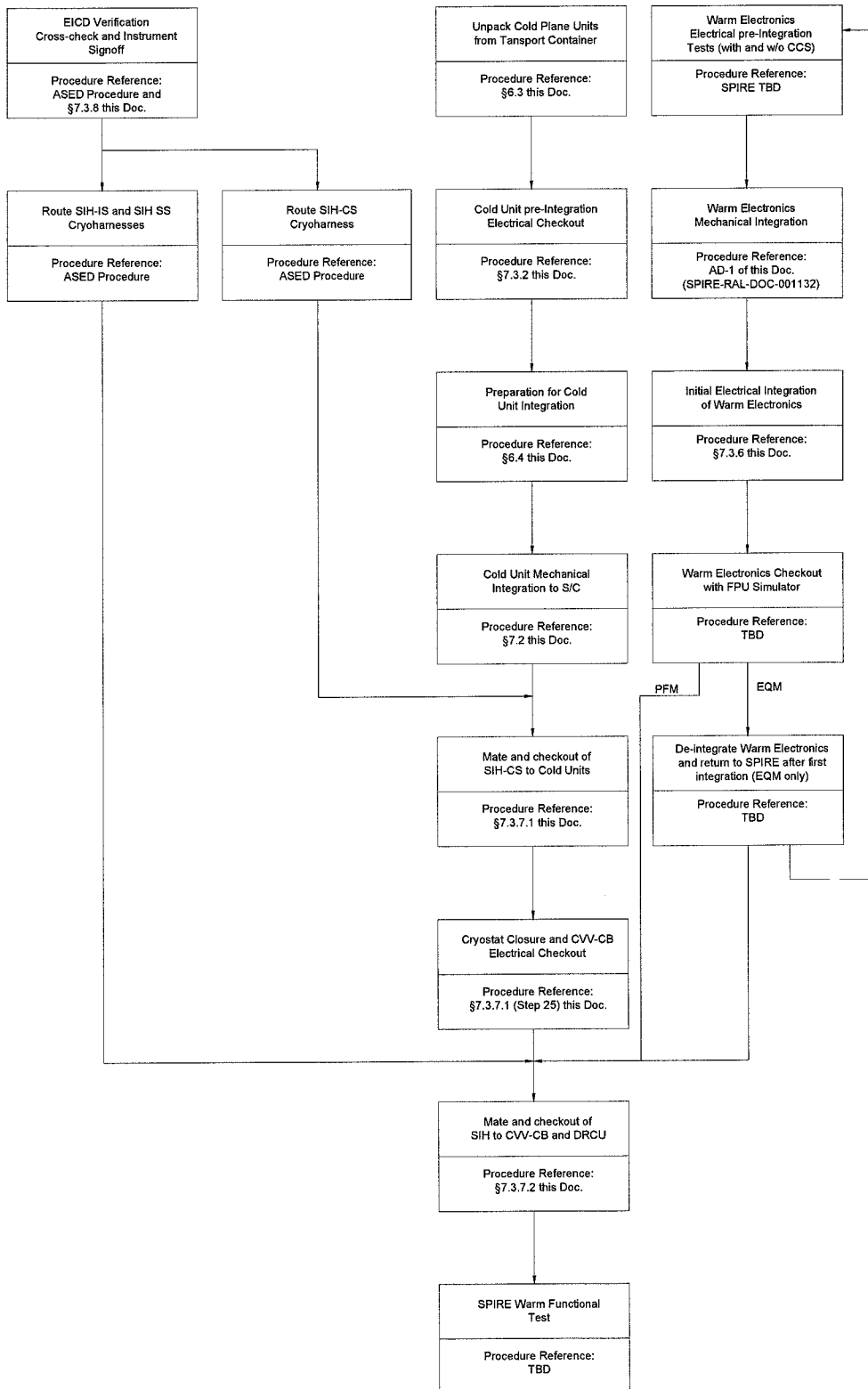


Figure 1 - General AIT Flow for the Integration of the cold plane units and the Warm Electronics to the S/C.

2. SCOPE

This document describes the procedures to be followed when handing the SPIRE FPU after delivery to ESA/Alcatel.

It covers the handling and integration procedures to be followed.

It covers both the CQM and PFM units

3. DELIVERY CONDITION

The SPIRE instrument is delivered in the following condition:-

The FPU is supplied in a dedicated, re-useable, container.

Alignment cube is fitted to the FPU. (red tag item). See section 8 for further details.

FPU aperture cover fitted (red tag item). See section 8 for further details.

Harnesses between the FPU and JFETs fitted.

FPU and JFETs attached to a baseplate.

Shorting plus or covers will be fitted to all electrical connectors See section 8 for further details.

FPU and JFETs double wrapped in polythene or lumalloy film.

Witness mirrors and/or PFO plates will be fitted to the baseplate

Silica gel moisture control devices will not be used

3.1 Shock recorders

Attached to the FPU baseplate, inside the transportation container are re-settable shock indicators These operate in three axis and are set to 5,10 and 25g.

Upon inspection, if any of these recorders have triggered the project team at RAL should be informed.

'Tip and Tell' tilt sensors are attached to the outside of the FPU container.

Upon inspection, if any of these recorders have triggered the project team at RAL should be informed

4. TRANSPORT

4.1 In dedicated experiment containers

Protect from rain and moisture.

Transport in closed vehicles only.

Protect from extremes of temperature, -10°C to +50°C, and prevent the formation of dew at any time.

4.2 After integration on the spacecraft (in spacecraft container)

Equivalent to Cleanroom 100 conditions

Assuming that the cryostat is closed:

FPU Aperture cover (red-tag item) shall be removed

Alignment cube (red-tag item) shall be removed

No other specific requirement.

For transport the CVV is closed, evacuated, cooled, OBA in vertical position, z-axis downwards]

5. STORAGE

5.1 In dedicated experiment container

Ensure aperture cover (red-tag item) is fitted.

Protect from rain and moisture.

Protect from extremes of temperature, 10°C to +30°C.

Alignment cube is fitted.

5.2 Out of container (in RR100 cleanroom, awaiting integration)

Ensure aperture cover (red-tag item) is fitted.

Alignment cube is fitted

6. HANDLING

6.1 General.

The FPU is a delicate optical instrument and should be handled with extreme care at all time.

Contamination of the optical surfaces within the instrument is prevented by the aperture cover. This cover should remain in place unless it is necessary to remove it.

WARNING: The bipod legs on two corners of the instrument are very thin section and easily damaged.

Care must be taken at all times not to put side loads into these items. These are at risk at all times when the FPU is not attached to a rigid plate. When it is attached to a rigid plate i.e. the HOB or its transport plate then it is tolerant of loads from vibration, lateral expansion, thermal tests, etc.

6.2 ESD protection

The SPIRE instrument contains very sensitive detectors that are susceptible to damage by Electro static discharge. On delivery all connectors will be protected by covers or shorting plugs as appropriate. When handling, all personnel shall wear anti static protection (wrist straps or other suitable method) When the cryoharness is not connected to the DRCU and the FPU Faraday Shield Link connected to Backshell at the warm end, then the FPU is electrically floating and prone to ESD damage.

6.3 Unpacking from dedicated experiment container

The FPU is supplied attached to a baseplate together with the JFETs and the JFET harness already integrated. It is bagged in polythene or lumaloy film.

To remove the FPU and JFETs from its container, the following procedure should be followed: -

In an area with a cleanliness of class 100,000 minimum, undo the eight latches that secure the container lid and remove the lid.

The protective bagging encloses the FPU, JFETs and harness and is taped to the baseplate.

Unscrew and remove the four off M8 cap head screws that secure the baseplate to the anti vibration mounts. Attach the lifting frame Ref MSSSL/5264/404 to a crane and hydra-set. Lower the lifting frame to the baseplate and attach to the eyebolts provided on the baseplate.

The FPU, JFETs and baseplate can now be lifted out of the container with a crane.

Clean bagging material and baseplate, then transport to RR100 airlock.

Remove bagging

The instrument can now enter RR100

Shorting plugs on the JFP and JFS provide ESD protection at this stage.

6.4 Preparation for integration

The FPU is supplied with the JFETs and associated harness already fitted.

The following tasks need to be carried out before integration onto the spacecraft.

Only standard tools are required at this stage.

a) Fitting of JFET supports

The JFETs will be fitted to the spacecraft together with the FPU. They will need supporting during this activity.

The SPIRE supplied MGSE provides provision to support the JFETS during integration.

b) Fitting of Lifting attachment

Fit the lifting attachment to the FPU as shown in annex A.

Attach the lifting wires to the JFETS.

c) Alignment cube.

The FPU is supplied with the alignment cube fitted, and should be left in place until all alignment activities are complete, it can be removed and replaced within the alignment tolerances required if necessary..

d) Thermal strap.

Remove the detector level 0 thermal strap and the Torlon support frames; leave the other two thermal straps in place

e) **Grounding strap.**

The FPU is electrically connected to the baseplate for ESD protection, this strap to be disconnected from the baseplate.

f) **Fitting of RFI tight EMI backshells**

The Herschel/SPIRE EQM cryoharness implements only a subset of the PFM cryoharness bundles for cost a schedule reasons. As a consequence, a number of open connectors are present on the SPIRE Cold Plane Units. These open connectors are to be sealed against RFI by backshells to be supplied by ASED. This activity is to be carried out at this stage providing that the extra length of backshell does not cause a mechanical interference during the integration of the instrument onto the OBA.

g) **Removal from baseplate**

WARNING: The bipod legs on two corners of the instrument are very thin section and easily damaged. Care must be taken at all times not to put side loads into these items. These are at risk at all times when the FPU is not attached to a rigid plate.

Undo the five M4 fasteners which secure the Photometer JFET rack (HSJP) (8 JFETs) to the baseplate. Leave the screws in position as they cannot be removed from the JFET rack.

Undo the four M4 fasteners that secure the Spectrometer JFET rack (HSJS) (2 JFETs) to the baseplate. Note that two of these fasteners are studs with nuts on the top, the nuts should be removed and the studs left in place.

The two remaining L0 straps are also secured to the baseplate. To release these from the baseplate, undo the 4 off M4 fasteners on each strap and remove the fasteners. NOTE. The undersides of these straps form the thermal interface to the spacecraft helium tank pods. Their surfaces are flat and soft gold plated, these surfaces can easily be damaged and the thermal performance of the instrument may suffer as a result.

Unbolt the cone from the FPU by undoing the M8 nut, thus leaving the cone on the baseplate.

Undo and remove the 8 fasteners on the blade mounts that attach the FPU to the baseplate.

The FPU and JFETs can now be lifted from the baseplate.

Undo and remove the FPU cone from the baseplate and re-attach it onto the Optical Bench. Note: there are special washers (part number A3/5264/302-3) under the head of each screw and also Vespel insulating bushes (A3/5264/302-2) either side of the mounting flange.

Torque the screws to 8.1 Nm. +/- 10% above running torque

The FPU and JFETs are now ready for integration.

Note: All screws that interface to the spacecraft are metric threads.

6.5 Preparation for packing

All units should be wrapped in clean film and replaced in their transit containers. The FPU should be refitted to its baseplate using the following procedure:

Assuming activities described in section 6.3 have been carried out, and the FPU and JFETs are supported on a crane, with the FPU mounting cone still attached to the optics bench.

Remove the cone mount from the spacecraft optics bench

Fix the cone to the SPIRE baseplate using the four M6x21 cap head screws. Note: there are special washers (part number A3/5264/302-3) under the head of each screw and also Vespel insulating bushes (A3/5264/302-2) either side of the mounting flange.

Torque the screws to 8.1 Nm. +/- 10% above running torque.

The Spectrometer JFET studs (2 off) as indicated on interface drawing 0-KE-0104-360. Should still be fitted to the baseplate

Lift the FPU and JFETs using the lifting gear as described in section 6.

Very gently lower the assembly onto the baseplate, ensuring that the JFET studs engage on the JFETs and the cone mount engages in its location on the FPU.

NOTE: the cone is very thin walled section and large moments can be applied if the FPU is not lowered with its interface plane parallel to the baseplate

When all units are resting on the baseplate, fit the attachment screws (M6X21) to the bipod feet as for the cone mount, torque the screws to 8.1 Nm. +/- 10% above running torque.

Fit the M8 nut and Belleville washer to the mounting cone. Torque to 8.25 Nm. +/- 10% above running torque.

Remove the lifting/handling fixture.

Fit the two long bolts and two nuts to secure the spectrometer JFET. Torque the screws to 2.1 Nm. +/- 10% above running torque.

Fit the 5 long bolts to secure the photometer JFET. Torque the screws to 2.1 Nm. +/- 10% above running torque.

Secure the L0 straps to the baseplate using M4X20 socket head cap screws. Torque the screws to 1.5 Nm. +/- 10% above running torque.

Fit the electrical grounding strap between the FPU and the baseplate.

Cover the FPU and JFETs with a double layer of clean polythene or lumaloy film and secure each one with tape to the baseplate.

Fit the lifting frame Ref MSSSL/5264/404 to the four eyebolts in the plate.

6.6 Packing in containers.

Fit guide pins onto anti vibration mounts.

Lift the plate into the container.

Remove lifting frame.

Remove guide pins from anti vibration mounts

Secure baseplate to the anti-vibrations mounts in the floor of the transit container.

Fit container lid.

7. INTEGRATION

7.1 Required tools/MGSE

SPIRE supplied tools/MGSE:-

FPU and JFET handling frame.

FPU/JFET/baseplate lifting gear

JFET fixation hardware

Isolation washers, special screws and studs

L3 pressure plates 2-off

L1 strap screws M8 2off, M3 4off (these screws will be prepared for wire locking)

Wire for locking above screws.

L1 bushes for the vent line end

Temporary FPU Grounding Strap including M4 x 6mm fastener to connect to OBA

Supplied by spacecraft

NOTE, Could possibly be attached to the unused harness support bracket holes, or any other convenient tapped hole.

Crane, with Hydraset

Fixation bolts,

FPU M6 12 off -

L0 straps M4 16 off -

L0 pressure plate 4 off

L3 strap M4 4off

Torque wrench to cover 1.5 to 8.25 Nm

Allan key, spanners etc

DVM for electrical isolation testing

7.2 Mechanical integration to spacecraft

FPU and JFETs

Assuming activities described in section 6 have been carried out, and the FPU and JFETs are supported on a crane.

Fix the cone to the SPIRE baseplate using the four M6x21 cap head screws. Note: there are special washers (part number A3/5264/302-3) under the head of each screw and also Vespel insulating bushes (A3/5264/302-2) either side of the mounting flange.

Torque the screws to 8.1 Nm. +/- 10% above running torque.

Fix the Spectrometer JFET studs (2 off) as indicated on interface drawing 0-KE-0104-360. Note these should be screwed into the HOB until 45mm of stud are protruding from the surface.

Lift the FPU and JFETs using the lifting gear as described in section 6.

Very gently lower the assembly onto the HOB, ensuring that the JFET studs engage on the JFETs and the cone mount engages in its location on the FPU.

The flexible ends of the L0 straps are unsupported at this stage and will need to be guided by hand into place as the FPU is lowered

NOTE: the cone is very thin walled section and large moments can be applied if the FPU is not lowered with its interface plane parallel to the HOB

When all units are resting on the HOB, fit the attachment screws (M6X21) to the bipod feet as for the cone mount.

Fit the two Bellville washers and the M8 Kaylock nut to the cone mount. Torque to 8.25Nm.

Remove the lifting/handling fixture.

L0 straps

- The cooler pump and evaporator straps

These will be in place at this stage.

Ensure that the lower flexibles of these two straps align with the pod interfaces. Fit the attachment screws (ten M4 For the evaporator strap, six M4 screws for the pump

Torque to specification defined by Astrium

- Detector strap

The light baffle, upper flexible strap should already be in place on the FPU.

Fit the Torlon support frames.

Move the level 0 main strap into place and align the dowel holes (see Assembly drawing 5264/309).

Push in Dowels and ensure that the flexibles are aligned.

Place the cold strap support clamp plates over the top.

Fit the four 4-40 UNC fixings to the cold strap support clamp plates to secure the main strap. Torque to 0.76 Nm. +/- 10% above running torque.

Ensure that the lower flexibles align with the pod interface. Fit the six M4 attachment screws . Torque in accordance with Astrium specification.
Fit the joining plates of the main supports to the joining plates of the upper flexibles, using eight 4-40 UNC bolts and Kaylock nuts. Torque to 0.76 Nm. +/- 10% above running torque

L1 straps.

Fit the two L1 straps to the FPU using at each location, one Bellville washer type B0750-056-S and one M8 bolt, torque to 10.5 Nm +/- 10% above running torque. And two M4 bolts and two Bellville washers (type B0375-020-S) under each screw head. Torque to 1.5 Nm +/- 10% above running torque. On final assembly the M8 fasteners to be wire locked to the M4 fasteners. Screws will be prepared for wire locking

L3 straps.

Fit the two L3 straps to the JFETs using the attachment hardware (L3 thermal strap clamp provided by SPIRE) as shown in interface drawings 0-KE-0104-350 and 0-KE-0104-360. Torque to 2.5 Nm.
Note. Spacecraft temperature sensors, two sensors on each clamp, fit to this interface.

Isolation test

Measure and record the electrical isolation between the chassis of the FPU and the cryostat. Reading should be more than 1 MΩ. Fix the temporary grounding strap from the FPU to the OBA. Repeat the measurement of the resistance between the cryostat and the FPU to ensure that grounding has been successful, reading should be less than 3Ω

7.3 Electrical integration

7.3.1 General

Several subsystems with the SPIRE FPU are ESD sensitive and especially vulnerable during the integration process. All normal precautions shall be taken when handling the FPU especially when open connectors are present. This includes the wearing of a correctly terminated ESD wrist strap (or equivalent) whilst carrying out any handling operation of the Cold Plane Units or Warm Electronics.

The sequence of the integration is to follow Figure 1.

7.3.2 Cold Units pre-Integration Electrical Checkout

The MDM connectors on the FPU, JFP and JFS are probed with a DVM to verify the correct ground isolation and critical signal isolation exists. The connectors are to be cross checked against the SPIRE Harness Definition Document (AD-3). The functions to be checked are outlined in Table 7-1.

Unit	Function
FPU	P-Cal Impedance, S-Cal Impedance, BSM Impedances, SMEC Impedances, Thermistor Impedances, Cooler Impedances
JFP	Photometer analogue ground isolation, JFET Bias, JFET Heater Bias and Bolometer Bias Impedances
JFS	Spectrometer analogue ground isolation, JFET Bias, JFET Heater Bias and Bolometer Bias Impedances

Table 7-1 Cold unit electrical interface verification

7.3.3 Cryo-harness Cross talk checks (now obsolete)

No cross-talk test will be carried out on the S/C Cryoharness as a part of the instrument integration.

7.3.4 Cryo-Harness grounding check

Requisites:

1. The SIH-CS has been routed from the CVV-CB to the location of the I/Fs with SPIRE
2. SPIRE Cold Plane Units have not been integrated onto the OBA

Before any electrical integration of the SPIRE FPU a check of the grounding within the cryoharness shall be carried out. This must verify that the FPU Faraday shield¹ is isolated from the chassis of the CVV/SVM. when the Cold SIH, the Intermediate SIH and the Warm SIH are routed on the S/C but not mated with either the focal plane units or the SVM units. To verify this, it may be necessary to temporarily isolate the unmated cryoharness connectors backshells of the cold units from the CVV. To achieve this, the connector backshells are to be temporarily placed inside plastic bags.

For each of the Cryoharnesses listed in Table 7-2, the isolation between the specified pin on the outside of the CVV-CB and the chassis of the cryostat is to be greater than 5MΩ.

Cryoharness	Applicability	Pin
C1	EQM and PFM	5
C2	PFM	1
C3	EQM and PFM	2
C4	PFM	1
C5	PFM	1
C6	EQM and PFM	1
C7	PFM	1
C8	PFM	1
C9	PFM	1
C10	EQM and PFM	1
C11	EQM and PFM	1
C12	PFM	1
C13	PFM	1

Table 7-2 - Cryoharness grounding isolation check.

7.3.5 Warm electronics mechanical integration

Before any electrical integration of the SPIRE FPU, the warm electronics shall be integrated according to the warm electronics integration procedure. AD 4.

¹ The FPU Faraday Shield is fully explained in the SPIRE Harness Definition Document, SPIRE-RAL-PRJ-000608, Issue 1.1, 05/03/03.

7.3.6 Initial electrical integration of Warm Electronics

Requisites:

1. The Warm Electronics have completed their pre-Integration tests with the Instrument and PLM EGSE
2. The Warm Electronics have been mechanically integrated to the SVM according to AD-1

Step	Applicability	Activity
1	EQM and PFM	Connect grounding strap from the DPU to the SVM
2	EQM and PFM	Measure and record the resistance between the chassis of the DPU and the SVM and verify that it is less than 10mΩ.
3	EQM and PFM	Connect grounding strap from the DCU to the SVM
4	EQM and PFM	Measure and record the resistance between the chassis of the DCU and the SVM and verify that it is less than 10mΩ.
5	EQM and PFM	Connect grounding strap from the FCU to the SVM
6	EQM and PFM	Measure and record the resistance between the chassis of the FCU and the SVM and verify that it is less than 10mΩ.
7	EQM	Route and secure W1, W3 and W5 to SVM attachment points. Remove and store connector covers
8	PFM	Route and secure W1 through W6 to SVM attachment points. Remove and store connector covers
9	EQM	Remove and store the connector covers from DPU J07, J08 and J09 then mate W1, W3 and W5 to J07, J08 and J09
10	PFM	Remove and store the connector covers from DPU J07 through J12 then mate W1 through W6 to DPU J07 through J12
11	EQM	Remove and store connector covers from FCU J01, FCU J03 and DCU J01 and mate W1, W3 and W5
12	PFM	Remove and store connector covers from FCU J01 through J04, DCU J01 and DCU J02 then mate W1 through W6
13	EQM	Remove and store connector covers from FCU J31, FCU J35 and DCU J03. Route EGSE Bench power supply harnesses and mate to FCU J31, FCU J35 and DCU J03.
14	PFM	Route and secure W7 and W8 to SVM. Remove and store connector covers for FCU J07 and J08. Remove and store connector covers for DCU J03 and J04. Remove and store connector covers from W7 and W8 then mate firstly to the appropriate FCU then DCU connectors.
15	PFM	Route and secure Prime DPU primary power harness from DPU LCL. Remove and store harness connector covers. Remove and store connector cover from DPU J01. Mate harness to LCL connector then to DPU J01.
16	PFM	Route and secure Prime and Redundant DPU primary power harness from DPU LCL. Remove and store harness connector covers. Remove and store connector covers from DPU J01 and J02. Mate harness to LCL connectors then to DPU J01 and J02.
17	EQM	Route and secure S/C 1553 bus harnesses. Remove and store DPU P03, J03, J04 and P04 connector covers

7.3.7 Electrical Connection (Mating of DRCU and Cold Plane Units)

When delivered, the JFET units will be fitted with safeing plugs (Type-III See RD 1) on the MDM 37 bias connectors on JFS and JFP. Covers will be present to protect the open MDM 25P detector connectors and the MDM 37S Subsystem connectors. These should be left in place during the mechanical integration.

NOTE: This order of connection must be maintained to protect the sensitive electronics in the SPIRE FPU and warm electronics.

It is not planned to use connector savers on the cold end of the cryo-harness as multiple insertions are not expected.

7.3.7.1 Connection of Internal Cryoharness (SIH-CS) to SPIRE Cold Plane Units

Requisites:

1. External cryoharness is not connected to the CVV vacuum connectors (CVV-CB)
2. JFP and JFS have Type-III Safeing plugs connected.
3. Cryoharness is routed within cryostat but not mated to instrument
4. The Cold Units are mechanically integrated onto the OBA
5. FPU Grounding Strap shorts FPU Chassis to the OBA

Step Number	Applicability	Activity
1	EQM only	Install RFI tight backshells on any remaining open connectors on FPU, JFP and JFS
2	PFM only	Mate the 128-way safeing plug for harnesses C11 and C13 (SPIRE Type-VIII) to the mating connector on the outside of the CVV (CVV-CB P29 and CVV-CB P30)
3	EQM only	Connect the cryo-harness C10 and C11 to connectors J19, J21, J23, J25, J27 and J29 to the FPU.
4	PFM only	Connect the cryo-harness C10, C11, C12 and C13 to connectors J19 through J30 to the FPU.
5	EQM and PFM	Mate the 128-way safeing plug for C1 (SPIRE Type-VI) to the mating connector on the outside of the CVV (CVV-CB P32)
6	EQM and PFM	Mate the 128-way safeing plug for harnesses C3 (SPIRE Type-V) to the mating connector on the outside of the CVV (CVV-CB P26)
7	EQM only	Remove the Type-III safeing plugs from JFP J27
8	PFM only	Remove the Type-III safeing plugs from JFP J25 and J27
9	EQM and PFM	Mate JFP P25 and JFP P27 to JFP J25 and JFP J27
10	EQM only	Remove the Type-III safeing plugs from JFP J28
11	PFM only	Remove the Type-III safeing plugs from JFP J26 and J28
12	EQM and PFM	Mate JFP P26 and JFP P28 to JFP J26 and JFP J28
13	PFM only	Remove the Type-III safeing plug from JFS J09
14	EQM and PFM	Mate JFS P09 to JFS J09
15	PFM only	Remove the Type-III safeing plug from JFS J10
16	EQM and PFM	Mate JFS P10 to JFS J10
17	EQM only	Mate 128-way safeing cover for C6 (SPIRE Type-VII) to CVV-CB P24
18	PFM only	Mate 128-way safeing cover for C2, C4, C5, C6, C7, C8 and C9 (SPIRE Type-VII) to CVV-CB P31, P22, P23, P24, P25, P27 and P28
19	EQM only	Mate JFP P13, P14, P15 and P16 to JFP J13, J14, J15 and J16

Step Number	Applicability	Activity
20	PFM only	Mate JFP P01 through P24 to JFP J01 through J25
21	EQM only	Mate JFS P05 and P06 to JFS J05 and J06
22	PFM only	Mate JFS P01 through P24 to JFS J01 through J07
23	EQM and PFM	Remove red-tag FPU grounding strap
24	EQM and PFM	During the final closure of the cryostat, the remaining red-tag items are to be removed from the cold plane units
25	EQM PFM(TBD)	Using two ASED provided Break-out boxes and SPIRE provided EGSE, the grounding configuration electrical interface will be probed at the 128-Way CVV-CB ²

After this stage has been carried out, the cold plane instrument is safe from an ESD point of view. The Cryostat can be closed (provided Cold Plane Red-tag Items have been removed!) and transported from one establishment to another.

7.3.7.2 Connection of SVM Cryoharness (SIH-SS) to SPIRE DRCU and SIH-IS to CVV-CB

Requisites:

1. External cryoharness (SIH-IS and SIH-SS) is routed but not connected to the CVV vacuum connectors
2. The SIH-IS and SIH-SS Cryoharnesses are mated at the SVM-CB³
3. The SIH-CS is connected to the instrument
4. The SIH-IS is not connected to the CVV-CB

This part of the electrical integration carries out the following activities:

- Verification of the correct grounding configuration of the Cold Plane Units and the Cryoharness
- Partial verification of critical electrical interfaces between the cryoharness and the Cold Plane Units
- Safe mating of the cold plane units and the DRCU

See Table 7-3 for procedure details.

² This step is required during the EQM programme as the SIH-CS will be in

³ Providing that SIH-IS is not connected to the CVV-CB and that the SIH-SS is not mated with the DRCU, the SIH-IS and SIH-SS can be mated in no particular order without any particular ESD precautions.

Step		Activity	Notes	Applicability	
				EQM	PFM
1.1	Prepare cryoharness DRCU connector backshells	Remove inspection covers from cryoharness backshells (DCU J05 to J32 and FCU J11, J12, J13, J14, J17, J18, J19, J20, J21, J22, J23, J24, J25, J26, J29 and J30)		No	Yes
1.2		Remove inspection covers from cryoharness backshells (DCU J14, J15, J16, J29, J30, J31, J32 and FCU J11, J13, J17, J19, J21, J23, J25 and J29)		Yes	No
1.3		Break and electrically isolate all the FPU Faraday Shield Link connection to the DRCU backshells		Yes	Yes
2.1.1	Connect cryogenic Phot Analogue grounds to DRCU via LIAs	Mate SIH-SS-06 P14, P15 and P16 to DCU J14, J15 and J16		Yes	Yes
2.1.2		Remove SPIRE Safeing Plug Type-VII from CVV-CB J24		Yes	Yes
2.1.3		Mate SIH-IS-06 P24 to CVV-CB J24	PLW Analogue ground connected to cold end via detector harness. JFETs connected to analogue ground via ESD resistors	Yes	Yes
2.2.1		Mate SIH-SS-09 P05, P06 and P07 to DCU J05, J06 and J07		No	Yes
2.2.2		Remove SPIRE Safeing Plug Type-VII from CVV-CB J28		No	Yes
2.2.3		Mate SIH-IS-09 P28 to CVV-CB J28	PSW Analogue ground connected to cold end via detector harness. JFETs connected to analogue ground via ESD resistors	No	Yes

Step		Activity	Notes	Applicability	
				EQM	PFM
2.3.1		Mate SIH-SS-04 P20, P21 and P22 to DCU J20, J21 and J22		No	Yes
2.3.2		Remove SPIRE Safeing Plug Type-VII from CVV-CB J22		No	Yes
2.3.3		Mate SIH-IS-04 P22 to CVV-CB J22	PMW Analogue ground connected to cold end via detector harness. JFETs connected to analogue ground via ESD resistors	No	Yes
3.1	Connect cryogenic Phot Analogue grounds to Bias harness	Mate SPIRE Safeing Plug Type-IX to SIH-SS-03 P30		Yes	Yes
3.2		Remove SPIRE Safeing Plug Type-V from CVV-CB J26		Yes	Yes
3.3		Mate SIH-IS-03 P26 to SVM-CB J26	PLW, PMW and PSW Analogue grounds connected to cold end via terminated bias harness. JFETs connected to analogue ground via ESD resistors	Yes	Yes
4.1	Remove Phot harness connections to DCU	Demate: SIH-SS-C6 P14, P15 and P16 from DRCU. Place connector dust caps over contacts		Yes	No
4.2		Demate: SIH-SS-C6 P14, P15 and P16 from DRCU. SIH-SS-C9 P05, P06 and P07 from DRCU SIH-SS-C4 P20, P21 and P22 from DRCU Place connector dust caps over contacts		No	Yes

Step		Activity	Notes	Applicability	
				EQM	PFM
5.0	Mate remaining Phot. Harnesses	Mate: SIH-IS-05 P23 to CVV-CB J23 SIH-IS-07 P25 to CVV-CB J25 SIH-IS-08 P27 to CVV-CB J27	All Phot harnesses mated to CVV-CB but not connected to DRCU. Safeing plug on SIH-C3-P30 keeping entire Phot cryo system safe!	No	Yes
6.1	Confirmation of Phot Harnesses grounding	Measure isolation of FPU Faraday shield on SIH-SS-P29 from connector backshell	Correct configuration of FPU faraday shield confirmed for Phot harnesses	Yes	Yes
6.2		Remove SPIRE Safeing plug Type-IX from SIH-SS-03-P30	SPIRE is temporarily ESD vulnerable	Yes	Yes
6.3		Measure isolation of Pins 21, 30 and 78 of SIH-SS-03 P30 from connector backshell.	Isolation test to be carried out with a DVM. The common terminal to be connected firstly to backshell of P30. The measure probe is then used on the pin contacts	Yes	Yes
6.4		Mate SPIRE Safeing Plug Type-IX to SIH-SS-03 P30	SPIRE is ESD safe	Yes	Yes
7.1	Safe mating of Spect harnesses to CVV-CB	Mate SPIRE Safeing Plug Type-X to SIH-SS-01 P32		Yes	Yes
7.2		Remove SPIRE Safeing plug Type-VII from CVV-CB-J31		No	Yes
7.3		Mate SIH-SS-02 P23, P24, P26 and P26 to DRCU J23, J24, J25 and J26		Yes	Yes
7.4		Mate SIH-IS-02 P31 to CVV-CB J31	SSW (and SLW!) analogue grounds connected to DRCU Spec Analogue ground plane	No	Yes
7.5		Remove SPIRE Safeing plug Type-VI from CVV-CB-J32		No	Yes
7.6		Mate SIH-IS-01 J32 to CVV-CB P32		Yes	Yes
7.7		Demate: SIH-SS-C02 P23, P24, P24 and P26 from DRCU		Yes	Yes

8.1	Confirmation of Spect Harnesses	Measure isolation of FPU Faraday shield on SIH-SS-01 P31 from connector backshell	Correct configuration of FPU faraday shield confirmed for Spect harnesses	Yes	Yes
8.2		Remove SPIRE Safeing plug Type-X from SIH-SS-03-P32	SPIRE is temporarily ESD vulnerable	Yes	Yes
8.3		Measure isolation of Pins 6 and 12 of SIH-SS-01 P32 from connector backshell.	Isolation test to be carried out with a DVM. The common terminal to be connected firstly to backshell of P32. The measure probe is then used on the pin contacts	Yes	Yes
8.4		Mate SPIRE Safeing Plug Type-IX to SIH-SS-03 P30	SPIRE is ESD safe	Yes	Yes
9.1	Connection of S/S Harness to CWV-CB	Mate SIH-IS-10 P32 to CVV-CB J32	Check critical impedances up cryoharness towards Cold Plane Units with DVM	Yes	Yes
9.2		Remove SPIRE Safeing Plug Type VIII from CVV-CB J30		Yes	Yes
9.3		Mate SIH-IS-11 P30 to CVV-CB J30	Check critical impedances up cryoharness towards Cold Plane Units with DVM	Yes	Yes
9.4		Mate SIH-IS-12 P33 to CVV-CB J33	Check critical impedances up cryoharness towards Cold Plane Units with DVM	No	Yes
9.5		Remove SPIRE Safeing Plug Type VIII from CVV-CB J29		No	Yes
9.6		Mate SIH-IS-13 P29 to CVV-CB J29	Check critical impedances up cryoharness towards Cold Plane Units with DVM	No	Yes
10.1	Confirmation of Phot Harnesses grounding	Measure isolation of FPU Faraday shield on SIH-SS-01 P31 from connector backshell	Correct configuration of FPU faraday shield confirmed for FPU Subsystem harnesses	Yes	Yes
11.1		Connect the FPU Faraday Shield link to all the SIH-SS harnesses and re-install the connector covers		Yes	Yes

12.1	Final iconnection of Photometer and Spectrometer Bias and Detector output channels	Mate SIH-SS-03 P29 to DCU J29		Yes	Yes
12.2		Demate SPIRE Safeing Plug Type-IX from SIH-SS-03 J30		Yes	Yes
12.3		Mate SIH-SS-03 P30 to DCU J30	Check analogue ground and critical impedances up cryoharness towards Cold Plane Units	Yes	Yes
12.4		Mate SIH-SS-01 P31 to DCU J31		Yes	Yes
12.5		Demate SPIRE Safeing Plug Type-X from SIH-SS-01 J32		Yes	Yes
12.6		Mate SIH-SS-01 P32 to DCU J32	Check analogue ground and critical impedances up cryoharness towards Cold Plane Units	Yes	Yes
12.7		Mate SIH-SS-04 P20, P21 and P22 to DCU J20, J21 and J22	Idem	No	Yes
12.8		Mate SIH-SS-05 P17, P18 and P19 to DCU J17, J18 and J19	Idem	No	Yes
12.9		Mate SIH-SS-06 P14, P15 and P16 to DCU J14, J15 and J16	Idem	Yes	Yes
12.10		Mate SIH-SS-07 P11, P12 and P13 to DCU J11, J12 and J13	Idem	No	Yes
12.11		Mate SIH-SS-08 P08, P09 and P10 to DCU J08, J09 and J10	Idem	No	Yes
12.12		Mate SIH-SS-09 P05, P06 and P07 to DCU J05, J06 and J07	Idem	No	Yes
12.13		Mate SIH-SS-01 P32, P27 and P28 to DCU J32, J27 and J28	Idem	Yes	Yes
12.14		Mate SIH-SS-02 P23, P24, P26 and P26 to DRCU J23, J24, J25 and J26	Idem. Phot and Spect detectors fully connected to DRCU	No	Yes

13.1	Final Connection of Cryoharness to FCU	Mate SIH-SS-10 P11, P23 and P25 to FCU		Yes	Yes
13.2		Mate SIH-SS-11 P13, P17, P19, P21 and P29 to FCU		No	Yes
13.3		Mate SIH-SS-11 P13 and P29 to FCU		Yes	No
13.4		Mate EGSE harnesses to SIH-SS-11 P17, P19 and P29		Yes	No
13.5		Mate SIH-SS-13 P12, P24 and P26 to FCU		No	Yes
13.6		Mate SIH-SS-12 P14, P26, P20, P22and P30 to FCU		No	Yes

Table 7-3 Sequence for the mating of the cold units and the warm units via the cryoharness

7.3.8 SIH EICD Cross-check and Instrument Sign-off

For EQM: This cross-check of the SIH EICD involves the connection of the ASED harness checkout EGSE to the SPIRE instrument test cryoharness which has been programmed according to the SIH EICD.

ASED are to provide the procedure for the test.

A review of the results of the test will be carried out to give clearance for the integration of the SIH to the DRCU and Cold Units.

For PFM: TBD

7.4 Electrical disconnection

Disconnection is the reverse of connection

7.5 Removal from spacecraft

WARNING: The bipod legs on two corners of the instrument are very thin section and easily damaged. Care must be taken at all times not to put side loads into these items. These are at risk at all times when the FPU is not attached to a rigid plate.

Unbolt the cone from the FPU by undoing the M8 nut, thus leaving the cone on the baseplate.

Remove all electrical connections, see section 7.4

Undo the five M4 fasteners which secure the Photometer JFET rack (HSJFP) to the HOB.

Undo the four M4 fasteners that secure the Spectrometer JFET rack (HSJFS) to the HOB. Note that two of these fasteners are studs with nuts on the top.

Undo the 6 off M4 fasteners on each L0 strap and remove, separate the cold strap from the helium tank pod. NOTE. The underside of these straps form the thermal interface to the spacecraft helium tank pods. Their surfaces are flat and soft gold plated, these surfaces can easily be damaged and the thermal performance of the instrument may suffer as a result.

Remove the Detector Level 0 strap from the supports by undoing the clamps at the top of the strap support frames, the lower flexibles from the spacecraft pod interface and the bolts at the joining plates with the upper flexibles.

Undo and remove the one M8 and two M4 screws from each of two L1 cold strap interface, separate the cold strap from the FPU

Undo and remove the two M4 screws from the L3 interfaces on each JFET, separate the cold strap from the JFET.

Undo and remove the 8 fasteners that attach the FPU to the baseplate.

The FPU and JFETs can now be lifted from the HOB

8. RED TAG ITEMS

The following red tag items are fitted to the FPU when delivered.

- 1 An aperture cover
- 2 Alignment cube
- 3 Temporary grounding strap
- 4 Shorting plugs

When removed all red tag items shall be bagged and stored in the dedicated "red tag box".

The aperture cover is removed by unscrewing the four 2-56 UNC (imperial) cap head screws, which are captive in the cover, and lifting the cover clear.

The alignment cube is removed by unscrewing the three fixing screws and lifting clear.

9. GREEN TAG ITEMS

There are no green tag items

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SPIRE FPU Handling and Integration
Procedure

Ref: SPIRE-RAL-PRC-
001923

Issue: 3

Date: 6/12/04

Page: 28 of 35

ANNEX A - DRAWINGS OF SPIRE FPU MGSE

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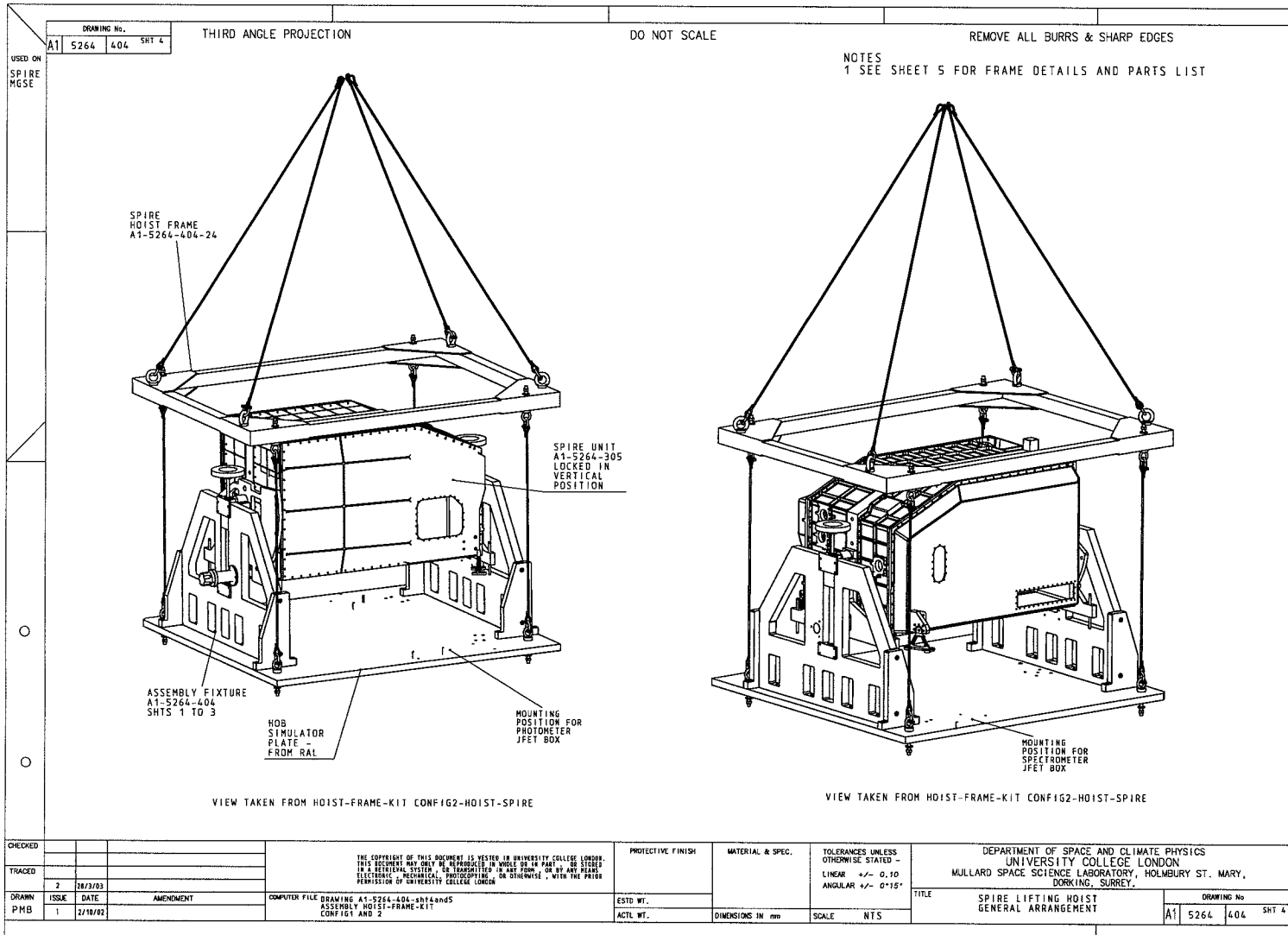
SPIRE FPU Handling and Integration
Procedure

Ref: SPIRE-RAL-PRC-001923

Issue: 3

Date: 6/12/04

Page: 29 of 35



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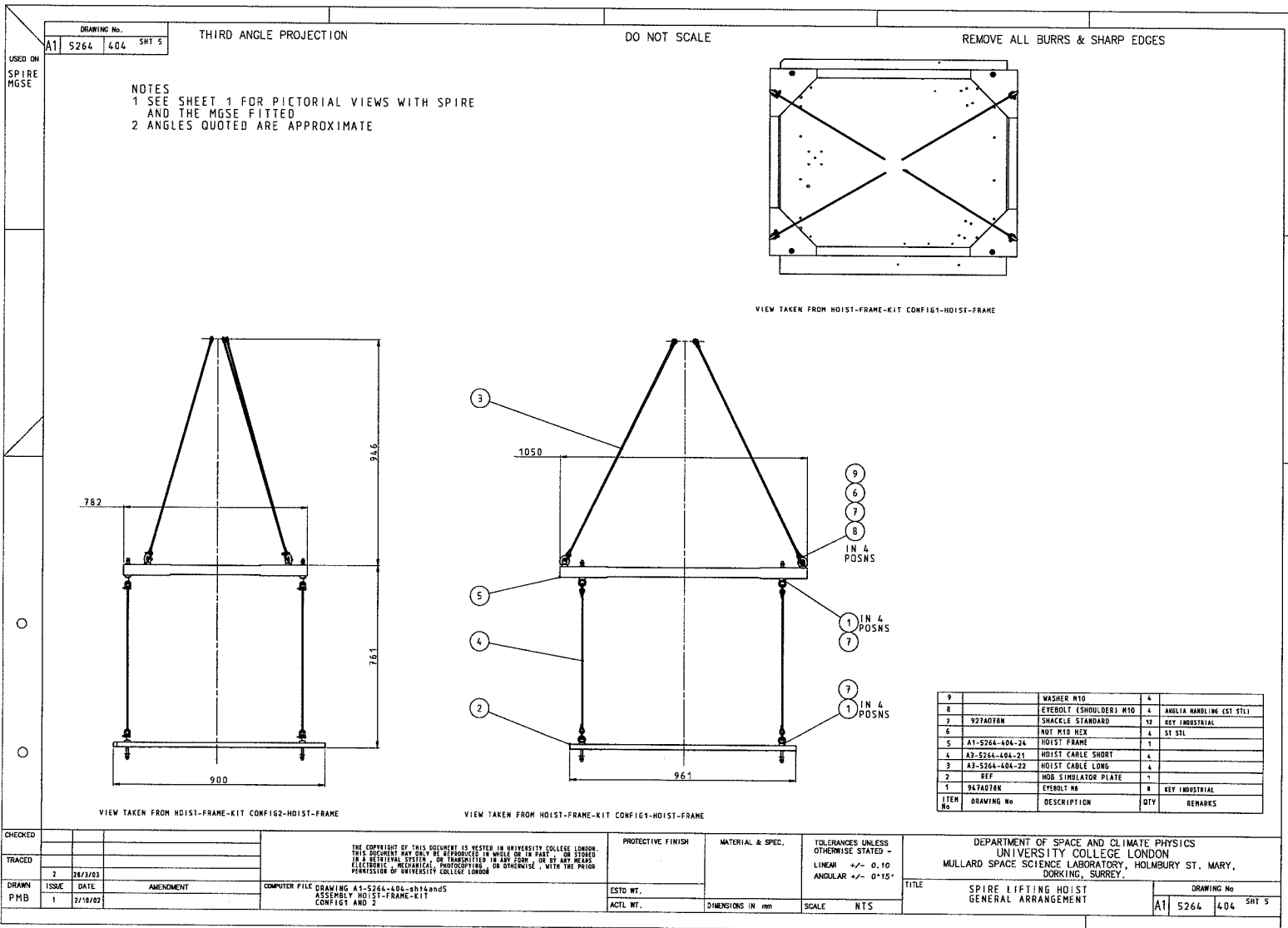
SPIRE FPU Handling and Integration
Procedure

Ref: SPIRE-RAL-PRC-001923

Issue: 3

Date: 6/12/04

Page: 30 of 35

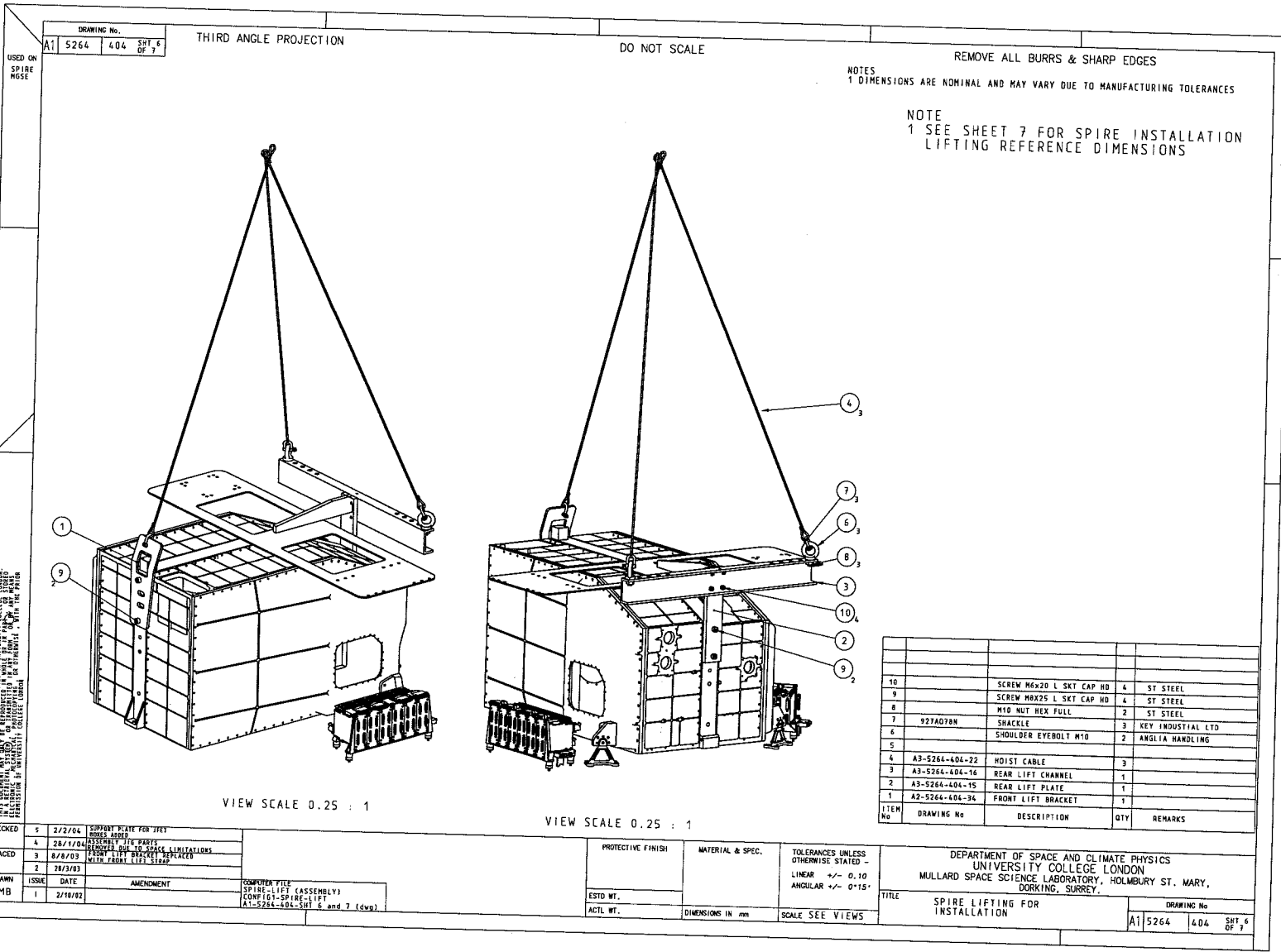


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Ref: SPIRE-RAL-PRC-001923
 Issue: 3
 Date: 6/12/04
 Page: 31 of 35



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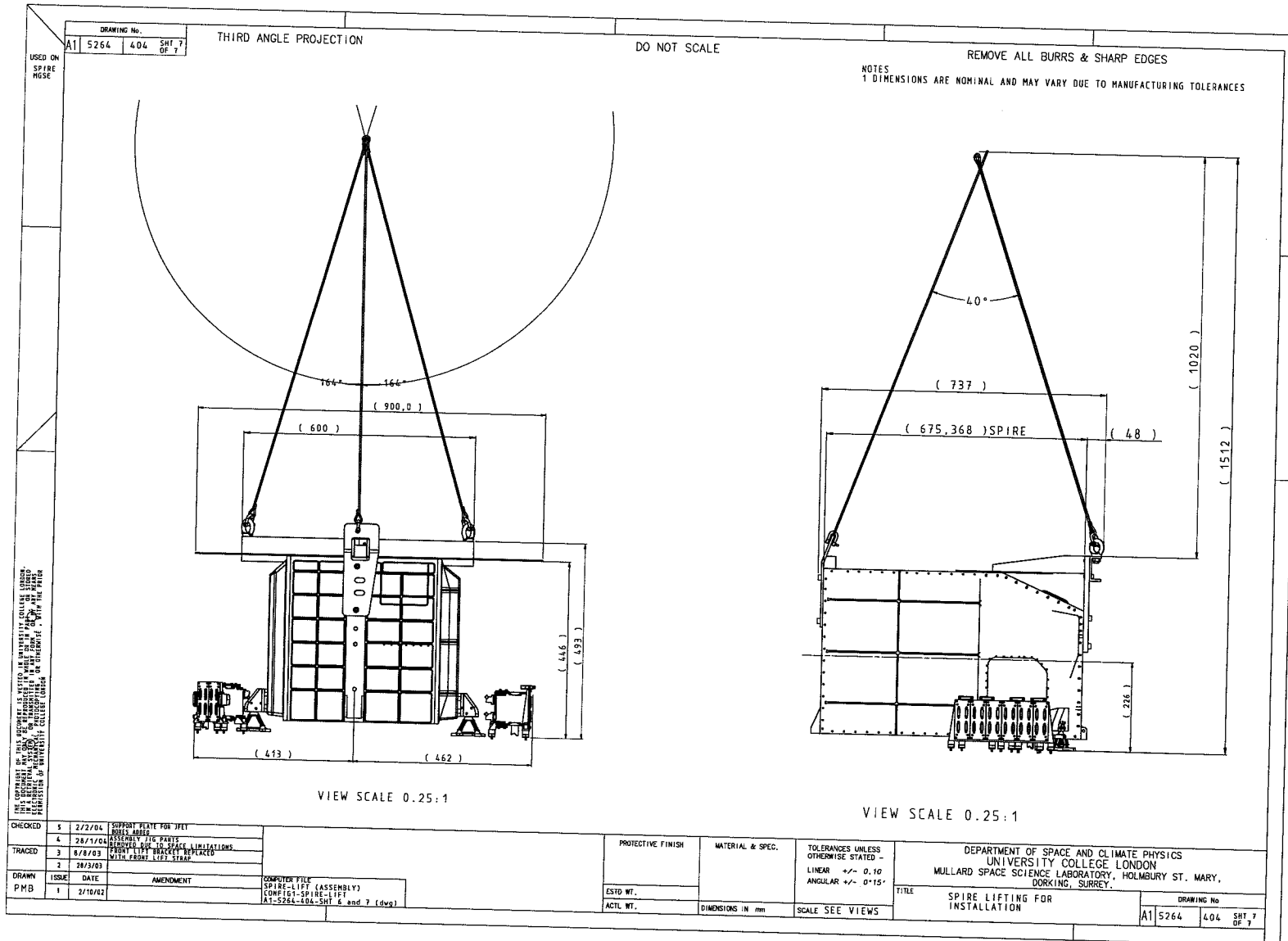
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Procedure

Ref: SPIRE-RAL-PRC-001923

Issue: 3

Date: 6/12/04

Page: 32 of 35



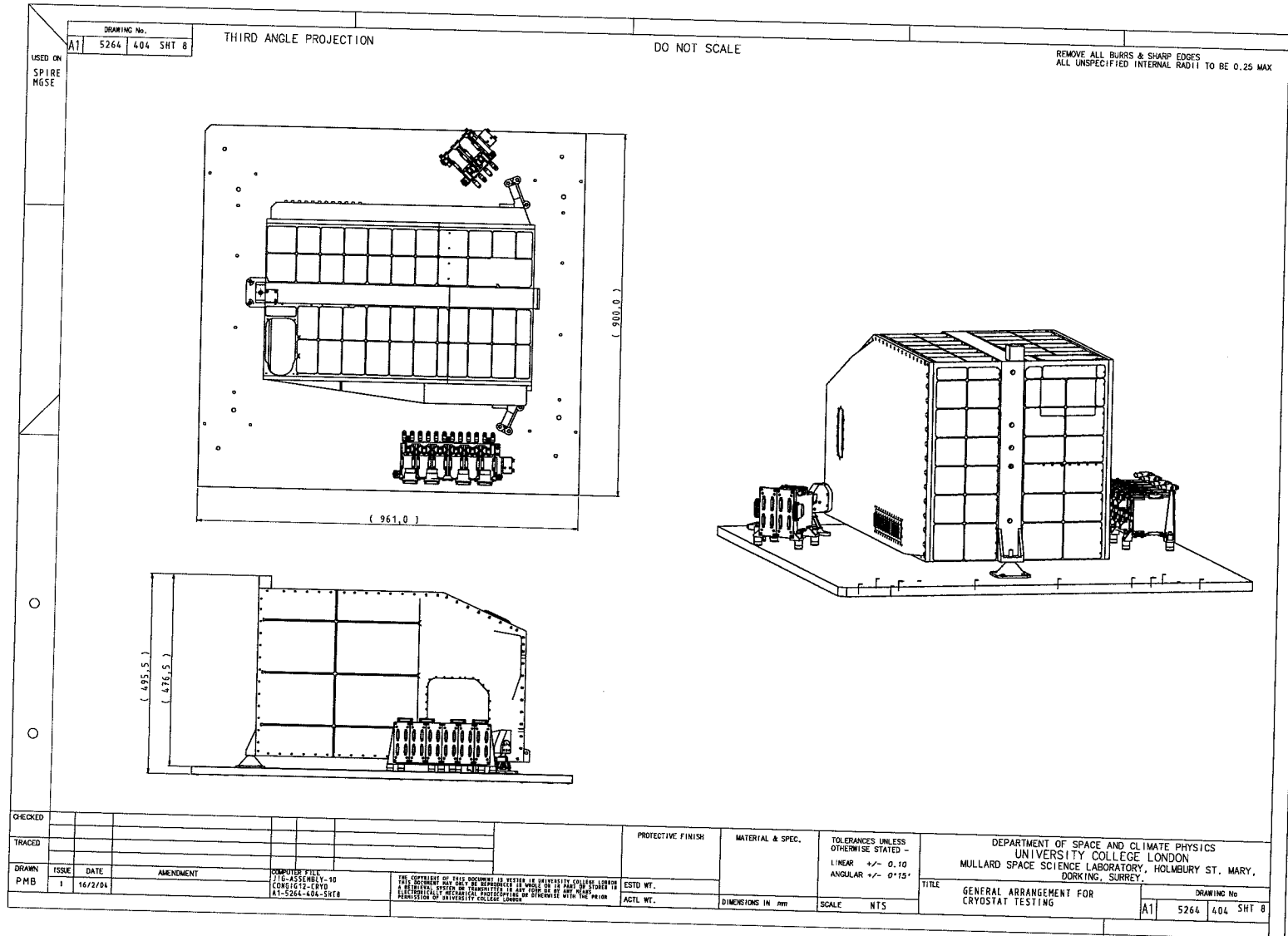
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Ref: SPIRE-RAL-PRC-001923
Issue: 3
Date: 6/12/04
Page: 33 of 35



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Project Document

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Procedure

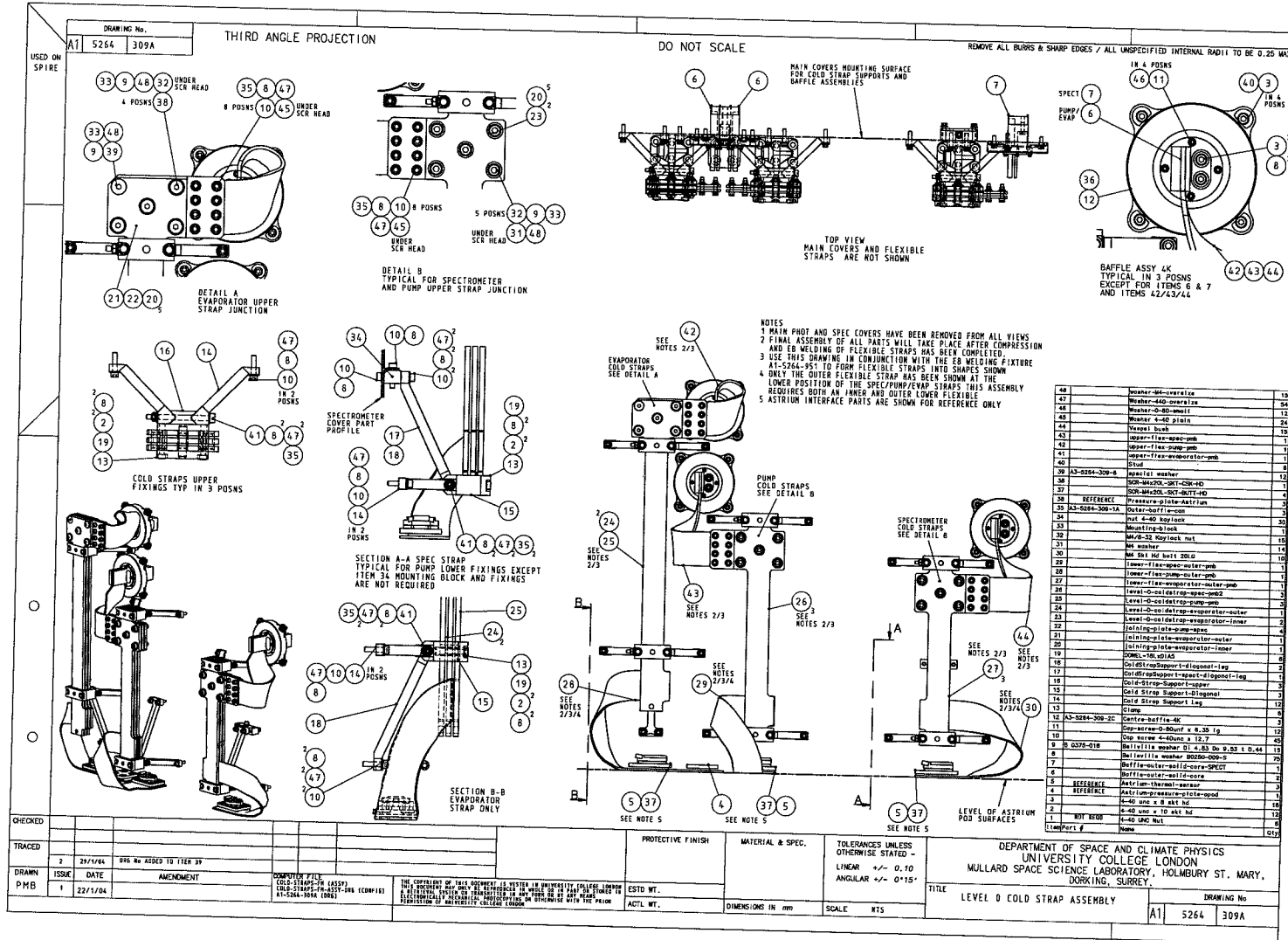
Ref: SPIRE-RAL-PRC-
001923

Issue: 3

Date: 6/12/04

Page: 34 of 35

ANNEX B - L0 THERMAL STRAP ASSEMBLY



DEPARTMENT OF SPACE AND CLIMATE PHYSICS
 UNIVERSITY COLLEGE LONDON
 MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY,
 DORKING, SURREY.

TITLE: LEVEL 0 COLD STRAP ASSEMBLY
 DRAWING No: A1 5264 309A

Spacecraft/Project	HERSCHEL	Document No	SPIRE-RAL-PRJ-001898		
Instrument/Model	SPIRE / CQM	Issue No	2	REV	0
Subsystem		Date	15 December 2004		

OPEN WORK STATUS RECORD

Open work as identified during DRB on 11 and 12 November 2004

Updated 6/12/04

	OPEN Work	Status
*	Apply Scotchweld inside the JFET carbon fibre feet's	Done
	Exchange Damaged JFET	Completed 18/11/04
	Swap level 0 Straps	
*	FPU external alignment & fit alignment cube	Fitted 18/11/04
*	MGSE proof load test (To be ready for !7/11/04)	Done
	Change DCU/FCU external power supply cable	
	Integration of the EMI backshell (performed by ASED)	
	Grounding of warm units (normal work, performed by ASED, see AI 18)	
*	For transportation, the FPU is sealed in plastic bags, and flushed with dry nitrogen	Done
	Fit "connector saver" to 4 JFET connectors	
*	Before Shipping	

Note

Due to the unavailability of the Alignment Cube, metrology was carried out on the Cube interface with the SPIRE optical bench. Metrology data on the cube will allow the cube to SPIRE boresight to be established.

Shipping list
Part of SPIRE CQM EIDP

SPIRE CQM

The following equipment will be delivered to:-

EADS Astrium,
Attn. Mr Paul Mack
Ludwig-Boelkow-Allee
Gate 2
85521 Ottobrunn
Germany


Contact persons at Ottobrunn:
Paul Mack, Tel 23768, paul.mack@astrium.eads.net
Axel Runge, Tel 20036, axel.runge@astrium.eads.net
Christian Schlosser, Tel 29343,
christian.schlosser@astrium.eads.net

Box No	Contents	Model	Size (LxWxH) Meters	Weight Kg
1	FPU Fitted with:- Aperture cover (red tag item) Alignment cube Spectrometer JFET assembly Photometer JFET assembly JFET fixation hardware Isolation washers, special screws and studs	CQM CQM CQM	1.2x1.2x1.0	170
2	DPU	AVM1	0.6x0.6x0.6	20
3	DCU	QM1	0.7x0.5x0.5	35
4	FCU	QM1	0.7x0.5x0.5	30
5	Power supply (for DCU and FCU)	Bench power supply	0.7x0.7x0.7	45

Box No	Contents	Model	Size (LxWxH) Meters	Weight Kg
6	WIH	Test harness	0.9x0.7x0.7	30
6	Thermal strap fixation hardware L3 Pressure plates 2-off L1 Screws and isolating bushes M8 2off, M3 4off (these screws will be prepared for wire locking) Wire for locking above screws. M4 non isolating bushes for the vent line end of the strap 8 off (previously supplied to Astrium)	CQM		
6	Tools etc.	GSE		
6	Red tag items box	GSE		
6	Power supply for mechanisms	EGSE		
6	MGSE, Straps and shackles	MGSE		
6	CDMS simulator monitor	EGSE		
6	FPU simulator monitor	EGSE		
6	EIDP version 1.1 paper copy	DOCS		
7	FPU simulator	EGSE	1.0x0.7x1.5	65
8	FPU simulator (monitors and cables)	EGSE	0.7x0.4x0.6	15
9	MGSE – lifting equipment	MGSE	0.7x0.5x0.1	4
10	CDMS simulator computer	EGSE	0.6x0.5x0.5	8
11	Electrical test equipment	EGSE	0.6x0.4x0.2	4

SPIRE	Project Document	Ref	SPIRE-RAL-DOC-001971
		Issue	4.2
	SPIRE BUILD STATUS (ABCIDL)	Date	1 December 2004
			Page 1 of 9
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SUBJECT:	AS BUILT CONFIGURATION ITEM DATA LIST BUILD STATUS
PREPARED BY:	Dave Smith
MODIFIED BY	E C Sawyer & E A Clark
DOCUMENT No:	SPIRE-RAL-PRJ-001971

APPROVED BY:	Name	Signature & Date
Instrument Development Manager	Eric Sawyer	
AIV Manager	Dave Smith	
Systems Engineer	Douglas. Griffin	
Product Assurance Manager	Eric Clark	 Digitally signed by Eric Clark Date: 2004.12.03 13:11:34 Z

Distribution

Live Link

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		Issue	4.2
	SPIRE BUILD STATUS (ABCIDL)	Date	1 December 2004
			Page 2 of 9
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CHANGE RECORD

ISSUE	DATE	Comments / change
4.0D	03 October 04	Issued for CQM DRB
4.1D	15 November 04	Actions from CQM DRB incorporated
4.2	1 December 2004	Issued for CQM EIDP Issue 2.

CONTENTS

AS BUILT CONFIGURATION ITEM DATA LIST BUILD STATUS.....	1
DISTRIBUTION.....	1
CHANGE RECORD.....	2
CONTENTS.....	2
1. SCOPE.....	3
2. APPLICABLE DOCUMENTS.....	3
3. CONFIGURATION STATUS.....	3
3.1 SUBSYSTEM CONFIGURED ITEM DOCUMENT LIST (CIDL).....	3
3.2 TOP DRAWINGS.....	4
3.3 SPECIFICATIONS - RAL.....	4
3.4 SPECIFICATIONS. - SUBSYSTEMS.....	5
3.5 INTERFACES (ICD) - RAL.....	5
3.6 INTERFACES (ICD) - SUBSYSTEMS.....	6
3.7 LISTS.....	6
3.8 PLANS - RAL.....	7
3.9 PLANS - SUBSYSTEMS.....	7
3.10 PROCEDURES.....	8
3.11 REPORTS.....	8
3.12 WORK STATEMENTS.....	8
3.13 MANUALS.....	8
4. BUILD STATUS.....	9
Build change record	
FPU	
JFETS	
Warm Electronics	

SPIRE	Project Document	Ref	SPIRE-RAL-DOC-001971
		Issue	4.2
	SPIRE BUILD STATUS (ABCDL)	Date	1 December 2004
			Page 5 of 9
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3.4 Specifications. – Subsystems

Doc Ref	Doc Title	Iss/Rev	Date
SPIRE-ATC-PRJ-000460	Beam Steering Mirror subsystem Specification	3.7	11 Sep 03
SPIRE-IFS-PRJ-000444	ON board \software URD	1.2	15 May 03
SPIRE-IFS-PRJ-000462	DPU Subsystem Specification	1.2	26 Nov 01
SPIRE-IFS-PRJ-001036	Onboard software Specification Document	1.0	11 Jun 03
SPIRE-JPL-PRJ-000456	SPIRE Detector Subsystem Spec	3.2	7 Jan 03
SPIRE-LAM-PRJ-000459	Spectrometer Mirror Mechanism Subsystem Spec	8.0	12 Oct 01
SPIRE-MSS-PRJ-000427	Structure Specification Doc	2.0	26 Nov 02
SPIRE-QMW-PRJ-000454	Filters Subsystem Specification	2.0	7 Sep 01
SPIRE-QMW-PRJ-000648	Spire Calibrators Software Interface Req	1.0	10/Apr/01
SPIRE-QMW-PRJ-000649	Spire Calibrators Electrical Interface Req	1.1	10/Apr/01
SPIRE-QMW-PRJ-001101	Photometer Calibrator (PCAL) Subsystem Spec	1.0	7 Sep 01
SPIRE-QMW-PRJ-001105	Spectrometer Calibrator (SCAL) Subsystem Spec	1.0	7 Sep 01
SPIRE-SAP-PRJ-000461	DRCU Subsystem Spec	1 0	14 Feb 03
SPIRE-SAP-PRJ-000638	FPU Simulator	0.3(D)	20 Jan 03
SPIRE-SBT-PRJ-000458	SPIRE & PACS Sorption Coolers Specification	3.3	20 Nov 01
SPIRE-UCF-PRJ-000064	SPIRE Science Requirements Document	3.0	21 Nov 00

3.5 Interfaces (ICD) - RAL

Doc Ref	Doc Title	Iss/Rev	Date
SCI-PT-IIDB/SPIRE-02124	SPIRE IIDB	3.3	
SPIRE-RAL-DWG-001409	Forms Annex 1 to SCI-PT-IIDB/SPIRE-02124 SPIRE MECHANICAL INTERFACE DRAWINGS	10.0	Feb 04
SPIRE-RAL-PRJ-000450	Spire System Budget	4.0	01 Jun 03
SPIRE-RAL-PRJ-000608	SPIRE Harness Definition Document	1.1	5 Mar 03
SPIRE-RAL-PRJ-000728	Cryogenic Interface Thermal Mathematical Model	2.1	20 Jan 03
SPIRE-RAL-PRJ-001078	Spire Data ICD	1.0	15 Jan 03
SPIRE-RAL-PRJ-000560	Thermal Configuration Control	0.9	04 Feb 02

SPIRE	Project Document	Ref	SPIRE-RAL-DOC-001971
		Issue	4.2
	SPIRE BUILD STATUS (ABCIDL)	Date	1 December 2004
			Page 6 of 9
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3.6 Interfaces (ICD) - Subsystems

Doc Ref	Doc Title	Iss/Rev	Date
SPIRE-ATC-PRJ-001171	BSM ICD	3.2	28 Sep 04
SPIRE-IFS-PRJ-000650	Spire DPU ICD;	1.4	24/03/03
SPIRE-JPL-PRJ-001181	Detectors (BDA) ICD	2.0	26 Feb 02
SPIRE-LAM-PRJ-000446	Optical Error Budget	4.0	17/Jan/02
SPIRE-LAM-PRJ-000944	LAM ICD (SPL.PFM.00.R1.01 A)	A	3/Oct/01
SPIRE-MSS-PRJ-000294	Structure Optics ICD	1.0	13/06/00
SPIRE-MSS-PRJ-000298	Structure SMEC-m ICD	1.0	14/06/00
SPIRE-MSS-PRJ-000299	Structure Filters ICD	1.0	13/Jun/00
SPIRE-MSS-PRJ-000331	Structure-Cooler ICD	1.0	13/Jun/00
SPIRE-MSS-PRJ-000617	Structure Mechanical ICD MSSL-SPIRE-SP004.11	3.0	14/02/03
SPIRE-SAP-PRJ-000451	DRCU ICD (SAP-SPIRE-CCa-075-02)	1.0	14/Feb/03
SPIRE-SAP-PRJ-001364	DPU/DRCU ICD (DATA: SAP-SPIRE-CCa-076-02)	1.0	14/Feb/03
SPIRE-SBT-PRJ-000690	Spire & PACS Sorption Coolers ICD	1.3	07/12/01
SPIRE-UCF-PRJ-001149	SCAL ICD	3.0	5 Jul 04
SPIRE-UCF-PRJ-001150	PCAL ICD	3.0	17 May 04
SPIRE-UCF-PRJ-001151	UCF Filters ICD	3.0	5 Jun 03

3.7 Lists

Doc Ref	Doc Title	Iss/Rev	Date
SPIRE-RAL-PRJ-000455	Major Milestone List	1.4	2 Jun 03
SPIRE-RAL-PRJ-002165	Qualification Matrix	2.0	12 Nov 04
SPIRE-RAL-PRJ-002095	CQM Verification Matrix (VCD)	1.1	1 Dec 04
SPIRE-RAL-PRJ-001079	SPIRE NCR Status list	5.1	25 Nov 04
SPIRE-RAL-PRJ-001080	Engineering Change Request List	4.0	16 Nov-04
SPIRE-RAL-PRJ-001081	Request For Waiver List	4.1	25 Nov 04
SPIRE-RAL-PRJ-001092	Combined Declared Materials List	3.0	06 Nov 04
SPIRE-RAL-PRJ-001093	Combined Declared Processes List	3.0	06 Nov 04
SPIRE-RAL-PRJ-001094	Combined Declared Mechanical Parts List	3.0	06 Nov 04
SPIRE-RAL-PRJ-001095	Combined Declared EEE Parts list	3.0	06 Nov 04
SPIRE-RAL-REP-001670	PAD Status List	2.0	15 May 03
SPIRE-RAL-DOC-002069	SPR/SCR List.	1.0D	02 Jul 04
SPIRE-IFS-PRJ-001596	DPU AVM Verification Control Matrix	1.0	11 Apr 03
SPIRE-UCF-PRJ-001138	Critical Items List	2.0	06 Jun 02

SPIRE	Project Document	Ref	SPIRE-RAL-DOC-001971
		Issue	4.2
	SPIRE BUILD STATUS (ABCIDL)	Date	1 December 2004
			Page 7 of 9
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3.8 Plans - RAL			
Doc Ref	Doc Title	Iss/Rev	Date
SPIRE-RAL-DOC-001123	SPIRE SQM Performance Test Specification	0.4	29 May 02
SPIRE-RAL-DOC-001132	SPIRE Warm Electronics Integration Plan	0.1	10 Jan 02
SPIRE-RAL-DOC-001652	SPIRE Functional Test Specifications	1.2	04 Sep 04
SPIRE-RAL-NOT-001122	SPIRE STM Performance Test Plan	0.1	31 Jan 02
SPIRE-RAL-PRJ-000017	Product Assurance Plan	1.2	27 Aug 04
SPIRE-RAL-PRJ-000018	Spire Science Implementation Plan (DRAFT)	1.1	18 Mar 02
SPIRE-RAL-PRJ-000029	Spire Management plan	1.1	12 Apr 01
SPIRE-RAL-PRJ-000030	SPIRE Product Tree (DRAFT)	2.0	12 Apr 01
SPIRE-RAL-PRJ-000032	SPIRE Document Management Plan	1.1	13 Sep 00
SPIRE-RAL-PRJ-000035	Spire Instrument Development Plan	1.1	12 Apr 01
SPIRE-RAL-PRJ-0001106	ICC Software Configuration Plan	1.1	01 Feb 02
SPIRE-RAL-PRJ-000410	AIV Plan	3.0	25 May 03
SPIRE-RAL-PRJ-000626	SPIRE Configuration Management Plan	1.3	28 Feb 02
SPIRE-RAL-PRJ-000852	EMC Control Plan (DRAFT for comment)	0.4	29 May 02
SPIRE-RAL-PRJ-001070	Cleanliness Plan	1.0	9 Jan 02
SPIRE-RAL-PRJ-001866	SPIRE Calibration Plan	0.1	12 Nov 03

3.9 Plans - Subsystems			
Doc Ref	Doc Title	Iss/Rev	Date
SPIRE-ATC-PRJ-000736	BSM Subsystem Test Plan	4.2	24 Mar 04
SPIRE-CGS-DOC-001776	DPU-SW Verification & Validation Plan / Acceptance Test	1.0	5 Apr 02
SPIRE-IFS-PRJ-000834	DPU Test Plan	0.1	8 Aug 01
SPIRE-IFS-PRJ-001756	DPU/ICU Spacecraft Interface Test Plan	1.1	05 Sep 02
SPIRE-LAM-PRJ-001842	Optical Alignment Plan	1.0	30 Apr 03
SPIRE-MSS-PRJ-000652	SPIRE Structure Integration Plan	0.1	Apr 01
SPIRE-MSS-PRJ-001023	SPIRE STRUCTURE-MAIV Flow Chart	3.0	Feb 03
SPIRE-MSS-PRJ-001841	Vibration Test Specification STM Qualification Plan	2.0	04 Jul 03
SPIRE-QMW-PRJ-001103	Spectrometer Calibrator MAIV Flow Chart	1.0	04 Sep 01
SPIRE-SAP-PRJ-001607	Detector Control Unit EM/QM1 Preliminary Test Plan	1.0	14 Feb 03
SPIRE-SBT-PRJ-000691	SPIRE & PACS Sorption Coolers MAIV Flow Chart	1.3	13 Jan 04
SPIRE-UCF-PRJ-001686	300mk Strap Supports MAIV Flow Chart	1.0	10 Feb 03

SPIRE	Project Document	Ref	SPIRE-RAL-DOC-001971
		Issue	4.2
	SPIRE BUILD STATUS (ABCIDL)	Date	1 December 2004
			Page 8 of 9
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3.10 Procedures			
Doc Ref	Doc Title	Iss/Rev	Date
SPIRE-MSS-PRJ-001650	Structure Assembly, Integration & Handling Procedure	4.0	12 Jul 04
SPIRE-RAL-DOC-001578	SPIRE Cold Optical Alignment Procedure	1.0	17 Jun 03
SPIRE-RAL-DOC-001888	Cold Verification 1-Master Procedure	1.1	22 Jan 04
SPIRE-RAL-PRC-002181	Warm Electronics Integration procedure	1.0	14 Oct 04
SPIRE-UCF-PRJ-001687	300mk Strap Supports-Photometer Support assembly Proc	1.0	10 Feb 03
SPIRE-UCF-PRJ-001895	Assembly Procedure (Electrical insulated Joints)	1.0	04 Dec 03

3.11 Reports			
Doc Ref	Doc Title	Iss/Rev	Date
SPIRE-RAL-DOC-001293	SPIRE Safety Submission	4.0	18 Jun 04
SPIRE-RAL-NOT- 001704	Harness Derating Analysis	1.0	15 May 03

3.12 Work Statements			
Doc Ref	Doc Title	Iss/Rev	Date

3.13 Manuals			
Doc Ref	Doc Title	Iss/Rev	Date
	Instrument Users Manual	TBW	
	Flight Operations Manual	TBW	
SPIRE-IFS-PRJ-001391	SPIRE OBS User Manual	1.0	24 Sep 04

SPIRE	Project Document	Ref	SPIRE-RAL-DOC-001971
		Issue	4.2
	SPIRE BUILD STATUS (ABCIDL)	Date	1 December 2004
			Page 9 of 9
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4. BUILD STATUS

Date	Issue	Sheet	Change	Reason for change
13/11/2003	0.1D	All		First draft
11/03/2004	1.0	FPU JFETS	300 mk Straps Identified Internal harnesses identified Thermometer numbers provided BDA thermometers removed from list Thermometer numbers provided	Configuration as for cold thermal verification 1
11/03/2004	2.0D	All	Columns for cold vibration added	Configuration for cold vibration
26/07/2004	3.0D	All	Columns for 2nd Cold Thermal Verification Added L1 Thermal Interface Added L0 Thermal Interfaces Added JFET sheet corrected (no filters)	Configuration for cold thermal verification 2
03/10/2004	4.0D	All	Columns for EQM delivery added	Final configuration for delivery
15/11/2004	4.1D	All	Columns added for drawing issue number, NCR and change tracking refs.	Action from CQM DRB
29/11/2004	4.2D	all	issuse numbers and NCRs added ABCIDL Appendix Document list added	For CQM EIDP SPIRE-RAL-PRJ-001898 issue 2

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref	
Structure	Optical Bench Panel	Optical bench panel	5264-302-4	2	MSSL	HR-SP-RAL-NCR-027		
						HR-SP-RAL-NCR-036		
		Photometer Cover	Photometer Cover Wall	5264-302-6	6	MSSL		
			Photometer cover lid	5264-302-10	1	MSSL		
			Photometer Seal- Top	5264-302-7	2	MSSL		
			Photometer Seal- Bottom	5264-302-8	2	MSSL		
		Spectrometer Cover	Spectrometer Cover Wall	5264-303-1	2	MSSL		
			Spectrometer Cover Lid	5264-303-2	2	MSSL		
			Spectrometer seals top	5264-303-4	1	MSSL		
			Spectrometer seals bottom	5264-303-5	2	MSSL		
		FPU Supports	A Frames	5264-302-1	5	MSSL		
			Fixed Mount Cone	5264-302-5	4	MSSL		
			A Frame Support bracket	5264-302-14	1	MSSL		
			A Frame Support Plates	5264-302-15	2	MSSL		
			A Frame Support brackets	5264-302-26	1	MSSL		
			Insulating Bush	5264-302-2	2	MSSL		
			Special Washer	5264-302-3	1	MSSL		
			Dowel retaining Plate	5264-302-39	1	MSSL		
			Tubular Dowels (8mm)	5264-302-40	1	MSSL		
			Dowel - 'A' Frame support	5264-302-41	1	MSSL		
			Dowel - 'A' Frame Top	5264-302-42	1	MSSL		
			Special Washer - A Frame Brackets	5264-302-43	1	MSSL		
		I1 Thermal I/F				RAL		

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
Photometer Box	Photometer detector box	Back cover	5264-306-1	4	MSSL	HR-SP-JPL-NCR-047	
		Spine	5264-306-2	6	MSSL		
		Front cover	5264-306-3	4	MSSL		
		BDA Adapter Plate	5264-911	2	MSSL		
		PDIC 1 mount	5264-310-1	2	MSSL		
		PDIC 1 clamp ring	5264-310-2	1	MSSL		
		PDIC dowel bolt	5264-310-3	2	MSSL		
		PDIC 2 mount	5264-311-1	2	MSSL		
		PDIC 2 clamp ring	5264-311-2	1	MSSL		
		Detector Box support Cone	5264-312	1	MSSL		
		Photometer Detector Box A frames supports(2 per set)	5234-313	2	MSSL		
		Washer	5264-313-1	1	MSSL		HR-SP-RAL-NCR-083
		Bushes	5264-313-2	1	MSSL		
		L0 Thermal I/F			MSSL		
		Spectrometer Box		Spectrometer detector box	5264-307-1		4
Filter mount	5264-307-2			4	MSSL		
Spectrometer Detector Box supports(3 per set)	5264-307-4			2	MSSL		
BDA Adapter Plate	5264-911			2	MSSL		
Bushes	5264-307-5			1	MSSL		
L0 Thermal I/F					MSSL		
SCAL Box		Scal Box	5264-314-1	4	MSSL	HR-SP-RAL-NCR-066	
		SCAI Cover	5264-314-2	1	MSSL		
		SCAL Exit Baffle Ring	5264-314-3	1	MSSL		
		SCAL Baffle Clamp	5264-314-4	1	MSSL		

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
Mirror Mounts		Secondary optical Bench	5264-305-12	1	MSSL	HR-SP-RAL-NCR-030	
		Support PM6	5264-305-13	2	MSSL		
		PM6 Support Spare	5264-305-19	1	MSSL		
		Support PM8	5264-305-14	1	MSSL		
		PM10 Support	5264-305-17	1	MSSL		
		Support SM6	5264-305-2	2	MSSL		
		sm6 Support Spare	5264-305-18	1	MSSL		
		Support SM7	5264-305-3	2	MSSL		
		Bulkhead SM6 and SM7	5264-305-15	1	MSSL		
		Support SM8a	5264-305-4	2	MSSL		
		Support SM9-10a	5264-305-6	2	MSSL		
		Support SM9-10b	5264-305-7	2	MSSL		
		Support SM11a	5264-305-8	2	MSSL		
		Support SM11b	5264-305-9	2	MSSL		
		Support SM12a	5264-305-10	1	MSSL		
	Support SM12b	5264-305-11	1	MSSL			
Other Optics		SFIL2 Cold Stop	5264-305-22	3	MSSL		
		Photometer Cold Stop Clamp PFIL3	5264-306-4	1	MSSL		
		Photometer Cold Stop PFIL3	5264-306-5	2	MSSL		
		CFIL1 Baffle Mount	5264-304-6	6	MSSL		
		CFIL1 Baffle Clamp Ring	5264-304-7	2	MSSL		
		PFIL2 Mount Back Plate	5264-302-12	1	MSSL		
		PFIL2 Mount CLamp plate	5264-302-17	1	MSSL		
		Filter Mounts - SFIL2	5264-305-20	4	MSSL		
		Filter Mount - SFIL2 clamp ring	5264-305-21	2	MSSL		
		SFIL2 dowels	5264-305-27	1	MSSL		
		SBS 1and 2 Filter mount (2 per set)	5264-305-23	3	MSSL		
		SBS 1and 2 Filter Clamp	5264-305-24	1	MSSL		
		Clamp Plate SFIL -3	5264-307-3	1	MSSL		
				s/n			

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref	
Optics	Mirrors	CM3	SPI-MIR-11-DD-01-A	01	LAM	HR-SP-RAL-NCR-042		
		CM5	SPI-MIR-12-DD-01-A	01	LAM	LAM.QUA.SPI.NCR.020068		
							LAM.QUA.SPI.NCR.020074	
							LAM.QUA.SPI.NCR.030025	
							LAM.QUA.SPI.NCR.030026	
							LAM.QUA.SPI.NCR.030037	
			PM6	SPI-MIR-21-DD-01-A	01	LAM	LAM.QUA.SPI.NCR.030035	
			PM7	SPI-MIR-22-DD-01-A	02	LAM	LAM.QUA.SPI.NCR.030036	
			PM8	SPI-MIR-23-DD-01-A	03	LAM		
			PM9	SPI-MIR-24-DD-01-A	02	LAM		
			PM10	SPI-MIR-25-DD-01-A	03	LAM		
			PM11	SPI-MIR-26-DD-01-A	02	LAM		
			SM6	SPI-MIR-31-DD-01-A	01	LAM		
			SM7	SPI-MIR-32-DD-01-A	02	LAM	LAM.QUA.SPI.NCR.030004	
			SM8A	SPI-MIR-33-DD-01-A	01	LAM	LAM.QUA.SPI.NCR.030031	
							LAM.QUA.SPI.NCR.030032	
			SM9A	SPI-MIR-34-DD-01-A	01	LAM		
			SM10A	SPI-MIR-36-DD-01-A	02	LAM		
			SM11A	SPI-MIR-37-DD-01-A	01	LAM	LAM.QUA.SPI.NCR.020076	
							LAM.QUA.SPI.NCR.030027	
							LAM.QUA.SPI.NCR.030028	
			SM12A	SPI-MIR-38-DD-01-A	01	LAM	LAM.QUA.SPI.NCR.020020	
			SM8B	SPI-MIR-33-DD-02-A	01	LAM	LAM.QUA.SPI.NCR.020026	
					LAM.QUA.SPI.NCR.030033			
					LAM.QUA.SPI.NCR.030034			

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
		SM9B					
		SM10B	SPI-MIR-34-DD-02-A	01	LAM		
		SM11B	SPI-MIR-36-DD-02-A	03	LAM	LAM.QUA.SPI.NCR.030003	
			SPI-MIR-37-DD-01-A	01	LAM	LAM.QUA.SPI.NCR.020076	
						LAM.QUA.SPI.NCR.030029	
		SM12B	SPI-MIR-38-DD-01-A	01	LAM	LAM.QUA.SPI.NCR.030030	
		All mirrors				LAM.QUA.SPI.NCR.020014	
		SCCA1	not fitted		LAM		
		SCCA2	not fitted		LAM		
		Sccb1	not fitted		LAM		
		Sccb2	not fitted		LAM		
	Filters	CFIL1	FILT-CQM-101	B690	UWC		
		PFIL-2	FILT-CQM-102	B604	UWC		
		PFIL-3	FILT-CQM-103	B654	UWC	HR-SP-RAL-NCR-072	
		PDIC-1	FILT-CQM-310	1191	UWC		
		PDIC-2	FILT-CQM-320	1193	UWC		
		PFIL-4L	not fitted		UWC		
		SBS1	Dummy		UWC		
		SBS2	Dummy		UWC		
		SFIL2	FILT-CQM-113	B671	UWC		
		SFIL3S	FILT-CQM-116	B701	UWC		
		SFIL3L	FILT-CQM-120	B700	UWC		
		SFIL4S	not fitted		UWC		
		SFIL5S	not fitted		UWC		
		SFIL4L	not fitted		UWC		
		SFIL5L	not fitted		UWC		
Beam steering mirror		BSM assembly	SPIRE-BSM-030-001	1	ATC		
3He Cooler		Cooler assembly S/N 1	2000-14B 000	D	SBT	HR-SP-RAL-NCR-063	

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
300 mK thermal straps and supports		Bus Bar Upper	5264-306-7	2	MSSL	HR-SP-RAL-NCR-082	
		Busbar Lower	5264-306-8	2	MSSL		HR-SP-RAL-NCR-088
		BDA-Busbar Flange	5264-306-9	2	MSSL		
		Bus Connector PLW	5264-306-10	2	MSSL		
		Bus Junction ans PMW Connector	5264-306-11	2	MSSL		
		Bus Junction Clamp Plate	5264-306-12	2	MSSL		
		Light Trap to Bus Junction	5264-306-13	3	MSSL		
		Bus Connector PSW	5264-306-14	2	MSSL		
		BDA-Busbar Flange	5264-306-15	2	MSSL		
		PLW Bus Strap	5264-306-16	1	MSSL		
		PMW Bus Strap	5264-306-17	1	MSSL		
		PSW Bus Strap	5264-306-18	1	MSSL		
		End stop Photometer Light Trap	5264-306-19	2	MSSL		
		Light Trap Feed Through - Photometer	5264-306-20	1	MSSL	HR-SP-RAL-NCR-038	
		Stop Bush -Bus Bar Mountings	5264-306-21	1	MSSL		
		Light Trap Feedthrough spect.	5264-307-6	1	MSSL	HR-SP-RAL-NCR-079	
		Light Baffle Junction	5264-307-7	1	MSSL		
		SSW Spect. BDA to light trap strap	5264-307-8	1	MSSL		
		SLW Spect. BDA to Light Trap Strap	5264-307-9	1	MSSL		
		BDA Cold Interface Spectrometer	5264-307-10	3	MSSL		
		Bush inner Spectrometer light trap	5264-307-11	1	MSSL		
		Bush outer Spectrometer light trap	5264-307-12	1	MSSL		
		Cold Strap Support	5264-307-13	1	MSSL		
		Photometer Baffle	LTS CQM2 311	1	UWC		
		Spectrometer Baffle	LTS CQM2 411	1	UWC		
		Cooler to photometer det box	5264-302-30	2	MSSL		
		Cooler to spectrometer det box	5264-302-31	2	MSSL	HR-SP-UWC-NCR-001	
	L0 Thermal Straps		Detector Box I/F	5264-309A	2	MSSL	
		Cooler Pump I/F	5264-309A	2	MSSL		
		Cooler Evap I/F	5264-309A	2	MSSL		

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
300 mK Thermal control system		Not fitted to CQM					
BDA	Photometer LW array	S/N 006	10209800	6	JPL	HR-SP-JPL-NCR-004	
	Photometer MW array		10209727	B	JPL	HR-SP-JPL-NCR-057	
	Photometer SW array		10209727	B	JPL		
	Spectrometer SW array		10209727	B	JPL		
	Spectrometer LW array		10209727	B	JPL		
SMEC		SMEC STM	SPI-STM-00-D1-01	A	LAM	HR-SP-RAL-NCR-045	
						HR-SP-RAL-NCR-070	
PCAL		PCAL assembly	PCAL-CQM-000	B	UWC		
SCAL		SCAL assembly	SCAL-CQM-000		UWC	HR-SP-RAL-NCR-048	
						HR-SP-RAL-NCR-064	
						HR-SP-RAL-NCR-066	

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
FPU RF Filters	RF filter box	FPU RF Filter assembly	2-KE-0104-373	C		HR-SP-RAL-NCR-049	
						HR-SP-RAL-NCR-069	
	supports	RFI Filter Bracket Corner Bracket	A2/5264/302-27	1	MSSL	HR-SP-RAL-NCR-028	
		Temporary RFI Bracket	A2/5264/302-28	2	MSSL		
		RFI Filter Frame Edge Bracket	A2/5264/302-29	1	MSSL		
	RF Filter Modules	RF-1	10209780-1	A	JPL		
		RF-2	10209780-2	A	JPL		
		RF-3	10209780-3	A	JPL		
		RF-4	10209780-4	A	JPL		
		RF-5	10209780-5	A	JPL		
		RF-6	10209780-6	A	JPL		
		RF-7	10209780-7	A	JPL		
		RF-8	10209780-8	A	JPL		
RF-9		10209780-9	A	JPL			
RF-10		10209780-10	A	JPL			
	RF-11	10209780-11	A	JPL			
	RF-12	10209780-12	A	JPL			

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
FPU internal		F1 PSW BDA J01 to HSJFP J29	41		Tekdata	HR-SP-RAL-NCR-071	
		F2 PSW BDA J02 to HSJFP J30	43		Tekdata		
		F3 PSW BDA J03 to HSJFP J31	45		Tekdata		
		F4 PSW BDA J04 to HSJFP J32	47		Tekdata		
		F5 PSW BDA J05 to HSJFP J33	49		Tekdata		
		F6 PSW BDA J06 to HSJFP J34	51		Tekdata		
		F7 PLW BDA J01 to HSJFP J35	21		Tekdata		
		F8 PLW BDA J02 to HSJFP J36	23		Tekdata		
		F9 PMW BDA J01 to HSJFP J37	25		Tekdata		
		F10 PMW BDA J02 to HSJFP to J38	27		Tekdata		
		F11 PMW BDA J03 to HSJFP to J39	29		Tekdata		
		F12 PMW BDA J04 to HSJFP to J40	31		Tekdata		
		F13 SSW BDA J05 to HSJFS J11	34		Tekdata		
		F14 SSW BDA J06 to HSJFS J12	36		Tekdata		
		F15 SLW BDA J01 to HSJFS J13 (plus PTC Cold harnessing – F28)	37 and 39		Tekdata	HR-SP-RAL-NCR-073	
		F16 COOLER-P to FPU J19A	8		Tekdata		
		F17 COOLER-R to FPU J20A	10		Tekdata		
		F18 SCal-P to FPU J21A	12		Tekdata		
		F19 SCal-R to FPU J22A	14		Tekdata		
		F20 THERM-P to FPU J23A	4		Tekdata		
		F21 THERM-R from FPU J24A	6		Tekdata		
		F22 BSM-P to FPU J25A	16		Tekdata		
		F23 BSM-R to FPU J26A	18		Tekdata		
		F24 SMEC Launch (Prime) connected to FPU J27A	Part of SMEC		Tekdata		
		F25 SMEC Control (Prime) connected to FPU J29A	Part of SMEC		Tekdata		
		F26 SMEC Launch (Red.) connected to FPU J28A	Part of SMEC		Tekdata		
		F27 SMEC Control (Red.) connected to FPU J30A	Part of SMEC		Tekdata		

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
Thermometers	Level 1	T_SOB_1	HSFPU Harness Filter Bracket		RAL		
		T_SOB_2	HSFPU Optical Bench		RAL		
		T_SUB_1	M3,5,7 Optical Sub Bench		RAL		
		T_SUB_2	M3,5,7 Optical Sub Bench		RAL		
		T_BAF_1	Input Baffle		RAL		
		T_BAF_2	Input Baffle		RAL		
		T_BSMS_1	BSM/SOB I/F(SOB side)		RAL		
		T_BSMS_2	BSM/SOB I/F(SOB side)		RAL		
		T_SCST_1	SCAL Structure		UWC		
		T_SCST_2	SCAL Structure		UWC		
		T_CPHP_1	Cooler Pump		LAM		
		T_CPHP_2	Cooler Pump		LAM		
		T_CEV_1	Cooler Evap		LAM		
		T_CEV_2	Cooler Evap		LAM		
		T_CPHS_1	Cooler Pump Heat Switch		LAM		
		T_CPHS_2	Cooler Pump Heat Switch		LAM		
		T_CEHS_1	Cooler Evap Heat Switch		LAM		
		T_CEHS_2	Cooler Evap Heat Switch		LAM		
		T_CSHT_1	Cooler Shunt		LAM		
		T_CSHT_2	Cooler Shunt		LAM		
		T_SCL4_1	SCAL 4%		UWC		
		T_SCL4_2	SCAL 4%		UWC		
		T_SCL2_1	SCAL 2%		UWC		

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
		T_SCL2_2 SCAL 2%			UWC		
		T_BSM_1 BSM			ATC		
		T_BSM_2 BSM			ATC		
		T_FTS_1 SMEC			RAL		
		T_FTS_2 SMEC			RAL		
		T_FTS_3 SMEC/SOB I/F			RAL		
		T_FTS_4 SMEC/SOB I/F			RAL		
		FPU +X A-Frame Interface			RAL		
		FPU -X A-Frame Interface			RAL		
		SOB Cone Interface			RAL		
		SOB L1 Strap Interface			RAL		
		SOB Cooler Interface			RAL		
		L1 photo connector bracket			RAL		
	Level 0	T_PL0_1 Phot L0 Encl Strap IF			RAL		
		T_PL0_2 Phot L0 Encl			RAL		
		T_SL0_1 Spec L0 Encl Strap IF			RAL		
		T_SL0_2 Spec L0 Encl			RAL		
		T_PL0_3 Photometer Level 0 Enclosure			RAL		
		T_SL0_3 Spectrometer Level 0 Enclosure			RAL		

JFET Units

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
HSJFP							
	JFET Structure	Structure assembly 6 JFET rack	0-KE-0104-350-H				
	JFET Modules	JFET Module 1	10209750-1	H 1	RAL JPL	HR-SP-RAL-NCR-081 HR-SP-JPL-NCR-001	
		JFET Module 2	10209750-2	4	JPL	HR-SP-JPL-NCR-001	
		JFET Module 3	10209750-2	4	JPL	HR-SP-JPL-NCR-001	
		JFET Module 4	10209750-2	4	JPL	HR-SP-JPL-NCR-001	
		JFET Module 5	10209750-2	4	JPL	HR-SP-JPL-NCR-001	
		JFET Module 6	10209750-2	4	JPL	HR-SP-JPL-NCR-001	
	JFET Backharness		10209785	A	JPL	HS-SP-RAL-NCR-074	
		Thermometer	10209786	A	JPL RAL		
HSJFS							
	JFET Structure	Structure assembly 2 JFET rack	0-KE-0104-360-K	K	RAL	HS-SP-RAL-NCR-068	
	JFET Modules	JFET Module 1	10209750-2	4	JPL	HR-SP-RAL-NCR-081	
		JFET Module 2	10209750-2	4	JPL	HR-SP-JPL-NCR-001	
	JFET Backharness		10209784	B	JPL	HR-SP-JPL-NCR-001 HS-SP-RAL-NCR-074	
		Thermometer			JPL RAL		

Warm Electronics

Subsystem	Unit	Item	Drawing/Reference	Issue	Supplier	NCR Ref	Change Ref
DRCU	DCU					HR-SP-RAL-NCR-058	
						HR-SP-CEA-NCR-109	
						HR-SP-CEA-NCR-110	
						HR-SP-CEA-NCR-121	
						HR-SP-CEA-NCR-124	
						HR-SP-CEA-NCR-125	
						HR-SP-CEA-NCR-126	
						HR-SP-CEA-NCR-127	
						HR-SP-CEA-NCR-129	
						HR-SP-CEA-NCR-131	
					HR-SP-CEA-NCR-132		
			LIA-P	SPIR-EL13100	SN 1	SAP	
			LIA-P	SPIR-EL13100	SN 2	SAP	
			LIA-S	SPIR-EL13200	SN1	SAP	
			LIA-S	SPIR-EL13200	SN2	SAP	
			LIA-S	SPIR-EL13200	SN3	SAP	
			BIAS	SPIR-EL140000	SN1	SAP	
			DAQ + IF	SPIR-EL150000	SN2	SAP	
		FCU	Backplane	SPIR-EL320000	SN1	SAP	
							HR-SP-CEA-NCR-118
						HR-SP-CEA-NCR-128	
						HR-SP-CEA-NCR-130	
						HR-SP-CEA-NCR-123	
						HR-SP-CEA-NCR-122	
						HR-SP-CEA-NCR-105	
			TEMP	SPIR-EL330000	SN2	SAP	
			CCHK	SPIR-EL340000	SN2	SAP	
			Backplane	SPIR-EL320000	SN1	SAP	
		MCU			LAM		
DPU	Electronics Unit	CPU board S/N 5	DPU-EM-110.00-0	1	IFSI		
		CPU piggy back board	DPU-EM-120.00-0	1	IFSI		
		I/F board S/N 05	DPU-EM-210.03-0	1	IFSI		
		DC/DC converter board S/N 03	DPU-EM-310.00-0	1	IFSI		
		Motherboard S/N 05	DPU-EM-410.00-0	1	IFSI		
	Software				IFSI		

	Name	Dep./Comp.		Name	Dep./Comp.
	Alberti von Mathias Dr.	AOE22		Wöhler Hans	AOE22
	Barlage Bernhard	AED11			
x	Bayer Thomas	AET52			
	Fehringer Alexander	AOE13			
	Frey Albrecht	AED422			
	Gerner Willi	AED11			
	Grasl Andreas	OTN/AET52			
	Grasshoff Brigitte	AET12			
	Hauser Armin	AOE23			
x	Hendry David	Terma Resid.	x	Alcatel	ASP
	Hinger Jürgen	AOE22	x	ESA/ESTEC	ESA
x	Hohn Rüdiger	AET52			
	Huber Johann	AOA4			
	Hund Walter	ASE4A		Instruments:	
x	Idler Siegmund	AED432	x	MPE (PACS)	MPE
x	Ivány von András	FAE22		RAL (SPIRE)	RAL
	Jahn Gerd Dr.	AOE23		SRON (HIFI)	SRON
	Kalde Clemens	APE3			
	Kameter Rudolf	OTN/AET52		Subcontractors:	
	Kettner Bernhard	AET42		Air Liquide, Space Department	AIR
	Knoblauch August	AET32		Air Liquide, Space Department	AIRS
x	Koelle Markus	AET22		Air Liquide, Orbital System	AIRT
x	Kroeker Jürgen	AED65		Alcatel Bell Space	ABSP
	Kunz Oliver Dr.	AOE23		Astrium Sub-Subsyst. & Equipment	ASSE
x	Lamprecht Ernst	OTN/ASI21		Austrian Aerospace	AAE
	Lang Jürgen	ASE4A		Austrian Aerospace	AAEM
	Langfermann Michael	AET52		APCO Technologies S. A.	APCO
x	Mack Paul	OTN/AET52		Bieri Engineering B. V.	BIER
x	Pastorino Michel	ASPI Resid.		BOC Edwards	BOCE
	Peltz Heinz-Willi	AOE13		Dutch Space Solar Arrays	DSSA
x	Pietroboni Karin	AED65		EADS CASA Espacio	CASA
x	Platzer Wilhelm	AED22		EADS CASA Espacio	ECAS
	Rebholz Reinhold	AET52		EADS Space Transportation	ASIP
	Reuß Friedhelm	AED62		Eurocopter	ECD
x	Rühe Wolfgang	AED65		HTS AG Zürich	HTSZ
x	Runge Axel	OTN/AET52		Linde	LIND
	Sachsse Bernt	AED21		Patria New Technologies Oy	PANT
x	Schink Dietmar	AED422		Phoenix, Volkmarsen	PHOE
x	Schlosser Christian	OTN/AET52		Prototech AS	PROT
	Schmidt Rudolf	FAE22		QMC Instruments Ltd.	QMC
	Schweickert Gunn	AOE22		Rembe, Brilon	REMB
	Steininger Eric	AED422		Rosemount Aerospace GmbH	ROSE
x	Stritter Rene	AED11		RYMSA, Radiación y Microondas S.A.	RYM
	Tenhaeff Dieter	AOE22		SENER Ingeniería SA	SEN
	Thörmer Klaus-Horst Dr.	OTN/AED65		Stöhr, Königsbrunn	STOE
	Wagner Klaus	AOE23		Terma A/S, Herlev	TER
	Wietbrock Walter	AET12			