

<b>Spacecraft/Project</b>	HERSCHEL	<b>Document No</b>	SPIRE-RAL REP-002007		
<b>Instrument/Model</b>	SPIRE	<b>Issue No</b>	1	<b>REV</b>	2
<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	13-July- 2004		

***Report at receipt/delivery or other major movement of instrument/hardware and associated GSE.***

<b>Inspection Report</b>	CQM Post Cryo Vibration Incoming Inspection	<b>Date Started</b>	7 <sup>th</sup> May 2004
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FROM	TO
CSL	RAL

<b><i>Inspection conducted by</i></b>		<b><i>Witnessed by (Product Assurance)</i></b>	
Name	Signature / Date	Name	Signature / Date
<b>Dave Smith</b>		<b>Eric Clark</b>	

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## INTRODUCTION

This inspection report shall be completed for formal transfers of hardware between RAL and customers, agencies or collaborating organisations

The following must be inspected:

	<b>SECTION</b>	<b>No</b>
<b>Documentation</b>	YES	1
<b>Containers</b>	YES	2
<b>Visual Inspection of Hardware</b>	YES	3
<b>Connectors</b>	YES	4
<b>Electrical Checkout</b>	YES	5
<b>Appendix A - CQM JFET SN002 Post Vibe Electrical checkout</b>	YES	
<b>Appendix B: Electrical Checkout of Subsystems</b>	YES	

Each section contains a checklist that shall be completed.

Unused boxes should have N/A entered.

Deviations e.g. items not delivered or incomplete documentation must be noted in the comments column.

For previously agreed deviations refer to the Delivery Review Board (DRB) minutes of meeting (MOM) or similar.

**NCR's must be raised for other deviations, damage or defects noted.**

<b>Spacecraft/Project</b>	<b>HERSCHEL</b>	<b>Document No</b>	<b>SPIRE-RAL REP-002007</b>		
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## **PROCEDURE FOR CQM POST CRYO VIBRATION INCOMING INSPECTION**

- Move transport container into preparation area
- Inspect container for signs of damage/moisture
- Remove FPU + HOB from container onto MGSE
- Move into clean area and onto optical bench
- Inspect witness mirrors
- Perform electrical measurements
  - JFETS and detectors
  - Continuity checks on SMEC, SCAL, PCAL, BSM etc...
  - Electrical isolation of L0 system
- Remove covers and perform visual inspection
- Remove thermal straps
- Mount on MGSE
- Remove covers in turn and perform detailed visual inspection (do not touch accelerometers at this point)
- Remove accelerometers (replace detector boxes after removal)
- Replace covers mount on HOB and store to allow PFM work to progress.

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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	13-July- 2004		

## SECTION 1: DOCUMENTATION

Documentation shall be checked for completeness, any items not received or to be delivered later should be noted.

**Note 1:** The delivery review board minutes should list outstanding items, e.g. open work, open NCRs and Waivers etc. A copy should accompany or form part of the EIDP. If there is no EIDP then it should be referenced on this report.

**Note 2:** All items dispatched from the Laboratory must have a Dispatch Note completed and signed, with a copy filed in the appropriate section of the EIDP.

<b>No.</b>	<b>Procedure</b>	<b>Comments (Include NCR Number if applicable)</b>	<b>Check N/A or ✓</b>
1.1	Is the documentation complete	None seen	
1.2	Is the accompanying documentation compliant with project requirements	None seen	
1.3	Note DRB/MoM Document Number, minutes and note any discrepancies with respect to agreements recorded. OR attach copy of minutes.		N/A
1.4	Additional Remarks		

<b>Spacecraft/Project</b>	HERSCHEL	<b>Document No</b>	SPIRE-RAL REP-002007		
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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	13-July- 2004		

## SECTION 2: INSPECTION OF CONTAINERS

No.	Procedure	Remarks (Include NCR Number if applicable)	Check N/A or ✓
	<b>Transport Containers – External condition.</b>		
2.1	Inspect the outside of the containers for obvious mechanical damage: Cracks, fasteners/locks clips, physical damage, dents or scratches etc. Handling provisions, Other damage		✓
2.2	Markings for description and destination		✓
2.3	Packing / unpacking instructions	Packed & unpacked by RAL	✓
2.4	Warning labels relating to handling, lifting, stacking limits		✓
2.5	Additional Remarks Check security of container		✓
	<b>Transport Containers – Internal condition</b>	Triple Bagged	
2.6	Check environmental monitors such as humidity indicators, shock recorders and record the location and readings on the inspection	Humidity inside box and first Bag >40% Shock +/- 5g Y. +/- 15g Z. -5g X	
2.7	Check mounting fixtures or brackets and screws, padding and packing.		✓
2.8	Additional Remarks Check security of container		✓

<b>Spacecraft/Project</b>	HERSCHEL	<b>Document No</b>	SPIRE-RAL REP-002007		
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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	13-July- 2004		

### SECTION 3: VISUAL INSPECTION OF HARDWARE

Insert one copy of the following section for each configuration item, OR Individual unit.

**Note:** Section 3 when used with the front sheet may be used as a complete report for small units prior to final closure, if this is done confirm unit interior check carried out before closure Interior check will be limited to visible items.

<b>CI NUMBER</b>		<b>SERIAL NUMBER</b>	
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No.	Procedure	Remarks (Include any NCR Numbers if Applicable)	Check N/A or ✓
3.1	Check contents against shipping list		N/A
3.2	Note external contamination	Dust on Witness Mirrors and surfaces. Clean & Vacuum before removing covers	✓
3.3	Inspect the outside for physical damage, cracks, dents, scratches		✓
3.4	Degradation of painting		N/A
3.5	Mounting provisions		✓
3.6	Fasteners correctly locked	NCR: HR-SP-RAL-NCR-068 Torlon insulating washer upside down on JFET foot assembly	
3.7	Check for protective covers on all electrical and fluid connectors and on	Dust covers fitted	✓

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<b>Subsystem</b>	<b>CQM Post Cryo Vibration</b>	<b>Date</b>	<b>13-July- 2004</b>		

	optical and sensor apertures		
3.8	Remove thermal straps and inspect interfaces	Some chafing of detector box interfaces	✓
3.9	Mount on MGSE		✓
3.10	Remove Photometer Cover and inspect for physical damage, cracks, dents, scratches		✓
3.11	Remove Spectrometer Cover and inspect for physical damage, cracks, dents, scratches	HR-SP-RAL-NCR-069 Screw from filter unit support fallen out HR-SP-RAL-NCR-070. Possible chafing/wear marks on SMEC HR-SP-RAL-NCR-071. Piece of Kapton found between webbing on filter side	
3.12	Remove Accelerometers		✓
3.13	Remove spectrometer detector box and inspect filters		✓
3.14	Remove Photometer detector box and inspect filters	NCR: HR-SP-RAL-NCR-072 Damage on photometer detector box	
3.15	Remove Cooler for post vibration tests		✓

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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	13-July- 2004		

### SECTION 4 CHECK ALL CONNECTORS

No.	Procedure	Remarks (Include NCR Number if applicable)	Check N/A or ✓
4.1	Bent pins	Several Connectors have pins out of optimum alignment but will be OK But the 7 <sup>th</sup> pin down left hand side of J24 viewed from front is out of alignment more than any of the others, will require attention before connecting.	
4.2	Internal / external damage		✓
4.3	Internal debris	NCR: - HR-SP-RAL-NCR-073 Cracking of elastomer in BDA-JFET MDM 51S connector	
4.4	Connector covers fitted		N/A
4.5	Connector savers in position	None	✓
4.6	EMC Covers Fitted	Two fitted to one of the JFET racks top left hand side	
4.7	<b>RED</b> tag items/covers fitted		N/A
4.8	Any other damage	NCR: HR-SP-RAL-NCR-074 Heatshrink on JFET back harnesses	



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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	13-July- 2004		

### SECTION 5 ELECTRICAL CHECKOUT

<b>No.</b>	<b>Procedure</b>	<b>Remarks (Include NCR Number if applicable)</b>	<b>Check N/A or ✓</b>
5.1	Photometer JFETs , measure electrical continuity	Active detector measured - See appendix A	✓
5.2	Spectrometer JFETs , measure electrical continuity		N/A
5.3	Subsystems , measure electrical continuity	See appendix B	✓

### SECTION 6 INSPECTION OF SORPTION COOLER

<b>No.</b>	<b>Procedure</b>	<b>Remarks (Include NCR Number if applicable)</b>	<b>Check N/A or ✓</b>
6.1	Remove Sorption Cooler and ship to CSL	Delivered 28-May-2004	✓
6.2	Perform cryogenic test of cooler to verify that no change in performance has occurred	See test report HSO-SBT-TN-106 'Coolers SPIRE CQM – PERFORMANCE VERIFICATION'	✓
6.3	Return cooler to instrument	Returned 28-June-2004	✓

<b>Spacecraft/Project</b>	HERSCHEL	<b>Document No</b>	SPIRE-RAL REP-002007		
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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	13-July- 2004		

### SECTION 7 METROLOGY OF PLW BDA

<b>No.</b>	<b>Procedure</b>	<b>Remarks (Include NCR Number if applicable)</b>	<b>Check N/A or ✓</b>
7.1	Remove PLW BDA	Removed 04-June-2004	✓
7.2	Measure position of BDA thermal interface to check for movement	Results inconclusive as measurement was not sensitive enough However no visible signs of Kevlar wear	✓
7.3	Reinatal PLW to detector box		

<b>Spacecraft/Project</b>	<b>HERSCHEL</b>	<b>Document</b>	<b>SPIRE-RAL REP-002007</b>		
<b>Instrument/Model</b>	<b>SPIRE</b>	<b>Issue No</b>	<b>1</b>	<b>REV</b>	<b>0</b>
<b>Subsystem</b>	<b>CQM Post Cryo Vibration</b>	<b>Date</b>	<b>7<sup>th</sup> May 2004</b>		

**Appendix A - CQM JFET SN002 Post Vibe Electrical checkout**

DKG, BMS

Monday, 10 May 2004

Log of events

1. Wired up MDM 37P to connect into JFP J27.
  - a. Pins 17, 18, 19, 35, 36 and 37 connected to DC power supply ground.
  - b. Pins 32 and 15 to Vss.
  - c. Pins 14 and 34 to Vdd.
  - d. All other contacts left un-terminated
2. Removed shorting plug from JFP J27.
3. Mated MDM 37P to JFP J27 with the DC power supply connected but un-powered. The shorting plug in JFP J28 remained in place during this operation.
4. The shorting plug in JFP J28 was then removed.
5. A bespoke cable with an MDM 25P and a D-Sub 26 was used to connected to J13. The other end connected to a 26 pin BOB
6. The power supply was switched on and Vdd set to +3V and Vss set to -1.5V
7. Measurements carried out on J13 and the results logged in the spreadsheet.
8. The PS was turned off
9. Measurements carried out on J14 and the results logged in the spreadsheet.
10. The PS was turned off
11. Measurements carried out on J15 and the results logged in the spreadsheet.
12. The PS was turned off
13. Measurements carried out on J16 and the results logged in the spreadsheet.
14. The PS was turned off
15. The current consumption was measured on the Vdd line.
16. The PS was turned off
17. J16 Removed
18. J28 shorting plug fitted.
19. Test connector removed from J27
20. J27 shorting plug fitted



**INCOMING / OUTGOING INSPECTION REPORT**

**PRODUCT ASSURANCE**  
Space Science and Technology Department

<b>Spacecraft/Project</b>	<b>HERSCHEL</b>	<b>Document No</b>	<b>SPIRE-RAL REP-002007</b>		
<b>Instrument/Model</b>	<b>SPIRE</b>	<b>Issue No</b>	<b>1</b>	<b>REV</b>	<b>0</b>
<b>Subsystem</b>	<b>CQM Post Cryo Vibration</b>	<b>Date</b>	<b>7<sup>th</sup> May 2004</b>		

JFET Module S/N	SN 002
Calibration Instrument #	Fluke 87 (47551548)
Calibration Date	07-Apr-04
Power Supply S/N	
Calibration Date	NA
Date of Test	10-May-04
Test Engineer	Griffin
Witness	Swinyard
Vdd	3.00 V
Vss	-1.51 V
Current in Vdd Line	3.263mA

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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	7 <sup>th</sup> May 2004		

Name	Pin	JAA (J16)	Offset	JBB (J15)	Offset	JAA' (J14)	Offset	JBB' (J13)	Offset
Channel 1 +	01	1.1110 V	0.0 mV	0.8130 V	2.0 mV	0.6030 V	1.0 mV	0.7200 V	-4.0 mV
Channel 1 -	14	1.1110 V		0.8110 V		0.6020 V		0.7240 V	
Channel 2 +	02	1.0560 V	1.0 mV	1.2450 V	-2.0 mV	0.6480 V	-4.0 mV	1.1550 V	1.0 mV
Channel 2 -	15	1.0550 V		1.2470 V		0.6520 V		1.1540 V	
Channel 3 +	03	0.7610 V	0.0 mV	1.1870 V	-1.0 mV	0.6330 V	1.0 mV	0.8890 V	-6.0 mV
Channel 3 -	16	0.7610 V		1.1880 V		0.6320 V		0.8950 V	
Channel 4 +	04	1.0690 V	-5.0 mV	0.8000 V	-1.0 mV	1.1110 V	-1.0 mV	0.9210 V	5.0 mV
Channel 4 -	17	1.0740 V		0.8010 V		1.1120 V		0.9160 V	
Channel 5 +	05	0.8150 V	1.0 mV	0.5070 V	5.0 mV	1.2430 V	-2.0 mV	0.9540 V	5.0 mV
Channel 5 -	18	0.8140 V		0.5020 V		1.2450 V		0.9490 V	
Channel 6 +	06	0.9930 V	-3.0 mV	1.4040 V	0.0 mV	0.6060 V	3.0 mV	0.6510 V	-5.0 mV
Channel 6 -	19	0.9960 V		1.4040 V		0.6030 V		0.6560 V	
Channel 7 +	20	0.7670 V	2.0 mV	0.7560 V	2.0 mV	1.1040 V	-4.0 mV	1.1880 V	0.0 mV
Channel 7 -	07	0.7650 V		0.7540 V		1.1080 V		1.1880 V	
Channel 8 +	21	1.1250 V	-3.0 mV	0.8580 V	5.0 mV	0.6330 V	6.0 mV	0.6290 V	6.0 mV
Channel 8 -	08	1.1280 V		0.8530 V		0.6270 V		0.6230 V	
Channel 9 +	22	0.7330 V	0.0 mV	1.3740 V	6.0 mV	0.8990 V	-1.0 mV	1.3840 V	2.0 mV
Channel 9 -	09	0.7330 V		1.3680 V		0.9000 V		1.3820 V	
Channel 10 +	23	0.6810 V	8.0 mV	1.4010 V	3.0 mV	0.9830 V	-2.0 mV	1.1140 V	1.0 mV
Channel 10 -	10	0.6730 V		1.3980 V		0.9850 V		1.1130 V	
Channel 11 +	24	1.0940 V	3.0 mV	0.8700 V	3.0 mV	0.8010 V	-4.0 mV	1.0020 V	7.0 mV
Channel 11 -	11	1.0910 V		0.8670 V		0.8050 V		0.9950 V	
Channel 12 +	25	0.7400 V	2.0 mV	0.8710 V	2.0 mV	0.8480 V	4.0 mV	0.8830 V	-3.0 mV
Channel 12 -	12	0.7380 V		0.8690 V		0.8440 V		0.8860 V	

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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	7 <sup>th</sup> May 2004		

**Appendix B: Electrical Checkout of Subsystems**

Checkout of Subsystems (Electrical Probing) - DVM -> Voltcraft 96 calibrated 23/12/2003 Cert #10048

**1) SMEC launch/Thermal Tail FPU J27**

- SMEC Temp OK
- SMEC I/F Temp OK
- All others O/C

**2) SMEC Control – FPU J29**

- Pins 1 & 2 Drive coil 1 – OK 489 Ohms
- Pins 21 & 22 Drive coil 2 – O/C
- Pins 4 & 5 drive coil sense – O/C
- Pins 7 & 8 pos led power – O/C
- Pins 27 & 28 pos sen power– O/C
- Pins 10 & 11 pos sen 1– O/C
- Pins 30 & 31 pos sen 1 F/B– O/C
- Pins 13 & 14 pos sen 2– O/C
- Pins 33 & 34 pos sen 2 F/B– O/C
- Pins 16 & 17 pos sen 3– O/C
- Pins 36 & 37 pos sen 3 F/B– O/C

**3) SCAL -> No connections – internal harness not present**

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<b>Subsystem</b>	CQM Post Cryo Vibration	<b>Date</b>	7 <sup>th</sup> May 2004		

**4) Cooler tail J19**

- 1, 2, 20, 21 sorption pump OK
- 4, 5, 22, 23 Evap – ok
- 6, 7, 25, 26 pump heater switch – OK
- 9, 10, 27, 28 Evap heat switch - OK
- 14, 15, 32, 33 Shunt – OK
- 16, 17, 34, 35 Pump Heater – OK
- 18, 19, 36, 37 HS Heater - OK

**5) BSM J25**

- 18, 19, 36, 37 Jiggle drive – 18-36 ->260Ohm    19, 37->O/C
- 15, 16, 34, 35 Chop drive – 15, 24 ->260Ohm    16, 35->O/C
- 10, 11, 28, 29 PCAL – OK 240Ohm across PCAL
- 7, 8, 26, 27 Temp – OK