GRAVITY PROBE B

PROCEDURE FOR

PAYLOAD VERIFICATION

(PTP) Procedure for TRE Aliveness Test Following Payload Insertion, Rev. A

PO 487 Rev, A

July 12, 2000

Prepared by: *Bob Farley*

Approvals:

Program Responsibility	Signature	Date
Bob Farley TRE REE		
M. Taber Payload Test Director		
GP-B System Engineering		
D. Ross GP-B Quality Assurance		
Barry Muhlfelder GP-B Payload Technical Manager		

NOTES:

Level of QA required during performance of this procedure:

_4_ Stanford QA Representative

All redlines must be approved by QA

Revision Record:

Rev	Rev Date	ECO #	Summary Description
-	August 10, 1999	na	Original issue
A	July 12, 2000	1182	Incorporated redlines

Acronyms and Abbreviations:

Acronym / Abbreviation	**Meaning**
GSE	Ground Support Equipment
TRE	Telescope Readout Electronics
AS3	Artificial Star #3

Notify ONR 24 hours prior to beginning testing.

Person Contacted: _____ Date and Time: _____

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1. Scope

This procedure verifies that the TRE has been installed and connected properly, and that the detectors respond to the appropriate stimuli.

2. Configuration Requirements

2.1 Probe is installed in the dewar. Probe pressure <1E-5 torr. TRE mounted on dewar, with cables connected to tophat and GSE test support rack.

2.2 Artificial Star #3 mounted atop probe (likely).

2.3 If AS3 not mounted, than a transparent cover for Telescope aperture to allow illumination of detectors.

3. Hardware Required

3.1 Commercial test equipment

Manufacturer	Model	Serial Number	Calibr. Exp. Date

3.2 Mechanical/Electrical Special test equipment

Description	Part No.	Rev. no.	Serial No.	Certification Date
TRE Ground Support Equipment Rack	na		Unit #1	5/26/99
AS3 if available				

3.3 Tools

Description	No. Req'd
Flashlight required if AS3 not mounted	1 working

4. Software Required

4.1 Test Support Software

Test Software Name	Version No.	QA Verification
SQD362.exe, (supports two TREs.)	V3.62	

5. Procedures Required

Procedure Name	Procedure No.

6. Equipment Pretest Requirements

None.

7. Personnel Requirements

7.1 This test to be conducted only by certified personnel. Among those are Howard Demroff, Paul Ehrensberger, John Goebel, and Bob Farley.

8. Quality Assurance

8.1 Testing shall be conducted on a formal basis to approved and released procedures. The QA program office shall be notified of the start of this procedure. A Quality Assurance Representative, designated by D. Ross shall be present during the procedure and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Program Engineer, D. Ross or her designate, nominally R. Leese, will certify his concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating in the designated place(s) in this document. Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108.

9. Red-line Authority

9.1 Authority to red-line (make minor changes during execution) this procedure is given solely to the PTD or his designate and shall be approved by the QA Representative. Additionally, approval by the Hardware Manager shall be required if, in the judgment of the PTD or QA Representative, experiment functionality may be affected.

10. Safety Requirements

10.1 Connection and disconnection shall be performed only when the equipment involved is in a powered-down state.

10.2 Connector savers are to be used on the TRE and tophat connectors.

> **Note: The mating and demating of all flight connectors must be recorded in a log. This procedure does not require removal or replacement of connector savers onto the flight connectors--they should already be in place.**

10.3 Connectors shall be inspected for contamination and for bent, damaged, or recessed pins prior to mating.

10.4 Grounded wrist straps are to be worn prior to removal of connector caps or covers and during mating/demating operations.

10.5 ESD-protective caps or covers are to be immediately installed after demating of connectors.

11. References and Applicable Documents

12. Operations

12.1 Verify that LMMS 8A01948GSE-101 cables are installed between the TRE units and the TRE GSE Test Rack. Note which TRE serial number is connected to side A or side B of the Test Rack and enter the information in the table below.

12.2 Verify that Cable 8A01288-101 connects TRE-A to Tophat connector I9.

12.3 Verify that Cable 8A01287-101 connects TRE-B to Tophat connector I8.

TRE Assembly **8A00918-101**	GSE Rack Connection A or B	Tophat Connector	Initial and Date	QA Verification
TRE S/N001	Side _____	I ____		
TRE S/N002	Side _____	I ____		

12.4 Power the GSE Test Rack and boot the computer. Change to directory **SQD3** and run program named SQD362.exe. Select MON A in the main menu, and step through the four selections in the Global menu to enable both A and B commands.

12.5 If AS3 is mounted on the probe, assure that all light sources within the AS3 optical enclosure are not powered.

12.6 Power on the A Side TRE using the switch on the A side power supply.

12.7 Check the A-Side housekeeping display for both X and Y axes. Power supply voltages and Reference voltages should be within 5% of nominal values.

12.8 Navigate to the Main Menu and select MON B.

12.9 Power on the B Side TRE using the switch on the B side power supply.

12.10 Check the B-Side housekeeping display for both X and Y axes. Power supply voltages and Reference voltages should be within 5% of nominal values.

12.11 Use the following procedure to balance each of the eight detector circuits, and record the resulting hexadecimal OFFSET command for each in the table.

12.11.1 Select an Axis to balance, Side A or B, and X or Y. Navigate the menu using Esc, Commands, and TRE X or Y Axis.

12.11.2 In the Main Menu, select MON A or MON B as appropriate.

12.11.3 Select Commands, and the appropriate Axis menu.

12.11.4 Heat platform to 80 K using the following commands.

12.11.4.1 Set DTEMP to 0832h.

12.11.4.2 Set HEAT to 0007h.

12.11.4.3 Set CONTROL to 0080h.

12.11.4.4 Wait a few minutes or until the servo error voltage is within one-quarter volt of zero volts.

12.11.5 Set the CONTROL word to 1500h.

12.11.6 Set the BIAS word to 0000h.

12.11.7 Set the CLAMP word to 0000h.

12.11.8 Set the OFFSET to FFFFh.

12.11.9 Observe the value of XPSIG, YPSIG, XNSIG, or YNSIG as appropriate to monitor the progress. It is desired to find the smallest value of the OFFSET bytes that allow the xxSIG voltage to remain greater than zero.

12.11.10 Optionally, monitor the corresponding signal outputs (+ and -) with the oscilloscope, Sensitivity 5V per division.

12.11.11 Hold the SHIFT key down and depress F1 repeatedly until one of the ?PSIG values or waveforms becomes negative. Release the SHIFT key.

12.11.12 Hold the left Ctrl key and depress F1 once, or until the ?PSIG value or waveform is greater than zero volts. Release the Ctrl key.

12.11.13 Hold the SHIFT key down and depress F2 repeatedly until the ?PSIG value or waveform becomes negative. Release the SHIFT key.

12.11.14 Hold the left Ctrl key and depress F2 once, or until the ?PSIG value or waveform is greater than zero volts. Release the Ctrl key.

12.11.15 Hold the SHIFT key down and depress F3 repeatedly until the ?NSIG value or the other waveform becomes negative. Release the SHIFT key.

12.11.16 Hold the left Ctrl key and depress F3 once, or until the ?NSIG value or the waveform is greater than zero volts. Release the Ctrl key.

12.11.17 Hold the SHIFT key down and depress F4 repeatedly until the ?NSIG value or the waveform becomes negative. Release the SHIFT key.

12.11.18 Hold the left Ctrl key and depress F4 once, or until the ?NSIG value or the waveform is greater than zero volts. Release the Ctrl key.

12.11.19 Record the OFFSET hex command value.

	A-side, X-Axis	**A-side, Y-Axis**	**B-side, X-Axis**	**B-side, Y-Axis**
OFFSET (hex)				
CLAMP (hex)				
Initials & Date				

12.11.20 Repeat procedure from paragraph 12.11.1 for the other axes.

QA Witness_____ Date:_____

12.12 Set the Gain and CLAMP voltages according to the following procedure for each axis. Select the MON A or B from the main menu depending upon which circuit is being adjusted. The adjustment criteria is to achieve a value of X high+, X high-, Y high+, or Y high- that is not railed at +9.99 volts. The desired setting for these monitors is between zero and eight volts positive.

12.12.1 Set the CONTROL word to 1000h.

12.12.2 Choose a gain setting based on expected signal, where a higher gain code value gives greater gain. For now, choose a gain code of 8 and set the BIAS command to 8800h.

12.12.3 Select the CLAMP command. Hold the left Shift key and depress the F1 key repeatedly until the ? high+ monitor or one of the waveforms becomes negative. Release the Shift key.

12.12.4 Hold the Ctrl key and depress the F2 key once or until the ? high+ monitor or the level at the start of the waveform is within the desired range. Release the Ctrl key.

12.12.5 Hold the left Shift key and depress F2 until the ? high+ monitor is within the desired range or the start of the waveform is between zero and four volts on the oscilloscope display. Back up by using the Ctrl and F2 combination.

12.12.6 Repeat for the other signal output, using F3 and F4 in combination with the left Shift or Ctrl keys and observing the ?SIG - value.

12.12.7 Record the CLAMP command value in the table above.

12.12.8 Repeat the procedure beginning at 12.12 for the remaining axes.

12.13 [**If AS3 is mounted on the probe:**] With at least two detector outputs displayed on the oscilloscope, turn on the dc internal incandescent illumination lamps in AS3, and slowly increase the lamp voltage until the slopes of the waveforms increase to at least 3 volts peak to peak in 100 ms.

12.14 [**If AS3 is not on the probe:**] With at least two detector outputs displayed on the oscilloscope, direct the beam from the flashlight into the aperture of the telescope and note if any changes in the waveforms are observed. A definite increase in the slopes should occur as the light falls within the field of view.

12.15 Completion of testing

12.15.1 If no further testing of the TRE / DPA is needed, return the CONTROL registers to 0000h for all of the axes and verify completion in the table below.

Axis	A-side, X-Axis	A-side, Y-Axis	B-side, X-Axis	B-side, Y Axis
CONTROL	0000h	0000h	0000h	0000h
Initial & date				

Turn off the TRE power supplies in the test rack.

QA Witness_____ Date:_____

12.15.2 If other tests are to be performed using the TRE / DPA units, consider this as a good starting point and proceed with the requirements of that test procedure without turning the power off.

13. Test completed.

Completed by: _____

QA Witnessed by: _____

Date: _____

Time: _____

PTD_____ Date _____

Quality
Manager_____ Date _____