Procedure No. P0489 Rev. -

GRAVITY PROBE B

PROCEDURE FOR

PAYLOAD VERIFICATION

(PTP) Procedure for TRE Nominal FunctionTest

August 10, 1999

Prepared by: Bob Farley

Approvals:

Program Responsibility	Signature	Date
Paul Ehrensberger TRE Test Leader		
Bob Farley TRE REE		
M. Taber Payload Test Director		
GP-B System Engineering		
D. Ross GP-B Quality Assurance		
S. Buchman GP-B Hardware 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

Acronyms and Abbreviations:

Acronym / Abbreviation	**Meaning**
DMA	Detector Mount Assembly
GSE	Ground Support Equipment
TRE	Telescope Readout Electronics

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 interacts correctly with the DMAs, that amplifier balance is achieved, and that it is possible to sustain a reasonable operating temperature with minimum heater power.

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 Dewar is cooled with liquid helium.

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

3.3 Tools

Description	No. Req'd

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.
Procedure for TRE Aliveness Test Following Payload Insertion	P0487
Procedure for TRE / DMA Temperature Control Verification	P0488

6. Equipment Pretest Requirements

Procedure P0488 shall have been completed prior to this procedure.

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 Power the GSE Test Rack and boot the computer. Change to directory SQD362 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.

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

12.3 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.

12.4 Navigate to the Main Menu and select MON B.

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

12.6 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.

12.7 Set the control words for all four axes to 0000h.

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

QA Witness _____ Date:_____

12.8 Initial Temperature Stabilization

12.8.1 Set the program to display A-side Engineering data by selecting MON A in the main menu.

12.8.2 Select the X-Axis Controls Menu.

12.8.3 Set the command temperature using the A-side DTEMP register to 0824h.

12.8.4 Set the A-side HEAT command to 0006h.

12.8.5 Set the A-side CONTROL register to 0080h to enable local closed loop control.

12.8.6 Move to the Y-Axis menu and set the A-side DTEMP register to 0824h

12.8.7 Set the A-side HEAT register to 0006h and the A-side CONTROL register to 0080h.

12.9 Navigate to the Main Menu and select MON B.

12.9.1 Select the X-Axis Controls Menu.

12.9.2 Set the B-side DTEMP register to 0824h

12.9.3 Set the B-side HEAT command to 0006h.

12.9.4 Set the B-side CONTROL register to 0080h to enable local closed loop control.

12.9.5 Move to the Y-Axis menu and set the B-side DTEMP register to 0824h

12.9.6 Set the B-side HEAT register to 0006h and the B-side CONTROL register to 0080h.

12.9.7 Wait 2 to 3 minutes.

12.9.8 Set the A-side HEAT register to 0000h and set the B-side HEAT register to 0000h in the Y-axis menu.

12.9.9 Move to the X-axis menu and set the A-side HEAT register to 0000h and set the B-side HEAT register to 0000h.

12.10 Balancing the Amplifiers

12.10.1 Navigate to the Main Menu and select MON A.. Connect the A-side XPSIGHI and XNSIGHI signals to the oscilloscope.

12.10.2 Go to the X-axis Command menu, and set the A-side CONTROL word to 1580h.

12.10.3 Adjust the A-side OFFSET register to achieve the amplifier balance as was done in P0487.

12.10.4 Go to the Y-axis Command menu, and set the A-side CONTROL word to 1580h.

12.10.5 Adjust the A-side OFFSET register to achieve the amplifier balance as was done in P0487.

12.10.6 Navigate to the Main Menu and select MON B.

12.10.7 Go to the X-axis Command menu, and set the B-side CONTROL word to 1580h.

12.10.8 Adjust the B-side OFFSET register to achieve the amplifier balance as was done in P0487.

12.10.9 Go to the Y-axis Command menu, and set the B-side CONTROL word to 1580h.

12.10.10 Adjust the B-side OFFSET register to achieve the amplifier balance as was done in P0487.

12.11 **Gain Setting and CLAMP Adjustment**

12.11.1 Navigate to the Main Menu and select MON A.

12.11.2 Go to the X-axis Command menu, and set the A-side CONTROL word to 1080h.

12.11.3 Set the A-side BIAS word to cause a fairly high gain setting, AA00h.

12.11.4 Adjust the A-side CLAMP register so the indicated voltage of **X high+** is between zero and eight volts positive using combinations of Shift or Ctrl with F1 and F2 as done in P0487.

12.11.5 Adjust the A-side CLAMP register so the indicated voltage of **X high-** is between zero and eight volts positive using combinations of Shift or Ctrl with F3 and F4 as done in P0487.

12.11.6 Go to the Y-Axis Command Menu, and set the A-side CONTROL word to 1080h.

12.11.7 Set the A-side BIAS word to cause a fairly high gain setting, AA00h.

12.11.8 Adjust the A-side CLAMP register so the indicated voltage of **Y high+** is between zero and eight volts positive using combinations of Shift or Ctrl with F1 and F2 as done in P0487.

12.11.9 Adjust the A-side CLAMP register so the indicated voltage of **Y high-** is between zero and eight volts positive using combinations of Shift or Ctrl with F3 and F4 as done in P0487.

12.11.10 Navigate to the Main Menu and select MON B.

12.11.11 Go to the X-axis Command menu, and set the B-side CONTROL word to 1080h.

12.11.12 Set the B-side BIAS word to cause a fairly high gain setting, AA00h.

12.11.13 Adjust the B-side CLAMP register so the indicated voltage of **X high+** is between zero and eight volts positive using combinations of Shift or Ctrl with F1 and F2 as done in P0487.

12.11.14 Adjust the B-side CLAMP register so the indicated voltage of **X high-** is between zero and eight volts positive using combinations of Shift or Ctrl with F3 and F4 as done in P0487.

12.11.15 Go to the Y-Axis Command Menu, and set the B-side CONTROL word to 1080h.

12.11.16 Set the B-side BIAS word to cause a fairly high gain setting, AA00h.

12.11.17 Adjust the B-side CLAMP register so the indicated voltage of **Y high+** is between zero and eight volts positive using combinations of Shift or Ctrl with F1 and F2 as done in P0487.

12.11.18 Adjust the B-side CLAMP register so the indicated voltage of **Y high-** is between zero and eight volts positive using combinations of Shift or Ctrl with F3 and F4 as done in P0487.

12.12 Record the Results

12.12.1 Record the hex command settings for each axis and side in the table below.

Axis --->	A-side, X-Axis	A-side, Y-Axis	B-side, X-Axis	B-side, Y Axis
CONTROL	h	h	h	h
DTEMP	h	h	h	h
HEAT	h	h	h	h
CLAMP	h	h	h	h
BIAS	h	h	h	h
OFFSET	h	h	h	h
Initials & date				

QA Witness_____ Date:_____

12.12.2 Select MON A from the Main Menu.

12.12.3 Record the indicated platform temperature of the A-side detector modules in the table.

Axis	Temperature, Kelvin	Date & Time	Initials	QA Witness
A-side, X-Axis				
A-side, Y-Axis				

12.12.4 In the Disk Menu, set to record 30 second files Continuously.

12.12.5 Enable the Disk recording and record the name of the file here:

_____

12.12.6 Wait at least five minutes and Disable the recording.

Enter date and time here: _____

12.12.7 Navigate to the Commands menu and set the A-side CONTROL word to 1000h for both the X- and Y-Axes.

12.12.8 Select MON B from the Main Menu.

12.12.9 Record the indicated platform temperature of the B-side detector modules in the table.

Axis	Temperature, Kelvin	Date & Time	Initials	QA Witness
B-side, X-Axis				
B-side, Y-Axis				

12.12.10 Return to the Disk Menu, Enable Recording. Write the filename: _____

12.12.11 Wait at least five minutes and Disable the recording.

Enter the date and time : _____

12.12.12 Navigate to the Commands menu and set the B-side CONTROL word to 1000h for both the X- and Y-Axes.

12.12.13 Record the time and date: _____

12.12.14 Wait at least 30 minutes from the above time, and then record the platform temperatures for each of the four detector platforms in the table below, navigating as necessary using the main menu and command menus.

Axis	Temperature, Kelvin	Date & Time	Initials
A-side, X-Axis			
A-side, Y-Axis			
B-side, X-Axis			
B-side, Y-Axis			

QA Witness _____ Date:_____

12.13 Completion of testing

12.13.1 If no further testing of the TRE / DPA is needed, return the CONTROL registers to 0000h for all of the axes as in step 12.7.

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

QA Witness _____ Date:_____

12.13.2 Turn off the TRE power supplies in the test rack.

12.13.3 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: _____

Witnessed by: _____

Date: _____

Time: _____

PTD_____ Date _____

QE_____ Date _____