W. W. Hansen Experimental Physics Laboratory
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STANFORD, CALIFORNIA 94305-4085

Gravity Probe B Relativity Mission

ELECTRICAL TEST PROCEDURE (ETP) FOR SRE SPACECRAFT EMULATOR GSE

SN: | 001

GP-B Procedure
P0843 Rev -

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Prepared by: Jennifer Bower   Date
Gyroscope Suspension System (GSS) Group

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Approved by: William Bencze   Date
RE, Gyroscope Suspension System (GSS) Group

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Approved by: Dorrene Ross   Date
GP-B Quality Assurance

Table of Contents:

1.0 Revision History

Rev Level	Comments/notes	Date	Revised By
-	First release of this test procedure	5/30/01	J Bower

2.0 Scope:

2.1.   This procedure details the functional tests required for SRE Spacecraft Emulator Ground Support Equipment (GSE) prior to use with SRE flight hardware.

2.2.   Successful completion of this test certifies this device as functional and safe for use with SRE flight hardware.

3.0 Reference Documents

3.1.   Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment, MIL-STD-1686

3.2.   SRE to Spacecraft Interface Wiring Diagram, 8A00503

4.0 QA Provisions:

4.1.   Upon completion of this procedure, the SRE manager and the GP-B QA manager shall certify her/his concurrence that the procedure was performed and accomplished in accordance with the prescribed instructions by signing and dating his approval at the end of this procedure.

5.0 Test Personnel

This test procedure is to be conducted only by the following personnel:

5.1.   William Bencze

5.2.   Scott Smader

5.3.   Lo Van Ho

5.4.   Jennifer Bower

5.5.   Rick Bevan

5.6.

6.0 General Instructions

6.1.   Redlines can be initiated by the test personnel listed in Section 5.0 and must be approved by QA.

6.2.   Test operators shall read this procedure in its entirety and resolve any apparent ambiguities prior to beginning this test.

6.3.   Any nonconformance or test anomaly should be reported by a Discrepancy Report. Refer to the Quality Plan, P0108, for guidance. Do not alter or break test configuration if a test failure occurs; notify quality assurance.

6.4.   Only the following persons have the authority to exit/terminate this test or perform a retest: test operators listed in Section 5.0 and GP-B QA.

7.0 Hardware Safety Requirements:

7.1.   This assembly is ESD sensitive; special care shall be exercised per the "Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment", MIL-STD-1686

7.2.   Ensure that power is removed from cable assemblies before connecting or disconnecting cable connectors.

7.3.   Connector savers are to be used on all flight connector interfaces unless otherwise specified.

7.4.   Examine all mating connectors before attempting to mate them. Remove any foreign particles. Look for any damaged pins or sockets. Do not force the coupling action if excessive resistance is encountered. Ensure that keyways are aligned when mating connectors.

8.0 Test Equipment

The following support hardware, test equipment, or software will be used and the applicable information for the instruments shall be recorded below. Hand-written additions to this list may be made in the space provided.

Equipment Description	Make	Model	SN	Cal Due
1. SRE Spacecraft Emulator	SRE	NA		(this Pdoc)
2. Multimeter	Fluke			
3. Oscilloscope	Tektronix			
4. Power Supply (in SC emulator)	HP	6653A		
5. 40' 15-Pin GSE cable				
6. 40' 25-Pin GSE cable				
7.				
8.				

9.0 Device Under Test:

Record the serial number of the Device Undergoing Test, or DUT.

SRE Spacecraft emulator assembly	SN:	

Test Operator:	Name:	

| Start of test: | Date:
Time: | |
|---|---|---|

10.0   Power On:

Note: All handling of this DUT shall be performed using ESD control methods, as outlined in MIL-STD-1686. Unit shall be inspected at an ESD certified station. Wrist straps and/or heel grounding straps shall be used.
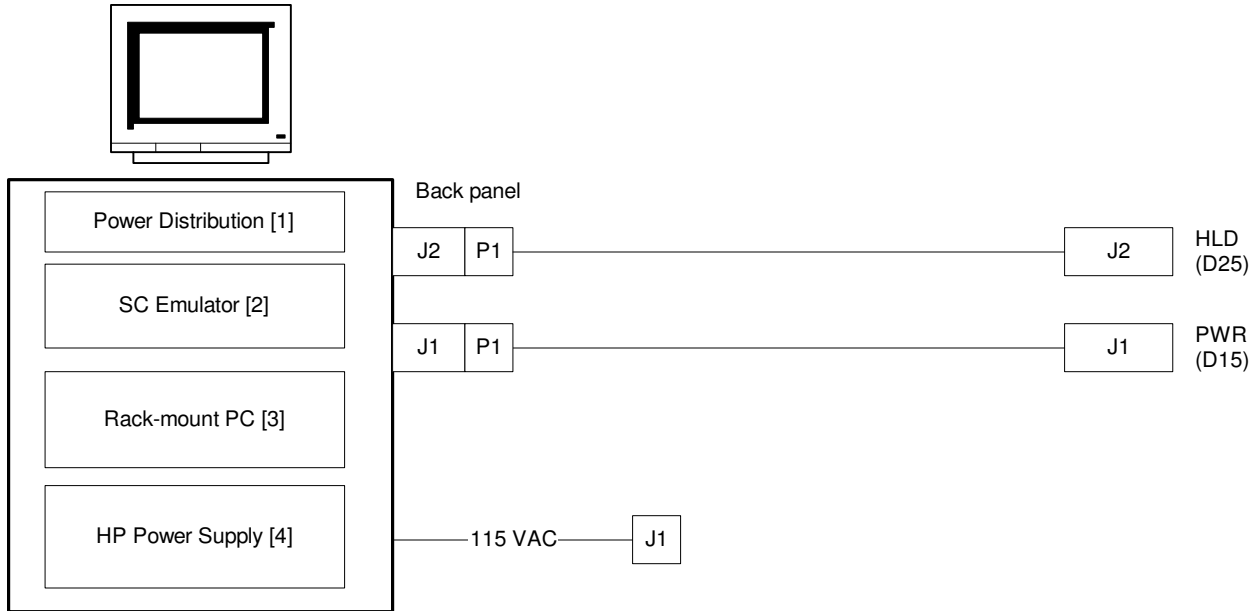
Figure 1: SRE Rack and Cables

	P/F	Notes
10.1. Turn on unit via the circuit breaker on the Power Distribution box [1]		
10.2. Boot the PC [3]		
10.3. Turn on power to HP DC Power Supply [4]		
10.4. Run LabView SRE Test program from desktop		
10.5. Record version number of LabView SRE Control Panel.		Version:
10.6. Turn on power to SC Emulator [2]		
10.7. In LabView, click "Power Settings" button to "ON"		
10.8. Verify 28V on HP Power Supply [4]		
10.9. Press "Undervolt Reset" on SC Emulator [2]		

11.0   Spacecraft Power Emulation Verification.

	P/F	Notes
11.1. Verify that the power panel on the LabView control panel is set for DC: 28.0 V, AC: 0.0 V		
11.2. Under "Power Settings," use down arrow to decrease "DC Voltage" (master voltage) until "SC Emulator Undervolt" indicator lights. Record voltage.		Undervolt Voltage:
11.3. Return the master voltage to 28V and press "Undervolt Reset."		
11.4. Click each of the three "Power Status" control buttons to indicate "ON." Verify each of the indicator lights on the SC Emulator is lit.		
11.5. Click each of the three "Power Status" control buttons to indicate "OFF." Verify each of the indicator lights on the SC Emulator is not lit.		
11.6. Using a multimeter, verify the table below for the 15-pin connector. Use the following pin combinations for the voltage measurements: Positive: Negative: Pin 1 Pin 9 Pin 3 Pin 10 Pin 4 Pin 12 Pin 6 Pin 13 Pin 7 Pin 15		

Power Status Configurations			Voltage Measurements					
SRE 28V	SW CLK	SW Htr	Pin 1	Pin 3	Pin 4	Pin 6	Pin 7	P/F
Off	Off	Off	0	0	0	0	0	
ON	Off	Off	28	28	28	0	0	
Off	ON	Off	0	0	0	28	0	
Off	Off	ON	0	0	0	0	28	

All voltage tolerances: ± 0.20 V

12.0 HLD Driver Emulation Verification:

	P/F	Notes
12.1. Connect the scope's negative terminal to pin 8 of the 25-pin connector and the positive terminal to the pins indicated in the table below.		
12.2. Verify the voltage pulses in the table below for the given HLD transitions.		

HLD Transition	1	14	2	15	3	16	4	17	5	6	18	19	P/F
FWD SRE A Pwr (ON)	P												
FWD SRE A Pwr (OFF)		P											
FWD SRE B Pwr (ON)			P										
FWD SRE B Pwr (OFF)				P									
TRE A Pwr (ON)					P								
TRE A Pwr (OFF)						P							
TRE B Pwr (ON)							P						
TRE B Pwr (OFF)								P					
Cable HTR 1/2 (ON)									P				
Cable HTR 1/2 (OFF)										P			
Cable HTR 3/4 (ON)											P		
Cable HTR 3/4 (OFF)												P	

P indicates 28 V pulse; blank indicates no pulse.

	P/F	Notes
12.3. Verify the 6 HLDs tested above indicate "OFF"		
12.4. Verify the voltage pulses in the table below for the given HLD transitions. Two voltage pulses should occur for each HLD transition: one when the mouse is pressed, and one when it is released.		

HLD Transition	7	21	9	22	10	P/F
SRE Aft Digital Reset	P					
Spare		P				
SRE Fwd A/B Digital Rest			P			
FWD SRE/TRE A Pwr RST				P		
FWD SRE/TRE B Pwr RST					P	

P indicates 28 V pulse; blank indicates no pulse.

I certify that this procedure was performed in whole and that the data recorded above is complete and accurate.

Test Engineer		Date	

This is to certify that the information obtained under this test procedure is as represented and the documentation is completed and correct.

SRE Representative		Date	
Quality Assurance		Date	

	SRE Spacecraft Emulator Tested on:_____ Retest by:_____ By:_____ Per P0758 Rev _____	Stamp:

	SRE Spacecraft Emulator Tested on:_____ Retest by:_____ By:_____ Per P0758 Rev _____	Stamp:

	SRE Spacecraft Emulator Tested on:_____ Retest by:_____ By:_____ Per P0758 Rev _____	Stamp: