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Gravity Probe B Relativity Mission

FULL FUNCTIONAL TEST PROCEDURE FOR THE GYROSCOPE SUSPENSION SYSTEM (GSS) FORWARD SUSPENSION UNIT (FSU) SUBSYSTEM

GP-B Procedure
P0702 Rev C

DUT PN: 26225-101 REV _____ SN: _______

___ Full Functional

Test Description (e.g. post x-axis vibe)________________

Prepared by: David Hipkins Date
FSU Test RE, Gyroscope Suspension System (GSS) Group

Approved by: William Bencze Date
Payload Electronics Manager.

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	19-Nov-2001	D Hipkins
A	Incorporation of redlines/error corrections resulting from first run on GSS FU SN 002	7-Jan-2002	WJ Bencze
B	Add test to verify switching of HV relays in thermal vacuum chamber (Fig 1, Sec 16.2.5, 17.5.3, 17.6.4)	15-Jan-02	WJ Bencze
C	Modified to add an alternate power configuration where a GSS aft FU is used to power the forward unit.	25-Jan-02	WJ Bencze

2.0 Scope:

This procedure details the operations required to perform a box-level full functional test on a GSS forward unit, PN 26225-101

This procedure is designed to execute the following test:

2.1 GSS FSU Full Functional (FF) Test

FSU is connected in a flight-like manner to a dummy load (fixed gyro capacitance simulator) and all tests are run in a flight-like configuration via flight-like telemetry.

3.0 Device Under Test (DUT):

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

26225-101 GSS Fwd Suspension Unit (FSU)	SN:	

Test Operator:	Name:	

Start of test:	Date: Time:	

4.0 Formal Requirements Verification

The Extended Functional test sequence of this procedure verifies by test the following requirements GSS Requirements:

None in this procedure.

5.0 Reference Documents

5.1	PLSE 13-1 Rev A	GSS Specification
5.2	P0758	GSS GSE Electrical Test Procedure (ETP)
5.3	P0759	APU Simulator Electrical Test Procedure (ETP) “Big Bertha”
5.4	26225	Assembly Drawing for the Fwd Suspension Unit (FSU)
5.5	S0477 Rev A	GSS Interface Control Document (ICD)
5.6	MIL-STD-1686	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment

6.0 Test Facilities

6.1 Primary facility: End Station 3 : Main Lab (HEPL 175), Stanford University

6.2 Alternate facility (specify):____

7.0 QA Provisions:

7.1 This procedure shall be conducted on a formal basis to its latest approved and released version. The QA Program Engineer (D. Ross) and the government representative (ONR/R. Gurr) shall be notified 24 hours prior to he start of this procedure. QA may monitor the execution of all or part of this procedure should they elect to do so.

QA notification time/date:

Date/time:________________________	Date/time:________________________________
GP-B QA (D. Ross)	Gov’t Rep (R. Gurr)

7.2 Upon completion of this procedure, the GSS 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.

8.0 Test Personnel

This test procedure is to be conducted only by the following personnel, or others designated by the GSS RE at the time of test (redline names in below as required)

8.1 William Bencze

8.2 David Hipkins

8.3 Yoshimi Ohshima

8.4 Rick Bevan

8.5 Paul Shestople

8.6 Scott Smader

8.7 Other: ___________________________

9.0 General Instructions

9.1 Redlines can be initiated by the test personnel listed in Section 8.0 and must be approved by QA.

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

9.3 Any nonconformance or test anomaly should be reported by via a Discrepancy Log (D-LOG). Refer to the Quality Plan, P0108, for guidance. Do not alter or break test configuration if a test failure occurs; notify quality assurance.

9.4 Only the following persons have the authority to exit/terminate this test or perform a retest: test operators listed in Section 8.0 and GP-B QA.

10.0 Hardware Safety Requirements:

10.1 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

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

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

10.4 Connector mating:

10.4.1 Examine all mating connectors before attempting to mate them.

10.4.2 Remove any foreign particles. Look for any damaged pins or sockets.

10.4.3 Do not force the coupling action if excessive resistance is encountered.

10.4.4 Ensure that key-ways are aligned when mating connectors.

11.0 External Test Equipment

The following support hardware 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.

Item	Equipment Description	Qty	Make	PN	SN	Cal Due
1.	GSS Spacecraft emulator	1	SU	NA		
2.	Gyro Simulator Dummy Load	1	SU	NA		
3.	Multimeter	1	Fluke			
4.	2-stub 1553 coupler	2	MilesTek	90-50202	NA	NA
5.	GSS testset workstation	1	SU	NA	NA	NA
6.	GSE power cable	1	LMCO	8A02084GSE-101	NA	NA
7.	GSE timing cable	1	LMCO	8A02085GSE-101	NA	NA
8.	GSE GFAB A cable	1	LMCO	8A01473-101	NA	NA
9.	GSE GFAB B cable	1	LMCO	8A01474-101	NA	NA
10.	GSE 1553 cable	1	LMCO	8A00673GSE-501	NA	NA
11.	1553 terminator	2	MilesTek	10-06403-025	NA	NA
12.	1553 patch cable	2	Trompeter	CA-2014-120	NA	NA
13.	FSU connector savers	7	Reynolds		See connection drawings	NA
Items below are needed only if DUT is to be powered by an external GSE power supply						
14.	GSS APU Simulator “Big Bertha”	1	LMTP	8A00740GSE-501		
15.	Dummy load voltage monitor box	1	SU	NA	01	NA
16.	GSS gold EU ACU	1	SU	26224-GSE		NA
Items below are needed only if DUT is to be powered by an Aft GSS flight unit						
17.	GSS ASU flight unit	1	SU	26226-101		NA
18.	GSS APU/FSU power cable	1	LMCO	8A01471-101	NA	NA
19.	GSS FSU	1	SU	26224-101	NA	NA

12.0 Required Software

12.1 PitView software tools current on the Testset computer are as follows:

12.1.1 Shared Telemetry Server: Version:____________________________

12.1.2 Command Client: Version:____________________________

12.1.3 PitView window interface: Version:____________________________

12.1.4 GSW (RAD6000 SW) Version:____________________________

12.1.5 GSW binary filename Filename:__________________________

13.0 GSE Certification Requirements:

	P/F	Notes:
13.1 Verify P0758 has been run on the Spacecraft Emulator GSE within the past 180 days or since the rack has been moved to the current test location.		Date:
13.2 This step needed only if DUT is to be powered by an external GSE power supply (Big Bertha) Verify P0759 has been run on the APU emulator GSE within the past 180 days or since the rack has been moved to the current test location.		Date:

14.0 Test Connection and Application of Power

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.

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

	P/F	Notes
14.1 Remove DUT from storage container. Verify that all connectors appear undamaged		
14.2 FSU Power – Check source of FSU power: _______GSE Power supply console 8A00740GSE-501 – “Big Bertha (Option A) — Go to section 14.3 _______Aft GSS Flight Unit, PN 25226-101 (Option B) — Go to section 14.4		

14.3 GSE Power Connection (Option A)

	P/F	Notes
14.3.1 Verify all Aft power supplies are turned off on the GSE panel.		
14.3.2 Connect FSU (DUT) and GSE as shown in Fig. 1. *Note: The computer on the Spacecraft Emulator is not required for this test.*		
14.3.3 Set Spacecraft clock simulator to the following: **16fo: A+B** **10 Hz: A+B** **Sun 10 Hz: A+B**		
14.3.4 Power on the aft GSS box. Record the ACU 3.3 V and 5 V supply current at the right		A @ 5.0V A @ 3.3V
14.3.5 Boot up the Sun workstation (as required), login, and change directory to location of test software.		
14.3.6 Load the processor from the test set (*gssloader*); Boot PitView (*startall*).		
14.3.7 Open the “Science Data” PITwindow		
14.3.8 Open the “Timing and state info” PITwindow		
14.3.9 Open the “Arbiter 7” PITwindow		
14.3.10 Record GSW version from ATC PIT window at right:		GSW Ver:
14.3.11 Power on the forward GSS box. Record the +14V current at the right		A @ +14V
14.3.12 Record the -14V current at the right		A @ -14V
14.3.13 Record the +6V current at the right		A @ +6V
14.3.14 Record the +55V current at the right		A @ +55V
14.3.15 Record the -55V current at the right		A @ -55V
14.3.16 Record power-on start time in power log		
14.3.17 Go to Section 15.0 (skip section 14.4)		

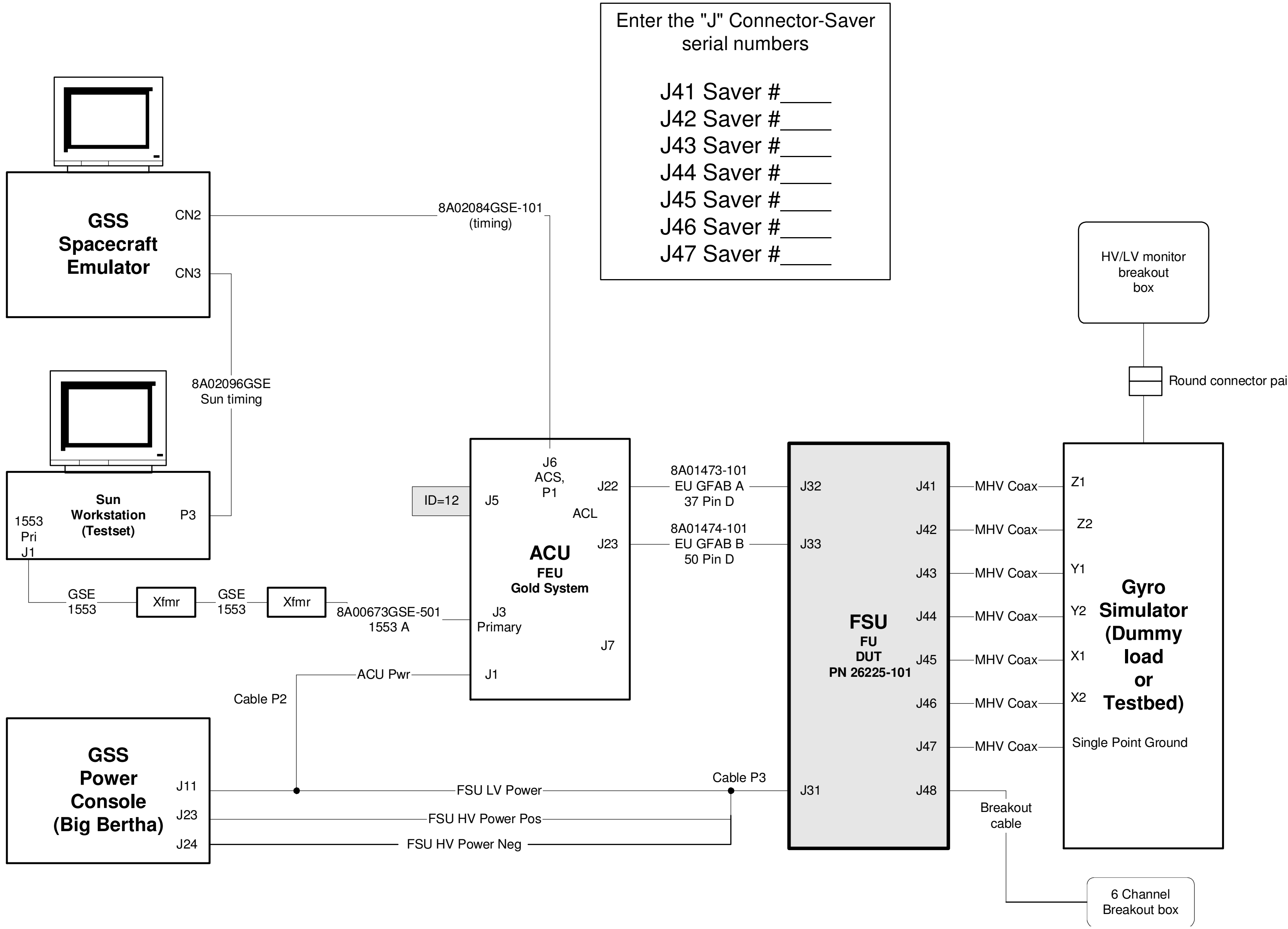

Figure 1 – GSE power connections to DUT (Option A)

14.4 Aft Flight GSS Power Connection (Option B)

	P/F	Notes
14.4.1 Verify all Aft power supplies are turned off on the Spacecraft Emulator panel.		
14.4.2 Connect FSU (DUT) to ASU and GSE as shown in Fig. 2.		
14.4.3 Set current limit on HP power supply in S/C emulator rack to 5.0 A • Close any LabView program that may be running. • Key in the following sequence on the front panel of the HP supply: • "**LOCAL, Function: CURRENT, 5.0, ENTER**"		
14.4.4 Restart the LabView *GSE Test* virtual instrument.		
14.4.5 Set supply voltage to **28.0 V** on the *GSE test* panel.		
14.4.6 Set Spacecraft clock simulator to the following: **16fo: A + B** **10 Hz: A + B** **Sun 10 Hz: A + B**		
14.4.7 Apply power to the aft box by turning on "Aft Main" on LabView control panel; record power on time in Power Log for this unit.		
14.4.8 Verify that current is < 550 mA; if greater remove power and cancel test.		
14.4.9 Record indicated main bus current as indicated on HP power supply front panel.		Current:
14.4.10 Cycle the "Power Mod 750A" and "Power Mod 750B" buttons "on" then "off" using the mouse (insures the state of the HV enable relays)		
14.4.11 Record power-on start time in power log for the DUT and the power and operations log for the FU ASU.		

	P/F	Notes
14.4.12 Boot up the Sun workstation (as required), login, and change directory to location of test software.		
14.4.13 Load the processor from the test set (*gssloader*); Boot PitView (*startall*).		
14.4.14 Open the "Science Data" PITwindow		
14.4.15 Open the "Timing and state info" PITwindow		
14.4.16 Open the "Arbiter 7" PITwindow		
14.4.17 Record GSW version from ATC PIT window at right:		GSW Ver:
14.4.18 Apply power to the forward GSS by turning on the "FSU A" supply on LabView control panel; record power on time in Power Log for this unit.		
14.4.19 Record indicated main bus current as indicated on HP power supply front panel.		Current:
14.4.20 Go to Section 15.0		

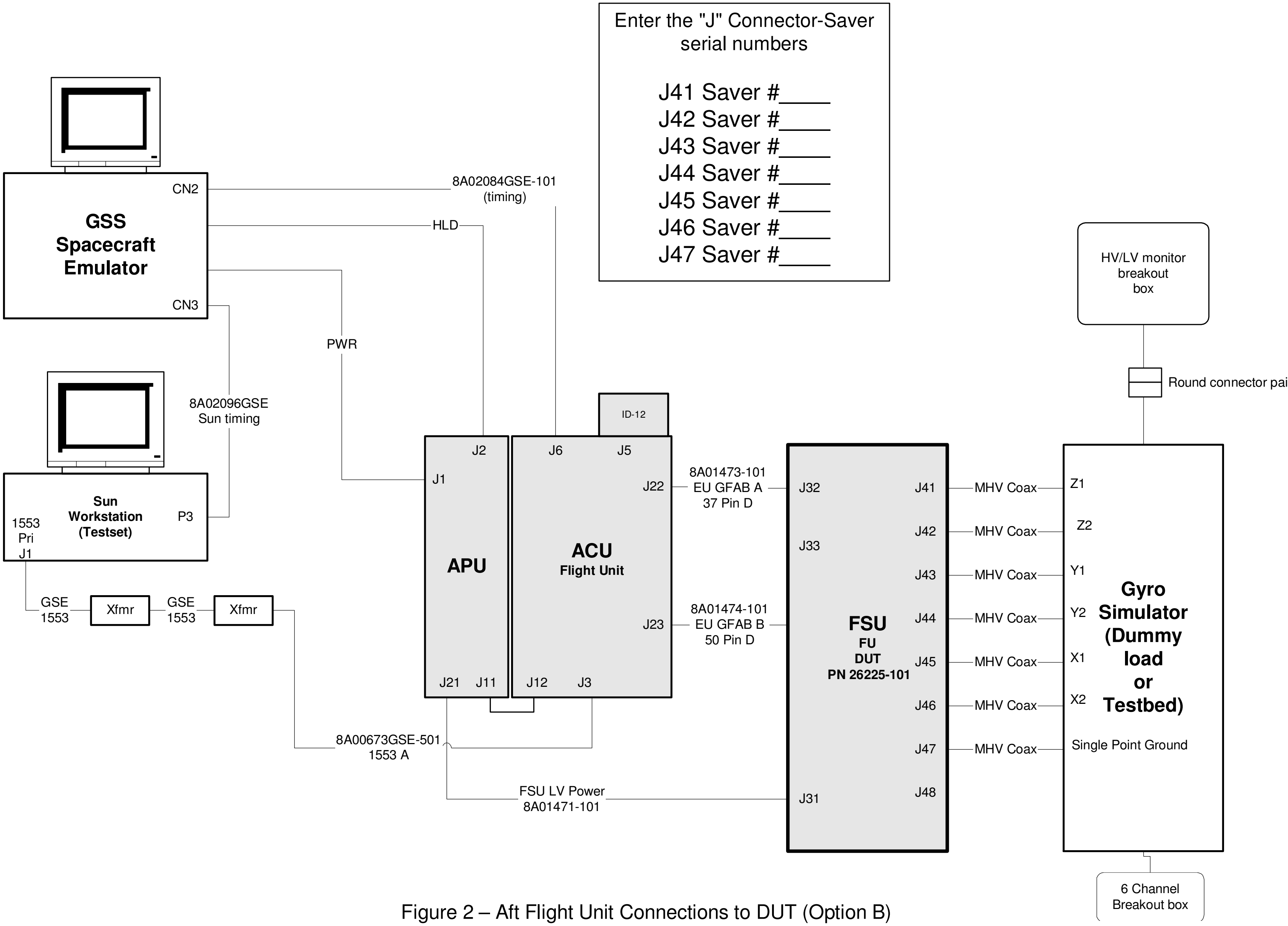

Figure 2 – Aft Flight Unit Connections to DUT (Option B)

15.0 Recording of Full Functional and Extended Functional Test Data:

15.1 Data required for the Full Functional (FF) test suite shall be entered in boxes delineated by a thick border, for example:

Full Functional data boxes:	*FF Data*

15.2 This procedure was written to be used with two power supply configurations (GSE or Aft GSS flight unit). For sections that do not apply to the power supply configuration noted in section **Error! Reference source not found.**, write "N/A" in data boxes and pass/fail boxes in those sections.

16.0 Full Functional

16.1 Initial board level test

16.1.1 Run ***P0702_start.scp***;

Test	P/F
16.1.2 Run ***P0702_FCL.scp***; record pass/fail status of command at right	
16.1.3 Run ***P0702_FMR.scp***; record pass/fail status of command at right	
16.1.4 Run ***P0702_ADDA.scp***; record pass/fail status of command at right	

16.2 Baseline MUX-Monitor Tests

16.2.1 Run ***P0702_MUX5.scp***; record the floating point values FLT: 1 through 6 in the "Timing and state info" PIT window below once the script completes and the display stabilizes:

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	P13V8_VMON	+13.8 ± 0.5 V	V	
2	M13V8_VMON	-13.8 ± 0.5 V	V	
3	P14A_VMON	+13.0 ± 0.5 V	V	
4	M14A_VMON	-13.0 ± 0.5 V	V	
5	P50_VMON	+55.0 ± 8.0 V	V	
6	M50_VMON	-55.0 ± 8.0 V	V	

16.2.2 Run ***P0702_MUX6.scp***; record the floating point values FLT: 1 through 6 in the "Timing and state info" PIT window below once the script completes and the display stabilizes:

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	P12A_VMON	+12.0 ± 0.25 V	V	
2	M12A_VMON	-12.0 ± 0.25 V	V	
3	P5A_VMON	+5.0 ± 0.25 V	V	
4	PHV_VMON	0 ± 10.0 V	V	
5	NHV_VMON	0 ± 10.0 V	V	
6	FRM_TEMP_MON	Ambient ± 5.0 C	V	

16.2.3 Run ***P0702_MUX7.scp***; record the floating point values FLT: 1 through 5 in the "Timing and state info" PIT window below once the script completes and the display stabilizes:

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	SIG AGND	0 ± 0.1 V	V	
2	P5A_REF	+5.0 ± 0.1 V	V	
3	P5D_VMON	+5.0 ± 0.25 V	V	
4	CHRG_ELX_MON	0 ± 0.1 V	V	
5	OSC_VCO_MON	0 V to 10 V	V	

16.2.4 Run ***P0702_MUX8.scp***; record the floating point values FLT: 1 through 5 in the "Timing and state info" PIT window below once the script completes and the display stabilizes.				
	Nominal temperature: Enter nominal ambient temperature of the FSU box (i.e. thermal vacuum chamber temp). If this test is being run in a laboratory environment, use 25.0 C		Ambient Temp	
Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X_TEMP_MON	Ambient ± 5.0 C	C	
2	Y_TEMP_MON	Ambient ± 5.0 C	C	
3	Z_TEMP_MON	Ambient ± 5.0 C	C	
4	FRM_TEMP_MON	Ambient ± 5.0 C	C	
5	MUX_TEMP_MON	Ambient ± 5.0 C	C	

16.3 Basic Arbiter Transition Tests

Description	Notes	P/F
16.3.1 Set the PON reset bit. Power cycle the FSU box (Turn off LV power, wait 10 seconds, turn on LV power		
16.3.2 Clear the Mode Register Word. Verify that this is in fact the result by looking in the "Arbiter 7" PIT window.	GHW command 16 6	
16.3.3 Set the PON reset bit	GHW command 16 13	
16.3.4 Verify from the "Arbiter 7" window that the Mode reads **"00-PWR ON".**	Should read **MODE : "00-PWR ON".**	
16.3.5 Turn on the 220 Hz interrupt	SHG command 1 7	
16.3.6 Turn on the bridge position filters	SCS command 6 11	
16.3.7 Verify that the bridge is showing a centered dummy load. Look in the "Science data" PIT window to see the bridge output voltage	Each axis should be |position|< 0.3 V	
16.3.8 Set the **COMP_OK** bit	GHW command 16 7	
16.3.9 Enable the **HIGH_THRESHOLD_EN** and **LOW_THRESHOLD_EN** bits on the mode register	GHW commands 16 11 & 16 21	
16.3.10 Change the **MODE** to Ground Test. This will bring the arbiter into the PRIME state	GHW command 16 5 3	
16.3.11 Verify that the **HIGH_THRESHOLD** and **LOW_THRESHOLD** are not exceeded. You can see this in either the "Arbiter 7" or "Timing and state info" PITs	Both should read; "***below threshold***"	
16.3.12 Change the **MODE** to science mode. Wait 45 seconds for arbiter timer to time out.	GHW command 16 5 1 Arbiter state should be ***LB1***	
16.3.13 Run script **ARB_8to9.**	Arbiter state should be ***LB2***	
16.3.14 Run script **ARB_9to1**	Arbiter state should be ***PRIME***	
16.3.15 Run script **ARB_1to7.** Wait 45 seconds for the transition from HB1 to HB2.	Arbiter state should be ***HB2***	
16.3.16 Run script **ARB_7to8.HTE**	Arbiter state should be ***LB1***	
16.3.17 Run script **ARB_8to5to6**	Arbiter state should be ***HB1***	
16.3.18 Run script **ARB_6to8_C.LTE**	Arbiter state should be ***LB1***	

Description	Notes	P/F
16.3.19 Run script **ARB_8to5to6**	Arbiter state should be ***HB1***	
16.3.20 Run script **ARB_6to8_NoH.HTE**	Arbiter state should be ***LB1***	
16.3.21 Run script **ARB_8to5to6** (Wait 45 seconds before running the next script or command)	Arbiter state should be ***HB1***	
16.3.22 Run script **ARB_6to8_NoH.LTE**	Arbiter state should be ***LB1***	
16.3.23 Run script **ARB_8to5to6** (Wait 45 seconds before running the next script or command)	Arbiter state should be ***HB1***	
16.3.24 Run script **ARB_6to8_C.HTE**	Arbiter state should be ***LB1***	
16.3.25 Run script **ARB_8to9**	Arbiter state should be ***LB2***	
16.3.26 Run script **ARB_9to7.NTE**. (Wait 45 seconds before running the next script or command)	Arbiter state should be ***HB2***	
16.3.27 Run script **ARB_7to1**	Arbiter state should be ***PRIME***	
16.3.28 Run script **ARB_1to9.LTE**	Arbiter state should be ***LB2***	
16.3.29 Run script **ARB_9to1**	Arbiter state should be ***PRIME***	
16.3.30 Run script **ARB_1to9.HTE**	Arbiter state should be ***LB2***	
16.3.31 Run script **ARB_9to6** (Wait 45 seconds before running the next script or command)	Arbiter state should be ***HB1***	
16.3.32 Run script **ARB_6to7**	Arbiter state should be ***HB2***	
16.3.33 Run script **ARB_7to1**	Arbiter state should be ***PRIME***	
16.3.34 Run script **ARB_1to6** (Wait 45 seconds before running the next script or command)	Arbiter state should be ***HB1***	
16.3.35 Run script **ARB_6to7**	Arbiter state should be ***HB2***	
16.3.36 Run script **ARB_7to1**	Arbiter state should be ***PRIME***	
16.3.37 Change the **MODE** to Spinup. (Wait 45 seconds before running the next script or command)	GHW command 16 5 2	

Description	Notes	P/F
16.3.38 Verify that the arbiter has changed state	Arbiter state should be ***SB1***	
16.3.39 Set the **COMP_OK** bit to 0	GHW command 16 8 Arbiter state should be ***SB2***	
16.3.40 Set the **COMP_OK** bit to 1	GHW command 16 7 Arbiter state should be ***SB1***	
16.3.41 Change the **MODE** to Ground Test	GHW command 16 5 3	
16.3.42 Verify that the arbiter has changed state	Arbiter state should be ***PRIME***	
16.3.43 Change the **MODE** to Science mode	GHW command 16 5 1	
16.3.44 Wait 45 seconds. Verify that the Arbiter has changed state	Arbiter state should be ***HB1***	
16.3.45 Run script **ARB_6to7**	Arbiter state should be ***HB2***	
16.3.46 Run script **ARB_7to1**	Arbiter state should be ***PRIME***	

16.4 Oscillator level tests:

16.4.1 Run ***P0702_OSCHI***; record indicated gyro position as reported in the "Science data" PIT window:			
Each must be |pos| < 0.35 V	Pos X (V)	Pos Y (V)	Pos Z (V)

16.4.2 Run ***P0702_OSCLO***; record indicated gyro position as reported in the "Science data" PIT window:			
Each must be |pos| < 0.35 V	Pos X (V)	Pos Y (V)	Pos Z (V)

16.5 Charge control bias tests

16.5.1 Run ***P0702_CC0***; record the value in FLT:4 in the "Timing and state info" PIT window below once the script completes and the display stabilizes:

Mux Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
4	CHRG_ELX_MON	0.0 ± 0.1 V	V	

16.5.2 Run ***P0702_CCP3***; record the value in FLT:4 in the "Timing and state info" PIT window below once the script completes and the display stabilizes:

Mux Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
4	CHRG_ELX_MON	3.0 ± 0.1 V	V	

16.5.3 Run ***P0702_CCM3***; record the value in FLT:4 in the "Timing and state info" PIT window below once the script completes and the display stabilizes:

Mux Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
4	CHRG_ELX_MON	-3.0 ± 0.1 V	V	

16.6 LVA and HVA outputs after PON reset (PON arbiter state)

16.6.1 Run ***P0702_LV01***; record the values from FLT:1 through 6 in the "Timing and state info" PIT window below once the script completes and the display stabilizes:

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_LV_VMON	0 ± 0.15 V	V	
2	X2_LV_VMON	0 ± 0.15 V	V	
3	Y1_LV_VMON	0 ± 0.15 V	V	
4	Y2_LV_VMON	0 ± 0.15 V	V	
5	Z1_LV_VMON	0 ± 0.15 V	V	
6	Z2_LV_VMON	0 ± 0.15 V	V	

16.6.2 High voltage power on

WARNING: HIGH VOLTAGE PRESENT ON OUTPUTS DURING THIS TEST SECTION
CHOOSE POWER ON METHOD BASED ON TEST CONFIGURATION
GSE (BIG BERTHA) - OR - AFT GSS

16.6.2.1 GSE Power Supply **(Option A)**

16.6.2.1.1 Press 725 V power enable on top of GSE supply	
16.6.2.1.2 Record the +725V current at the right	mA @ +725V
16.6.2.1.3 Record the -725V current at the right	mA @ -725V

16.6.2.2 Aft GSS FU Power Supply **(Option B)**

16.6.2.2.1 Click the "Power Mod 750A" HLD button to "on" on the Spacecraft emulator control panel	
16.6.2.2.2 Record indicated main bus current as indicated on HP power supply front panel.	Current:

16.6.3 Run ***P0702_MUX6.scp***; Record the values from FLT:4 and 5 in the "Timing and state info" PIT once the script completes and the display stabilizes

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
4	PHV_VMON	725 ± 50V	V	
5	NHV_VMON	-725 ± 50V	V	

16.6.4 Run ***P0702_HV01***; Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_HV_VMON	0 ± 10V	V	
2	X2_HV_VMON	0 ± 10V	V	
3	Y1_HV_VMON	0 ± 10V	V	
4	Y2_HV_VMON	0 ± 10V	V	
5	Z1_HV_VMON	0 ± 10V	V	
6	Z2_HV_VMON	0 ± 10V	V	

16.6.5 Turn off the high voltage power supply

16.7 <u>LVA output tests</u>

16.7.1 Run ***P0702_LV02*****;** Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_LV_VMON	0 ± 0.2 V	V	
2	X2_LV_VMON	0 ± 0.2 V	V	
3	Y1_LV_VMON	0 ± 0.2 V	V	
4	Y2_LV_VMON	0 ± 0.2 V	V	
5	Z1_LV_VMON	0 ± 0.2 V	V	
6	Z2_LV_VMON	0 ± 0.2 V	V	

16.7.2 Run ***P0702_LV03*;** Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes				
Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_LV_VMON	25.0 ± 0.75 V	V	
2	X2_LV_VMON	25.0 ± 0.75 V	V	
3	Y1_LV_VMON	25.0 ± 0.75 V	V	
4	Y2_LV_VMON	25.0 ± 0.75 V	V	
5	Z1_LV_VMON	25.0 ± 0.75 V	V	
6	Z2_LV_VMON	25.0 ± 0.75 V	V	

16.7.2.1 Using the output monitor breakout box connected to the dummy load, measure the output of the LVA amplifier (monitors are scaled down by a factor of 100)			
Monitor Signal	Acceptable Range	Measured Value (x.xxx)	P/F
X1 monitor	0.25 ± 0.05	V	
X2 monitor	0.25 ± 0.05	V	
Y1 monitor	0.25 ± 0.05	V	
Y2 monitor	0.25 ± 0.05	V	
Z1 monitor	0.25 ± 0.05	V	
Z2 monitor	0.25 ± 0.05	V	

16.7.3 Run ***P0702_LV04*;** Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes				
Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_LV_VMON	> 44 V	V	
2	X2_LV_VMON	> 44 V	V	
3	Y1_LV_VMON	> 44 V	V	
4	Y2_LV_VMON	> 44 V	V	
5	Z1_LV_VMON	> 44 V	V	
6	Z2_LV_VMON	> 44 V	V	

16.7.4 Run ***P0702_LV05***; Record the values from FLT:1 through 6 in the “Timing and state info” PIT once the script completes and the display stabilizes

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_LV_VMON	$<$ -44 V	V	
2	X2_LV_VMON	$<$ -44 V	V	
3	Y1_LV_VMON	$<$ -44 V	V	
4	Y2_LV_VMON	$<$ -44 V	V	
5	Z1_LV_VMON	$<$ -44 V	V	
6	Z2_LV_VMON	$<$ -44 V	V	

16.7.5 Run ***P0702_LV06***; Record the values from FLT:1 through 6 in the “Timing and state info” PIT once the script completes and the display stabilizes

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_LV_VMON	-25.0 $\pm$ 0.75 V	V	
2	X2_LV_VMON	-25.0 $\pm$ 0.75 V	V	
3	Y1_LV_VMON	-25.0 $\pm$ 0.75 V	V	
4	Y2_LV_VMON	-25.0 $\pm$ 0.75 V	V	
5	Z1_LV_VMON	-25.0 $\pm$ 0.75 V	V	
6	Z2_LV_VMON	-25.0 $\pm$ 0.75 V	V	

16.8 HVA output tests

16.8.1	Run ***P0702_HV02*;** Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes
16.8.2	Turn on ±725 V power to GSS

WARNING: HIGH VOLTAGE PRESENT ON OUTPUTS DURING THIS TEST SECTION

CHOOSE POWER ON METHOD BASED ON TEST CONFIGURATION

GSE (BIG BERTHA) - OR - AFT GSS

16.8.2.1 GSE Power Supply **(Option A)**

16.8.2.1.1	Press 725 V power enable on top of GSE supply	

16.8.2.2 Aft GSS FU Power Supply **(Option B)**

16.8.2.2.1	Click the "Power Mod 750A" HLD button to "on" on the Spacecraft emulator control panel	

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_HV_VMON	0 ± 10.0 V	V	
2	X2_HV_VMON	0 ± 10.0 V	V	
3	Y1_HV_VMON	0 ± 10.0 V	V	
4	Y2_HV_VMON	0 ± 10.0 V	V	
5	Z1_HV_VMON	0 ± 10.0 V	V	
6	Z2_HV_VMON	0 ± 10.0 V	V	

16.8.3 Run ***P0702_HV03*;** Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes (relay switches to HV)

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_HV_VMON	200 ± 10	V	
2	X2_HV_VMON	200 ± 10	V	
3	Y1_HV_VMON	200 ± 10	V	
4	Y2_HV_VMON	200 ± 10	V	
5	Z1_HV_VMON	200 ± 10	V	
6	Z2_HV_VMON	200 ± 10	V	

16.8.3.1 Using the output monitor breakout box connected to the dummy load, measure the output of the HVA amplifier (monitors are scaled down by a factor of 100)			
Monitor Signal	Acceptable Range	Measured Value (x.xxx)	P/F
X1 monitor	2.00 ± 0.50	V	
X2 monitor	2.00 ± 0.50	V	
Y1 monitor	2.00 ± 0.50	V	
Y2 monitor	2.00 ± 0.50	V	
Z1 monitor	2.00 ± 0.50	V	
Z2 monitor	2.00 ± 0.50	V	

16.8.4 Run ***P0702_HV04*;** Record the values from FLT:1 through 6 in the “Timing and state info” PIT once the script completes and the display stabilizes				
Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_HV_VMON	-200 ± 10 V	V	
2	X2_HV_VMON	-200 ± 10 V	V	
3	Y1_HV_VMON	-200 ± 10 V	V	
4	Y2_HV_VMON	-200 ± 10 V	V	
5	Z1_HV_VMON	-200 ± 10 V	V	
6	Z2_HV_VMON	-200 ± 10 V	V	

16.8.5 Run ***P0702_HV05***; Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes				
Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_HV_VMON	700 ± 20 V	V	
2	X2_HV_VMON	700 ± 20 V	V	
3	Y1_HV_VMON	700 ± 20 V	V	
4	Y2_HV_VMON	700 ± 20 V	V	
5	Z1_HV_VMON	700 ± 20 V	V	
6	Z2_HV_VMON	700 ± 20 V	V	

16.8.6 Run ***P0702_HV06***; Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes				
Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_HV_VMON	-700 ± 20 V	V	
2	X2_HV_VMON	-700 ± 20 V	V	
3	Y1_HV_VMON	-700 ± 20 V	V	
4	Y2_HV_VMON	-700 ± 20 V	V	
5	Z1_HV_VMON	-700 ± 20 V	V	
6	Z2_HV_VMON	-700 ± 20 V	V	

16.8.7 Turn off the HV power supply

16.9 ABU static output tests

16.9.1 Attach centered dummy load to GSS. Record dummy load SN at right	SN

16.9.2 High Backup static test. Run ***P0702_HBU1*;** Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes

Channel	Monitor Signal	Acceptable Mux Range	MUX Value (xx.xx)	P/F
1	X1_BU	2.1 ± 0.30	V	
2	X2_BU	2.1 ± 0.30	V	
3	Y1_BU	2.1 ± 0.30	V	
4	Y2_BU	2.1 ± 0.30	V	
5	Z1_BU	-4.15 ± 0.30	V	
6	Z2_BU	-4.15 ± 0.30	V	

16.9.3 Spin-up backup static test, gyro centered. Run ***P0702_SBU1*;** Record the values from FLT:1 through 6 in the "Timing and state info" PIT once the script completes and the display stabilizes

Channel	Monitor Signal	Acceptable Range	MUX Value (xx.xx)	P/F
1	X1_BU	0.36 ± 0.50	V	
2	X2_BU	0.36 ± 0.50	V	
3	Y1_BU	0.36 ± 0.50	V	
4	Y2_BU	0.36 ± 0.50	V	
5	Z1_BU	-0.81 ± 0.30	V	
6	Z2_BU	-0.81 ± 0.30	V	

16.10 Survival heater resistance measurement.

Choose measurement based on the power supply configuration of this test.

16.10.1 Big Bertha power configuration **(Option A)**

16.10.1.1 For Big Bertha power configuration - Connect a multimeter to the banana inputs labeled "Heater Power" on the front of the APU simulator power supply and measure the resistance.

Acceptable Resistance	Measured Resistance	P/F
9.5 ± 1.5 Ohms		

(Skip to section 17.0)

16.10.2 Aft GSS FU power configuration **(Option B)**

(Heater is powered directly from GSS aft power supply)

16.10.2.1	Click "on" the heater power port on the GSS spacecraft emulator		
16.10.2.2	Record indicated main bus current as indicated on HP power supply front panel.	Current:	
16.10.2.3	Click "off" the heater power port on the GSS spacecraft emulator		
16.10.2.4	Record indicated main bus current as indicated on HP power supply front panel.	Current:	
16.10.2.5	Compute the change in current between step and step. Record result at right.	| Delta |	
16.10.2.6	Acceptable Range for delta current: 1.2 ± 0.4 A		P/F

17.0 Completion of procedure:

	P/F	Notes
17.1 Remove power to both the forward and aft boxes if the DUT will be returned to storage following the test. For burn in or extended testing, keep power on.		
17.2 Return DUT to storage container if applicable.		

18.0 Certification:

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.

GSS Representative		Date	
Quality Assurance		Date	

Extension Sheet

PN 26225-101 SN:__________, Date:_____________Test Director:_____________________

Sheet ________of___________

Step	Operation	GSW Command	P/F	Notes