

**LASER INTERFEROMETER GRAVITATIONAL WAVE
OBSERVATORY**

-LIGO-

**CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY**

Document Type	DCC Number	Date
Test Procedure and Results	LIGO-T040109-B-C	20 April, 2006
STS-2 Seismometer Chassis Test Procedure		
Richard S. Abbott		

Distribution of this draft: NSF reviewers, LIGO scientists
This is an internal working note of the LIGO Laboratory

California Institute of Technology
LIGO Project – MS 18-33
Pasadena, CA 91125
Phone (626) 395-2129
Fax (626) 304-9834
E-mail: info@ligo.caltech.edu

Massachusetts Institute of Technology
LIGO Project – MS 20B-145
Cambridge, MA 01239
Phone (617) 253-4824
Fax (617) 253-7014
E-mail: info@ligo.mit.edu

www: <http://www.ligo.caltech.edu/>

Performed by: _____
 Date: _____
 Board Serial Number: _____

3. Overview

The HEPI STS-2 Seismometer Interface Chassis provides power and control channels for a single STS-2 seismometer. The chassis receives 6 differential signals from the seismometer that are sent as outputs to the Seismic Interface Chassis for ultimate transmission to the ADCs. A summary of functions for the STS-2 Seismometer Interface are:

- 3.1 DC power to the remotely located STS-2 seismometer
- 3.2 Receives 6 channels of differential signals from the STS-2 seismometer
- 3.3 Interfaces analog signals to the Seismic Interface Chassis by differential interface
- 3.4 Provides local front panel switches and remote VME based control of STS-2 functions

The function of this procedure is to check each channel from its input to the respective output, test binary controls and to verify proper DC power consumption.

4. Test Equipment

- 4.1 Power Supply capable of +/- 15 volts and +24 volts
- 4.2 Function generator (Stanford Research DS360 or the like)
- 4.3 Oscilloscope

5. Preliminaries

- 5.1 Perform visual inspection on board to check for missing components or solder deficiencies
- 5.2 Set power supplies to +/- 15 and +24 volts, and then turn them off. Connect the power supplies to the chassis under test at the **Power Distribution Board** at the test points labeled +15, -15, +24 and GND according to the silkscreen. Note the minus 24 volt input is unused on this system.

6. DC Tests

- 6.1 Turn on the power supplies to the system under test and record the total current. The specification assumes all inputs are not driven and the front panel switches are clicked down.

Total Current	Specification	Observation
+15V Supply	Less than or equal to 100mA	
-15V Supply	Less than or equal to 100mA	
+24V Supply	Less than or equal to 20mA	
Power LEDs	Lit with equal brightness	

7. Dynamic Tests

7.1 The following tests verify the proper gain, for each signal channel. The test consists of applying a 100 Hz signal to test the channel gain

7.2 Using a function generator and an oscilloscope, enter **0.1V** p-p (**HI-Z**) sine wave on the function generator and apply to the prescribed input and observe the amplitude at the designated output. For differential outputs, use two scope probes in “differential mode” that is probe 1 minus probe 2

STS-2 Response Data

INPUT (+, -)	OUTPUT POINTS	NOMINAL MAG (100HZ)	MEAS. MAG. (100HZ)
50 pin D-sub pin 3/36	STS2-X, TP2&TP3 & X-MON BNC	TP2-TP3: 20v p-p +/- 2v BNC: 10v p-p +/-1v	TP2-TP3: BNC:
50 pin D-sub pin 20/4	STS2-Y, TP2&TP3 & Y-MON BNC	TP2-TP3: 20v p-p +/- 2v BNC: 10v p-p +/-1v	TP2-TP3: BNC:
50 pin D-sub pin 37/21	STS2-Z, TP2&TP3 & Z-MON BNC	TP2-TP3: 20v p-p +/- 2v BNC: 10v p-p +/-1v	TP2-TP3: BNC:

7.3 Enter **10V** p-p (**HI-Z**) on the function generator and use only the positive output relative to GND. This requires referencing the common of the function generator to STS-2 GND.

INPUT (+, -)	OUTPUT POINTS	NOMINAL MAG (100HZ)	MEAS. MAG. (100HZ)
50 pin D-sub pin 41/GND	MASSPOS-U TP2&TP3	TP2-TP3: 20v p-p +/- 2v	TP2-TP3:
50 pin D-sub pin 8/GND	MASSPOS-V TP2&TP3	TP2-TP3: 20v p-p +/- 2v	TP2-TP3:
50 pin D-sub pin 24/GND	MASSPOS-W TP2&TP3	TP2-TP3: 20v p-p +/- 2v	TP2-TP3:

7.4 Using a piece of cable to short the indicated point to ground, or by actuating the front panel switches, verify the operation of the following binary functions (**FP** indicates Front Panel, **RP** indicates Rear Panel). **For the rear panel (XY-220) functions to operate normally, it is necessary to have all the front panel toggle switches toggled down:**

INPUT	OUTPUT	EXPECTED RESPONSE	ACTUAL RESPONSE
Push AZ button FP	AZ LED	LED is lit	
CAL switch from NORM to CAL FP	CAL LED	LED is lit	
Period switch from 120SEC to 1SEC FP	D50 pin 6	Transition from 0 to 15V	
Basis switch from XYZ to UVW FP	D50 pin 22	Transition from 0 to 15V	
XY-220 Interface pin 6/GND RP	AZ LED	LED is lit	
XY-220 Interface pin 7/GND RP	D50 pin 6	Transition from 0 to 15V	
XY-220 Interface pin 8/GND RP	D50 pin 22	Transition from 0 to 15V	
XY-220 Interface pin 9/GND RP	CAL LED	LED is lit	