

LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

-LIGO-

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aLIGO HAM ISI Test Stand test Plan For LHO Installation		
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1 Introduction

The tests described below are required to verify the correct installation and operation of the control and monitoring electronics for an aLIGO Single-stage Internal Seismic Isolation (ISI) electronics Test Stand system. The tests are designed to test the electronics needed to control and monitor a single Horizontal Access Module (HAM) ISI Test Stand. This system should consist of :

- 2) aLIGO HAM ISI Anti-Alias Chassis
- 1) AdL Anti-Image Chassis
- 2) ISI Coil Driver Chassis
- 3) aLIGO HAM ISI Interface Chassis

2 Test Equipment

Function Generator

Digital Multimeter (DMM)

STS-2/LAC/GS-13 Seismometer Emulator Box

25-pinD to two 9-pinD vacuum cable, or in-air cable with the same pinout.

25-pin DSub breakout boards

Voltage Calibrator

3 Tests

3.1 Input Power

Turn on the power switches on the rear panel of the Anti-Alias Chassis, Anti-Image Chassis, ISI Coil Driver Chassis, ISI Interface Chassis, and the STS-2 Interface Chassis. Record the current being drawn by the system. Nominal is 330 mA (+18), 310mA (-18), 2.3A (+24), 1.6A (-24).

+18V 3.3 A -18V 3.1 A

+24V 2.3 A -24V 1.6 A

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3.2 Geophone channel Tests

3.2.1 GS-13s

Turn the Seismometer selector knob on the L4C/GS-13 Emulator box to the L4C setting. Plug in the appropriate connector of the two D9 connectors on the in-vac wiring cable. Check to see that the front panel power lights are green. If either is unlit, or red, disconnect the cable, and troubleshoot the power problem. Once the lights are both green, turn the front panel switch to “ON”. Turn the front panel oscillator switch to “INT”. Look at the appropriate channel with dataviewer, and verify that there is a signal. Using a voltage calibrator, or equivalent, put a 3.6VDC “L4C Test Monitor” BNC. Record the readback in counts in the table below.

GS-13 Channel	Amplitude (counts) Nominal is 700 (~350 to -350)	Pressure readback Nominal is -23520 for vertical and +21780 for horizontal
H1	700	21777
V1	700	-23529
H2	700	21780
V2	700	-23510
H3	700	21742
V3	700	-23517

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3.2.2 L4Cs

Keep the Seismometer selector knob on the L4C/GS-13 Emulator box to the L4C setting. Plug in the appropriate connector of the two D9 connectors on the in-vac wiring cable. Check to see that the front panel power lights are green. If either is unlit, or red, disconnect the cable, and troubleshoot the power problem. Once the lights are both green, turn the front panel switch to “ON”. Keep the front panel oscillator switch to “INT”. Look at the appropriate channel with dataviewer, and verify that there is a signal. Record its value in the table below. Using a voltage calibrator, or equivalent, put a 3.6VDC “L4C Test Monitor” BNC. Record the readback in counts in the table below.

L4C Channel	Amplitude (counts) Nominal is 700 (~350 to -350)	Pressure readback Nominal is -23520 for vertical and +21780 for horizontal
H1	700	21789
V1	700	-23520
H2	700	21765
V2	700	-23510
H3	700	21784
V3	700	-23517

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3.3 Coil Driver Tests

For each channel, put a 5Ω power resistor into the appropriate output. Put a minus (-)10,000 count DC level (which should correspond to 3.0VDC across the resistor) into the Coil Driver input, and read back the Vmon and Imon signals. Move the resistor to each channel under test, and record the results in the table below.

POD/Channel	Volts across resistor (3.0V Nom.)	Vmon (counts) (3438 Nom.)	Imon (counts) (590 Nom.)	Conversion of counts to Amps (970 Nom)
H1	3.0 V	3436	586	957.5 cts/A
V1	3.0 V	3435	589	981.6 cts/A
H2	3.0 V	3429	588	960.8 cts/A
V2	3.0 V	3438	589	981.7 cts/A
H3	3.0 V	3437	592	967.3 cts/A
V3	3.0 V	3437	580	966.7 cts/A

3.4 Capacitive Position Sensor Tests

Put in a 1Vp-p 10 Hz sine wave in on the appropriate pins below. Check the output of the capacitive position sensor in Data viewer. Make sure that the power out on the connector labeled Power Out is +18 at pin 1 and -18 at pin 3 with respect to the middle pin (GND).

Channel	Pins	Output Nom. 3,000 cts. p-p	Voltage at Power Out good?	Pass/Fail
V1	1(+) 14(-)	3,000	Yes	Pass
H1	2(+) 15(-)	3,000		Pass
V2	3(+) 16(-)	3,000		Pass
H2	4(+) 17(-)	3,000	Yes	Pass
V3	5(+) 18(-)	3,000		Pass
H3	6(+) 19(-)	3,000		Pass