LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

-LIGO-

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AdLIGO GS-13 Pre-Amp Test Procedure		
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Performed by: ______________
Date: ______________
Board Serial Number: ______________________

1. Overview

The AdLIGO GS-13 Pre-Amp board is a replacement for the preamp that comes with the GS-13 Seismometers. Its job is to take in the signal from the Seismometer, and send it out as an amplified, differential signal.

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

2. Test Equipment

2.1 Power Supply capable of +/- 15 volts
2.2 Function generator (Stanford Research DS360 or the like)
2.3 Oscilloscope
2.4 Stanford Research SR785 Network Analyzer, or the like

3. Preliminaries

3.1 Perform visual inspection on board to check for missing components or solder deficiencies
3.2 Before connecting the power to the board, set power supplies to +/- 15 Volts, and then turn them off. Connect the power supply Positive lead to J1 Pin2, GND to J1 Pin13, and Negative to J1 Pin15.

4. DC Tests

4.1 Turn on the power supplies to the system under test and record the total current.

Measure	Voltage read	Current
+15V Supply	(+15V +/- 0.5) V	???mA +/- 10mA
-15V Supply	(-15V +/- 0.5) V	???mA +/- 10mA

5. **Dynamic Tests**

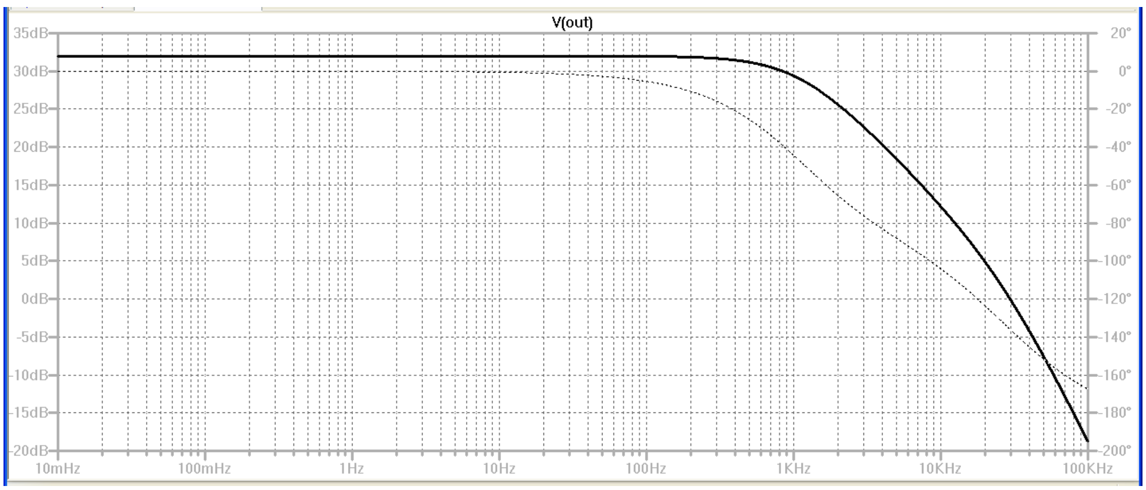
5.1 **Bypass throughput check:** Place a jumper onto the four 3-pin headers on the board. Each should be in the "Bypassed" position (between pins 2 and 3). Set a function generator to a **5V** p-p sine wave. Split this signal with a BNC Tee, with one signal going to the designated pins below, and the other going to channel 2 of an oscilloscope. Observe the amplitude at the designated output pins. All of the outputs should be the same amplitude as the input, with no observable phase delay or high-frequency noise. Place a check in the correct cell if the signal looks correct.

Input	**Output**
J1-3 (+) / J1-5 (-)	J1-9 (+) / J1-11 (-)

5.2 **Gain/Filter Check:** Set a function generator to a **0.1V** p-p sine wave. Move the jumpers to the "Filtered" position (pins 1-2), apply the signal on the correct pins below, and observe the amplitude at the designated output pins differentially (A-B) relative to ground. The outputs should have a DC gain of 40 V/V (32dB).

Input	**Output**
J1-3 (+) / J1-5 (-)	J1-9 (+) / J1-11 (-)

5.3 Frequency Response: Set the SR785 for a 100mV source, put a 9.03KΩ resistor inline with the Analyzer output, and do a sweep from 10Hz to 100KHz on the same pins as above. Observe the amplitude at the designated output pins differentially (A-B) relative to ground. The outputs should have a DC gain of 40 V/V (32dB) and should have a pole at 2.2 KHz. do a Swept Sine measurement from 10Hz to 100KHz on each channel. The nominal response is a pole at 1.2KHz. The plot should look similar to the graph below.



Input	Output Look Like Graph?
J1-3 (+) / J1-5 (-)	J1-9 (+) / J1-11 (-)

Noise Measurement: Short the input pins together, and check the output noise of the circuit between 1Hz and 1KHz. It should not be higher than 0.6 µV/ √Hz (-124 dB).

Input	Noise below 0.6 µV/ √Hz?
J1-3 (+) / J1-5 (-) Grounded together.	J1-9 (+) / J1-11 (-)