

**LASER INTERFEROMETER GRAVITATIONAL WAVE
OBSERVATORY**

-LIGO-

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Test Procedure and Results	LIGO-T020101-00-C	July 30, 2001
+/- 10 Amp Driver Module/Chassis Test Procedure		
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1. Overview

The +/- 10 amp driver chassis consists of 6 driver modules, each capable of supplying +/- 10 amps DC into 3 ohms maximum when powered from the maximum allowed power supply of +/- 30 VDC. The amplifier has a nominal voltage gain of 3, a pole at 530 Hz, and a zero at 3.2 kHz.

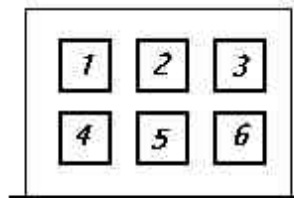
This procedure covers the test of the chassis as a whole and each of the six driver modules contained within the chassis.

2. Test Equipment

- Power Supply capable of at least +/- 10 amps
- Dynamic Signal Analyzer
- Multimeter
- Oscilloscope
- Audio Function Generator
- 2 ohm, 300 watt resistor

3. Preliminaries

- Set power supplies to +/- 28 volts, turn them off then connect to chassis under test
- Connect test input board (D020392) to the 37 pin input connector using a ribbon cable.
- Record the serial number of each module according to the following diagram



Front

Chassis Serial Number _____

Module	1	2	3	4	5	6
Serial Number						

4. DC Tests

- Turn on the power supplies to the chassis under test and record the total current. The specification assumes all 6 modules are installed, otherwise note the configuration in the chart

Total Current	Specification	Measured Current
Positive Supply	Less than or equal to 1 amp	
Negative Supply	Less than or equal to 1 amp	

- Record the output offset voltage of each driver module in the chassis as measured at TP1

Module	1	2	3	4	5	6
Offset Voltage (0 +/- 10 mV)						

- Verify airflow direction (front panel inlet, rear panel outlet) for each of the 3 cooling fans, and that each fan is running at approximately the same speed.

Airflow checked	
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5. Current Limit Tests – The following tests are sequentially performed to each of the 6 individual modules. Each module is fuse protected at 15 amps of output current.

- Connect the 2 ohm power resistor to output under test
- Apply a DC input (approximately 0 to 12 volts) to the BNC input on the test board (D020392) and slowly increase the input voltage while monitoring the power supply current for evidence of current limiting (increasing input voltage with no increase in power supply current)
- Repeat for the other polarity of input voltage and record all data in table below

Module	1	2	3	4	5	6
Positive Current Limit (10 +/-1 amps)						
Negative Current Limit (-10 +/-1 amps)						

6. Frequency Response Tests

- Set the dynamic signal analyzer for a 10 Hz to 20 kHz swept sine measurement with an input drive level of 1 volt p-p
- Sequentially measure the frequency response of each module according to the data table below

Module	1	2	3	4	5	6
10 Hz Gain (9.5 dB +/- 0.5 dB)						
Pole location (530 +/-50 Hz)						
Zero Location (3.2 kHz +/- 200 Hz)						

7. External Shutdown Input Test

- With 2 ohm power resistor connected to output under test, drive the respective input with a dc level sufficient to draw 2 amps into the load
- Sequentially short the “Sleep” pin of each channel under test to ground using the test board (D020392) at the pins provided, and check that the channel under test shuts down and recovers upon removal of the short. Verify this for each channel by checking the appropriate box in the table below

Module	1	2	3	4	5	6
Functional Check						

8. Temperature Sensor Checks – Each module has an ambient and heat sink temperature sensor. The sensors are calibrated for 10 mV per degree Celsius.

- Measure the output of each ambient temperature sensor and record in the table checking that it makes sense compared to the ambient temperature (i.e. 21 deg. C should give 210 mV, +/- 25 mV)

Module	1	2	3	4	5	6
Temperature						

- With no input to the channel under test, record the heat sink temperature then raise the dc drive to establish 5 amps of output current. After 2 minutes, record the heat sink temperature as measured on the test board (D020392) and repeat the whole process sequentially for each channel. Record results in the data table below.

Module	1	2	3	4	5	6
Initial Temp						
Temp at 2 Minutes						

9. Current Sensor Check

- For each channel under test, verify the correct current sensor output slope of 47.2 mV per amp by taking data at 0 amps and full scale (~10 amps) output current. Record data in the chart below.

Module	1	2	3	4	5	6
Slope (47.2 +/- 8mV mV/Amp)						