LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

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Test Procedure for Slow Controls Concentrator Auxiliary 3

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1 Overview

The slow controls concentrator auxiliary 3 supports 6 DC photodiode amplifiers, 4 photodiodes interfaces, and 2 extra readbacks.

2 Test Equipment

- Multimeter, scope and signal generator.
- Second slow controls concentrator auxiliary 3 (D1201345 -v1).
  Replace the 4 front-panel breakout boards with quad TNC breakouts.
- 2 test cables DB9 to 4xBNC (D1102414-v1).
- DC power supplies.

3 Documentation

- Schematics—D1201345 -v1

4 Tests

Power up the measurement equipment and open the lid of the DUT. Connect a DB37 cable (male-male) between the DUT and the second slow controls concentrator. Connect the test cables to “Photodiode DC 1-4 IN” and “Photodiode DC 1-4 OUT”.

4.1 Power

Check the voltages on the concentrator power board. The voltage should be within 5% of nominal. Test that the OK signal is a TTL low (<0.8V).

TP6 (+5V)_____

TP8 (+15V)_____

TP3 (−15V)_____

TP9 (OK) _____

4.2 LED

Check that the LED on the front panel and the 3 LEDs on the rear panel are lit.

Front panel LED_____ Rear panel LEDs_____

4.3 Testing

Use an Ohmmeter and check the continuity of the signal lines between the two slow controls concentrators. Each tested signal should read 50Ω.

Concentrator	**Signal**	**Pass/Fail**
Extra 1	Extra signal	
Extra 2	Extra signal	

Apply a 1kHz sine wave to each the BNCs of the first test cable while measuring the response with a scope on the second test cable, at the front panel BNCs of the DUT (Photodiode Monitors) and at the front panel BNCs of the second concentrator (Photodiode Monitors).

Cable 1	**Pass/Fail**				
	Cable 2	**DUT**		**2nd concentrator**	
		PDMon	**PDMon+4**	**PDMon**	**PDMon+4**
BNC 1					
BNC 2					
BNC 3					
BNC 4					

Move the 2 test cables to the PD Amp DC 1-4 and PD Amp DC 5-6 connectors, respectively. Measure the voltage of the photodiode amplifier monitors at the DUT at the second chassis and at the rear cable (should be close to zero). The quad TNC breakouts of the second chassis have the connectors assigned as Gain 1 input, Gain 2 input, Monitor 1, Monitor 2, respectively.

Signal	**Voltage at DUT**	**Voltage at 2nd unit**	**Cable**
Photodiode amplifier monitor 1			
Photodiode amplifier monitor 2			
Photodiode amplifier monitor 3			
Photodiode amplifier monitor 4			
Photodiode amplifier monitor 5			
Photodiode amplifier monitor 6			

Clip a 100 kΩ resistor to the TNC PD input of each DC photodiode amplifier channel in turn. Measure the voltage of the photodiode amplifier monitors at the DUT at the second chassis and at the rear cable. Make one measurement at this gain (voltage should be 100mV).

Signal	**Voltage at DUT**	**Voltage at 2nd unit**	**Cable**
Photodiode amplifier monitor 1			
Photodiode amplifier monitor 2			
Photodiode amplifier monitor 3			
Photodiode amplifier monitor 4			
Photodiode amplifier monitor 5			
Photodiode amplifier monitor 6			

Now ground the center pin of the corresponding gain input and measure again (should be 315mV).

Signal	**Voltage at DUT**	**Voltage at 2nd unit**	**Cable**
Photodiode amplifier monitor 1			
Photodiode amplifier monitor 2			
Photodiode amplifier monitor 3			
Photodiode amplifier monitor 4			
Photodiode amplifier monitor 5			
Photodiode amplifier monitor 6			

Ground both the center pin and the outer shell to ground, measure again (should be 1.00V).

Signal	**Voltage at DUT**	**Voltage at 2nd unit**	**Cable**
Photodiode amplifier monitor 1			
Photodiode amplifier monitor 2			
Photodiode amplifier monitor 3			
Photodiode amplifier monitor 4			
Photodiode amplifier monitor 5			
Photodiode amplifier monitor 6			

Ground the outer shell to ground, measure again (should be 3.15V).

Signal	**Voltage at DUT**	**Voltage at 2nd unit**	**Cable**
Photodiode amplifier monitor 1			
Photodiode amplifier monitor 2			
Photodiode amplifier monitor 3			
Photodiode amplifier monitor 4			
Photodiode amplifier monitor 5			
Photodiode amplifier monitor 6			