

LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

-LIGO-

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BNC to DB9 Signal Chassis Test Procedure		
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Performed by: _____

Date: _____

Board Serial Number: _____

1. Overview

The BNC to DB9 Signal Chassis (D1400423) takes in signals on BNC connectors, and puts out differential signals on 9-pin DSub connectors. On a chassis with four inputs, the gain is unity, but on chassis with 16 inputs, the gain is a flat x10 V/V. To make this procedure most useful, it will be set up to test either chassis. In cases where the test result is different for each kind of chassis, the expected for the 4-channel chassis will be **bold**, and the 16-channel chassis will be in (parentheses).

2. Test Equipment

- 2.1 Power Supply capable of +/- 18V
- 2.2 SR785 Network Analyzer, or equivalent
- 2.3 Dsub Breakout board (9-pin)
- 2.4 Oscilloscope
- 2.5 Digital Multimeter

3. Preliminaries

- 3.1 Perform visual inspection of the Chassis to make sure nothing looks overtly broken.
- 3.2 Before connecting the power to the box, set a power supply to +/- 18 Volts and then turn it off. Connect the power supply to the chassis under test at the connector labeled "Power".

4. Electrical Tests

- 4.1 Turn on the power supplies, and record the current in the table below.

Voltage	Current 4 Inputs (16 Inputs)	Observed Current	Front and Back panel +/-15V LEDs On?
+18V	70mA +/- 15mA (200mA +/- 20mA)		
-18V	60mA +/- 15mA (180mA +/- 20mA)		

4.2 Transfer Functions

Set up the SR785 to perform a swept sine frequency response from 10Hz to 100KHz. Input a 1000mV p-p signal into the appropriate BNC on the front panel, and attach a 9-pin Dsub Breakout to the connector labeled "Out 1-4" and check the signal paths on the appropriate pins, per the table below. The transfer function should look relatively flat, with a slight <1dB fall at 100KHz.

Input/Output	Expected Output @ 20Hz 4Ch: 0dB +/-10m dB 16Ch: (+20dB +/-1dB)	Expected Output @ 100KHz 4Ch: -80m dB +/-15m dB 16Ch: (+19dB +/-1dB)
In1 / Out1-4 Pins 1(+)&6(-)		
In2 / Out1-4 Pins 2(+)&7(-)		
In3 / Out1-4 Pins 3(+)&8(-)		
In4 / Out1-4 Pins 4(+)&9(-)		

Input/Output	Expected Output @ 20Hz 4Ch: 0dB +/-10m dB 16Ch: (+20dB +/-1dB)	Expected Output @ 100KHz 4Ch: -80m dB +/-15m dB 16Ch: (+19dB +/-1dB)
In5 / Out5-8 Pins 1(+)&6(-)		
In6 / Out5-8 Pins 2(+)&7(-)		
In7 / Out5-8 Pins 3(+)&8(-)		
In8 / Out5-8 Pins 4(+)&9(-)		

Input/Output	Expected Output @ 20Hz 4Ch: 0dB +/-10m dB 16Ch: (+20dB +/-1dB)	Expected Output @ 100KHz 4Ch: -80m dB +/-15m dB 16Ch: (+19dB +/-1dB)
In9 / Out9-12 Pins 1(+)&6(-)		
In10 / Out9-12 Pins 2(+)&7(-)		
In11 / Out9-12 Pins 3(+)&8(-)		
In12 / Out9-12 Pins 4(+)&9(-)		

Input/Output	Expected Output @ 20Hz 4Ch: 0dB +/-10mdB 16Ch: (+20dB +/-1dB)	Expected Output @ 100KHz 4Ch: -80mdB +/-15mdB 16Ch: (+19dB +/-1dB)
In13 / Out13-16 Pins 1(+)&6(-)		
In14 / Out13-16 Pins 2(+)&7(-)		
In15 / Out13-16 Pins 3(+)&8(-)		
In16 / Out13-16 Pins 4(+)&9(-)		

4.3 Waveform Check: Set a signal generator to a 100 KHz, 1Vp-p signal, and read the amplitude on a scope:

Amplitude: _____ Vp-p

Now input that signal into the front panel BNCs (In+). Observe the output waveform on both output pins. Using clip leads, swap the polarity of the signal generator so that the signal is now going to the shield, instead of the center conductor. Record whether the output is the **same as** (or 10x) the input, with no High Frequency oscillations, in the table below:

Input	Signal Expected on:	Signal correct?
In1+	Out1-4 Pin 1(+)	
In1-	Out1-4 Pin 6(+)	
In2+	Out1-4 Pin 2(+)	
In2-	Out1-4 Pin 7(+)	
In3+	Out1-4 Pin 3(+)	
In3-	Out1-4 Pin 8(+)	
In4+	Out1-4 Pin 4(+)	
In4-	Out1-4 Pin 9(+)	
In5+	Out5-8 Pin 1(+)	
In5-	Out5-8 Pin 6(+)	

In6+	Out5-8 Pin 2(+)	
In6-	Out5-8 Pin 7(+)	
In7+	Out5-8 Pin 3(+)	
In7-	Out5-8 Pin 8(+)	
In8+	Out5-8 Pin 4(+)	
In8-	Out5-8 Pin 9(+)	
In9+	Out9-12 Pin 1(+)	
In9-	Out9-12 Pin 6(+)	
In10+	Out9-12 Pin 2(+)	
In10-	Out9-12 Pin 7(+)	
In11+	Out9-12 Pin 3(+)	
In11-	Out9-12 Pin 8(+)	
In12+	Out9-12 Pin 4(+)	
In12-	Out9-12 Pin 9(+)	
In13+	Out13-16 Pin 1(+)	
In13-	Out13-16 Pin 6(+)	
In14+	Out13-16 Pin 2(+)	
In14-	Out13-16 Pin 7(+)	
In15+	Out13-16 Pin 3(+)	
In15-	Out13-16 Pin 8(+)	
In16+	Out13-16 Pin 4(+)	
In16-	Out13-16 Pin 9(+)	