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# LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

**-LIGO-**

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<b>Optical Lever PD Interface Board (Rev B) Test Plan</b>		
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## 1 Introduction

The tests described below are required to verify the correct operation of the Optical Lever PD Interface Board (D010033, Rev B). It is important to note that all board outputs and monitors on the P1 are differential and must be measured differentially.

## 2 Test Equipment

Dynamic Signal Analyzer  
Oscilloscope  
Power supplies

## 3 Tests

### 3.1 Input Power

Record the input voltage and current in the table below. Values should be +/-20mA of the nominal values.

Supply	Nominal Current	Actual	Pass/Fail
+15 V	0.25 A		
-15 V	0.25 A		

### 3.2 Filter Response

The nominal response of each channel is a 4<sup>th</sup> order 800Hz low pass filter. In addition to this filter, there are also whitening filters that can be selected. Each whitening section has zeros at 2Hz and 9.5KHz and poles at 40Hz and 500Hz. Each section will be tested separately by grounding the pin listed in the Filter Section/Enable column of the table. Using the dynamic signal analyzer, verify and record the response of each channel in the table below. Channels are considered to be responding correctly if the magnitude and phase are within 2dB and 5 degrees, respectively of the nominal values. A plot of the nominal response is shown on the last page of this document.

Channel/ Input	Output	Filter Section/ Enable	Gain/Phase at 2Hz Nom 3dB/ 41deg	Gain/Phase at 40Hz Nom 23dB/ 30deg	Gain/Phase at 1KHz Nom 8.7dB/ -277deg
QPD1-1/ J7-1, J7-2	J4-1, J4-2	1/ P1-17A			
QPD1-1/ J7-1, J7-2	J4-1, J4-2	2/ P1-18A			
QPD1-2/ J7-3, J7-4	J4-5, J4-6	1/ P1-19A			
QPD1-2/ J7-3, J7-4	J4-5, J4-6	2/ P1-20A			
QPD1-3/ J7-5, J7-6	J4-9, J4-10	1/ P1-21A			
QPD1-3/ J7-5, J7-6	J4-9, J4-10	2/ P1-22A			
QPD1-4/ J7-7, J7-8	J4-13, J4-14	1/ P1-23A			
QPD1-4/ J7-7, J7-8	J4-13, J4-14	2/ P1-24A			
QPD2-1/ J3-1, J3-2	J4-17, J4-18	1/ P1-25A			

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Q PD2-1/ J3-1, J3-2	J4-17, J4-18	2/ P1-26A			
QPD2-2/ J3-3, J3-4	J4-21, J4-22	1/ P1-27A			
QPD2-2/ J3-3, J3-4	J4-21, J4-22	2/ P1-28A			
QPD2-3/ J3-5, J3-6	J4-25, J4-26	1/ P1-29A			
QPD2-3/ J3-5, J3-6	J4-25, J4-26	2/ P1-30A			
QPD2-4/ J3-7, J3-8	J4-29, J4-30	1/ P1-31A			
QPD2-4/ J3-7, J3-8	J4-29, J4-30	2/ P1-32A			

### 3.3 Input to Output Connections

This test will confirm the connection from the inputs to the various board outputs. For this test a 100Hz, 1Vp-p sine wave is used. A channel is considered acceptable if the measured output sine wave has a 1Vp-p amplitude (+/-50mV) and the phase shown in the table below. All unused inputs should be grounded during this test.

Channel/ Input	EPICS Monitor P1-1A,C Volts 0deg?	QPD X EPICS P1-5A,C Volts 0deg?	QPD Y EPICS P1-6A,C Volts 0deg?	QPD Sum EPICS P1-7A,C Volts 180deg?
QPD1-1/ J7-1,2				
Channel/ Input	EPICS Monitor P1-2A,C Volts 0deg?	QPD X EPICS P1-5A,C Volts 0deg?	QPD Y EPICS P1-6A,C Volts 180deg?	QPD Sum EPICS P1-7A,C Volts 180deg?
QPD1-2/ J7-3,4				
Channel/ Input	EPICS Monitor P1-3A,C Volts 0deg?	QPD X EPICS P1-5A,C Volts 180deg?	QPD Y EPICS P1-6A,C Volts 180deg?	QPD Sum EPICS P1-7A,C Volts 180deg?
QPD1-3/ J7-5,6				
Channel/ Input	EPICS Monitor P1-4A,C Volts 0deg?	QPD X EPICS P1-5A,C Volts 180deg?	QPD Y EPICS P1-6A,C Volts 0deg?	QPD Sum EPICS P1-7A,C Volts 180deg?
QPD1-4/ J7-7,8				

Channel/ Input	EPICS Monitor P1-8A,C Volts 0deg?	QPD X EPICS P1-12A,C Volts 0deg?	QPD Y EPICS P1-13A,C Volts 0deg?	QPD Sum EPICS P1-14A,C Volts 180deg?
QPD2-1/ J8-1,2				
Channel/ Input	EPICS Monitor P1-9A,C Volts 0deg?	QPD X EPICS P1-12A,C Volts 0deg?	QPD Y EPICS P1-13A,C Volts 180deg?	QPD Sum EPICS P1-14A,C Volts 180deg?
QPD2-2/ J8-3,4				

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J8-3,4							
<b>Channel/ Input</b>	<b>EPICS Monitor P1-10A,C Volts 0deg?</b>	<b>QPD X EPICS P1-12A,C Volts 180deg?</b>	<b>QPD Y EPICS P1-13A,C Volts 180deg?</b>	<b>QPD Sum EPICS P1-14A,C Volts 180deg?</b>			
QPD2-3/ J8-5,6							
<b>Channel/ Input</b>	<b>EPICS Monitor P1-11A,C Volts 0deg?</b>	<b>QPD X EPICS P1-12A,C Volts 180deg?</b>	<b>QPD Y EPICS P1-13A,C Volts 0deg?</b>	<b>QPD Sum EPICS P1-14A,C Volts 180deg?</b>			
QPD2-4/ J8-7,8							