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LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

-LIGO-

CALIFORNIA INSTITUTE OF TECHNOLOGY

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8 Channel Anti-Image Filter Board Test Plan		
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1 Introduction

The tests described below are required to verify the correct operation of the 8 Channel Anti-Image Filter Board (D000186, Rev B). The transfer function of this board is a 7 pole, 6 zero, 4 dB ripple, 60 dB attenuation , 7570 Hz elliptic low pass filter. Note that this board is different from D000186, Rev A which uses discrete op amp stages to produce an elliptic response. The Rev A version of the board requires a different test plan.

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 dB ripple, 60 dB attenuation, 7 pole, 6 zero elliptic low pass. The cutoff frequency is 7570 Hz and response zeros are located at 16384 Hz and 37.5 KHz. Using the dynamic signal analyzer, verify and record the response of each channel in the table below. The stopband is defined as frequencies above 16KHz.

Chan	Input/ Output	Passband Ripple <4dB?	Stopband Atten > 60dB	F_{cutoff} = 7570Hz +/- 500Hz ?	F_{zero} = 16384 Hz +/- 0.5KHz ?	F_{zero} = 37.5 KHz +/- 0.5KHz ?	Pass/ Fail
1	J1-39 / J7-1						
2	J1-35 / J7-3						
3	J1-31 / J7-5						
4	J1-27 / J7-7						
5	J1-23 / J8-1						
6	J1-19 / J8-3						
7	J1-15 / J8-5						
8	J1-11 / J8-7						

A plot of the nominal transfer function is shown in the figure below.

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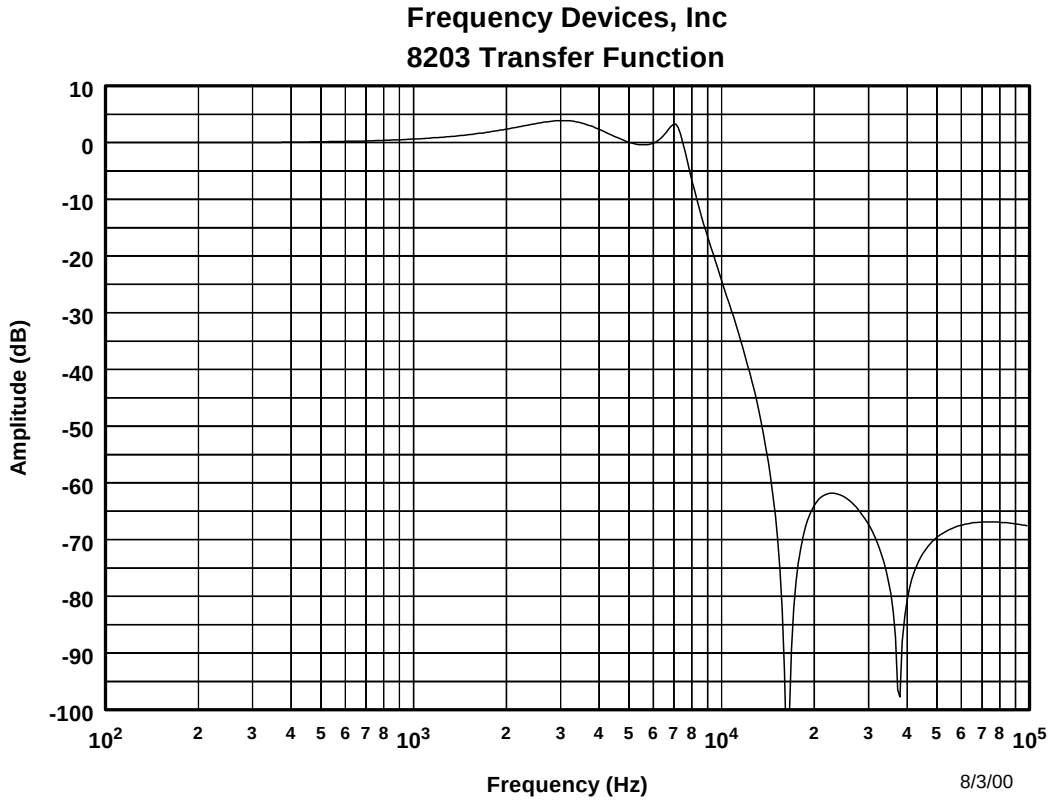

3.3 Monitor Operation

Verify the correct functioning of the front panel and EPICS monitors for each channel using a 100Hz, $1V_{p-p}$ sine wave and an oscilloscope.

Channel / Input	EPICS Monitor	EPICS Monitor = 1Vp-p, 100 Hz?	FP Monitor	FP Monitor = 1Vp-p, 1KHz?	Pass/Fail
1 / J1-39	P1-1A		J3A		
2 / J1-35	P1-2A		J3B		
3 / J1-31	P1-3A		J4A		
4 / J1-27	P1-4A		J4B		
5 / J1-23	P1-5A		J5A		
6 / J1-19	P1-6A		J5B		
7 / J1-15	P1-7A		J6A		
8 / J1-11	P1-8A		J6B		

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3.4 Output Noise

The output noise of each channel should be less than 500nV/√Hz for 5Hz<freq<10KHz, neglecting line related peaks related to measurement. For ease of connection, the front panel monitors are used for these tests, but they provide a reasonable measurement of the channel output noise.

Channel / Input	Output Monitor	Noise Out < 500nV/√Hz ?	Pass/Fail
1 / J1-39	J3A		
2 / J1-35	J3B		
3 / J1-31	J4A		
4 / J1-27	J4B		
5 / J1-23	J5A		
6 / J1-19	J5B		
7 / J1-15	J6A		
8 / J1-11	J6B		