



LIGO Laboratory / LIGO Scientific Collaboration

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Test Procedure for Test Oscillator Boxes.

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LIGO Scientific Collaboration

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1 Introduction

The following Test Procedure describes the test of proper operation of the Test Oscillator Boxes.

s/n S1103742

Tested by PBS

2 Test Equipment

- Voltmeter
- Oscilloscope
- Stanford Research SR785 analyzer
- RF Power Meter HP E4418A or Agilent N1914A
- Board Schematics—D1100663

3 Tests

The Test Oscillators use the Low Noise Power Module (D0901846-D).

- 1) Verify the proper current draw.** Using a bench DC supply apply +/- 24Volts to P7 and +/- 17 Volts to P6 of the low noise power Module (D0901846-D). Measure the current draw of the board.

+24 Volt current 0.1 A Nom. -24 Volt current 0.0 A Nom.

+17 Volt current 0.67A less than 1.1 A

-17 Volt current 0.06A less than 0.01 A

- 2) On the low noise power module check the voltage on TP 1-13.**

TP1 (+17V) 22.86V TP2 (-17V) -23.96V

TP3 , 4 (GND) TP5 (+ 5V) 5.06V

TP6 (-15V) ___ -14.97V _____ TP7 (+24V) ___ 22.87V _____

TP8 (GND) TP9 (-24V) ___ -23.97V _____

TP10 (GND) TP11 (+15V) ___ 14.97V _____

TP12 (+VREF) ___ 9.98V _____ TP13 (-VREF) ___ -9.98V _____

3) If TP 1 , 2 , 7 , 9 and 8 are correct then TP14 (OK) should be

Logic high ~3Volts. Confirm. ___ X _____

4) The noise on TP 12, 13, 11 and 6 should be measured with a SR785 using an rms power spectrum.

TP12 noise ___ 9.2 nVrms/sqrt Hz ___ less than 20 nVrms/sqrt Hz at 140 Hz

TP13 noise ___ 14.9 nVrms/ _____ less than 20 nVrms/sqrt Hz at 140 Hz

TP11 noise ___ 11.27 nVrms/ _____ less than 20 nVrms/sqrt Hz at 140 Hz

TP6 noise ___ 19.43 nVrms/ _____ less than 30 nVrms/sqrt Hz at 140 Hz.

This concludes the test of the power supply. Now test the crystal oscillators.

5) With the frequency control input grounded measure the RF output with a RF Power meter. The nominal output level is 12 dBm +/- 2dBm.

RF Output levels (dBm)

OSC1	OSC2	OSC3	OSC4
11.76	10.37	10.18	10.54

5) **Apply a dc voltage to the frequency control input.** Measure the output frequency as a function of input voltage. The frequency change is typically 50 ppm for +/- 10 volt input.

Oscillator 1 frequency change for 10 Volt input change _____ ppm

Oscillator 2 frequency change for 10 Volt input change _____ ppm.

Oscillator 3 frequency change for 10 Volt input change _____ ppm.

Oscillator 4 frequency change for 10 Volt input change _____ ppm

Oscillator 1, Center Frequency = 10.000 003 MHz

Frequency	9996	9997	9998	9999	9999
Voltage	10	9	8	7	6
Voltage	1	2	3	4	5
Frequency	0003	0002	0001	0001	0000
Frequency	0004	0004	0005	0006	0007
Voltage	-1	-2	-3	-4	-5
Voltage	-10	-9	-8	-7	-6
Frequency	0010	0009	0009	0008	0007

Oscillator 2, Center Frequency = 39.999 956 MHz

Frequency	7495	7702	7917	8141	8375
Voltage	10	9	8	7	6
Voltage	1	2	3	4	5
Frequency	9676	9401	9132	8872	8619
Frequency	0241	0530	0822	1116	1413
Voltage	-1	-2	-3	-4	-5
Voltage	-10	-9	-8	-7	-6
Frequency	2915	2613	2311	2011	1711

Oscillator 3, Center Frequency = 159. 999 272 MHz

Frequency	9825	0712	1615	2532	3460
Voltage	10	9	8	7	6
Voltage	1	2	3	4	5
Frequency	8276	7291	6316	5352	4399
Frequency	0279	1295	2321	3357	4403
Voltage	-1	-2	-3	-4	-5
Voltage	-10	-9	-8	-7	-6
Frequency	9781	8685	7599	6524	5458

Oscillator 4, Center Frequency = 78. 890 152 MHz

Frequency	5097	5590	6089	6592	7097
Voltage	10	9	8	7	6
Voltage	1	2	3	4	5
Frequency	9644	9135	8625	8115	7605
Frequency	0658	1161	1662	2158	2651
Voltage	-1	-2	-3	-4	-5
Voltage	-10	-9	-8	-7	-6
Frequency	5036	4570	4099	3622	3139

