LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

LIGO-E1200340-v1 *advanced LIGO* 6/12/2012

Test Procedure for Shutter Controller

Paul Schwinberg and Daniel Sigg

Distribution of this document:
LIGO Scientific Collaboration

This is an internal working note
of the LIGO Laboratory.

California Institute of Technology
LIGO Project – MS 18-34
1200 E. California Blvd.
Pasadena, CA 91125
Phone (626) 395-2129
Fax (626) 304-9834
E-mail: info@ligo.caltech.edu

Massachusetts Institute of Technology
LIGO Project – NW22-295
185 Albany St
Cambridge, MA 02139
Phone (617) 253-4824
Fax (617) 253-7014
E-mail: info@ligo.mit.edu

LIGO Hanford Observatory
P.O. Box 159
Richland WA 99352
Phone 509-372-8106
Fax 509-372-8137

LIGO Livingston Observatory
P.O. Box 940
Livingston, LA 70754
Phone 225-686-3100
Fax 225-686-7189

http://www.ligo.caltech.edu/

1 Introduction

The following test procedure describes the test of proper operation of the shutter controller.

2 Test Equipment

- Voltmeter
- Oscilloscope
- Shutter Controller Tester — D1200449-v1.
- 2 Uniblitz shutters
- Board Schematics — D1102312-v1.

3 Tests

The Shutter Control has two D880C Shutter Drivers mounted on the main PCB.
The Shutter Controller Tester should be powered up and plugged into the powered Shutter Control.
A Uniblitz shutter should be connected to each output.

1) **Verify that the basic logic works.** Toggle the open and close switches for both drivers.

   The monitor LEDs on both the Controller and Tester should change states.

Channel 1 open OK _____ Not OK _____ close OK _____ Not OK _____

Channel 2 open OK _____ Not OK _____ close OK _____ Not OK _____

Verify with a voltmeter that the front panel BNCs read the correct TTL levels, when toggling open and close. Write down the voltages (TTL HI > 2.0V and TTL LO < 0.8V).

Channel 1 open HI _____ V LO _____ V close HI _____ V LO _____ V

Channel 2 open HI _____ V LO _____ V close HI _____ V LO _____ V

2) **Verify that with no threshold voltage applied the shutter does not close.** Set the threshold pot at minimum and verify the voltage is zero with a meter connected to J1. Now ramp the PD pot from minimum to maximum, the monitor LEDs should not change state.

Channel 1 OK _____ Not OK _____ Channel 2 OK _____ Not OK _____

Verify with a voltmeter that the front panel BNC readback shows the correct photodetector voltage levels, when ramping. The photodiode voltages at the BNC should be 5% below the set point. Write down the voltages for

Channel 1 Lowest set point _____ V Readback _____ V

Channel 1 Mid set point ____2.5__ V Readback _____ V

Channel 1 Highest set point _____ V Readback _____ V

Channel 2 Lowest set point _____ V Readback _____ V

Channel 2 Mid set point ____2.5__ V Readback _____ V

Channel 2 Highest set point _____ V Readback _____ V

3) **Verify that when a threshold voltage is applied the shutter closes.** Set the threshold pot at 2.5 volts and verify with meter connected to J1. Now ramp the PD pot from minimum to maximum, the shutter should close and the the monitor LEDs should change state, read the trigger voltage with a meter connected to J1.

Channel 1 OK _____ Trigger 1 _____ V Channel 2 OK _____ Trigger 2 _____ V

Verify with a voltmeter that the front panel OUT BNCs read the correct TTL levels, when toggling the shutter. Write down the voltages (TTL HI > 2.0V and TTL LO < 0.8V).

Channel 1 out HI _____ V LO _____ V

Channel 2 out HI _____ V LO _____ V

Verify with a voltmeter that the front panel BNC readback shows the correct threshold voltage levels, when ramping. The threshold readback voltages should be the same as the set point. Write down the voltages for

Channel 1 Lowest set point _____ V Readback _____ V

Channel 1 Mid set point ____2.5__ V Readback _____ V

Channel 1 Highest set point _____ V Readback _____ V

Channel 2 Lowest set point _____ V Readback _____ V

Channel 2 Mid set point ____2.5__ V Readback _____ V

Channel 2 Highest set point _____ V Readback _____ V

4) **Verify that when close is applied the shutter stays closed.** Mount a 50 terminator to the front panel close BNC. Set the threshold pot at 2.5 volts and verify with meter connected to J1. Now ramp the PD pot from minimum to maximum, the shutter should stay close for all voltages.

Channel 1 OK _____ Not OK _____ Channel 2 OK _____ Not OK _____