



LIGO Laboratory / LIGO Scientific Collaboration

LIGO-E1200340-v2

advanced LIGO

7/12/2013

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/>

S1203627

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 5 V LO .1 V close HI 5 V LO .1 V

Channel 2 open HI 5 V LO .1 V close HI 5 V LO .1 V

- 2) **Verify that with no threshold and no trigger voltage applied the shutter can be operated.** Set the threshold pot at minimum and verify the voltage is zero with a meter connected to J1. Toggle on/off, the monitor LEDs should not change state. Now ramp the trigger voltage up and verify that the shutter closes.

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 .005 V Readback .004 V

Channel 1 Mid set point 2.5 V Readback 2.372 V

Channel 1 Highest set point 4.62 V Readback 4.379 V

Channel 2 Lowest set point .005 V Readback .004 V

Channel 2 Mid set point 2.5 V Readback 2.369 V

Channel 2 Highest set point 4.62 V Readback 4.378 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 monitor LEDs should change state, read the trigger voltage with a meter connected to J1.

Channel 1 OK Trigger 1 .538 V Channel 2 OK Trigger 2 .535 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 5.063 V LO .216 V

Channel 2 out HI 5.064 V LO .214 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 .003 V Readback .003 V

Channel 1 Mid set point ^{1.3}~~2.5~~ V Readback 1.289 V

Channel 1 Highest set point 2.637 V Readback 2.614 V

Channel 2 Lowest set point .003 V Readback .003 V

Channel 2 Mid set point ^{1.3}~~2.5~~ V Readback 1.288 V

Channel 2 Highest set point 2.637 V Readback 2.614 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