

## Arduino Shutter Tester Version 2

[Build a shutter tester for Focal Plane shutters - Cheap, Easy & it Works | Page 23 | Photrio.com Photography Forums](#)

### First use after loading firmware

Assuming the build has been completed correctly and the firmware loaded, when the Shutter Tester is connected to the computer via the USB cable, The LCD should light and display text.

If the LCD lights, but no text can be seen, try adjusting the contrast screw on the back. As an initial setting, turn fully clockwise and then just a small amount back.



### User Authentication.

The first time the Shutter Tester is operated, the LCD will say 'Auth Code' and display a number. This number must be sent via private message to Niglyn. The quickest way is via the Photrio forum, link at the top of the page.

A user key will be sent by return and must be entered into the shutter Tester. This is only required once.

To enter the user key, press the 'Display Average Button'. Keeping the button pressed will rapidly increase the displayed number. A quick press will increase the number by 1.

When the supplied user key matches that displayed, press the 'Reset Average' button.

If you overshoot the number, there is no way to decrease it. If you are close to 9999 then keep pressing, as the number wraps round to 0. If your number is low, press 'Reset Average' button. The Shutter Tester will restart and you can try again.

Once entered correctly, the screen will say 'Correct'. After a short while the screen will blank & go dark. After some internal number crunching, the Shutter Tester will spring back into life.

## Laser Alignment Utility

To enter the Alignment utility, apply power and when the splash screen is shown, press & hold the 'Display Average' button. Once in the utility, release the button.



This utility will allow checking and aligning of the laser and receiver pairs by giving an indication on the LCD whether or not the sensor can see the laser beam.

When the laser is shining onto the receiver and the receiver can see the laser, the LCD will report 'Seen' When the laser is blocked, by a piece of card or your hand, the LCD will say 'blocked'.



There are two different versions of the sensor, referred to as 'original' and 'new'. Both look identical, so there is no way to tell by looking, which type they are. The only difference between the two is that one has an inverse output to the other. If the Laser Alignment Utility seems to be working backwards, it means you have the old type of sensor.

If there is no change at all to the LCD screen, then check all the wiring. Lasers should be shining Red and the LED on the receiver boards should be on. There is no protection from incorrect wiring or sensor orientation on the boards, so incorrect wiring will most likely result in a damaged board or sensor.

**Note :-** You will probably find that the Laser barrel is not affixed to the pcb other than by its connecting wires. Adding a bit of hot-glue, or another suitable adhesive, will hold it in place.

To exit the utility, press 'Reset Average' button.

## Normal Use

After the initial splash screen, the LCD will change to the testing Screen.



## Testing screen

There are two columns. Each column will show the calculated exposure measurement from each of the laser and receiver pair.

The measured exposure is shown in milliseconds (0.001 of a second) one decimal place.

The fractional value is then shown below

The last value in each column C2 & C1 show the time Curtain1 and Curtain2 took to travel between the two sensors in milliseconds.

Each time the camera shutter is fired, the display will automatically update.

The letter 'R' will appear on the top right of the LCD (and 'Ready...' on the PC screen) when the Shutter Tester is ready for a new test. The sensors must be blocked, for this to happen.

If 'B' appears in the top right corner, it is indicating that shutter bounce has been detected.

Pressing the 'Display Average' button will show the average of (up to) the last ten readings.

Pressing the 'Reset Average' button will clear all of the accumulated readings, when changing shutter speeds, for example.

**Note:** - Due to limitations of the Arduino memory, error checking is limited. So strange readings may occur, for example fingers waved across the lasers or a seriously badly behaving camera is being tested.

LED light, including computer monitors, can also be problematic if it is PWM controlled. The Shutter Tester may see this as sensor changes.

## Computer Screen Display

Far more information can be displayed on the computer screen, than that of the LCD alone.

For this, a computer program called 'Arduino IDE' will be required. See separate document of how to instal this program.

The screenshot shows the Arduino IDE interface with the Serial Monitor window open. The Serial Monitor displays the following data:

```
*****
Cal value uS:- 431
PARAMETER          LASER2          LASER1
Shutter Speed MicroS  2317          1989
Shutter Speed milliS  2.3           2.0

Shutter Speed Seconds 0.002          0.002
Shutter Speed Fraction 1/432          1/503

Curtain Travel MicroS  8628          8300
Curtain Travel MilliS  8.6           8.3

*****
AVERAGES          LASER2          LASER1
shutter Speed Av mS  3           2           1
Curtain Travel Av mS  3           9           8

Shutter Speed Av Vul  3           1/443          1/839

shutter Speed Min mS  3           2           -1
shutter Speed Max mS  3           2           2

shutter Speed St Dev  3           0.19          1.47
Curtain Travel St Dev  3           1.53          1.53
*****
```

Annotations in the image point to the following UI elements:

- Select board & COM port
- Select Serial Monitor Window
- Drag up to maximise window
- Select baud rate
- Shows connected to board & using which COM port

The display follows a similar format to that of the LCD, but with more information.

Shutter bounces will be shown as well as if flash sync has occurred at the given speed.

Averages are updated and displayed. The number of cumulative tests used to calculate the average are shown (in this picture, 3 can be seen).

A maximum of ten individual tests are used to calculate the average. After this, the oldest is lost from the calculation and the latest reading added.

As with the LCD, pressing the 'Reset Average' button will clear the historic data and new averages will be calculated using new test data.