Reveni Labs Camera Tester

User Manual

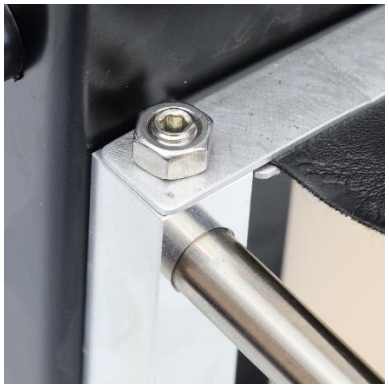
Version 1 - for Firmware V1.0 - subject to change with future updates

2024-04-24

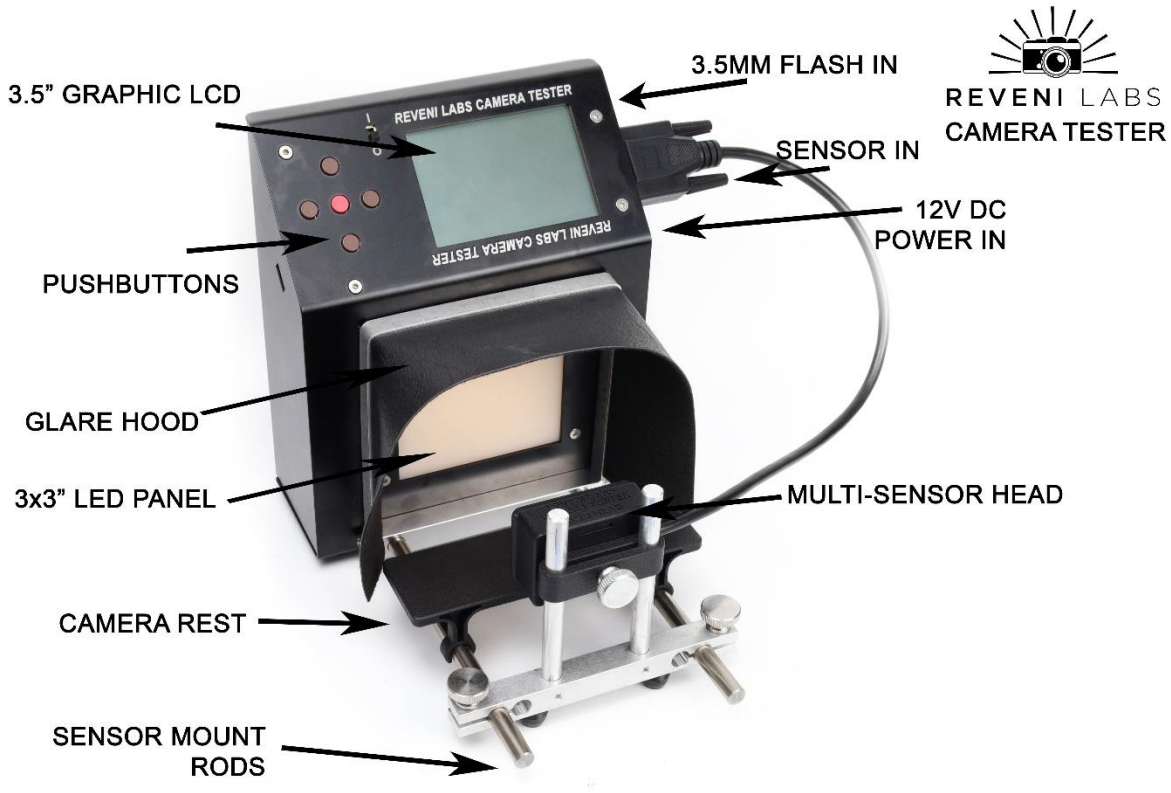
Assembly

1. Remove all the items from the box
2. Unwrap the Camera Tester, 200mm rod bundle, wall adapter and bag of parts
3. Peel off screen protector sheet
4. Find the two M5x12mm set screws in the bag of parts
5. Install the 200mm rods into the Camera Tester, aligning the flats on the rods with where the set screws will meet it
6. If you want to use it, complete the bends on the glare guard and attach it to the set screws with two M5 nuts
7. Attach the 100mm rods to the moving rod mount, aligning the rod flats towards the set screws
8. Put the moving rod mount on the 200mm rods

9. Plug in the sensor head and put it on the vertical rods
10. Plug in the 12V wall adapter and connect it to the Camera Tester **(ONLY USE THE INCLUDED WALL ADAPTER!)**



Assembled Unit



Setup

The Reveni Labs Camera Tester can be set up in several ways depending on the user's preference and the type of cameras being tested. The Camera Tester can be used in a vertical or horizontal orientation. Orientation is detected at power-up and the screen and buttons are rotated accordingly. The sensor jig can be attached or removed as needed. The sensor can be held by hand if the jig is not in use.

Sensor Heads

There are two sensor heads available. The 35mm sensor head is standard and is included with every Camera Tester. The 35mm head is used to test all leaf shutters, 35mm focal plane curtain shutters, and can be used to test medium format focal plane shutters as well, but only in the central area covered by the 35mm frame size.

Using the 35mm sensor with larger formats is made easier using various frame adapters, which are optional.

The 6-by-X head is optional and is only used to test medium format curtains from edge to edge. It doesn't contain the extra sensor required to test medium format leaf shutters.

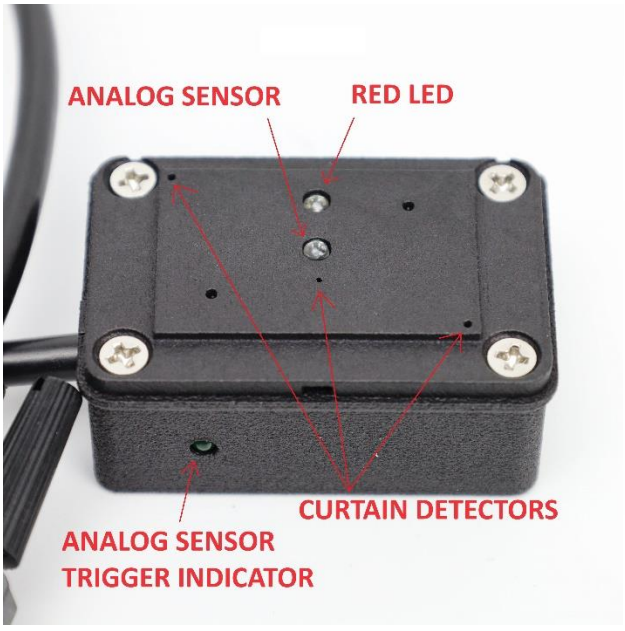


Figure 1 - 6-by-X Sensor Head

Figure 2 - 35mm Sensor Head

User Interface

The faceplate of the device has 5 buttons, a power switch, and an LCD display. These will rotate when the device is flipped from one orientation to the other. The device checks orientation on power-up and must be powered off and back on again to change the orientation.

In this manual the buttons are referred to as UP, DOWN, LEFT, RIGHT and CENTRE.

The power button is marked by an O for off and an I for on.

Generally, CENTRE button is for entering the menu and selecting a current mode (exiting the menu).

In the menu, LEFT/RIGHT buttons change the currently selected value and UP/DOWN buttons change which value is selected. The current value is highlighted by a box perimeter.

Mode-specific button behaviour is outlined in the descriptions of the modes below.

Testing A Camera

Some example configurations are shown below

Modes

Curtain Shutter

Curtain testing is done **without** a lens attached to the camera. These tests are done with the LED panel at full brightness.

DIRECTION: select the curtain travel direction so the distance between detectors can be correctly determined.

FORMAT: Select the appropriate frame size so that the curtain travel time can be correctly calculated.

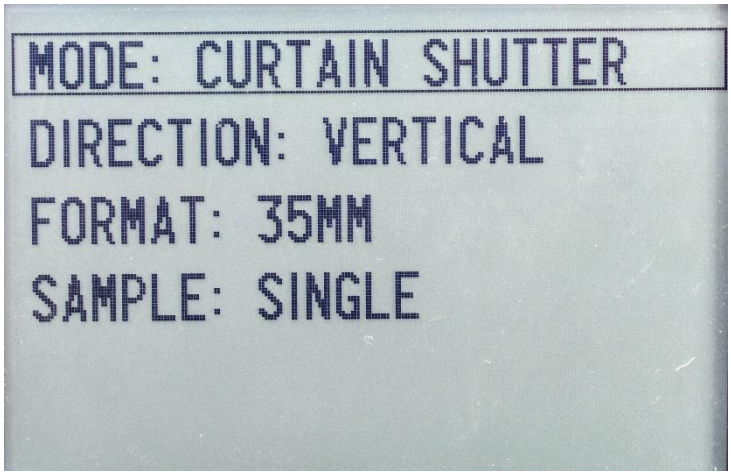


Figure 3 - Curtain Shutter Menu

SAMPLE: select from single readings, average, or continuous readings. After collecting averages, an average/high/low value will be displayed for each detection position.

Curtain Time Results

L, M, R: The time from when each sensor was uncovered by curtain 1 to when it was covered by curtain 2. In the example shown, curtain 2 is traveling faster than curtain 1, causing a reduction in the exposure on the right side of the frame.

C1 and C2: total travel time by curtain 1 and curtain 2, respectively.

C1/2: The exposure difference from one side of the frame to the other. In the example shown, around 1/3EV higher exposure on the left side. This is reflected in the individual L, M, R sensor times.

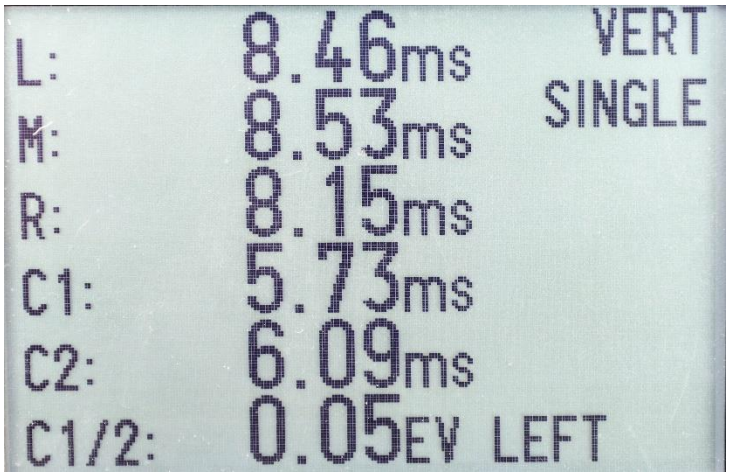


Figure 4 - Curtain Shutter Time Results

Top right corner: Indicating the currently selected shutter direction and sample mode.

Fractional Speed Results

Pressing the **DOWN** button will change the view to a simpler fractional shutter speed view, showing the fractional speeds instead of millisecond timing.

Exposure variation between left and right is shown in EV.

FPS (frames per second) is printed to test the firing speed of self-winding cameras

This screen also shows the flash contact delay following the full opening of the first curtain. Flash contact testing requires the PC port or hot shoe to be connected to the Camera Tester via the appropriate cable.

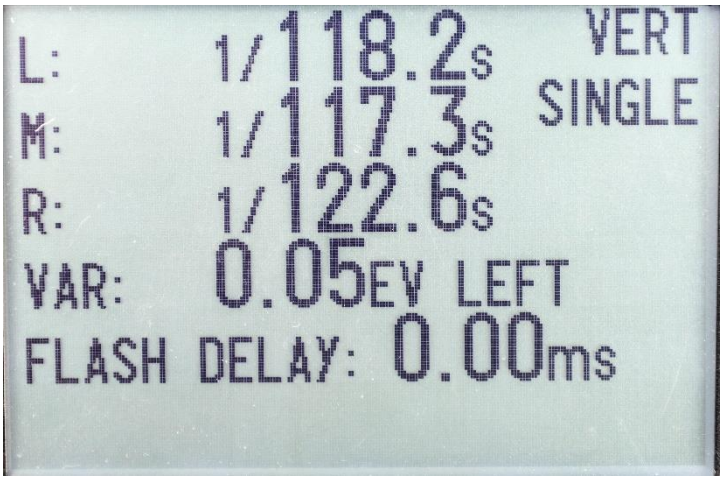


Figure 5 - Curtain Fractional Speed Results

Middle Time and Left/Right Relative Exposure Error

Pressing the **DOWN** button again will change to a middle time view with the left and right times replaced with the relative EV error with respect to the middle time

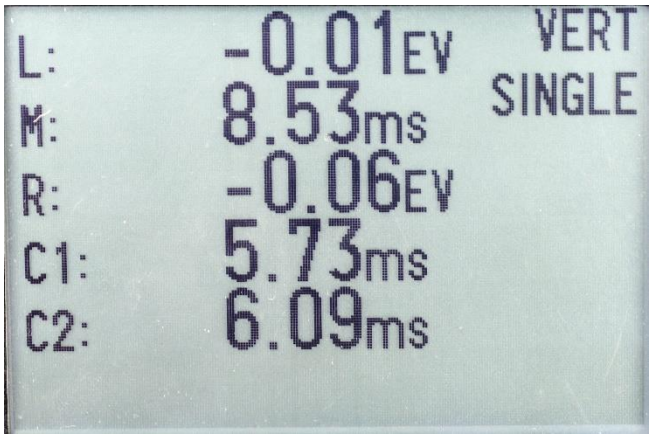


Figure 6 - Curtain Shutter Middle Time and Left/Right EV Variation

Average Mode Results

In average mode, the average, min and max for each sensor will be displayed in milliseconds. The quantity of averages will be counted at the top. The max variation is the largest variation in exposure on one of the sensors.

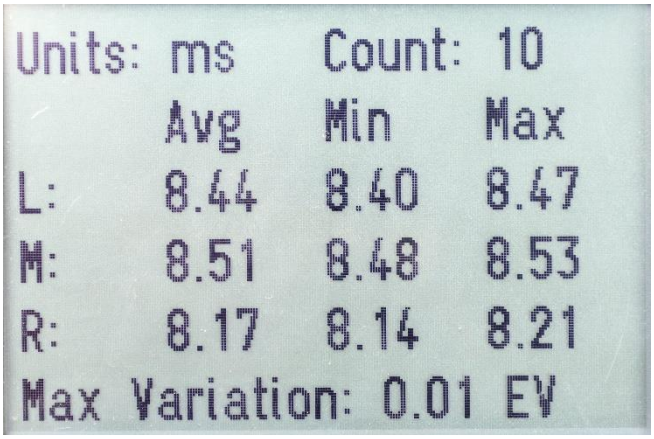


Figure 7 - Curtain Time Averages

Leaf Shutter

Leaf Shutter mode is used to test any in-lens shutters such as those on point-and-shoots, not-interchangeable lens cameras, fixed-lens rangefinders, and the like. These tests are done at full LED panel brightness.

APERTURE: Select the appropriate aperture the camera has been set to, so that the Camera Tester can set the appropriate sensor sensitivity range.

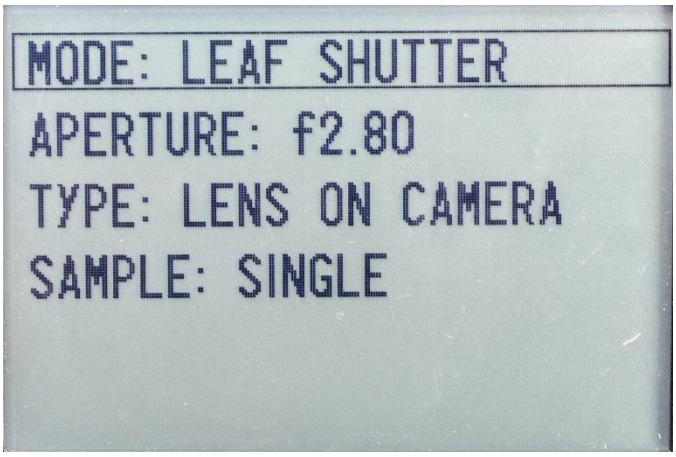


Figure 8 - Leaf Shutter Menu

Note: if the light is too bright because the selected aperture is smaller than the actual aperture by too much, the sensor will max out and a warning will instruct the user to adjust the camera aperture/selected aperture setting to make it right.

TYPE: Select what kind of lens setup this is; a lens on camera (brightness at the film plane is equal to the aperture), LF lens (reading is not at the film plane) or bare shutter (no optics at all). This is important so the Camera Tester selects the right sensor sensitivity.

SAMPLE: Single or running average mode can be selected. After showing the graph and results briefly, the averages will be displayed. The Camera Tester performs a high speed analog analysis of the shutter performance, and determines the opening time, fully open time, closing time, and effective shutter speed.

Leaf Results

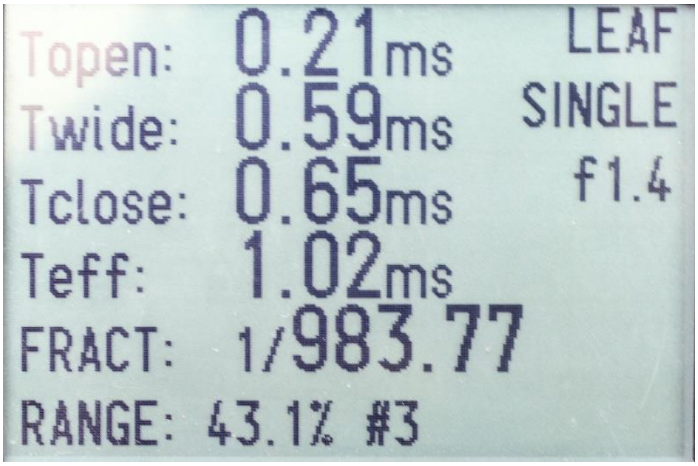


Figure 9 - Leaf Shutter Results

Topen: Shutter opening time (from initial detection to 95% maximum brightness)

Twide: The total time wide open (from first reading at 95% maximum brightness, to last reading at 95% maximum brightness)

Tclose: Shutter closing time (from 95% maximum brightness to 5% maximum brightness)

Teff: the effective exposure time, from the middle of the opening time to the middle of the closing time.

FRACT: fractional time for reference

Note: The opening/closing time will be longest at the widest aperture, and will be shorter at smaller apertures, as the time it takes for the shutter to uncover the smaller aperture is less than it takes to open completely. This will be reflected in the results you see. The effective shutter speed should remain similar at all apertures.

Graphic Curve

After displaying the results, the exposure curve is displayed. This is based on the raw data that the numerical results were calculated from. This is to help ensure a good reading was taken because the exposure curve will appear irregular if the sensor was misaligned or there is a major mechanical issue with the shutter.

Press the **DOWN** button to view the curve again.

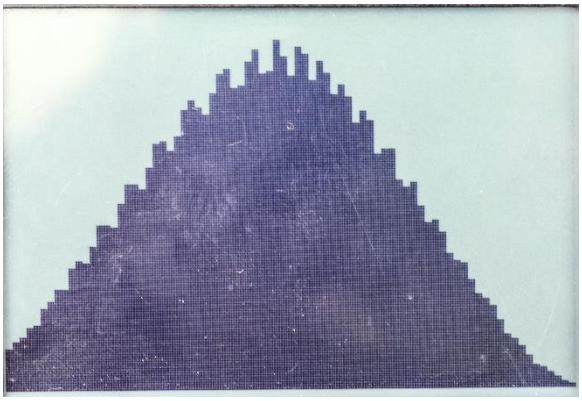


Figure 10 - Shutter Graph

Leaf Exposure

This mode will permit testing of auto-exposure cameras which use a leaf shutter. It will measure both the brightness at the film plane (to determine aperture) and measure shutter speed to determine the correct exposure and whether the camera achieved this.

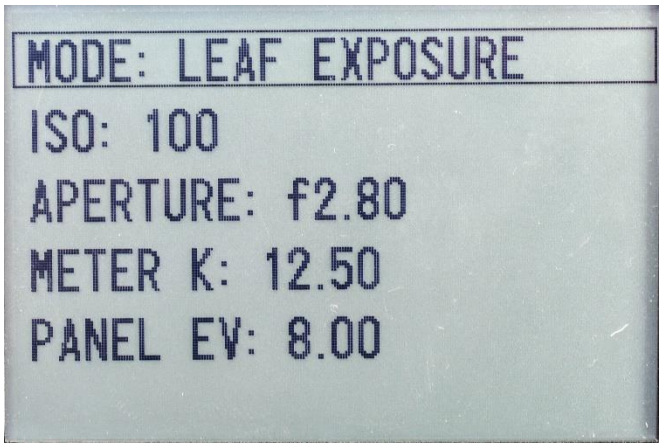


Figure 11 - Leaf Exposure Menu

These tests must be done with a lens attached, with the sensor placed at the camera's film plane.

Aperture information has to be entered (or at best estimated) to help with calculating the expected exposure. LED panel brightness can be adjusted along with the camera's meter K factor.

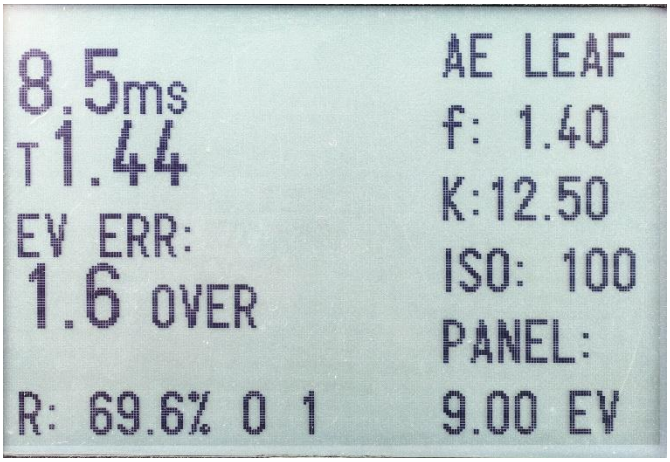


Figure 12 - Leaf Exposure Results

When on the results page, press the **RIGHT/LEFT** buttons to change the aperture, and the **UP/DOWN** buttons to increase/decrease the panel brightness.

R: The sensor head range is displayed at the bottom. This helps the user make sure they haven't set the aperture too low and the readings are not utilizing much of the sensor head's available capacity, reducing accuracy. If the aperture is set to a wide value (say f2) and the lens is set to a narrow value (say f16) the shutter fire won't be detected.

Curtain Exposure

This mode will operate similarly to the leaf exposure mode, except making some alterations to compensate for the curtain travelling past the sensor instead of the centrally-opening leaf shutter.

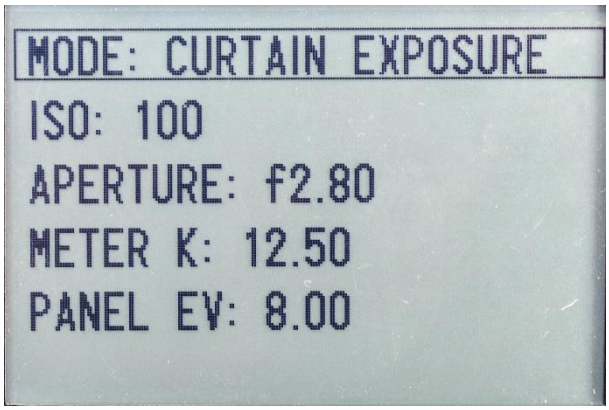


Figure 13 - Curtain Exposure Menu

These tests must be done with a lens attached, with the sensor placed at the camera's film plane.

This mode will only test the shutter speed in the centre of the curtain travel, and provide only one shutter speed result. Proper full curtain checking should be done in Curtain Shutter mode with the lens removed. This mode's primary function is checking the exposure system and automatic lens stop-down.

When on the results page, press the **RIGHT/LEFT** buttons to change the aperture, and the **UP/DOWN** buttons to increase/decrease the panel brightness.

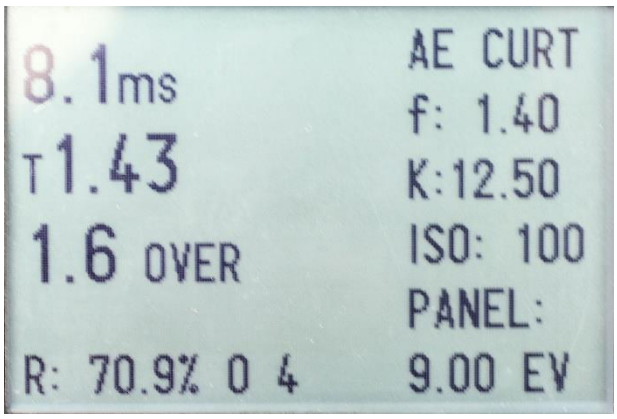


Figure 14 - Curtain Exposure Results

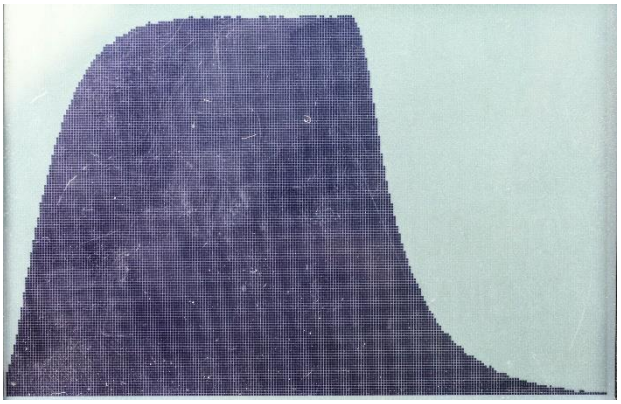


Figure 15 - Curtain Exposure Graph

Reflective Shutter Test

This mode allows for testing shutters which do not have through-body access for the sensor head to sit at the film gate.

This mode is effective for shutter speeds up to 1/1000.

The mirrored card included with the Camera Tester is placed at the film gate by inserting into the camera in place of film. The sensor head is aimed into the lens mount and the shutter is fired. The reflection of the red LED light on the sensor head is detected and timed.

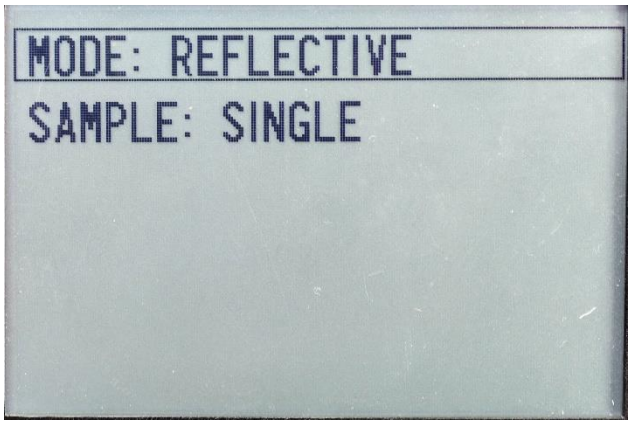


Figure 16 - Reflective Mode Menu

Some lateral movement can be applied to test the shutter in different sections.

This mode is only to be used on cameras which don't have through-body access for normal curtain testing because it doesn't provide as much information and is not as accurate.

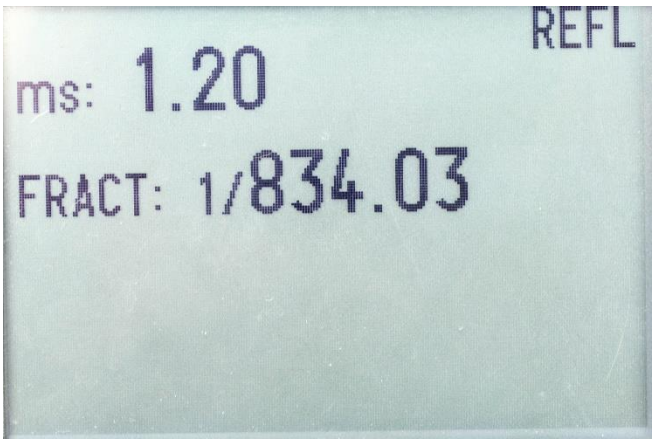


Figure 17 - Reflective Results

Figure 18 - Sensor position in reflective test

Light Meter

This mode sets the light panel to the selected reflected EV equivalent, so that reflective meters (both handheld and in-camera) can be tested against it. The meter should only see the light panel so when testing non-TTL camera meters, be sure to place the metering cell as close to the panel as possible.

The panel EV can be adjusted in the menu, and also when in light meter mode by pressing the **UP** and **DOWN** buttons.

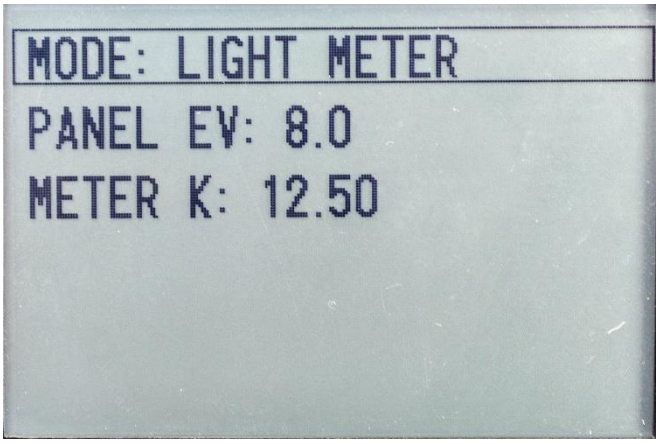


Figure 20 - Light Meter Menu

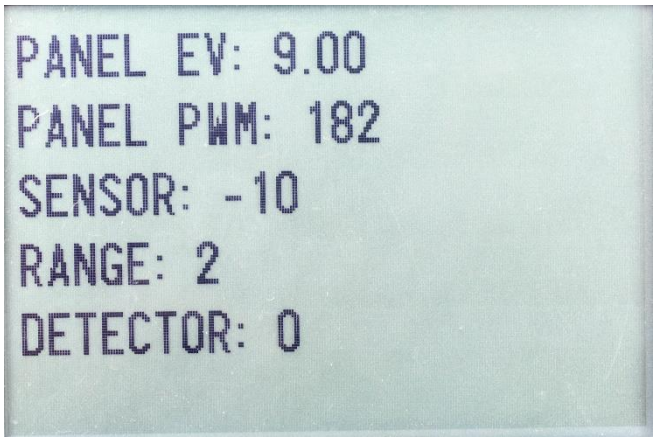


Figure 19 - Light Meter screen with sensor diagnostics

Aperture Test

This mode permits testing of apertures. The lens must be camera-mounted or otherwise placed so that the sensor is located at the film plane for infinity focus. The shutter must remain open continuously, either by a locked cable release or by holding the shutter button in bulb mode.

The measured aperture will be continuously read out on the display. The Camera Tester will automatically adjust the sensor sensitivity range as the measured brightness varies.

T: This is the measured aperture displayed as a T-stop. T-stops are like F-stops (a ratio of focal length / aperture diameter) with lens transmissibility (the actual amount of light reaching the film) included.

D: This is the Difference between two apertures. Pressing the RIGHT button will

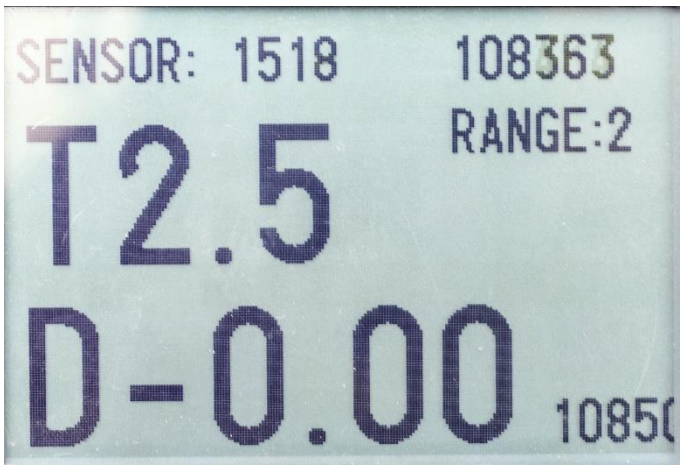


Figure 21 - Aperture Test screen with D zeroed

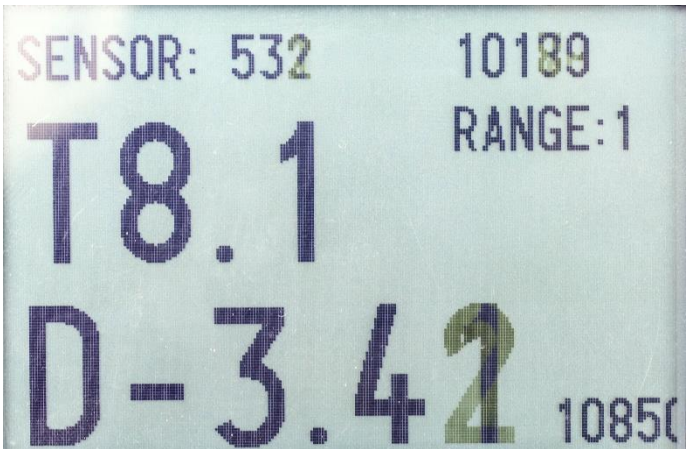


Figure 22 - Aperture test showing a 3.41 stop difference between T2.5 and T8.1

zero the reading, then the aperture can be varied to see the difference in light level, displayed in stops.

Other numbers shown are the sensor head range and raw brightness readings.

Calibration

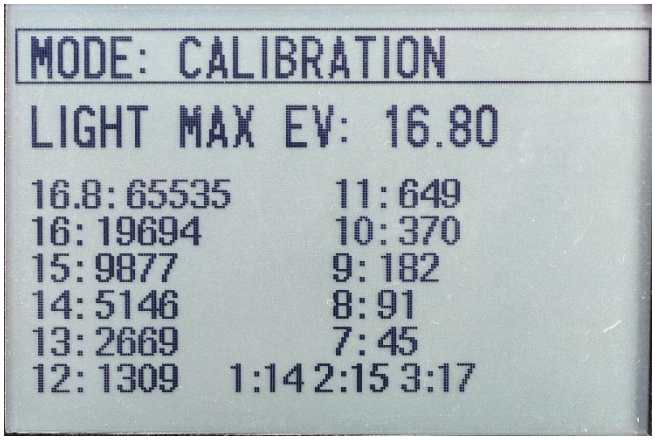


Figure 23 - Sensor Menu page showing current calibration

Calibration mode is used to calibrate the light panel using the 35mm sensor head.

The LED panel's maximum brightness must be determined using an external reference meter. This is done at the factory but can be re-done by the user using a reflective or spot meter which can read out in 1/10th EV or better. When the calibration mode is navigated to in the menu, the LED panel automatically switches to maximum brightness, which is when the maximum EV can be measured.

The factory brightness is measured and written on the label on the bottom of the Camera Tester. The maximum brightness is not expected to vary over time.

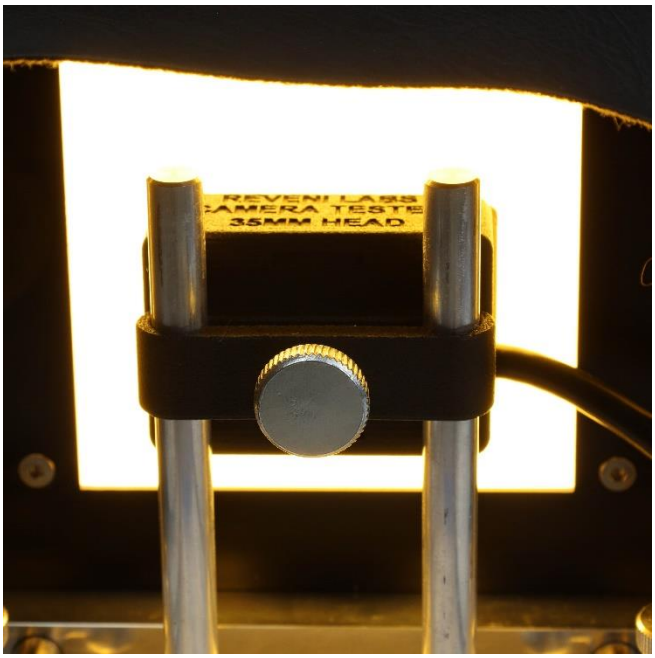


Figure 24 - Sensor position against light panel during calibration

Based on the supplied maximum panel EV, the 35mm Sensor Head will make successive measurements to find the LED panel constant-current level needed to get the lower EV values.

Calibration Process

The 35mm Sensor Head must be placed against the LED panel face. The room lighting should be dimmed or the glare guard should be attached, as stray light will affect the calibration of lower EV values. If needed, cover the sensor and light panel with a dark cloth to keep out external light during calibration.

Once started, the process takes a few minutes to complete.

If calibration is accidentally activated, power off the Camera Tester to stop it. The calibration values will only be over-written when the calibration process completes.

An accurate calibration is indicated when the completed calibration values, displayed in two rows on the Calibration menu page, decrease by approximately half.

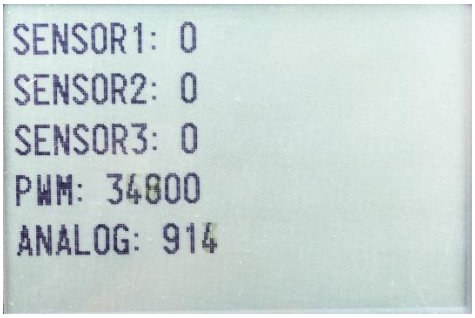


Figure 25 - Curtain detector trip level calibration

Figure 26 - Curtain detector trip level calibration complete

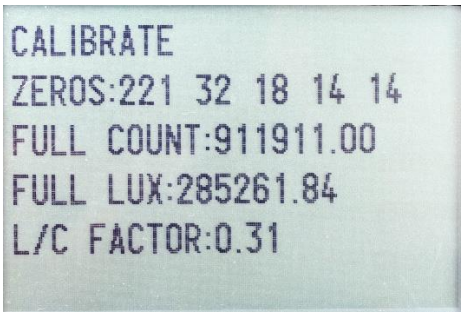


Figure 27 - Panel EV calibration starting

Figure 28 - Panel EV calibration underway

Firmware Update

The firmware updating process requires a data-capable micro USB cable and a PC or Mac.

1. Disconnect the 12V DC power from the Camera Tester (the position of the Camera Tester power switch is not important)
2. Plug the micro USB cable into the computer
3. Press and hold the button closest to the light panel
4. Connect the micro USB cable from the computer into the USB port on the side of the Camera Tester
5. The Camera Tester will appear as a storage device called “RPI-RP2”. The backlight will come on but the Camera Tester should not start as normal or display anything on the screen. If it shows normal running behaviour, unplug and repeat steps 3-4.

Figure 29 - The button being held down

6. Click and drag or copy and paste the firmware file (.uf2 filetype) to the storage device. Agree to any prompts about transferring the file.
7. The Camera Tester will automatically boot and begin running.
8. Unplug the micro USB cable from the Camera Tester
9. Connect the 12V DC power
10. On startup, observe the software version under the Reveni Labs logo to see it has updated successfully.

Service and Repairs

Please contact Reveni Labs directly if your Camera Tester has a problem and needs repair. Spare and replacement parts are available and the Camera Tester was designed with repairability in mind, so shipping it in for repair shouldn’t be necessary. Please use the Contact Us link below to get in touch.

https://www.reveni-labs.com/contact

FCC (United States only)

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation

ICES(Canada only)

ICES-003

This Class B digital apparatus complies with Canadian ICES-003.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

NMB-003

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada. L'utilisation de ce dispositif est autorisée seulement aux conditions suivantes: (1) il ne doit pas produire de brouillage et (2) l'utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

This product is designed to meet RoHS compliance regulations.

Protect the environment by not disposing of this product with household waste (2002/96/EC).

Check your local authority for recycling advice and facilities (Europe only).

Safety Warnings

If smoke or a bad odor comes from the device, unplug it and do not use it again without contacting Reveni Labs.

Never use the Reveni Labs Camera Tester in an environment containing flammable gasses as there is a danger of explosion or fire.

Do not allow children to play with the Reveni Labs Camera TEster as it and its parts are small enough to present a choking hazard.

Keep out of reach of children or pets.

Do not open the Reveni Labs Camera Tester unless instructed by Reveni Labs.

Contact

Email matt@reveni-labs.com or use the Contact Us page to report any bugs, make suggestions, or ask questions.