

Edgerton User's Manual

Description

This is a user's manual manual for Edgerton, the High-Speed LED Flash. The User Interface (UI)

For a complete overview of Edgerton, please visit <https://td0g.ca/2019/05/14/edgerton-a-high-speed-led-flash-diy/>. For the data repository, please visit https://github.com/td0g/high_speed_flash.

Batteries

For Edgerton Classic, eight AA batteries are required (8.8 – 12 V). Both alkaline and rechargeable batteries are suitable, although rechargeable batteries will require a fairly full charge in order to provide the 8.8V required by the high-voltage converter.

Calibration

Before using Edgerton, a calibration must be performed. The calibration procedure is described in the assembly manual. DO NOT use Edgerton prior to calibration.

Usage

Settings

When Edgerton is turned on, the settings are displayed. There are two settings:

- Flash duration (0.5us, 1us, 2us, 4us)
- Trigger delay (no units will be displayed). The colon acts as a decimal point, making the shortest delay 0.05 milliseconds (50 microseconds).

The settings can be adjusted by turning the encoder. To switch between settings, click the encoder once.

Triggering

The trigger port accepts a 3.5mm jack. The trigger behaves similar to a typical hotshoe-style camera flash: the 3.5mm plug base is grounded and the tip is held high by a pullup resistor. When the state of

the trigger changes, the unit will sound a high- or low- frequency chirp to indicate the change. Once in standby mode, the unit will trigger on a change in trigger state (low to high or high to low).

If a delay setting of 0 is selected, the unit will fire within microseconds of a trigger. If a delay greater than 0 is selected, the trigger will start timer and delay until the desired number of milliseconds have elapsed before strobing.

Charging & Strobing

Once the appropriate settings are selected, the flash can be charged by holding the encoder until a chime is heard. The capacitor voltage will be displayed during charging, which typically takes a couple seconds. When charging is complete, the unit will sound a second chime and the display will turn off.

While the capacitors are charged, the high-voltage converter will be active. This consumes a significant amount of energy from the batteries. To turn the converter off and return to the settings menu, simply press the encoder.

Serial Communication

If the flash controller is connected to a PC using an FTDI adapter, the following commands can be issued through a serial console (eg. Arduino, Termite). Any invalid commands will be responded with a brief 'help' description.

SERIAL COMMAND	DESCRIPTION	DETAILS
p	Print flash history	Prints the most recent flash records in chronological order. Data includes the flash duration, voltage, and calculated current.
e	Erase flash history	Clears all entries in the flash history memory. Does not clear the total flash count.

Troubleshooting

If the flash displays an error code (such as 'E01'), please refer to the chart below.

ERROR CODE	DESCRIPTION	SOLUTION
E01	Low Input Voltage	Replace batteries
E02	Capacitors Not Charging	Replace batteries, check internal components

Changelog

2020-04-21 VTG Initial Commit

2020-05-06 VTG Added 'Serial Communication' section

2020-09-01 VTG Firmware updted to 0.2.9