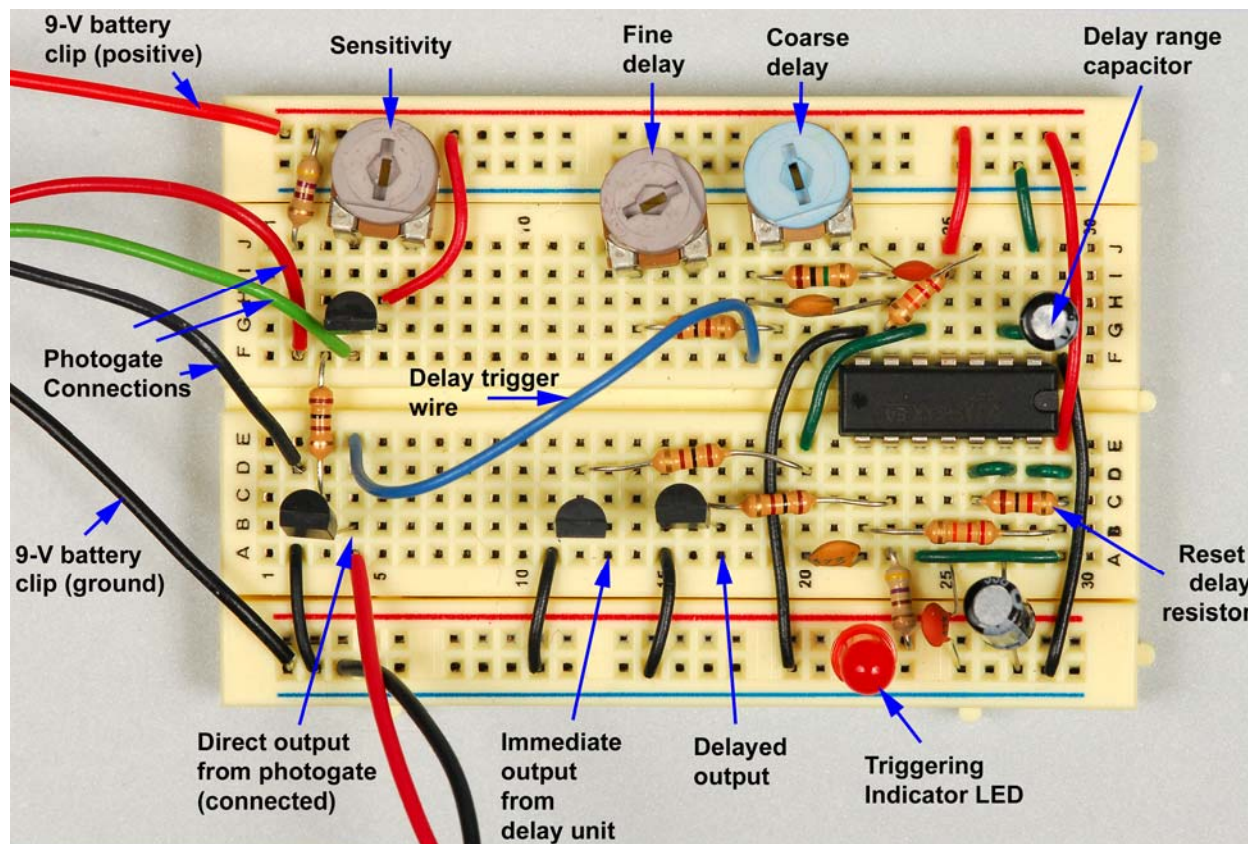


Instructions for Using the Assembled Transistor Photogate Trigger with Delay Unit (TPG-DU-A)



Supplied components

Circuit board with photogate and delay unit
 Photogate cable with wired emitter and detector
 3-foot, 2-conductor output cable

Small bag with these components:

- 0.01- μf capacitor (103)
- 0.1- μf capacitor (104)
- 100-k Ω resistor (brown-black-yellow)

Battery cable connection

The entire column of holes on the bottom along the blue line is negative (ground). Likewise, the entire column along the red line on the top is +9 V. These two columns are where the red and black cables from the battery clip are connected.

Connecting the photogate cable

The photogate cable has 3 wires: red, black, and green. The emitter (blue) and detector (clear) have already been soldered onto one end of the cable. The other end is connected to your circuit as shown to the right, in case you need to reconnect the cable:

Wire	Location
Red	2F
Black	2D
Green	4F

For testing and use, position the emitter and detector so that they are facing each other a few inches apart. Make sure they can't move as this will affect the sensitivity adjustment. Separations up to about 6 inches are possible, but the sensitivity must be adjusted critically for large separations. See the section below on how to adjust sensitivity.

Connecting the output cable

The output cable has 2 wires: red and black. Make the following connections, depending on which mode of output you would like to use:

Output Mode	Red Wire	Black Wire
directly from photogate (no delay)*	4A	(-)
from the immediate output of the delay unit	13A	(-)
from the delayed output	17A	(-)

Connect the other end of the output cable to the PC cord from your flash unit. See the following link for illustrated instructions on splicing the output cable to a PC cord or Flash-to-PC adapter:

<http://hiviz.com/kits/instructions/instructions.htm#other>.

* If you're connecting the output cable directly to the photogate output (no delay), be sure to disconnect the wire from 4E to 18F first.

Connecting the trigger to the delay unit

The jumper wire connecting the photogate to the delay unit runs from 4E (photogate output) to 18F (delay unit input). For testing the delay unit without the photogate, you can remove the jumper wire from 4E and touch it momentarily to ground. The triggering indicator LED should light momentarily if the delay unit is working correctly.

Powering the unit

The circuit runs on a 9-V battery. Connect the wires from the battery clip to the +9 V and ground columns. Disconnect the battery when the circuit is not in use. You may also choose to use a 9-V AC/DC adapter to power the unit. Any AC/DC adapter that provides up to an ampere of direct current at 9 V should do. Here's an example:

http://hiviz.com/kits/ACDC_adapter.htm.

Adjusting the delay time

The 1M potentiometer (blue knob) provides coarse delay control. Rotate it clockwise to increase the delay time up to about half a second. The 100k potentiometer (brown knob next to the blue knob) provides fine delay control. Set the coarse delay first and then tune it with the fine delay.

Adjusting the sensitivity of the photogate

If the photogate is working, you normally don't need to adjust the sensitivity. If, however, you want to adjust the sensitivity, here's the procedure:

First make sure the photogate is working. Then turn the brown knob (upper left in photo) one way or the other until the flash unit discharges spontaneously. Then back off the knob a little bit until the photogate works by passing a finger through it. Adjustments may need to be made one way or the other as the battery weakens or if you change the separation of the emitter and detector. If you increase the separation, do so in small steps, testing the photogate and readjusting the sensitivity as needed to ensure that the photogate continues to be aligned and working.

Replacing the timing capacitor to change the delay range

The timing capacitor connected into the circuit is a 0.47- μ f capacitor. This provides up to a half second delay. This is ideal for photographing drops and splashes but may be too long for other situations. You can change the delay range by replacing the 0.47- μ f capacitor with one of smaller value. An extra 0.1- μ f and 0.01- μ f capacitor have been provided for this purpose, and will yield the following time delays.

Capacitor	Time Delay	Location
0.47- μ f (cylindrical)	Half second	(+) to 28H, (-) to 29G
0.1- μ f (labeled "104")	Up to ~1/10 second	28H-29G (nonpolar)
0.01- μ f (labeled "103")	Up to ~1/100 second	28H-29G (nonpolar)

Replacing the 1-k Ω resistor with a 100-k Ω resistor to increase the reset delay

The 1-k Ω resistor from 26C to 29C can be replaced with the extra 100-k Ω resistor in order to increase the dead time after a triggering event. During this dead time, the circuit won't trigger. This is useful to prevent secondary events such as a second drop from actuating the circuit. The dead time is approximately equal to the value of the resistor in kilohms divided by 100. For example, the dead time for a 100-k Ω resistor would be 1 second.

Replacing components

Due to the nature of an open circuit on a breadboard, components may become dislodged and need to be reseatd.

Complete instructions for component placement can be found at this link: <http://hiviz.com/kits/instructions/tpg-du-manual2.htm>