

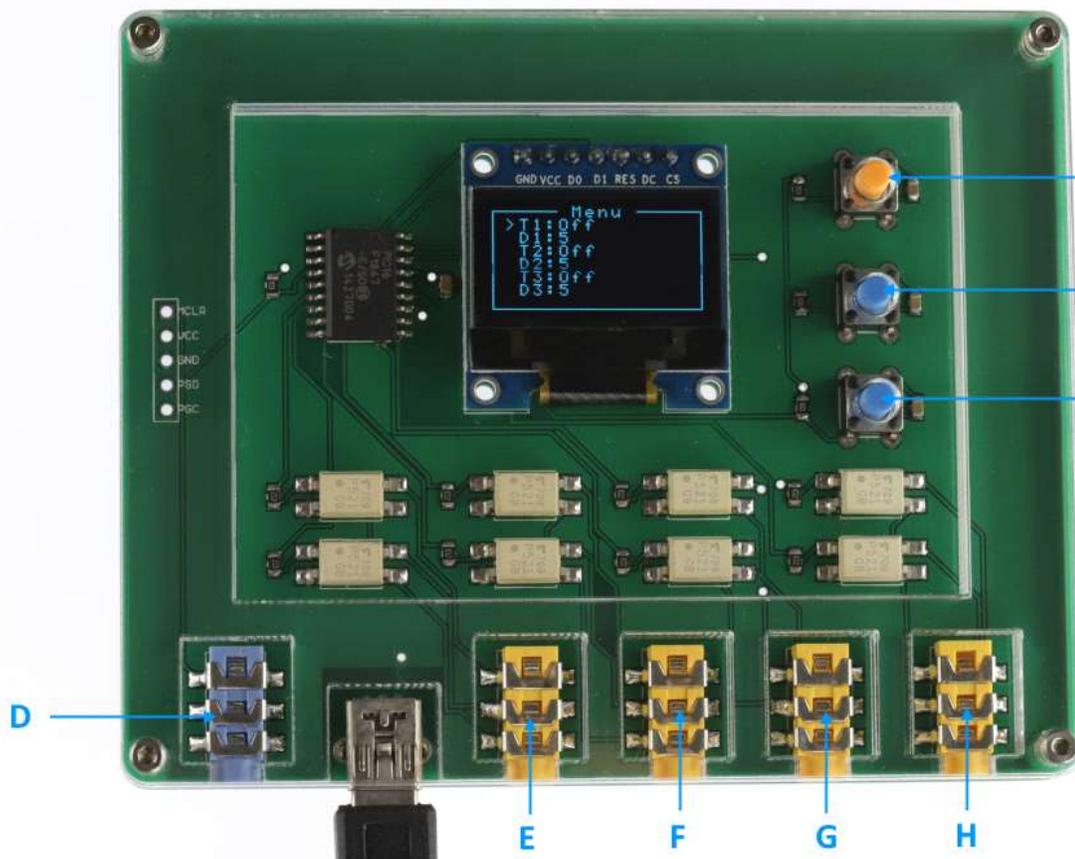
# MJKZZ Delay Controller

## Overview

MJKZZ delay controller is a programmable time delay device that allows to specify when and how long to activate output when an input single is detected. It has total of 8 optically isolated outputs that can be individually programmed. It is designed for many applications, such as flash control and camera activations.

## Operation

Here is a picture of the device:



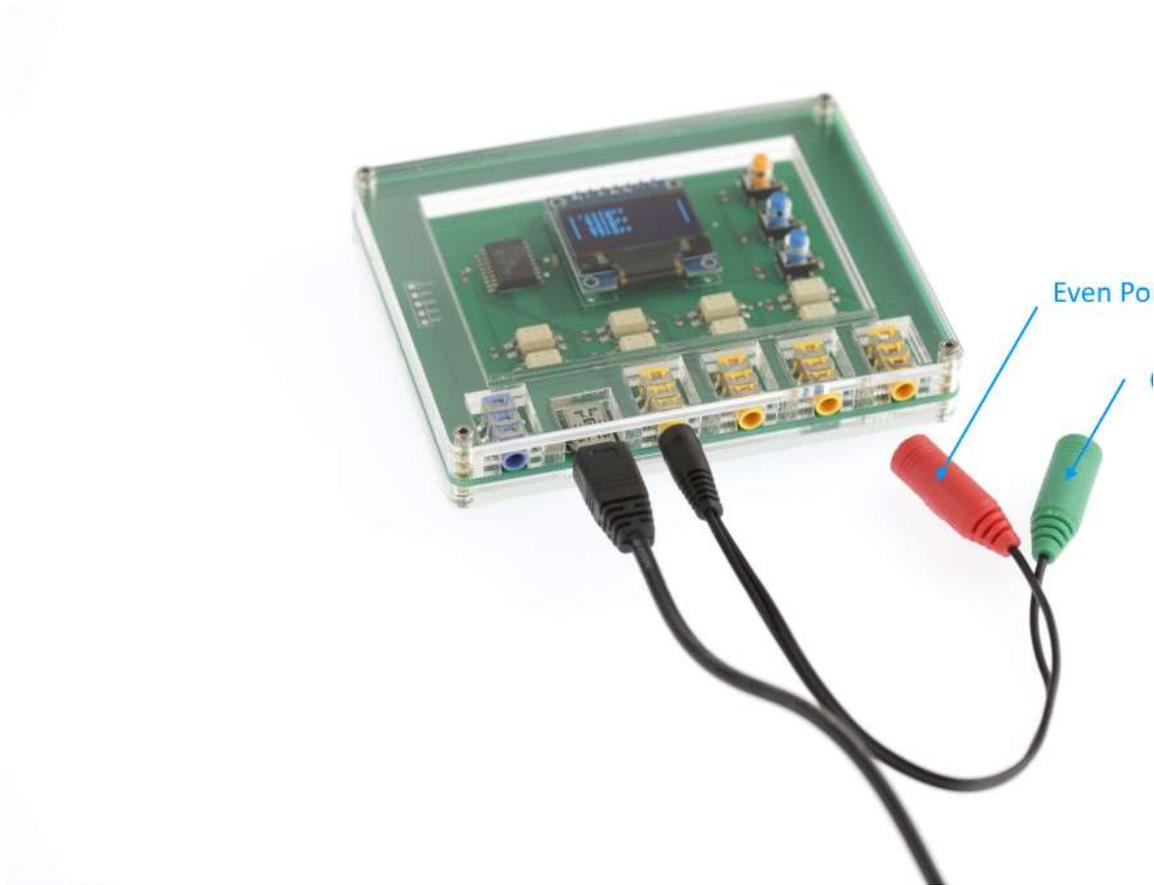
## Description of each labels:

- **A** is the mode button, pressing it to toggle Edit mode and Menu navigation mode when using the B and C buttons
- **B** is the UP button to move menu selection up when used in Menu navigation mode. When used in Edit mode, it is used to increase the value of edited item.
- **C** is the DOWN button to move menu selection down when used in navigation mode. When used in edit mode, it is used to decrease the value of edited item.
- **D** is the INPUT of the device. Though a stereo socket is used, only the tip (top most) and base (bottom most) connections are used. The base should be connected to the common ground of input circuit and the tip should be the trigger signal, and activation should be shorting the tip and the base.
- **E** is the output port of 1 (corresponds to T1 and D1) and port 2 (corresponds to T2 and D2)
- **F** is the output port of 3 (corresponds to T3 and D3) and port 4 (corresponds to T4 and D4)
- **G** is the output port of 5 (corresponds to T5 and D5) and port 6 (corresponds to T6 and D6)
- **H** is the output port of 7 (corresponds to T7 and D7) and port 8 (corresponds to T8 and D8)

Each port is controlled by an optical coupler, when activated, the port terminals are shorted together. For each pair of port, ie, P1 and P2, P3 and P4, etc, they share the same base and the tip of

the port is the odd numbered port (P1, P3, P5, and P7) and the middle contact is the even numbered ports (P2, P4, P6, and P8).

Image shown below shows a Y cable is used to split the two ports for each connector. The green one is USUALLY connected to the tip and the red one is USUALLY connect to the middle contact. There can be some exceptions.



Pressing the orange mode button (**A** in first image) can toggle Edit and Menu modes. To edit the selected item in navigation mode, toggle the mode into edit mode, then use the UP and DOWN (**B** and **C** button in first image) to change the value of it.

The T's (T1, T2, T3, T4, T5, T6, T7, T8) are the time, ie, when, to

activate the output port. The D's (D1, D2, D3, D4, D5, D6, D7, D8) are the duration of activation for the port.

In edit mode, when input signal arrives, the device still reacts to it as though in normal mode and activates all enabled (associated T's are not "off") outputs.

## **Modes of Operation**

The device can be set to one of the two operating modes -- **Multi** and **Round**.

**Multi** mode. In this mode, when input signal arrives, all enabled ports will be activated according to its trigger time (the Ts associated with each port) and will stay activated for its duration (the Ds associated with each port). The device will stay activated until all ports are finished.

Here is one example: let's say two ports are enabled, the P0 and P4 with parameters associated with them as following: P0: T0 = 200ms and D0 = 5ms and P4: T4=1003ms D4 = 5ms. In **Multi** mode, the P0 will be activated at when time reaches 200ms mark and P0 will stay activated for 5 milliseconds. The device will stay in running mode (Exec in menu bar) P4 is finished after 1003ms+ 5ms = 1008ms later.

Note, any input signal will be ignored during the time period the device stays activated, ie, in Exec mode shown in menu bar. In above example, input signal will be ignored till 1008ms later.

To cancel activation, simply press the Orange button (**A** button in first image). For example, if the A button is pressed before 1008ms, the operation will be cancelled and device goes back to its original mode before activation.

**Round** mode. In this mode, not all enabled ports are activated when signal arrives at INPUT port. Rather, the enabled port will be activated in **Round Robin** manner for each INPUT signal. In above example with P0 and P4 enabled. The first input signal will activate the P0. The second signal (after P0 is executed) will activate the P4. The third signal, however, will start from P0 again (round robin) since it is the NEXT enabled port from P4. This process goes on until the A button is pressed to cancel out this operation mode.

Signals will be ignored until activation of a port is finished. Take above example, when P0 port is being activated, which lasts  $200 + 5 = 205$ ms, any signal during this time period will be ignored.

Why **Round Robin** mode? In this mode, the device allows multiple flashes being triggered in sequence. This is beneficial, for example to overcome long flash charging time.

## **Input Triggering Type**

This device allows to react to three different type of input signals, namely, Edge Down, Edge Up, and Level.

**Edge Down.** For this type of input signal, the device is expecting a signal change from HIGH to LOW. This is a bit too technical, but

lets take one example. You can think of it as a push button switch that outputs a HIGH level voltage when not pushed down. So during its normal state, not pushed down, the signal level is HIGH. However, as soon as you push the switch down, the output of this switch will be LOW. This transition from HIGH to LOW is an edge down signal. So if this device is programmed to take such signal, it will react as soon as the switch is pushed down.

**Edge Up.** For this type of input signal, the device is expecting a change of signal from LOW to HIGH. Take the above push button switch as example, after the switch is pushed down, it generates a **Edge Down** signal. If this device is programmed to accept an **Edge Up** input, pushing down the switch, which generates a signal from HIGH to LOW, an **Edge Down type**, will NOT activate the device. However, **when the switch is released**, the signal level will change from LOW to HIGH, this is the **Edge Up** signal and it will activate the device.

**Level.** Both **Edge Down** and **Edge Up** input signal ONLY reacts to the **Change or Transition** of signal and does not respond to steady signal level. But for Level trigger, the device expects a **LOW Level** signal. So as long as the input stays LOW, the device will continue to react to it.

## **Saving of Settings**

To save settings, press and hold the mode button (A in the first image) for over 2 seconds. This feature allows all setting to be recovered after power off and on again.

## **Applications**

- Multiple exposure with flashes.
- Multiple camera shooting from different angles
- Bullet time photography