



EZ-3micro 3.1 Stage Timer

Version 1.1

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DESCRIPTION

The EZ-3micro (EZ-3u) is a brand new take on an old paradigm: the 3-stage timer. Using advanced microcontroller technology, the EZ-3micro brings the simplicity of three-stage timing with reliability and repeatability that is not available with analog timers. Unique to the EZ-3u is the ability for the user to set the timing ranges of each stage, allowing it to be customized to your application. In addition to the standard three stages, the EZ-3u provides an additional output – the “.1” – for starting audio players or quick activation of valves, relays, or other DC devices.

PRODUCT APPLICATIONS

- Museum and educational exhibits
- Holiday props and displays
- Film/TV/Theater effects and prop control

FEATURES & BENEFITS

- Self-contained – no programming required!
- Flexible start inputs
 - dry contact, DC voltage, PIR, and on-board push-button
- Control PRE delay timing, RUN timing, and OFF delay timing
 - set with on-board potentiometers
 - each phase indicated with color-coded LED
 - configuration mode allows user to adjust each range
- Relay output for controlling AC and DC devices
- Pulse output for controlling short-duration, high-current outputs
- Audio output (follows Pulse timing) to starting external audio player
 - Open-Collector and 5 VDC options
- 2.1 mm (center positive) power input
 - 12 to 24VDC
- Compact size: 3.5” x 2.5” (88.9mm x 63.5mm)

Power Connection and Power Switch

Power to the EZ-3u controller is provided through a 2.1 mm, center-positive barrel connector (commonly used with “wall-wart” power supplies).



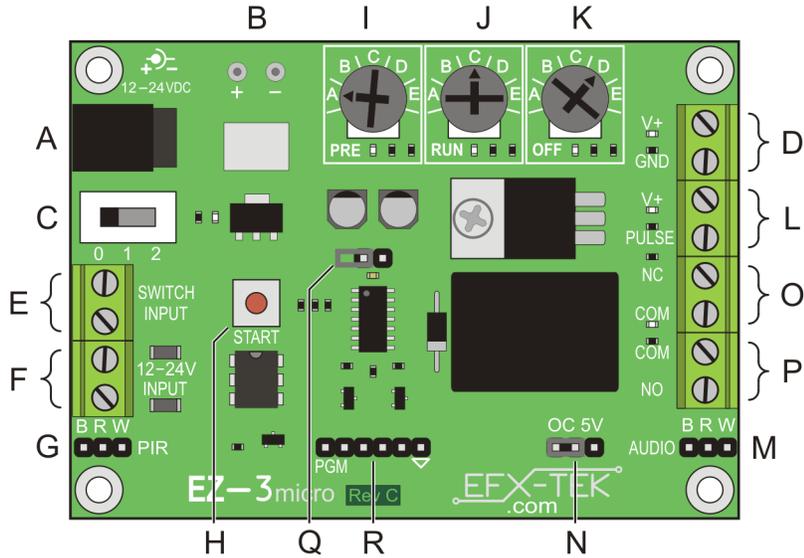
CAUTION: Check the power supply carefully before connecting to the EZ-3u; the use of a center-negative, AC, or unregulated supply that significantly exceeds 12 VDC may damage the controller.

Before connecting power to the EZ-3u controller, ensure that it is not resting on a metallic (conductive) surface; doing so could damage the EZ-3u circuitry and external power supply.



NOTE: Do not exceed 24 VDC at the input of the EZ-3u controller. Doing so may cause the on-board regulator to overheat and shut-down, preventing operation of the controller. When in doubt, use a regulated power supply.

EZ-3micro Connections & Controls



- A. Power input: 2.1mm barrel jack; 12 to 24 VDC
- B. Power input pads: 12 to 24 VDC
- C. Power switch (OFF / Configure / Run)
- D. Switched power output
- E. Start input: dry contact
- F. Start input: 12 to 24 VDC
- G. Start input: PIR
- H. Start input: manual button
- I. PRE delay potentiometer
- J. RUN time potentiometer
- K. OFF time potentiometer
- L. High-current pulse output (valve, relay, etc.)
- M. Open-collector/5V pulse output (audio player)
- N. OC/5V configuration jumper
- O. Normally-closed relay output
- P. Normally-open relay output
- Q. Pot configuration jumper
- R. Programming header (for hackers; see note)



NOTE: While a programming header is provided for advanced users interested in hacking the EZ-3u for their own purposes, EFX-TEK provides no support for hacking beyond a schematic for the product. Schematic is available from www.efx-tek.com.

Power Input

The EZ-3u is powered from 12 to 24 volts DC. DC power may be connected to via the 2.1mm power jack (A) or through the V+ and GND pads (B) located just above the power jack. When the power switch (C) is in position 2 (Run) the input power is routed to the V+ and GND output terminal block (D); this can be useful for providing power to the relay contacts or sharing power with other devices (e.g., audio controller).

Trigger Inputs

The EZ-3u provides four options for triggering its operational cycle:

- Dry contact (button, mat switch, etc.) terminal (E)
- 12 to 24 VDC input from another controller (F)
- PIR (G)
 - 3-pin header provides power and signal connections for Parallax-compatible PIR sensor
- START button (H)

All inputs are active and may be used together if desired.

Relay Outputs

The EZ-3u provides normally-open and normally-closed relay outputs for the period of the run cycle. These terminals are capable of switching AC or DC up to 5A.

Pulse Outputs

Unique to the EZ-3u are the pulse outputs that are active at the beginning of the run cycle.

- High-current, open-collector DC output (L) for valves and relays
- Low-current, open-collector or 5 VDC output (M) for audio players
 - output set with configuration jumper (N)

The high-current output terminal is designed for use with valves, relays, LEDs, and other DC devices. The positive side of the device is connected to the V+ terminal, the negative side of the device is connected to the PULSE terminal.

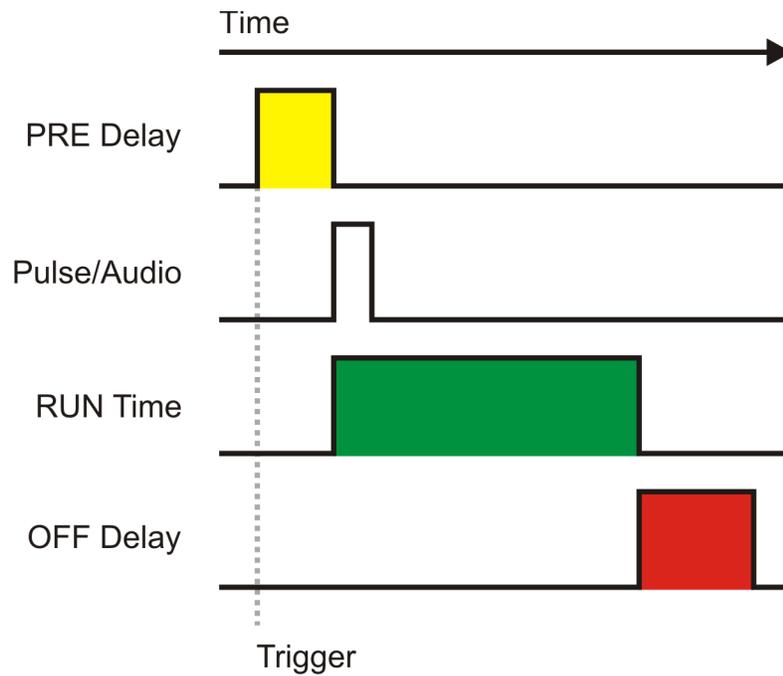
The low-current AUDIO output header may be configured for Open-Collector (OC) or 5 VDC output. The 3-pin audio header provides ground (B pin), 5 VDC (R pin), and selected pulse signal (W pin).

EZ-3micro Operation

As with traditional 3-stage timers, the EZ-3u waits for a trigger signal. When a trigger input is detected, the PRE delay timing is started; during this period the PRE delay LED (yellow) will light. When the pre-delay timing is complete the RUN timing is started; during this period the RUN time LED (green) is lit and the on-board relay is active. When the run timing is complete the relay is deactivated and the OFF timing is started; during this period the OFF time LED (red) is lit and the EZ-3u will ignore its trigger inputs. At the completion of the off-timing period, the red LED will extinguish and the EZ-3u is ready for another trigger input.

What makes the EZ-3u unique is the addition of pulse output signals that occur at the beginning of the run cycle. These outputs can be used to run a short-duration DC output (PULSE terminal) or to start an external audio player (AUDIO terminal).

The illustration on the following page visually describes the sequential operation of the EZ-3u on detecting a trigger input.



Configuration

The EZ-3u is ready-to-run; simply connect a suitable trigger and desired outputs, then set the PRE, RUN, and OFF stage potentiometers as required for the prop or display. Another feature of the EZ-3u that sets it apart from similar controllers is the ability to configure the timing span for each potentiometer, as well as the pulse output timing.



IMPORTANT: Disconnect any devices controlled by the Pulse or Audio outputs before entering the configuration mode.

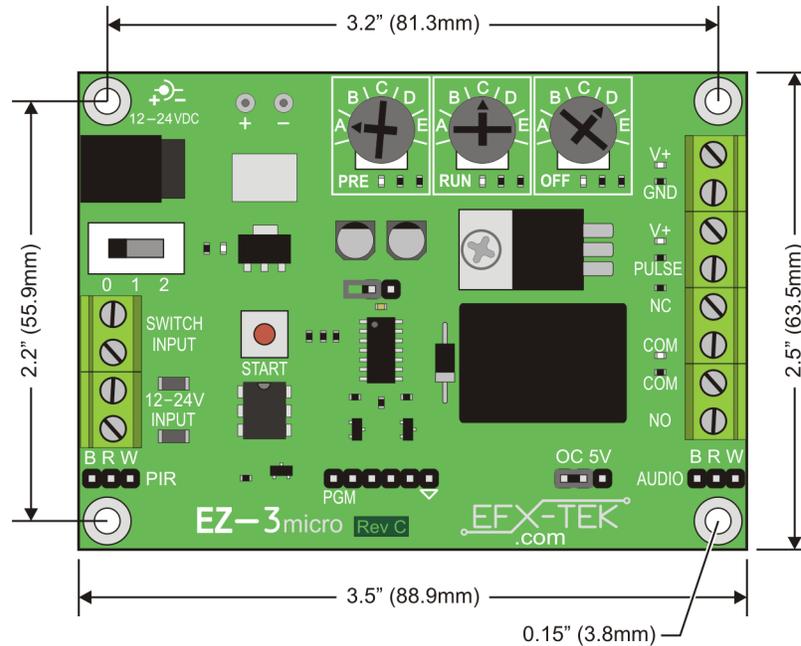
- Power up (position 1) with configuration jumper installed; wait for flashing PRE LED.
- While PRE LED is flashing, set PRE pot to desired zone. Press START to set
- While RUN LED is flashing, set RUN pot to desired zone. Press START to set.
- While OFF LED is flashing, set OFF pot to desired zone. Press START to set.
- While PULSE LED is flashing, set RUN* pot to desired zone. Press START to set.
- When all LEDs flash, your settings are saved. Power down and remove configuration jumper.

* Note: Setting the Pulse timing uses the RUN pot.

	Zone A	Zone B	Zone C	Zone D	Zone E
PRE Delay	(0-10s)	0-20s	0-30s	5-15s Random	10-30s Random
RUN Time	0.5-10s	(10s-1m)	10s-2m	10s-3m	10s-5m
OFF Time	10-30s	(10s-1m)	10s-2m	10s-3m	10s-5m
PULSE / Audio	(0.25s)	0.50s	1.00s	2.50s	5.00s

Values in parenthesis () denote factory settings for PRE, RUN, OFF, and PULSE timing

Mechanical Specifications



Electrical Specifications

Parameter	Symbol	Specification			Unit
		Min.	Typical	Max.	
Supply Voltage	V_{IN}	7.5	12	24	VDC
Supply Current	I_{IN}			150	mA
RELAY Voltage	VR_O			240	VAC
RELAY Current	IR_O			5	A
PULSE Output Current	IP_{OUT}			5	A
Audio Output Current (OC setting)	IA_{OUT}			50	mA
Audio Output Voltage (5V setting)	VA_{OUT}	4		5	V

Product Changes

- 01 OCT 2012: Run timing for Zone A setting changed from 10s-30s to 0.5s-10s.
 New potentiometers for better "feel."
 PCB marked **Rev D**