

PICO

Altimeter

TM1/2 manual V2

Congratulations on your purchase of one of rocketry's smallest timers.

This unit is very versatile and has many applications.

Let me touch on a few here.

Applications:

- 1) Breakwire/G-switch staging timer.
- 2) Breakwire/G-switch chute deployment timer.
- 3) Pull pin de-thermalizer.
- 4) Breakwire/G-switch controlled servo release mechanism.
- 5) Breakwire/G-switch controlled camera shutter trigger.
- 6) Breakwire/G-switch controlled servo for camera shutter.
- 7) Altimeter/MAD triggered timer for dual deployment.
- 8) Altimeter/MAD triggered servo release mechanism.

Contents:

- 1) Pico timer unit
- 2) 4 pin header
- 3) This manual

Power Source:

The timer requires a 2.5 to 5.5V power source. This source is also applied to the output when the timer times out. If you are using some sort of e-match you should be certain the power source is capable of lighting it. You can use a capacitor to store a charge to help boost the output. If required use a capacitor.

Mounting in rocket:

There is a mounting hole in the middle of the board. Install as needed

Output:

The output is a MOSFET that pulls the output to ground.

This can handle over 4A so can easily fire an Ematch.

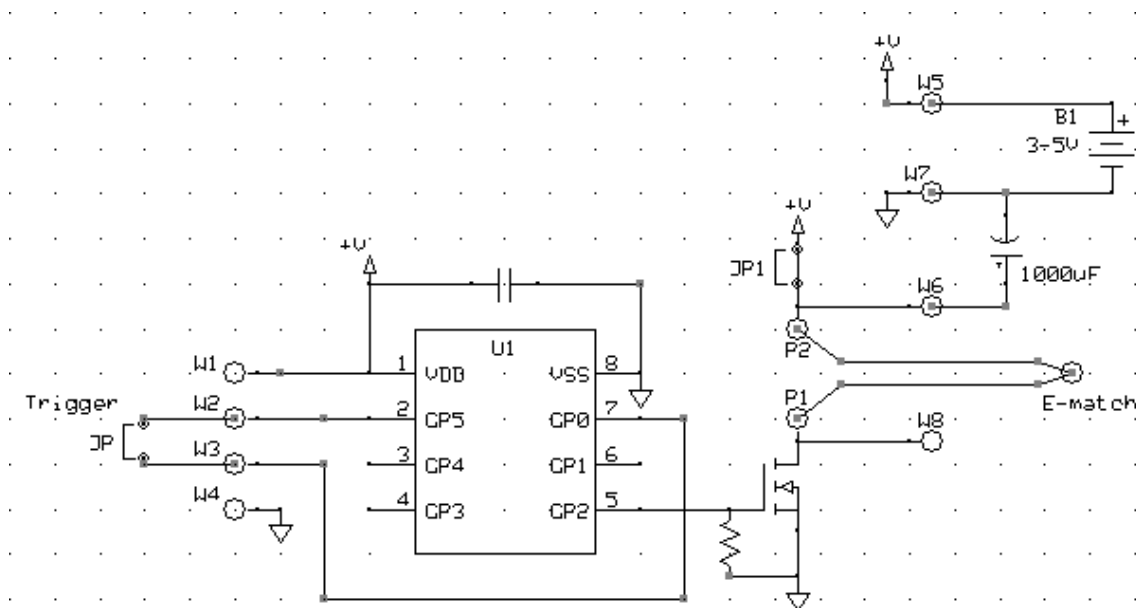
There is space for a pull up resistor (R2) that is used in applications that need digital output like servo control.

There are two places you can connect to this output.

The first is P1 and this allows you to insert the e-match lead directly into the optional socket at P1.

The second is at pad W8. With this way you can connect a remote e-match or connect a servo.

Staging timer



This timer can be used for staging or other applications .

It can be powered from a 3V lithium battery or two 1.5V cells like two AAA or N cells.

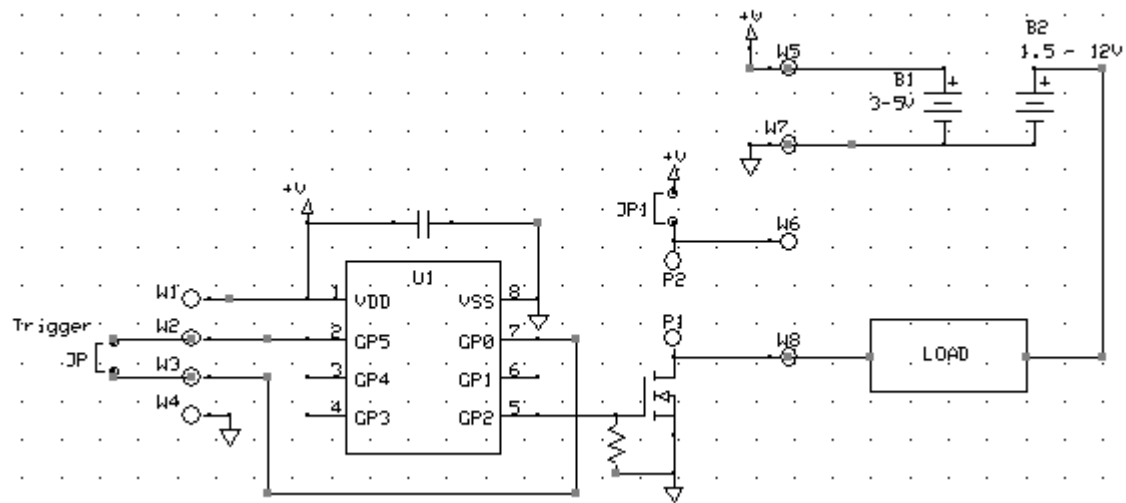
The capacitor stores the charge used to fire the e-match.

J1 can be a permanently soldered piece of wire, or if you are concerned about the charge current of the cap you could put a 0804 chip resistor for JP1.

The trigger jumper could be replaced by a G-switch if needed.

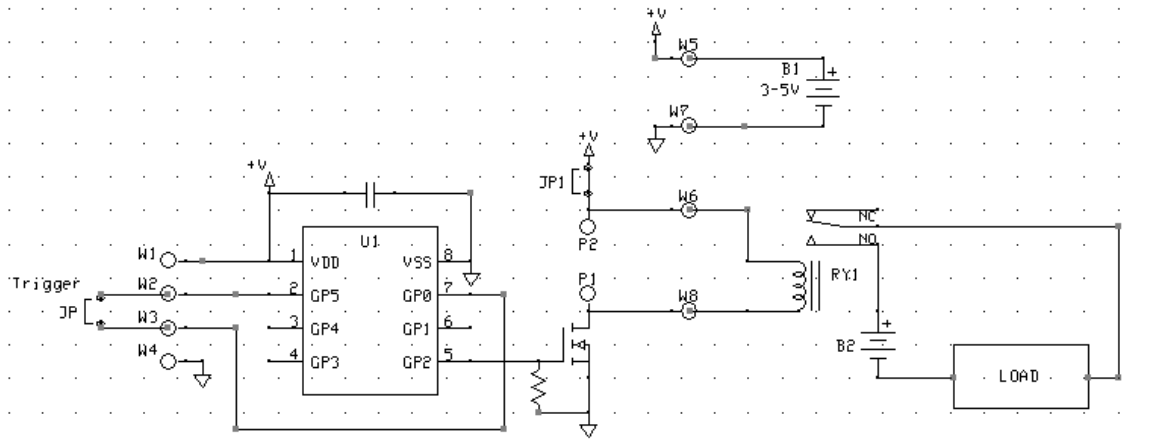
Be sure to test your setup with the battery you choose and also the e-match. Remember not all e-matches are created equal.

Using two batteries



This allows you to use two different power sources. This is handy if your load requires higher voltage than the 5.5V max the timer can handle. The batteries simply need a common ground.

Using a relay for isolation



This circuit is useful if you need very high power output.
The relay contacts isolate the load from the timer.

Timer trigger:

The time period starts when the initialize event occurs.

Using the software you can specify what event will start the timer.

N.O. refers to a normally open contact. The timer will start when it closes.

N.C. refers to a normally closed contact and the timer will start when it opens, like a break wire

Burnout can be detected if you connect a G-switch to the inputs. This allows you to have the time interval start at the burnout of the motor. This can be useful for airstarts or staging. Lets assume you are using a N.O. G-switch. Upon motor ignition the G-switch closes its contacts. When the contacts open back up the timer starts its time period.

Sensitivity: From the software you can adjust the sensitivity of the trigger. From the trigger section select Advanced. The default value used is 100. This indicates that the trigger contacts need to be triggered for 100mS out of 250mS. The system samples the trigger input every 1mS. If it is activated it increments the sense value. When the sense value reaches the value set from the advanced section the timer period starts. Every 250mS the sense value is set back to zero to start another sampling session. This way you get to control how sensitive you want the value. If you set it to 200 then you have less chances of accidentally triggering it. If you set it to 10 then it will trigger very quickly.

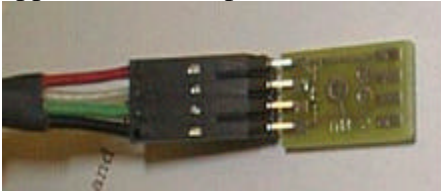
Timer adjustment

Timer adjustment requires an optional cable and software.

The timer takes its power from the computer serial port while it is being programmed.

The timer is supplied with a 4 pin header that is used to connect the configuration cable.

This header can be soldered to the board or just inserted into the programming cable and pressed firmly to the contacts for programming. Choose the method that best fits your application. This photo shows the cable being pressed in place.



Here is an outline of the steps required to reprogram the timer:

- 1) Hook up the serial cable
- 2) Run the software and reprogram the timer
- 3) Disconnect the serial cable

The software is very easy to use.

You start the program and select “Administer PICO” from the Tools menu.

Press the “Connect” button to connect to the timer.

When connected the label on this button changes to “Disconnect”.

Once connected the software reads the values from the PICO and will display the model, version and serial number of the timer.

It will also display the current settings.

Make any changes needed to the settings.

Press the “Write values to PICO” button and it will download the new values. The status window will indicate when the download is complete. To verify the values were written press the “Read values from PICO” button.

The screenshot shows the 'Administer' dialog box with the following elements:

- Connect** button
- Read Values from PICO** and **Write Values to PICO** buttons
- Fields for **Model:**, **Version:**, and **SN:** with a **Set Defaults** button
- Timer Delay(seconds)**: 5, **Second Delay**: (empty)
- Total Retrigger times**: 1, **Start After**: (empty)
- Use Two timer periods**
- Start Detect** section:
 - NC-Starts on open circuit**
 - NO-Starts on closed circuit**
 - Burnout detect**
 - Advanced** button
- Servo setup** section:
 - Enable Servo drive**
 - Servo Off position**: (empty)
 - Servo On position**: (empty)
 - Test Position** button
- Status:** section with a large empty text area and scroll arrows

PICO administer dialog

Administer Dialog sections

Delay settings

The delay is adjustable in ½ second intervals, note on very short times that there is ½ second delay for start detect.

If you want it to fire the output more than once for camera applications then set the number of retrigger times in the associated edit box.

If you want to use two different time delays then check the box to enable it and the second set of edit boxes become active.

When used with a camera, this allows you to take pictures in fast succession on the way up, but slow the picture taking after apogee.

Start Detect

There are several different ways to start the timer.

NC stands for Normally Closed and when selected the timer will start when the sense inputs are opened. This is generally used with a pull pin, or burn wire.

NO stands for Normally Open. When the sense pins are shorted together the timer starts. This could be used with a micro switch that's pressed in by the launch rod.

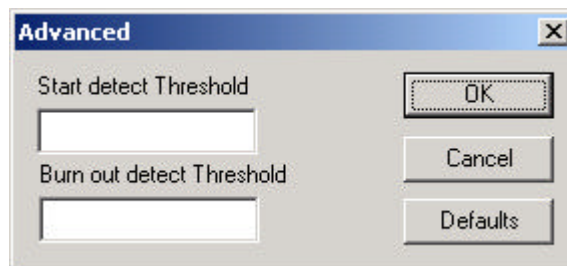
Or simply a switch you flip to start the timer.

Burnout detect is used in conjunction with NO or NC and allows you to detect burnout with a g-switch.

When the motor lights the g-switch contacts close. When the motor burns out, the contacts open again.

This second event will start the timer if you select Burnout detect.

The Advance button will bring up the Advanced dialog.



Advanced dialog

This allows you to adjust the sensitivity of detection.

To detect start the timer samples every 1mS for 250 samples.

The value in the box is the number of milliseconds the input needs to be active in order to trigger the timer.

Servo setup

This section is used if you have a servo attached to the timer.

To use a servo, please verify the servo resistor is installed.

The timer will drive the servo between two locations, the Off position and the On position.

It will stay in the On position for as long as the output is set to stay on (defaulted to 1/2sec On).

This allows you to trigger a camera without modifying it.

The servo travel is broken up into 10 parts, zero being all the way to one side and 10 all the way to the other side.
The Test Position button will bring up a dialog to allow you to test the position on the fly.



Test Position dialog

Simply move the slider and the servo will change to that position. Once you have determined the positions you want to use click Done to close the dialog.

Status

This displays details about what the software is doing.

Specifications:

| | |
|--------------------|------------------------------|
| Circuit board size | .7 inch x .4inch |
| Weight | Under 2grams without battery |
| Minimum delay | ½ second |
| Maximum delay | 32767.5 seconds |
| Adjustment steps | ½ second |
| Start event | N.O. or N.C. switch contact |
| Max cycles | 255 |
| Power requirements | Min = 2.5V, Max = 5.5V |
| Output | 4.2A continuous, 33A pulsed |

Limited warranty:

This unit is warranted against defects in workmanship for a period of one year from the date of purchase. The manufacturer will repair or replace the unit at its own discretion. Misuse of or modifications to the unit voids all warranties.

Limitation of Liability:

In no event will the manufacturer, its employees or its suppliers be liable for any incidental or consequential damages whatsoever (including, without limitation, damages for loss) arising out of the use or inability to use this product, even if the manufacturer has been advised of the possibility of such damages..

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

This unit is a toy. As such no claims are made or implied as to the suitability or capability of this product in the manner in which you want to use it. The user accepts all responsibility for use of the unit.