555-o-tron Astable Oscillator Configuration

www.MaximumOctopus.com/electronics/555otron.htm

You’ll find the latest versions of the instructions at the address at above.

Thank you for purchasing the 555-o-tron kit! I hope you have lots of fun with it!

If you have any suggestions for future boards then please let me know. I’ll send you some free boards if I like your idea!
Kit Contents

This kit was put together by a team of highly skilled octopuses; it should contain the following items:

1)  The main PCB  
2)  555 timer IC  
3)  8 pin DIP socket  
4)  0.1uF capacitor  
5)  6 pin female header  
6)  4 pin male header

Important Things to Remember

This kit is designed to run from 5V. Do not exceed 5V or the IC will be damaged. It will work fine from 4x 1.2V rechargeable batteries or 3x 1.5V alkaline batteries.

The IC socket and 555 IC must be placed on the board in the correct orientation or 555-o-tron will not work.

The 555 ICs are sensitive to static shocks so handle them with care and avoid touching the legs (pins).

Before soldering any components check and then double-check that they are correctly oriented.

Don’t rush, and have lots of fun!

If you need a good tutorial on soldering then SparkFun Electronics has a good one (https://www.sparkfun.com/tutorials/106) as does Adafruit Industries (http://www.ladyada.net/learn/soldering/thm.html).
Building Instructions

You will need a soldering iron, solder, an octopus (or a set of handy helper things) and wire cutters. To keep some of the large components in place while soldering you might find Blue-Tac useful to stop them moving around or falling off.

Take your time and check the placement of every component before soldering them in place!

All of the components sit on the top of the board, solder them to the underside.

STEP 1 – DIP socket

The socket is optional. The 8 pin socket will eventually hold the 555 timer IC. Don’t put chips in until the end.

Place it on the board so that the “notch” is facing the 4 pin header socket.

STEP 2 – 6 pin header

The 6 pin header goes to the left of the DIP socket and will eventually hold the resistors and capacitor that control the 555’s square wave output. It can go on the top or bottom of the PCB.

STEP 3 – 4 pin header

The four pin header can be placed above or below the PCB. It has four connections:

- OUTPUT (the square wave from the 555)
- GND (ground power connection)
- Vin (positive power connection, 3v to 9v)
- CTRL (connects directly to the 555’s CONTROL pin

STEP 4 – The Capacitor

There is a single capacitor and is labelled C1 on the PCB. It is not polarised, it can go in anyway round.

STEP 5 – Placing the 555 in to its socket

Now all of the components have been soldered to the board it’s time to place the 555 chip in to its socket. They should be socketed so the notch on the chip is on the same side as the notch on the socket – facing the 4 pin header.

Before you try to carefully slot the chip in to socket you’ll notice that the legs are spread out too much to fit. They’ll need to be bent inwards before they’ll fit. DO NOT FORCE IT.

The way I like to do this is by very carefully pressing each side of the chip on my desk until both sets of pins are parallel. Once the legs are parallel it will take a bit of force to push the chips in to the sockets, be gentle and patient.
How To

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T_1 \text{ (on time)} = 0.693 \times (R_1 + R_2) \times C
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\[
T_2 \text{ (off time)} = 0.693 \times R_2 \times C
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\[
\text{Time} = 0.693 \times ((R_1 + 2R_2) \times C)
\]

\[
\text{Frequency} = \frac{1}{T} = \frac{1.44}{((R_1 + 2R_2) \times C)}
\]

\[
\text{Duty cycle} = \left(\frac{T_1}{T_1 + T_2}\right) \times 100
\]

The 555 will output a square wave (pin 3) controlled by resistors R1 and R2, and capacitor C. The formulae for calculating the parameters of the square wave are found above.
If you have any comments or suggestions for this kit then please let us know.

For more information, updates and details of new kits check out the following links:

- Website  [www.MaximumOctopus.com](http://www.MaximumOctopus.com)
- Twitter  [http://www.twitter.com/maximumoctopus](http://www.twitter.com/maximumoctopus)
- Blog  [http://maximumoctopus.wordpress.com](http://maximumoctopus.wordpress.com)
- YouTube  [https://www.youtube.com/user/freshneyorg](https://www.youtube.com/user/freshneyorg)

This kit was designed and manufactured in the UK.

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