6 Digit 7-segment LED Counter


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

Thank you for purchasing the Angus 6 board! 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) 6x Kingbright 7-segment LED displays
3) 42x 330Ω resistors
4) 6x 16 pin DIP sockets
5) 6x 4026B 7-segment decimal counter ICs
6) 6x 0.1µF capacitors
7) 2x 4 pin male headers
8) 1x 10k resistor
9) 1x push button switch

Important Things to Remember

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

If you plan on driving this device from a voltage other than 5V then different resistors will be required.

The ICs can be run from higher voltages (check the datasheet), but the LEDs cannot.

The 7-segment LED devices and IC sockets (and corresponding ICs) must be placed on the board in the correct orientation or Freeman will not work.

The six counter 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 – Resistors**

Solder each of the 42 330Ω resistors on to the board first, these go in batches on 7, located just below the 7-segment digits. These protect the LEDs from excessive current. It doesn’t matter which way around they go (but I like to make them all face the same way!).

They are labelled on the PCB as R1 to R7 (in 6 batches).

The single 10k resistor goes just to the left of the right-hand side 4-pin header. It is labelled 10k on the PCB.

**STEP 2 – DIP sockets**

These sockets will eventually hold the six 4026 counter ICs. Don’t put chips in until the end.

Place them on the board so that the “notch” is facing up, towards the 7-segment displays.

**STEP 3 – Headers**

These will be used to connect power and data to the board.

One of the 4 pin headers goes on the left hand side of the board, the other, the right hand side.

The pins are labelled:

- **GND** Connect to ground (0V)
- **5V** Connect to +5V
- **CLOCK** Connect this to the source to count
- **RESET** Pull this high to reset all 6 digits to zero

**STEP 4 – The 7-segment LED devices**

These can only be fitted one way, with the decimal points at the bottom.
**STEP 5 – The 0.1uF Capacitors**

There is one of these for each of the 4026 ICs. They are labelled on the board as C1 to C6.

They are not polarized; they can go in any way around.

**STEP 6 – The Switch**

The reset switch goes on the bottom right of the board. It will only fit one way.

**STEP 7 – ICs in to the sockets**

Now all of the components have been soldered to the board it’s time to place the two 74HC595 chips in to their sockets. They should be socketed so the notch on the chip is on the same side as the notch on the socket – facing to the right.

Before you try to carefully slot the chips in to sockets 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 THEM.

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.

That’s all the hard work finished. You should now have something that looks like this:

Connect the board up to the thing you want to count, and have fun!
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
- Twitter: http://www.twitter.com/maximumoctopus
- Blog: http://maximumoctopus.wordpress.com
- Online store: http://store.MaximumOctopus.com
- YouTube: https://www.youtube.com/user/freshneyorg

This kit was designed and manufactured in the UK.

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