

Backlighting the Opencockpits Mode Control Panel



The Opencockpits Mode Control Panel is a full size replica of the real unit used in the Boeing 737. Compared to many other manufacturers of this unit for flight simulators, it's very cost effective at only 300 Euro. It's fully plug n play but does need to be connected to the sim via SIOC code as does all the OC interfaces. The only drawback is that it isn't backlit. The laser etched faceplate is ready for backlighting but no lighting is supplied nor catered for in the circuitry. This is a major drawback for some builders leading to a decision to purchase from other manufacturers in some cases however there is a cheap and simple solution..... Do It Yourself!

But how? Well that's where this tutorial comes in. After searching forums and users sites I found a few scant descriptions of how you might go about doing this, one of which was a very obscure clip on youtube. So after viewing this clip and a little experimentation and investigation I came up with a method which I'll document for other owners or prospective owners of this otherwise fantastic unit.

As in my other projects I am using LED's over incandescent globes due to the much lower current draw and heat generation. First thing to decide is the number of LED's required and where to place them. Obviously the fewer the better due to the number of LED's to wire up in such a confined space and after experimentation I decided on 33 in the locations below:



These LED's are 3mm Ultrabright 15000mcd and provide plenty of light while also being small enough to fit between the circuit board and front plate which is a gap of only 10mm. The method to achieve this is very simple although very fiddly as it requires soldering a 300mm length of twin flex cable to each LED, then gluing each one onto the circuit board behind at the location required.

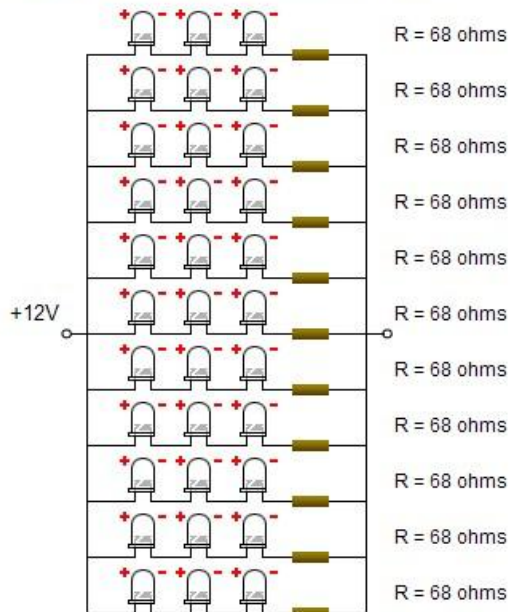


I purchased a circuit board from a local hobby electronics store which roughly had the solder tracks I required.



The LED's are grouped in 3's with a suitable resistor in series as per this circuit diagram:

Solution 0: 3 x 11 array uses 33 LEDs exactly



- each 68 ohm resistor dissipates 27.2 mW
- the wizard thinks 1/4W resistors are fine for your application
- together, all resistors dissipate 299.2 mW
- together, the diodes dissipate 2376 mW
- total power dissipated by the array is 2675.2 mW
- the array draws current of 220 mA from the source.

This circuit was sourced from <http://led.linear1.org/led.wiz/>. You might decide to use more or less just depends on how much work you want to do and how many LED's you can squeeze into the unit.



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Although fiddly it only took 2 hours to complete all soldering.

As all LED's have a lens to focus the light it's necessary to have them face the panel in front in order to provide maximum lighting so I bent the legs of each LED at right angle in order to fit them behind the faceplate. I also used heatshrink on each one so there was no risk of shorting. Be sure to determine the polarity of your wiring. This can be achieved by using colour coded wiring or, as in my case, a small piece of heatshrink on one leg of the wiring. Although I only needed 11 groups of 3 I catered for another 4 groups in case I needed to add LED's. This didn't end up being necessary.

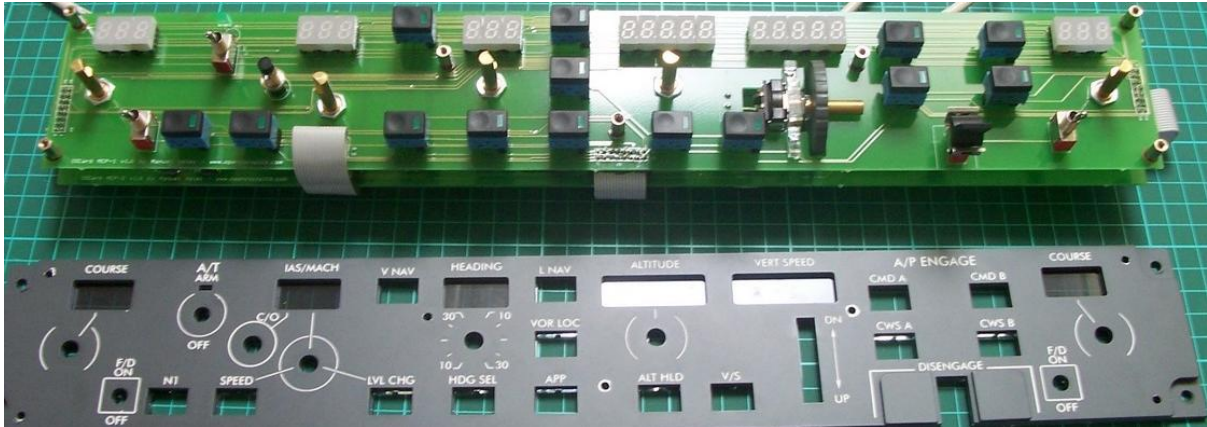


Solder the resistors onto the circuit board then all the LED wiring being sure to connect the polarity correctly. I checked each group of 3 as I went along using a 12v power supply so I didn't have any nasty surprises at the end. Of course test the whole circuit once completed.

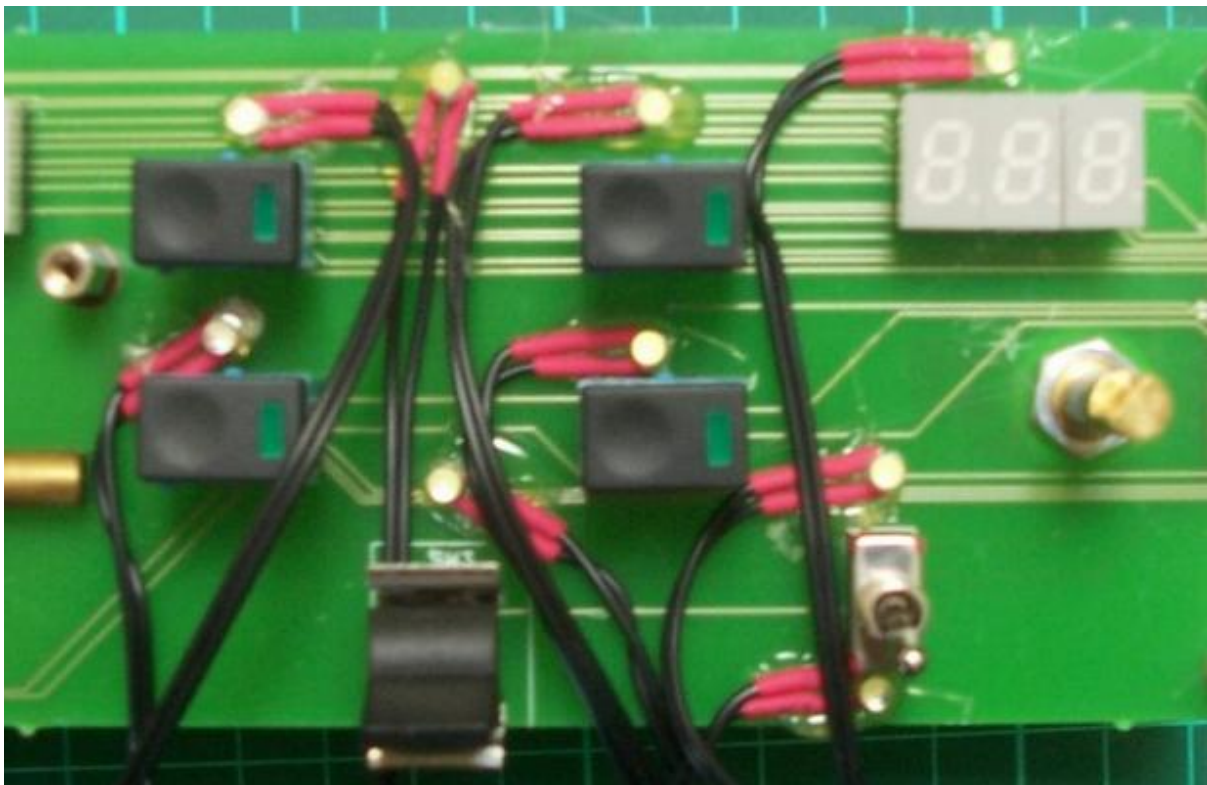


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The last challenge was to glue each LED onto the circuit board behind the lettering to be backlit. For this you will have to carefully dismantle the faceplate and glue each LED onto the circuit board behind in the most adequate location. Be sure to have the faceplate near you for reference.



I used hot glue as it was very sticky and quick drying.



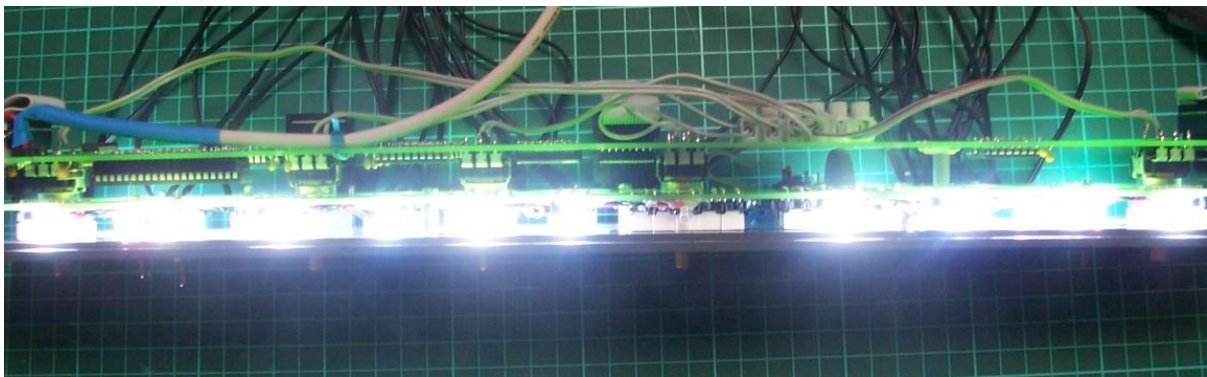
Now re-attach the faceplate and power up the LED's with a suitable 12v DC power supply to turn your Opencockpit MCP into a fully backlit unit. Tidy all the wiring which will hang out the bottom of your MCP and attach the circuit board to a secure location in your glareshield. Then power up using a power pack or PC power supply and you've backlit your MCP very cheaply and easily.



Here is the final result:



As you can see it's a tight squeeze but very manageable.



Here is the list of parts I used:

1. 33 x 3mm 15000mcd LED's
2. 11 x 68 ohm ¼ watt resistors
3. 33 x 300mm (12") thin twin flex cable
4. 1m Red heatshrink
5. Suitable circuit board
6. 12v DC power supply

Tools:

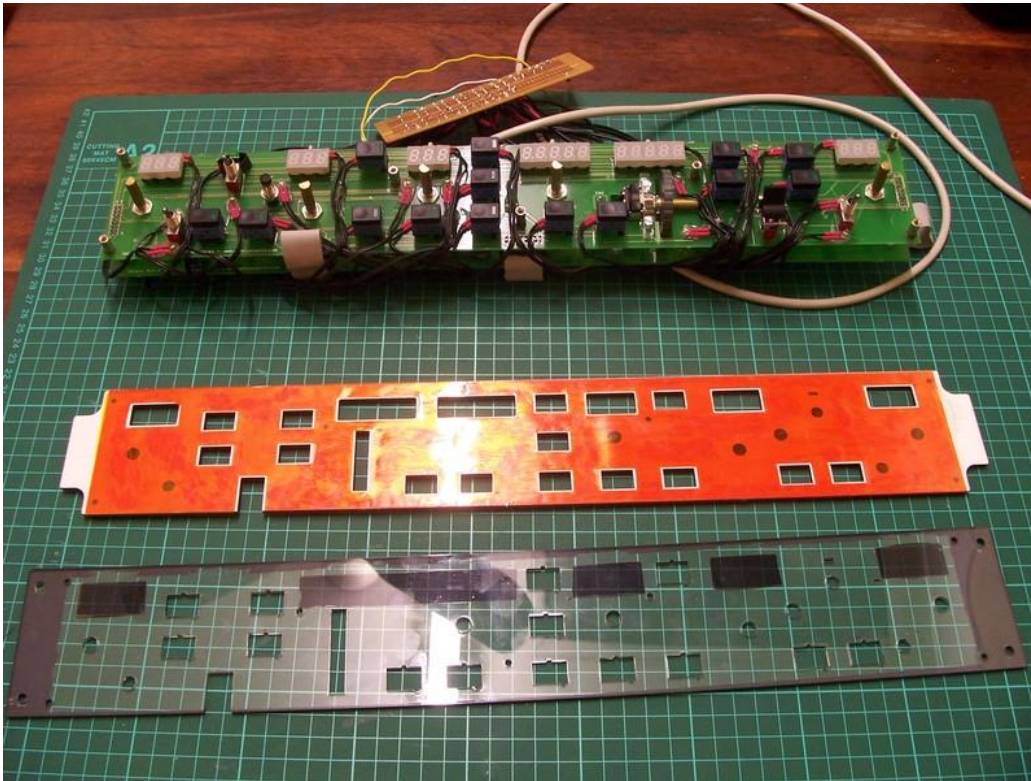
- Soldering Iron
- Heat gun
- Screw drivers
- Wire stripping knife
- Hot glue gun

As a final touch I decided to apply heavy duty cellophane in the form of lighting gel sheeting (the sort used for stage lighting) to give it a more orange tinge after reading Claude Kieffer's site [HERE](#). According to Claude's information the best combination of colour which results in a suitably pleasing orange is to use a sheet of yellow and orange together. I purchased the sheeting from ebay and they come in 1200 x 500mm sheets. I then removed the front plate (again) and applied a sheet of



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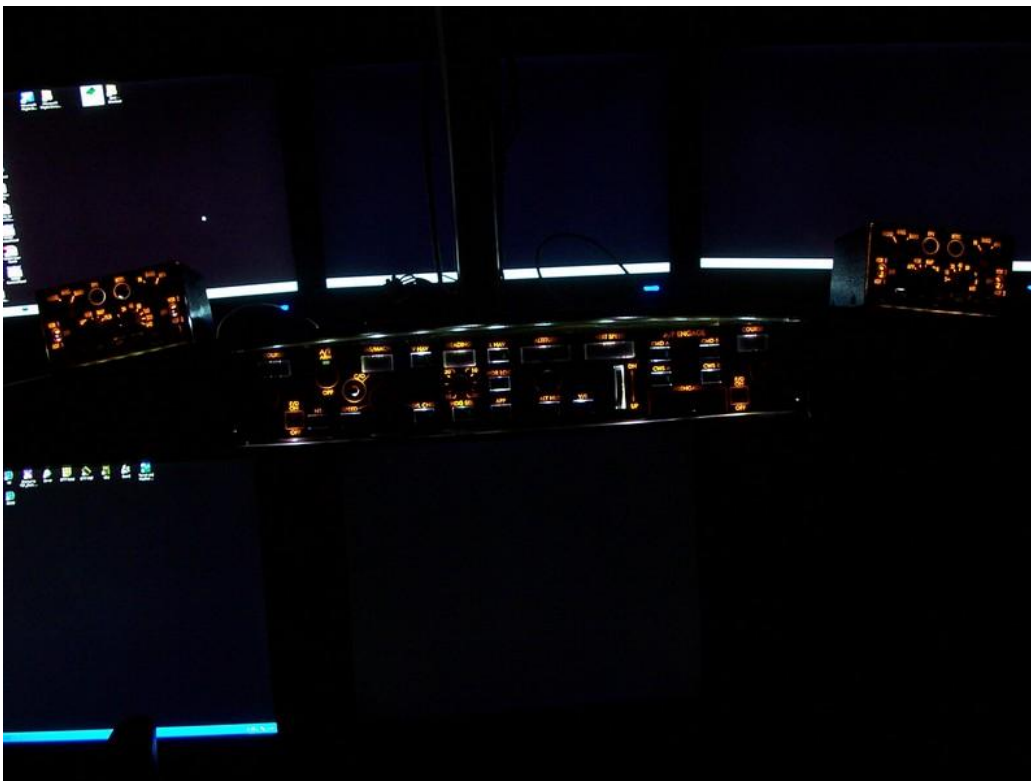
yellow and orange gel then cut away the holes. The Opencockpits panels have a white front plate and a clear support plate so sandwich the gel between the two for secure attachment.



Here is the EFIS completed and a comparison with the as yet un-coloured MCP.



All 3 panels completed.



And a night view. Hard to see but it's much more pleasing on the eyes than the stark white.



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