# Building the satellite board for the Picaxe 18A lightshow

These instructions describe the construction of the superflux LED satellite boards that are designed to be used with the Picaxe18A microcontroller lightshow kit. Assembly is very simple, as there are just a few components, and should take around 15 to 20 minutes per board.

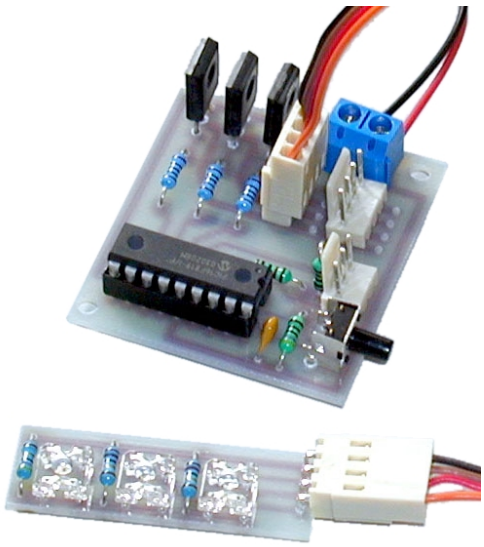
## Assembly

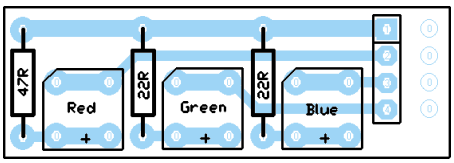
The satellite boards (which are not included in this kit, but are available sparately) are very simple–just use the right value resistors in the right places, and get the LEDs the right way around and in the right spots. The LEDs have a small bevel on one corner and this must line up with the bevel on the board overlay.

The interconnecting cables are simple enough–you can choose to have connectors on both ends, or hard wire the cable to the satellite board. If doing the latter, pass the cable ends through the respective holes in the satellite board before soldering into place–this acts to prevent the cable from breaking with repeated movement. To attach the header to the other end of the cable, do as follows:

Separate the four conductors for about 25mm along the cable and strip 5mm of insulation from the end of each one. Then fold the bare conductor back along the insulation, place in the crimp terminal and crimp with a suitable crimping tool. The ones used to terminate telephone crimp terminals work well, or if you are careful you can use a pair of long-nosed pliers. Just make sure the terminal is gripping the cable well. When fitting the terminated cable ends to the plastic header, make sure you get them the right way around, so that the +5 volt line is in the correct place, otherwise the LEDs will not flash correctly.

And that's about it!





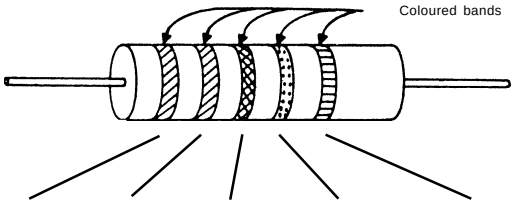

The circuit board and overlay for the satellite board, shown larger than actual size. Note that the resistor used with the red LED is a 47 ohm, whereas the other two LEDs have a 22 ohm resistor. This is due to the lower voltage drop across the red LED. It is very important to get the resistors and LEDs in the right places, otherwise the red LED may end up being overdriven, while one of the others is underdriven.

## Identifying the resistors

There should be no problems here, as there are only three of them, and the 47 ohm resistor is supplied separate while the two 22 ohm resistors are banded together. However, you might want to check their values anyway.

The coloured bands represent numbers and multipliers as shown in the table. Some resistors have four bands (two digits, a multiplier band and a tolerance band) while some resistors have five bands. Five-band resistors are read in the same manner as four-band resistors, except that the first three bands are digits, the fourth a multiplier and the fifth the tolerance band.

If you are unsure of a resistor's value, then make sure to check it with a multimeter.




| Colour | Hundreds | Tens | Units | Multiplier | Tolerance |
|---|---|---|---|---|---|
| Black | 0 | 0 | 0 | 1 | 20% |
| Brown | 1 | 1 | 1 | 10 | 1% |
| Red | 2 | 2 | 2 | 100 | 2% |
| Orange | 3 | 3 | 3 | 1000 | |
| Yellow | 4 | 4 | 4 | 10,000 | |
| Green | 5 | 5 | 5 | 100,000 | |
| Blue | 6 | 6 | 6 | 1,000,000 | |
| Violet | 7 | 7 | 7 | | |
| Grey | 8 | 8 | 8 | | |
| White | 9 | 9 | 9 | | |
| Gold | | | | 0.1 | 5% |
| Silver | | | | 0.01 | 10% |