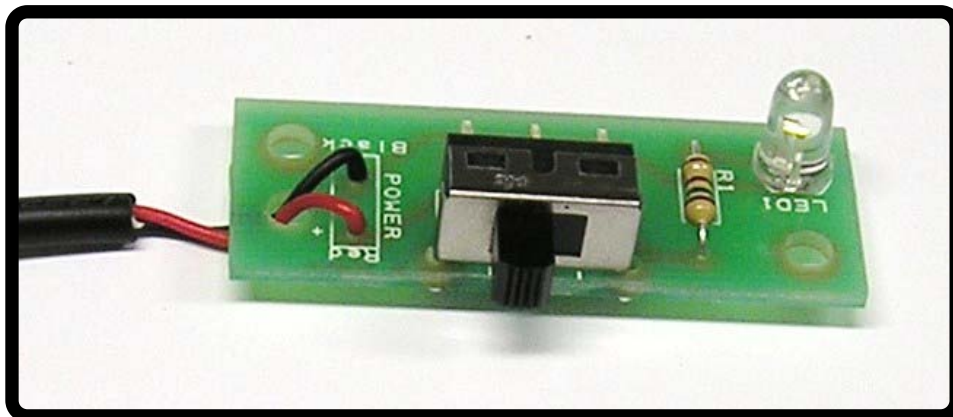




## USB lamp kit

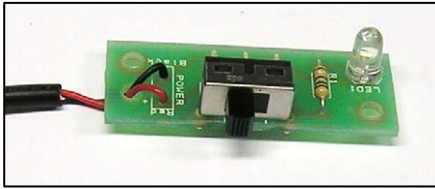


## Build Instructions

Issue 1.1



## Build Instructions



The finished USB lamp PCB is shown left. Before you put any components in the board or pick up the soldering iron, just take a look at the Printed Circuit Board (PCB). The components go in the side with the writing on and the solder goes on the side with the tracks and silver pads. You will find it easiest to start with the small components and work up to the taller larger ones. If you've not soldered before get your soldering checked after you have done the first few joints.

### Step 1

Start with the resistor R1 (example shown right). The text on the PCB shows where R1 should go. It doesn't matter which way around the resistor goes into the board.

If you are building the white light version of the kit:

R1 is a 150Ω resistor (it will be marked with brown, green, brown coloured bands).

Or if you are building the colour changing version of the kit:

R1 is a 0Ω (it will be marked with a single black coloured band).

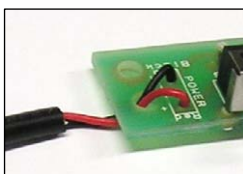


### Step 2

Place the Light Emitting Diode (LED - shown left) in to LED1. The LED won't work if it doesn't go in the right way around. If you look carefully one side of the LED has a flat edge, which must line up with the flat edge on the outline on the PCB. You can mount this facing up from the board, or if you prefer you can mount it at 90° angle to the PCB. To do this you will need to put a 90° bend into the LED legs, just make sure you bend it so the flat edge on the LED is next to the flat edge on the board. Once you are happy solder it into place.

### Step 3

Solder the PCB mount right angled on / off switch (shown right) into SW1. The row of three pins that exit the back of the switch must be soldered, but it won't matter too much if you can't solder the other two pins.



### Step 4

Finally the USB power lead needs to be connected. Feed the red and black wire of the lead through the strain relief hole (see left). The red wire of the USB power cable is soldered to the power connector labeled 'Red' and the black wire of the USB power cable is soldered to the power connector labeled 'Black'.

## Checking Your Circuit

Check the following before you plug your lamp into a USB port.

### Check the bottom of the board to ensure that:

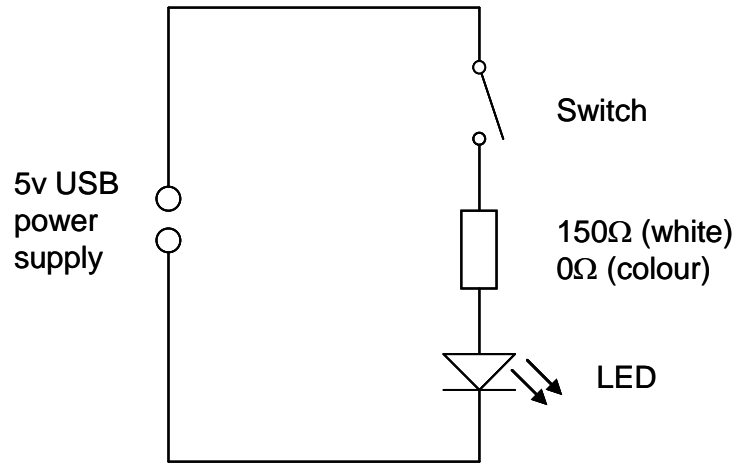
- All holes (except the two large mounting holes) are filled with the lead of a component.
- All these leads are soldered.
- Pins next to each other are not soldered together.

### Check the top of the board to ensure that:

- The flat edge on the LED matches the outline on the PCB.
- The red wire on the USB power cable is connected to the power connector labeled 'Red' and the black wire on the USB power cable is connected to the power connector labeled 'Black'.



## How the USB Lamp Works



The circuit diagram for the USB lamp is shown on the left. It is a very simple circuit. The 5V that powers the circuit is supplied from the USB connector.

LED's can be damaged if the current through them is not limited.

If you are using a white LED a 150Ω resistor has been selected to limit the current through the LED. This allows 10mA to flow through the LED so that it is at a good brightness.

If you are using a colour changing LED a 0Ω resistor is used instead. This is because the current limit resistor is built into the LED itself therefore we simply want to connect this LED directly to the 5V supply.

Finally the on off switch allows the circuit to be opened when the LED will be off or closed when the LED will be on