

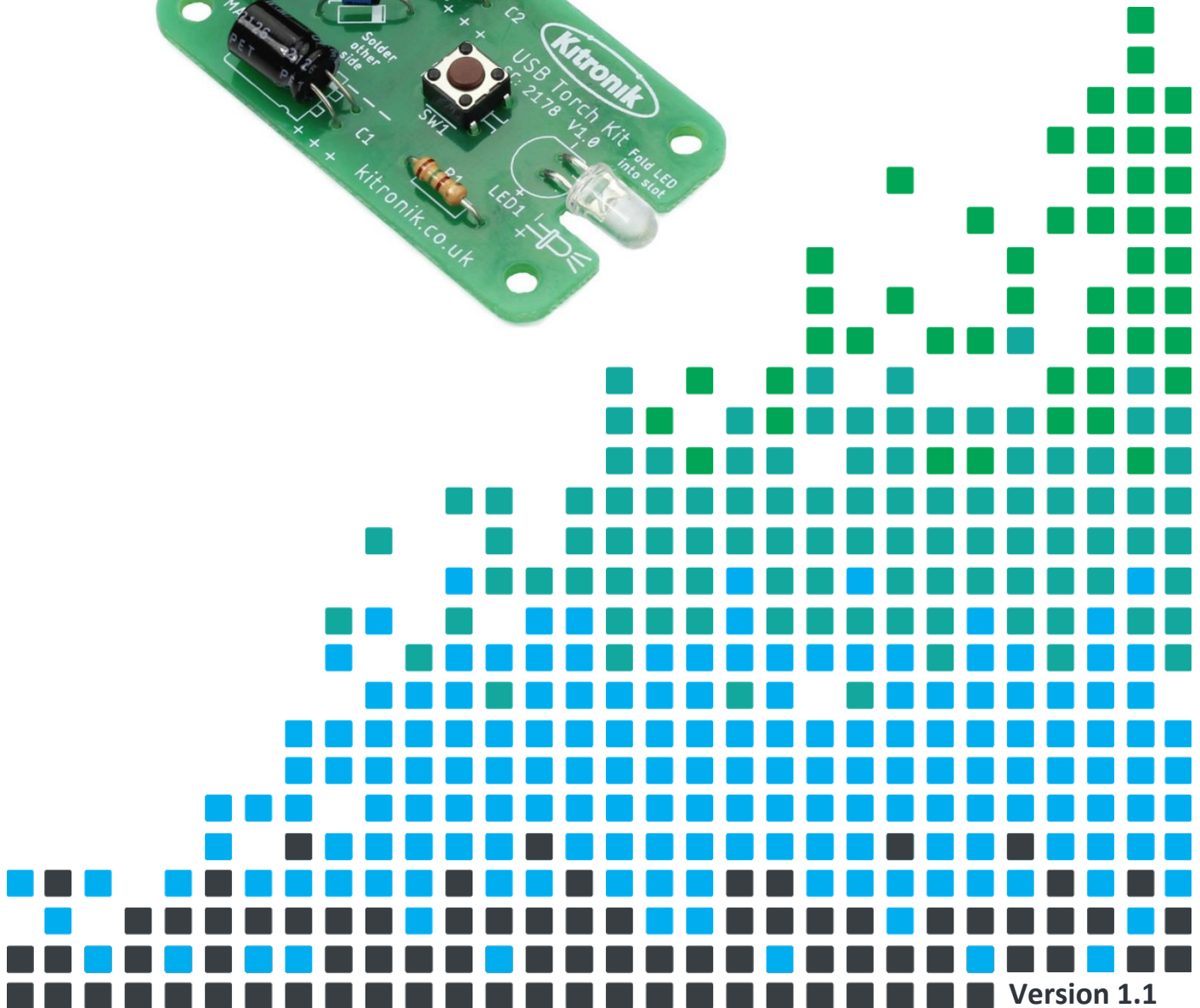
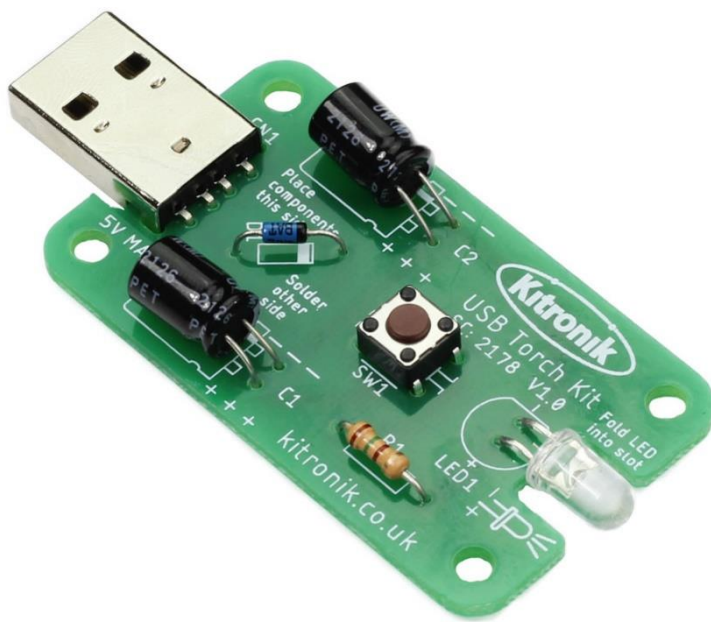


ESSENTIAL INFORMATION

- BUILD INSTRUCTIONS
- CHECKING YOUR PCB & FAULT-FINDING
- MECHANICAL DETAILS
- HOW THE KIT WORKS

LIGHT YOUR WAY WITH THIS

USB TORCH KIT



Build Instructions

Before you start, 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.

1 PLACE THE RESISTOR

1

The resistor R1 is 150 Ω . The text on the PCB shows where R1 should go. It doesn't matter which way around the resistor goes into the board. Once you are happy, solder them in place.



2 SOLDER THE SCHOTTKY DIODE

2

Place the BAT41 diode (D1). The text on the PCB shows where D1 should go. The black band on the diode should match the drawing on the PCB to which end the diode goes. Once you are happy, solder it in place.



3 PLACE THE SWITCH

3

The TACT switch is labelled SW1 on the PCB. Ensure the switch legs are as indicated by the component outline. It does not matter which way round the switch goes. Make sure to push the switch against the PCB. Once you are happy, solder it in place.



4 SOLDER THE LED

4

The LED to be placed in the holes indicated by LED. This component also needs to be fitted the correct way round. The longer leg of the LED should be placed into the '+' hole. This would leave the side of the component with a flat edge to be located into the '-' hole. If you wish to have the LED flat out of the PCB, as in the example, then bend the legs before soldering. The alternative is add wires between the LED and the board. If you do this it is a good idea to use different colour wires for the different legs.



5 SOLDER THE CAPACITORS

5

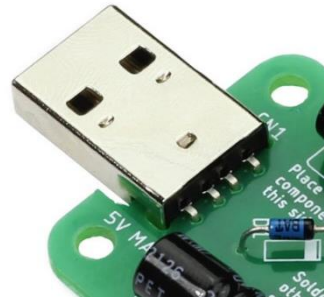
The capacitors placements are marked C1 and C2. The 2 capacitors need to be fitted the correct way. To do this, make sure the negative band on the capacitor that's marked with '-' is placed in the '---' hole on the PCB. Once you are happy, solder them in place.



6

SOLDER THE USB CONNECTOR

Place the USB connector and solder it. Also solder the 2 mounting lugs to ensure it is firmly attached to the PCB



Checking Your PCB

Check the following **before** you power up the unit:

Check the bottom of the board to ensure that:

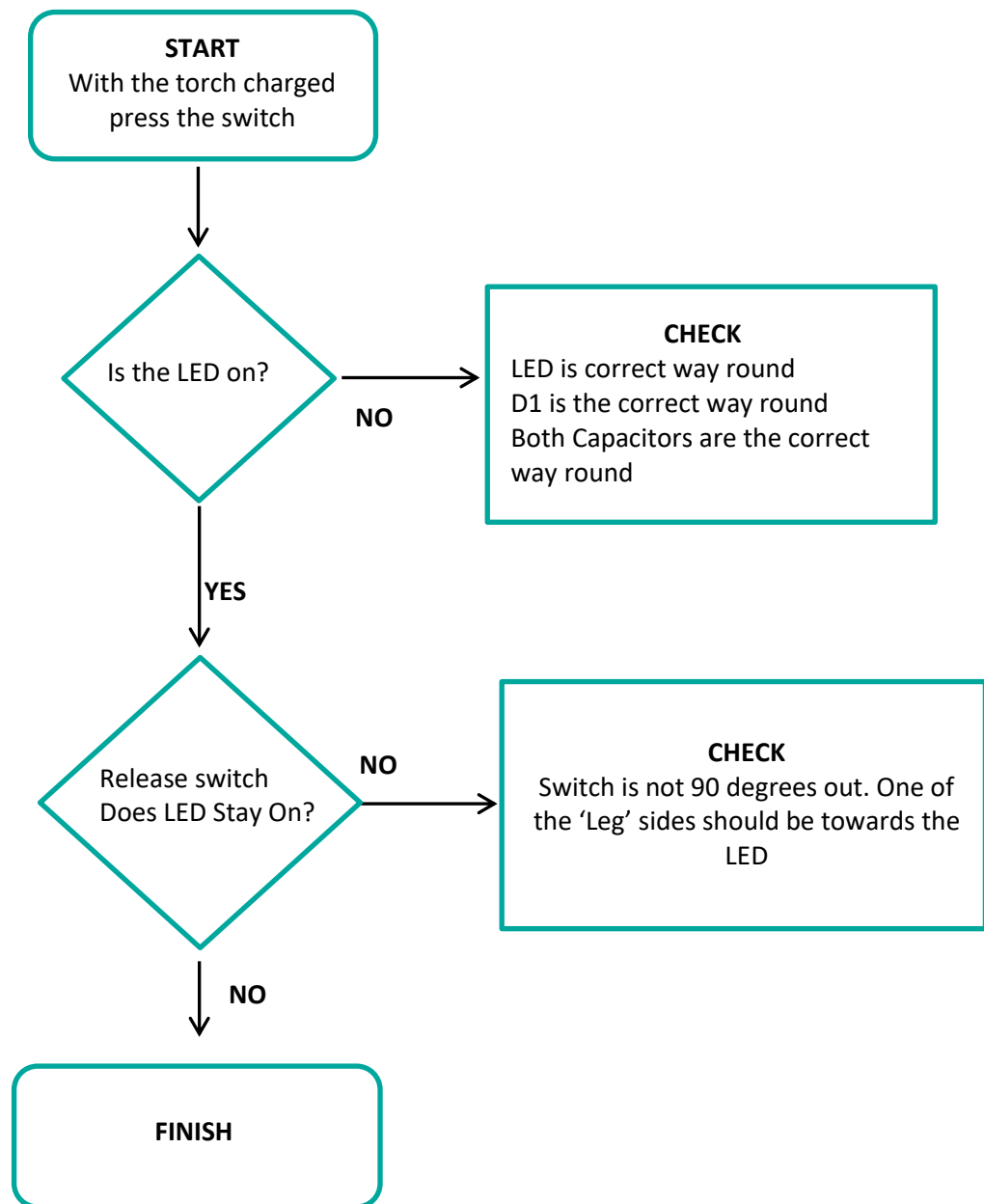
- All holes (except the large mounting holes) are filled with the lead of a component.
- All these leads are soldered.
- Pins next to each other are not soldered together.

Check the top of the board to ensure that:

- C1 and C2 match the outline on the PCB.
- C1 and C2 are the correct way round, with the - lead in the correct hole.
- The resistor bands on R1 are Brown, Green, Brown
- The diode has its band towards the LED end of the PCB
- The flat edge of the LED matches the outline on the PCB

Charge the Torch by plugging it into a USB supply for approximately 10 seconds.



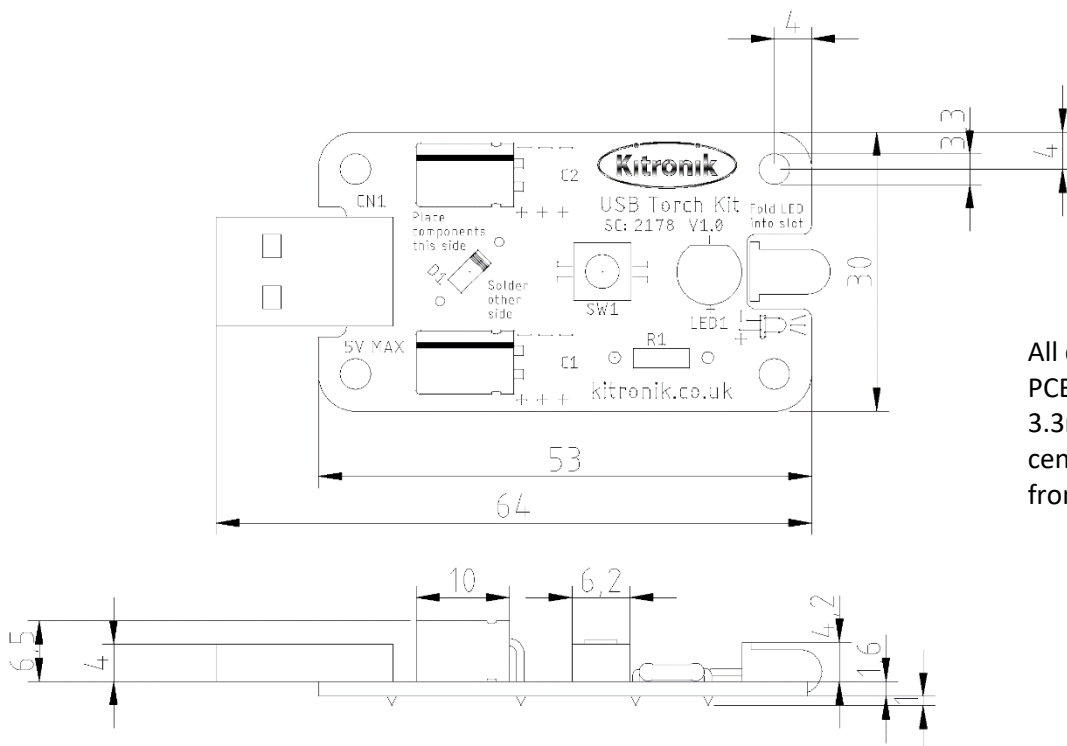


Designing the Enclosure

When you design the enclosure, you will need to consider:

- The size of the PCB (below left).
- Access to the switch
- Height of the components.
- Access to the USB connector to charge the torch

This technical drawing of the PCB and other components should help you to design your enclosure.

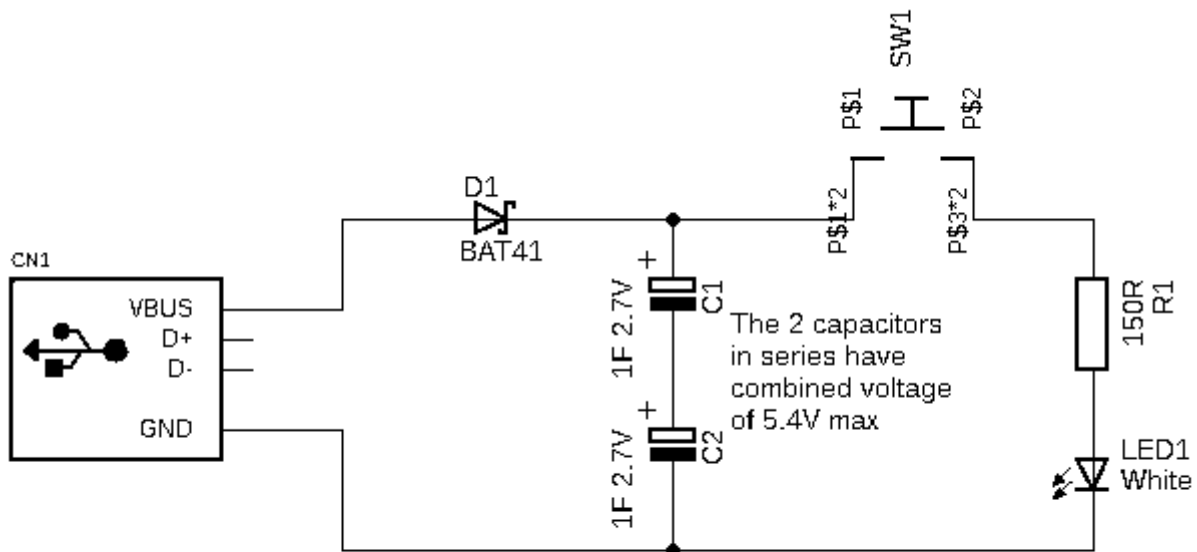


All dimensions are in mm. The PCB has four mounting holes 3.3mm in diameter. The centres of the holes are 4mm from the board edge

	<h3>Mounting the PCB to the enclosure</h3> <p>The drawing to the left shows how a hex spacer can be used with two bolts to fix the PCB to the enclosure.</p> <p><i>Your PCB has four mounting holes designed to take M3 bolts.</i></p>
--	--



How the Circuit Works



The circuit has 2 distinct sections, an energy storage section – consisting of the USB connector, capacitors, and a diode, and an energy using section – the LED. The sections are joined by the switch.

When the USB plug is connected to a USB power supply it provides current to charge the 2 capacitors (C1 and C2). The diode D1 prevents the Capacitors discharging back through the USB connection. USB specifies 5V output, so there are 2 capacitors rated at 2.7V each in series. This means the maximum voltage across the pair of capacitors can be up to 5.4V safely.

When the switch is pressed the circuit will use the available energy, either stored in the capacitors, or from the USB connection, to illuminate the LED.



Online Information

Two sets of information can be downloaded from the product page where the kit can also be reordered from. The 'Essential Information' contains all of the information that you need to get started with the kit and the 'Teaching Resources' contains more information on soldering, components used in the kit, educational schemes of work and so on and also includes the essentials. Download from:

www.kitronik.co.uk/2178



This kit is designed and manufactured in the UK by Kitronik

Telephone +44 (0) 115 970 4243

Sales email: sales@kitronik.co.uk

Tech Support email: support@kitronik.co.uk

Web: www.kitronik.co.uk



[kitronik.co.uk/twitter](https://twitter.com/kitronik)



[kitronik.co.uk/facebook](https://www.facebook.com/kitronik)




[kitronik.co.uk/youtube](https://www.youtube.com/kitronik)



[kitronik.co.uk/instagram](https://www.instagram.com/kitronik)



Designed & manufactured
in the UK by 



Every effort has been made to ensure that these notes are correct, however Kitronik accept no responsibility for issues arising from errors / omissions in the notes.

© Kitronik Ltd - Any unauthorised copying / duplication of this booklet or part thereof for purposes except for use with Kitronik project kits is not allowed without prior consent from Kitronik.

