



## TV-B-Gone Instructions

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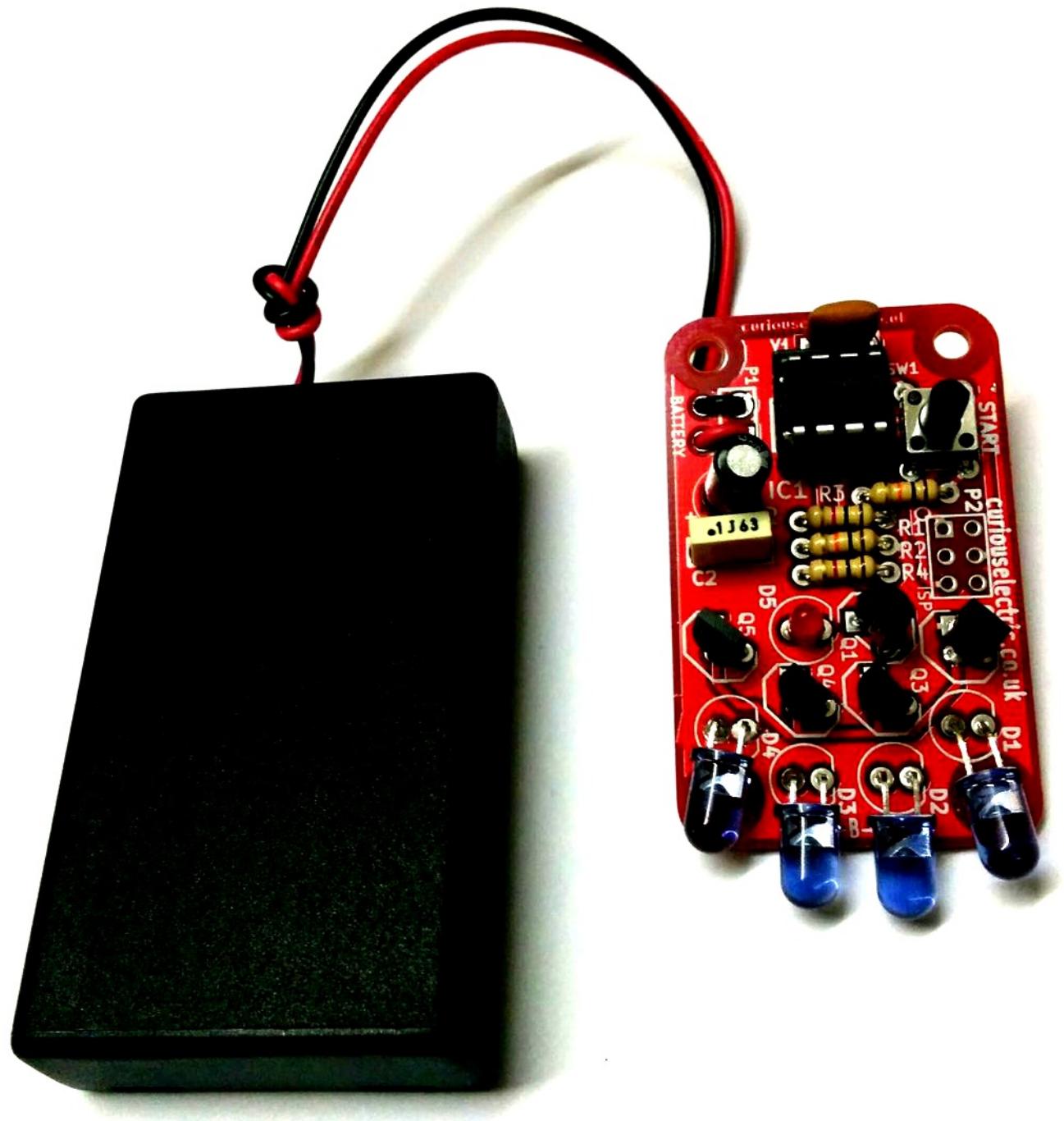
By: Matthew Little, Date: 13th Feb 2017

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### Overview

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The TV-B-Gone switches off TVs from a distance of up to 30m. It sends out the 'standby' command for the top 125 European and 125 US TV specifications. It is based upon an idea and product from [Mitch Altman](#).

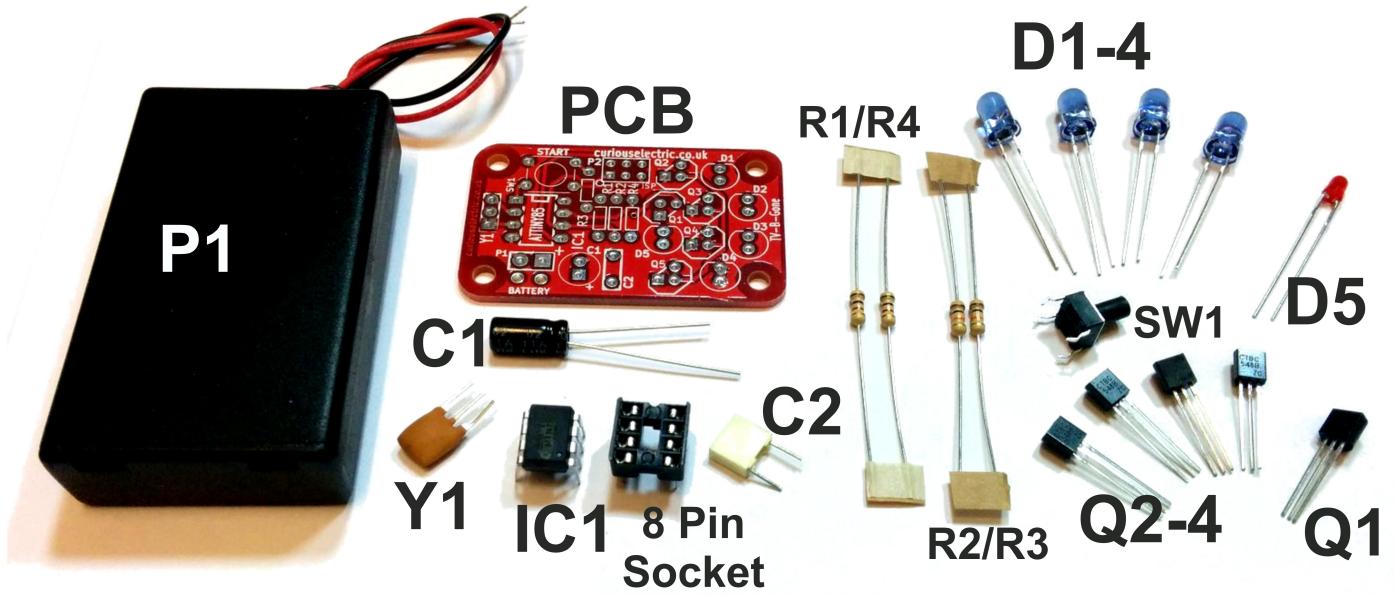


## In use

Switch on the battery pack and point at an unwanted TV. Press the black button and the red light will flash, showing it is sending out the various TV codes. The most popular codes are sent first, but it takes over 60 seconds to run through all the codes.

## Components

### PCB and components



Component Name	Value	Quantity	Reference
Capacitor	22uf	1	C1
Capacitor	0.1uf	1	C2
LED IR 950nm		4	D1,D2,D3,D4
LED Red 5mm		1	D5
MicroController	ATTiny85	1	IC1
IC 8pin Socket		1	
Battery Holder		1	P1
Resistor	1k	2	R1,R4
Resistor	10k	2	R2,R3
Transistor PNP	BC640	1	Q1
Transistor NPN	BC548	4	Q2,Q3,Q4,Q5
Switch		1	SW1
Resonator	8MHz	1	Y1

## Baseplate parts



Component Name	Info	Quantity
Base Plate	3mm Laser-cut plastic	1
M3 Nuts	BZP metal	8
M3 12mm Screws	BZP metal	4
Sticky Pad		1

## Tools required

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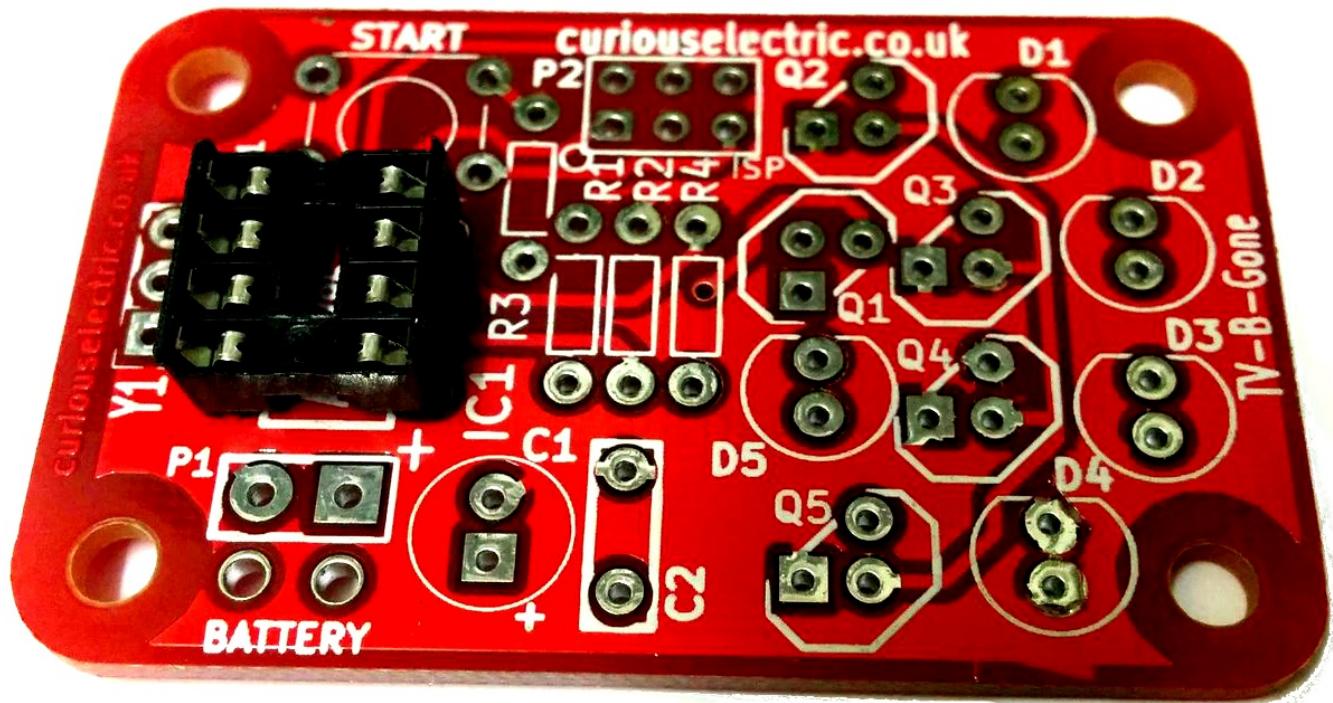


The main tools required are: Soldering Iron, solder and side cutters. A screw driver and small set of pliers is also useful.

[Here is a good getting started guide to soldering](#)

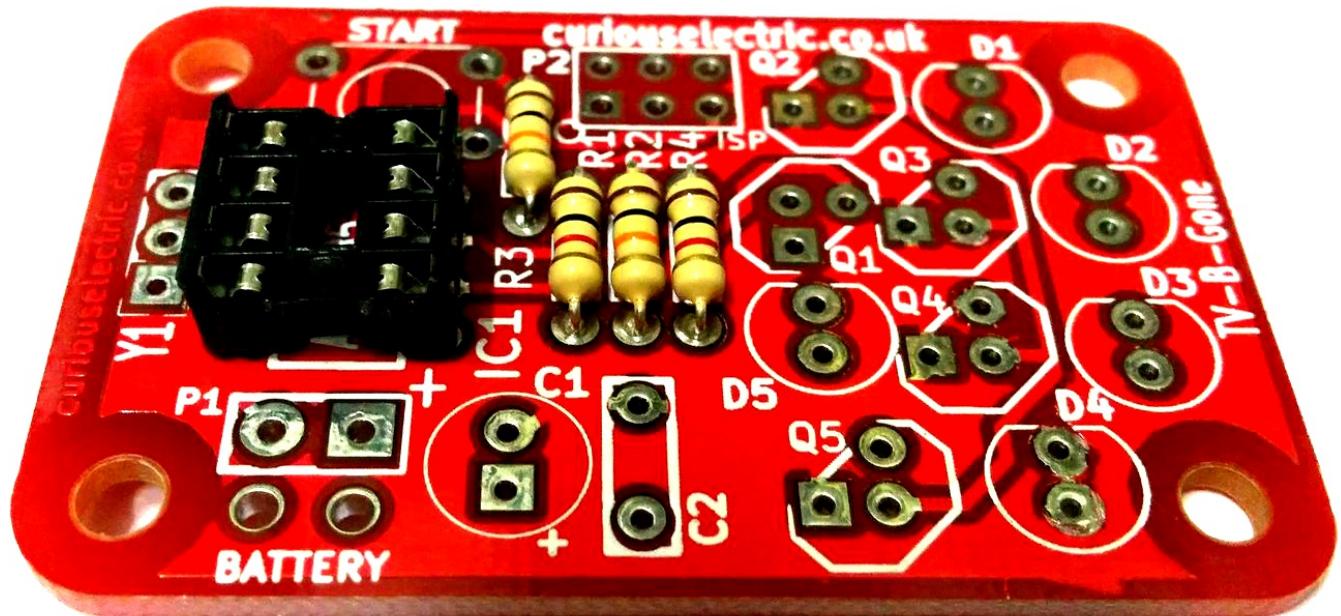
## Step 1: Solder the IC socket

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Ensure the IC (integrated circuit) socket is soldered with the notch on the holder aligned with the notch shown on the silkscreen of the PCB.

## Step 2: Solder the resistors



These resistors are:

Value	Colours	Reference

1k ohm	Brown, Black, Red, Gold	R1
10k ohm	Brown, Black, Orange, Gold	R2
10k ohm	Brown, Black, Orange, Gold	R3
1k ohm	Brown, Black, Red, Gold	R4

The resistors do not have a polarity and can be soldered either way around.

### Step 3: Solder the capacitors



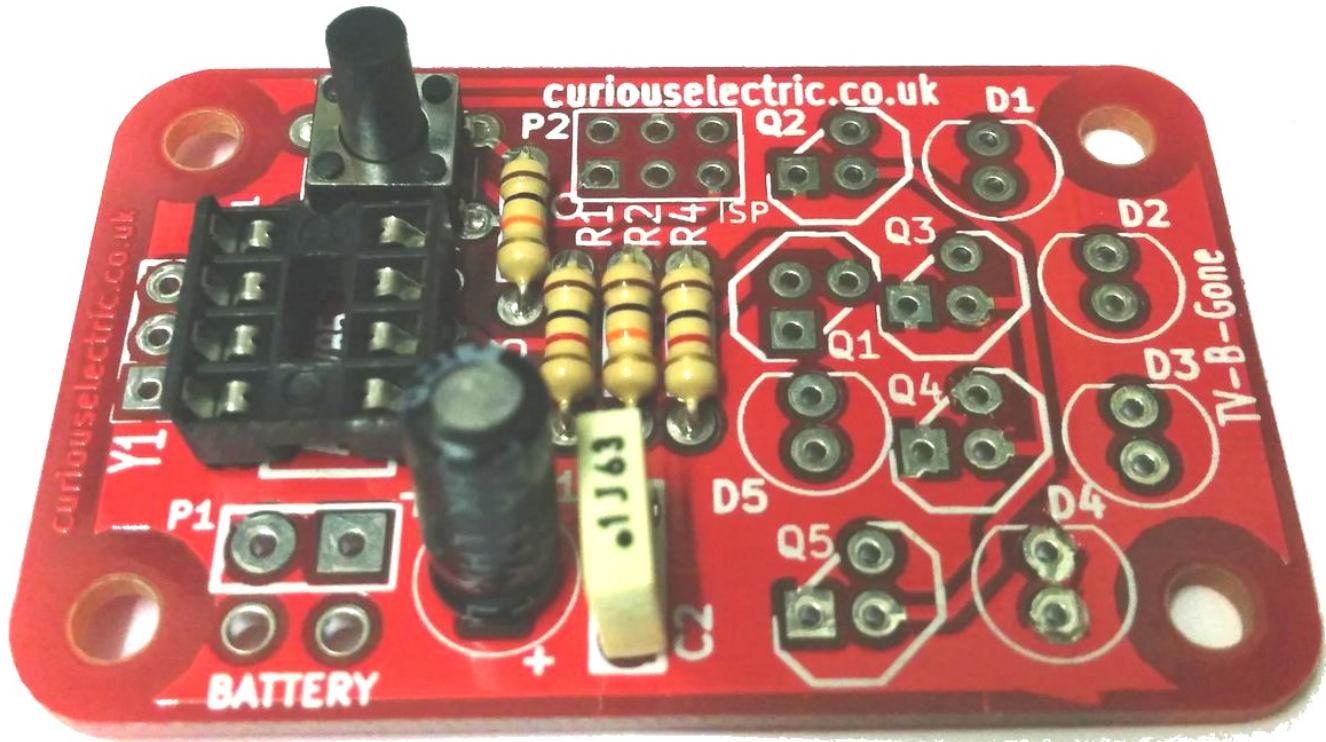
The capacitors are:

Value	Identification	Reference
22uF	Black cylinder with white stripe. "22uF" Marked	C1
0.1uF	Cream box with ".1J63" Markings	C2

C1 does not have a polarity and can be soldered either way around.

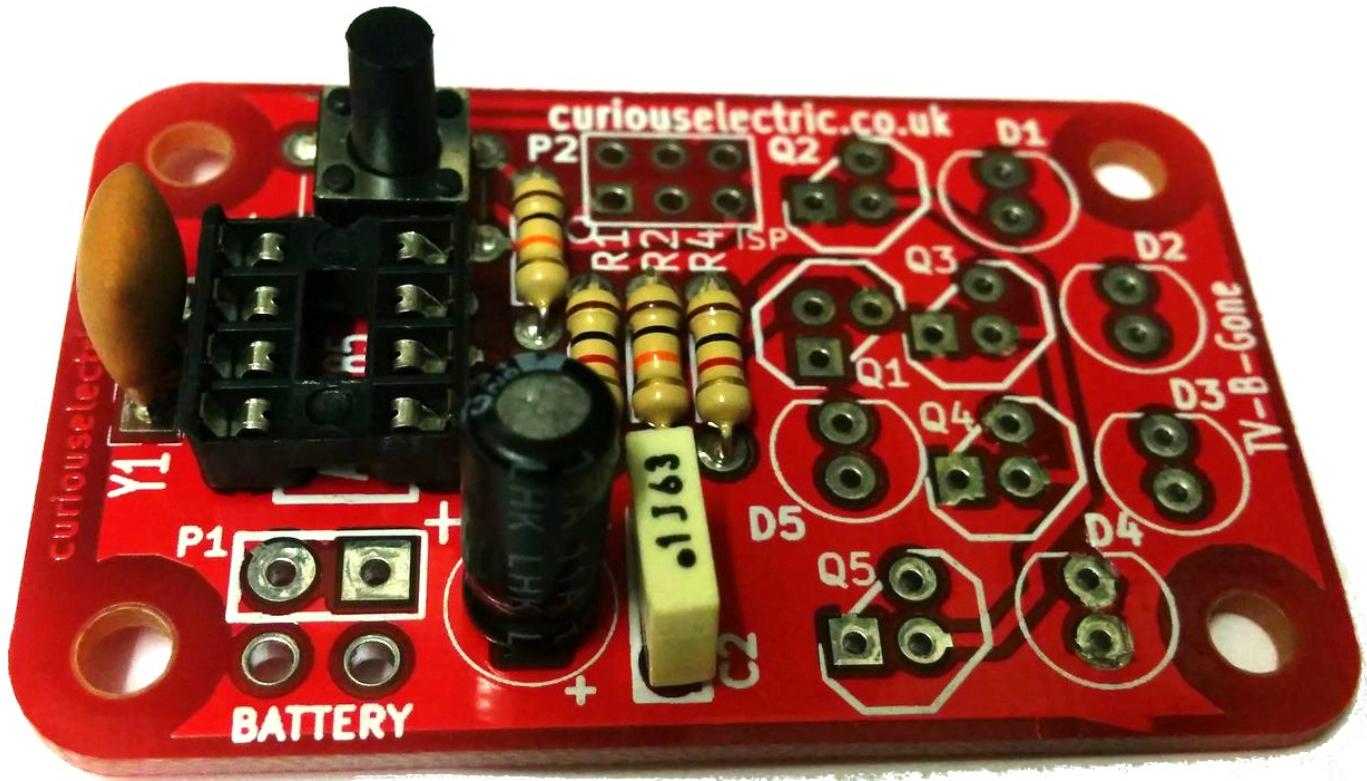
C2 is polarised. The long lead is positive (+ve). There is a white stripe down the negative side. Ensure the positive and negative leads align correctly. The positive lead needs to fit in the hole with the "+" symbol near it.

### Step 4: Solder the switch



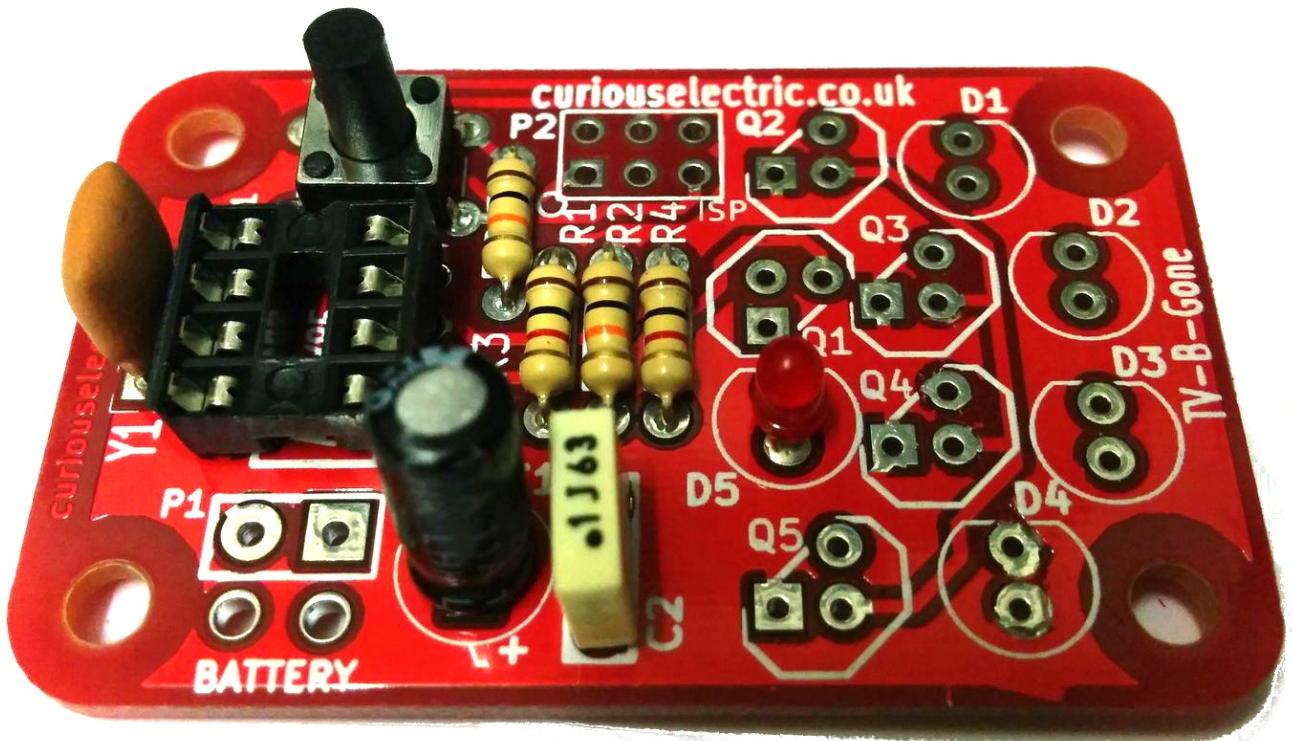
The switch fits in to the four holes marked "SW1" and "START".

## Step 5: Solder the 16MHz resonator



The resonator is the three-pin device and is soldered into the three holes near Y1. It does not matter which way round the device is soldered in.

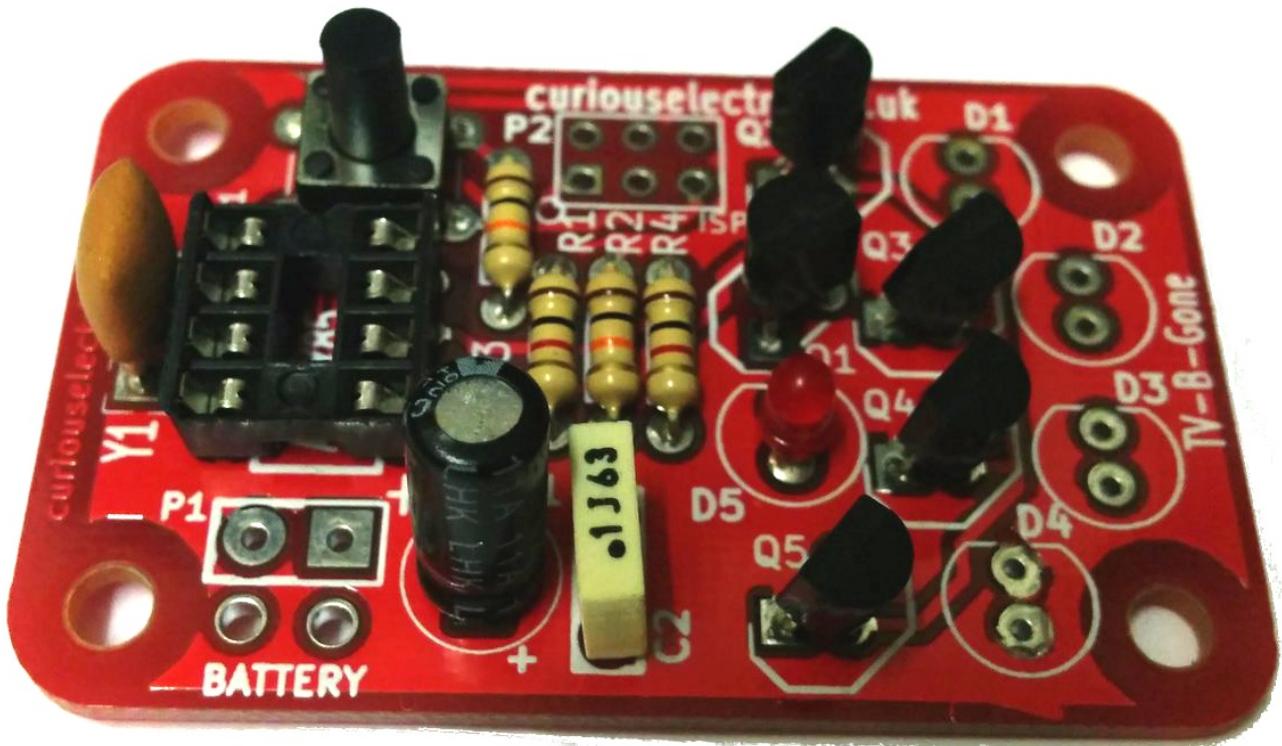
## Step 6: Solder the red LED



The red LED is soldered into the holes marked "D5". The LED has a polarity with the long lead being positive (+ve) and the shorter lead is negative. Also the negative side has a flat side on the plastic LED enclosure. Ensure the flat side aligns with the flat side of the LED. The flat side is the -ve. The rounded side is the +ve.

## Step 7: Solder the transistors

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There are 5 transistors to solder in (4 of BC548 and 1 of BC640):

Value	Marking	Reference
BC640	BC640	Q1
BC548	BC548	Q2
BC548	BC548	Q3
BC548	BC548	Q4
BC548	BC548	Q5

The transistors have a polarity and the flat side of the transistor should align with the longer flat side of the silk screen. Please check the photo for more detail.

## Step 8: Solder the infra-red LEDs



The IR LEDs are transparent plastic and, to the human eye, they cannot be seen flashing. They emit light outside of human eye spectrum.

The IR LEDs are soldered into the holes marked "D1-D4". The LED has a polarity with the long lead being positive (+ve) and the shorter lead is negative. Also the negative side has a flat side on the plastic LED enclosure. Ensure the flat side aligns with the flat side of the LED. The flat side is the -ve. The rounded side is the +ve.



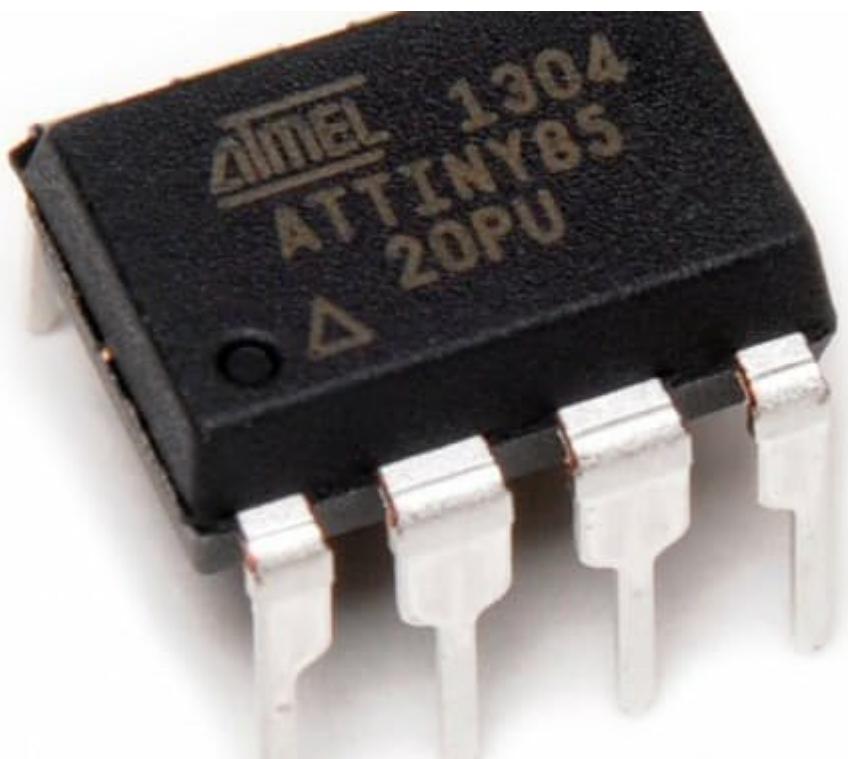
Bend the leads of the LED at 90 degrees so that they shine away from the PCB, as shown.

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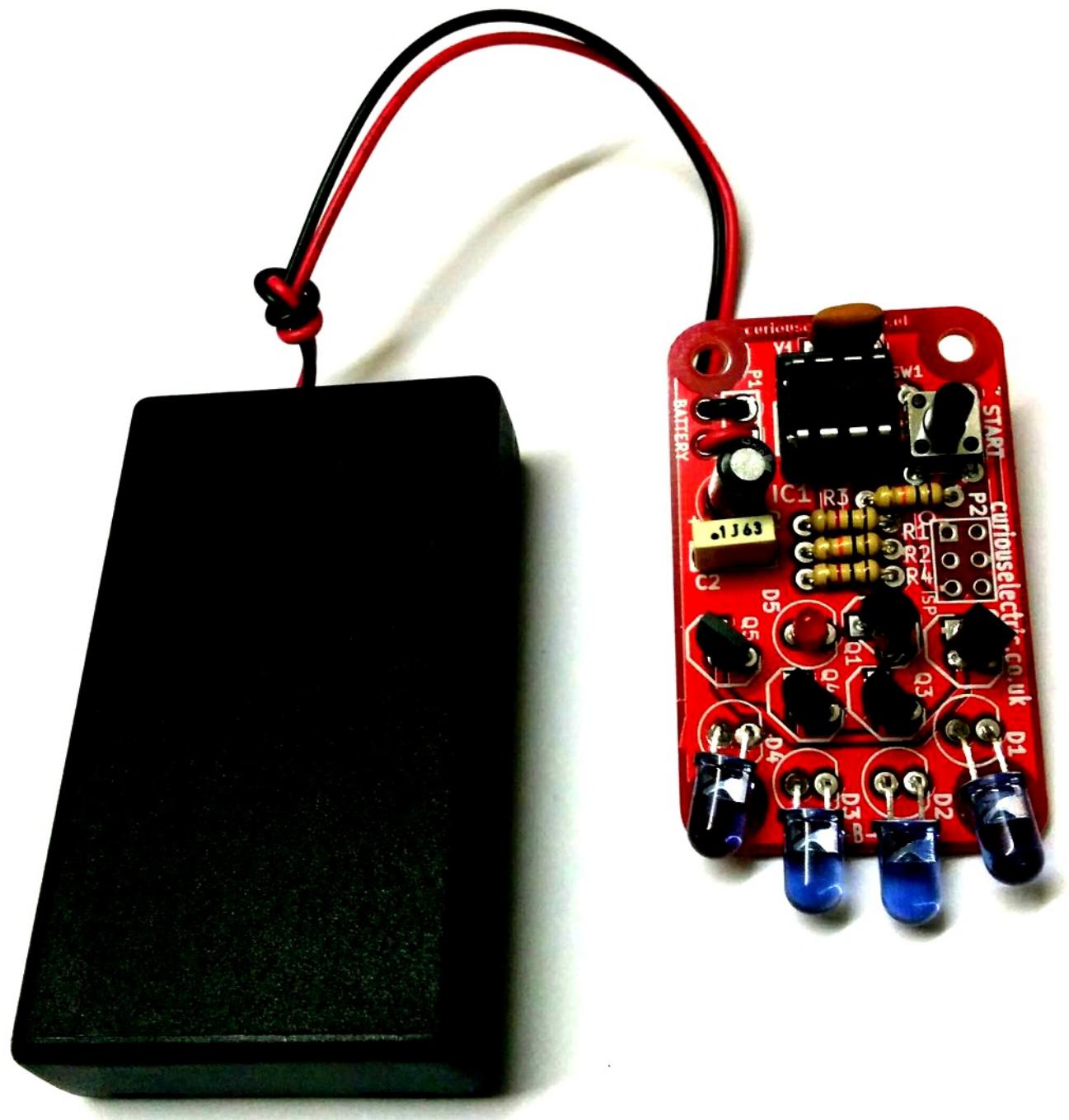
### Step 9: Insert programmed IC into socket.



The programmed IC (an ATTiny85 microcontroller) must be inserted the correct way. There is a small dot on the IC which indicates pin 1. This dot should be aligned with the notch shown on the PCB silkscreen and on the IC socket.



## Step 10: Wire up battery box

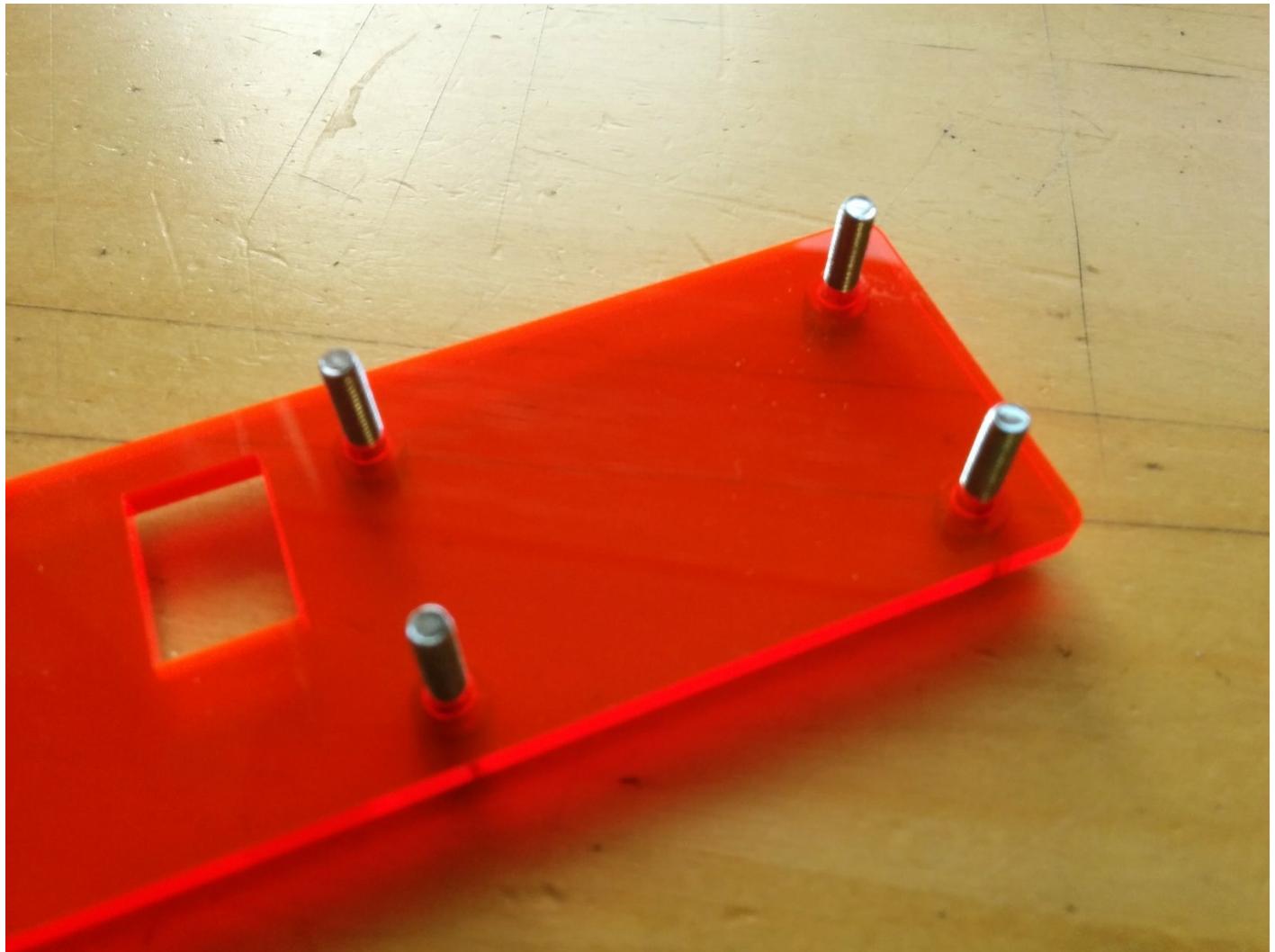


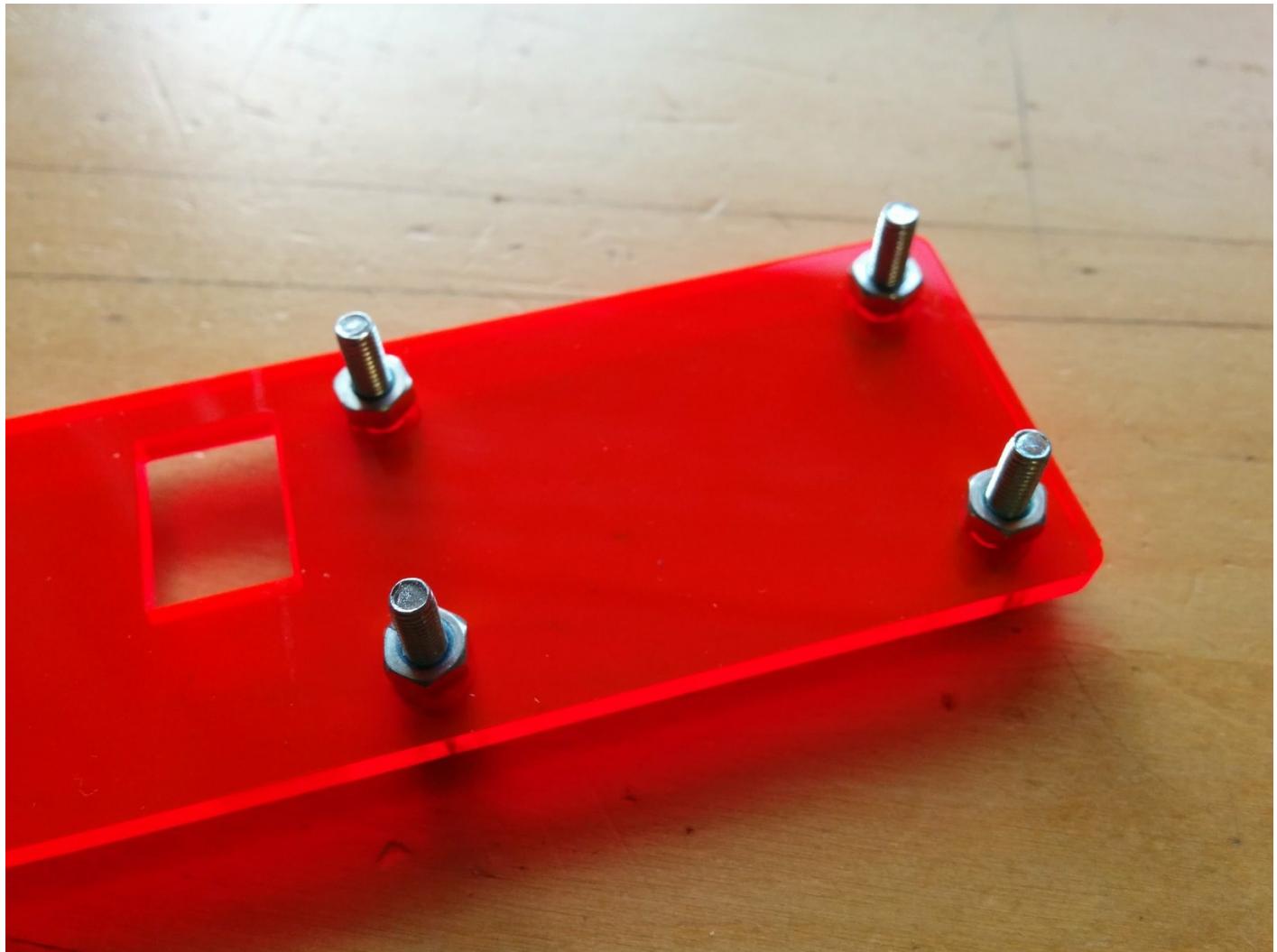
Push the wires from the battery box through the larger holes next to the word "Battery". These can then be knotted to provide strain relief.

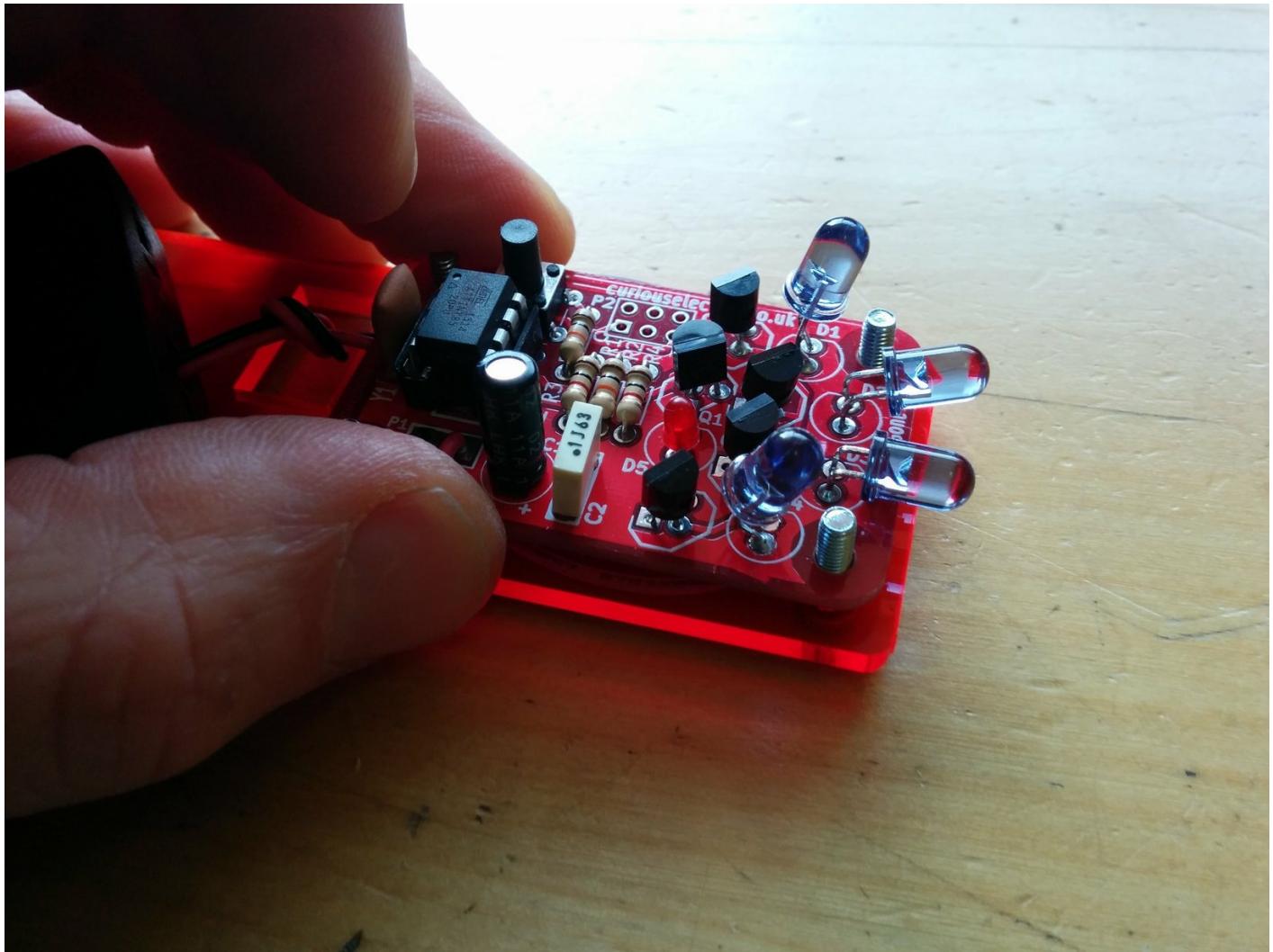
The red wire is the battery positive (+ve) and is soldered to the hole in P1 with the **square** pad, next to the "+" symbol. The black wire is soldered into the other pad.

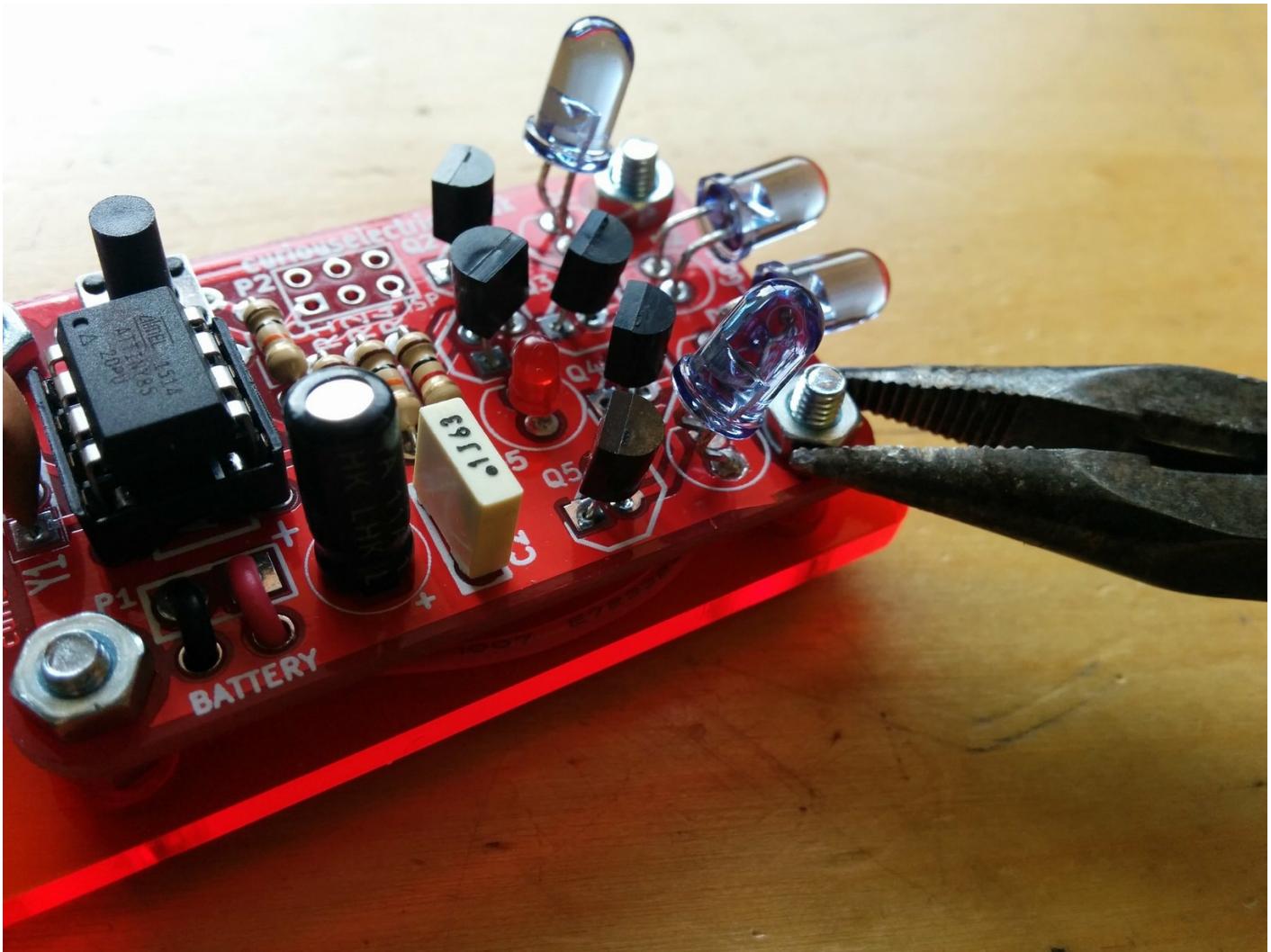
## Step 11: Attach PCB to baseplate

Use the 4 machine screws and the 8 nuts to hold the PCB to the baseplate as shown here:





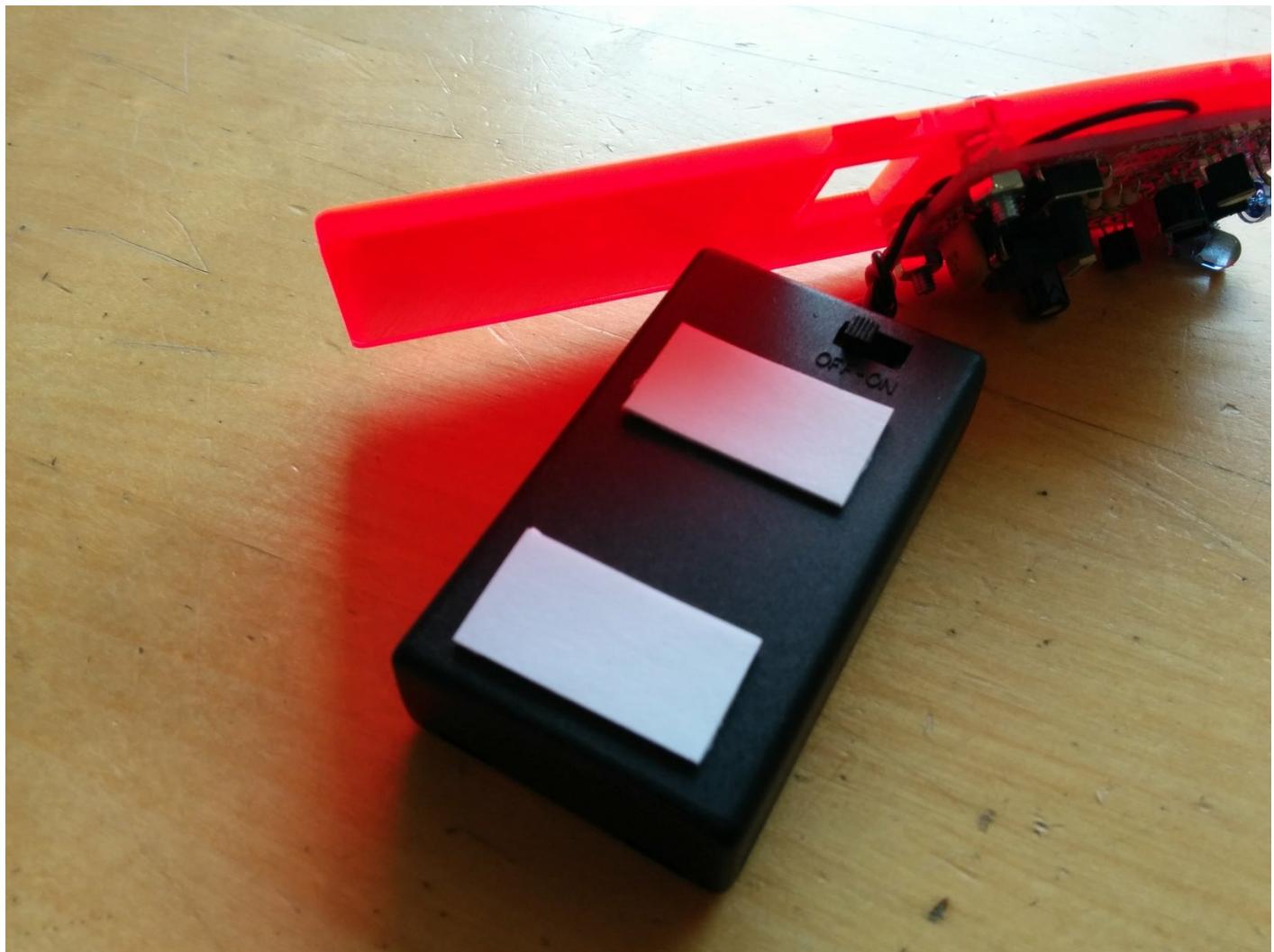


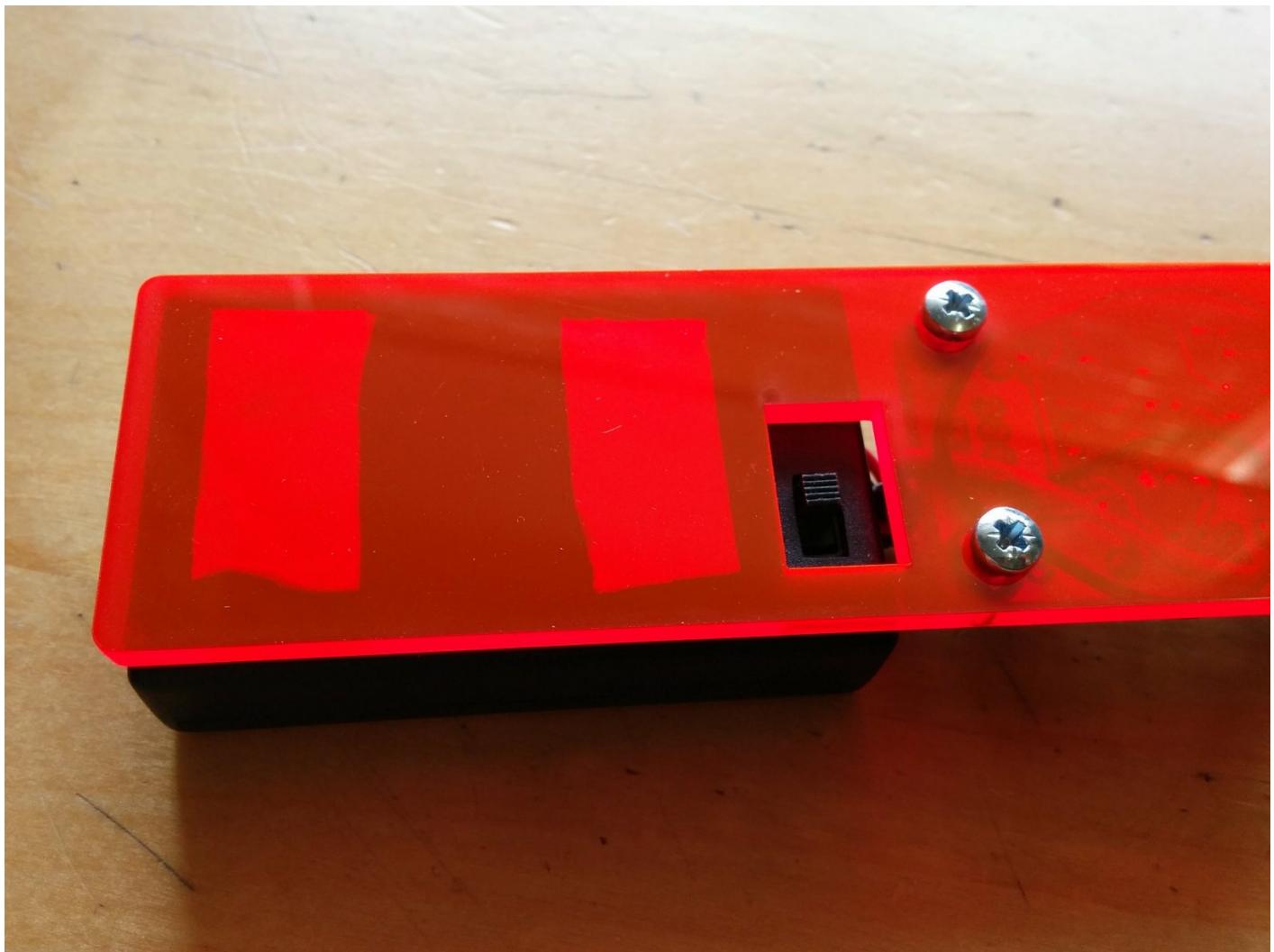


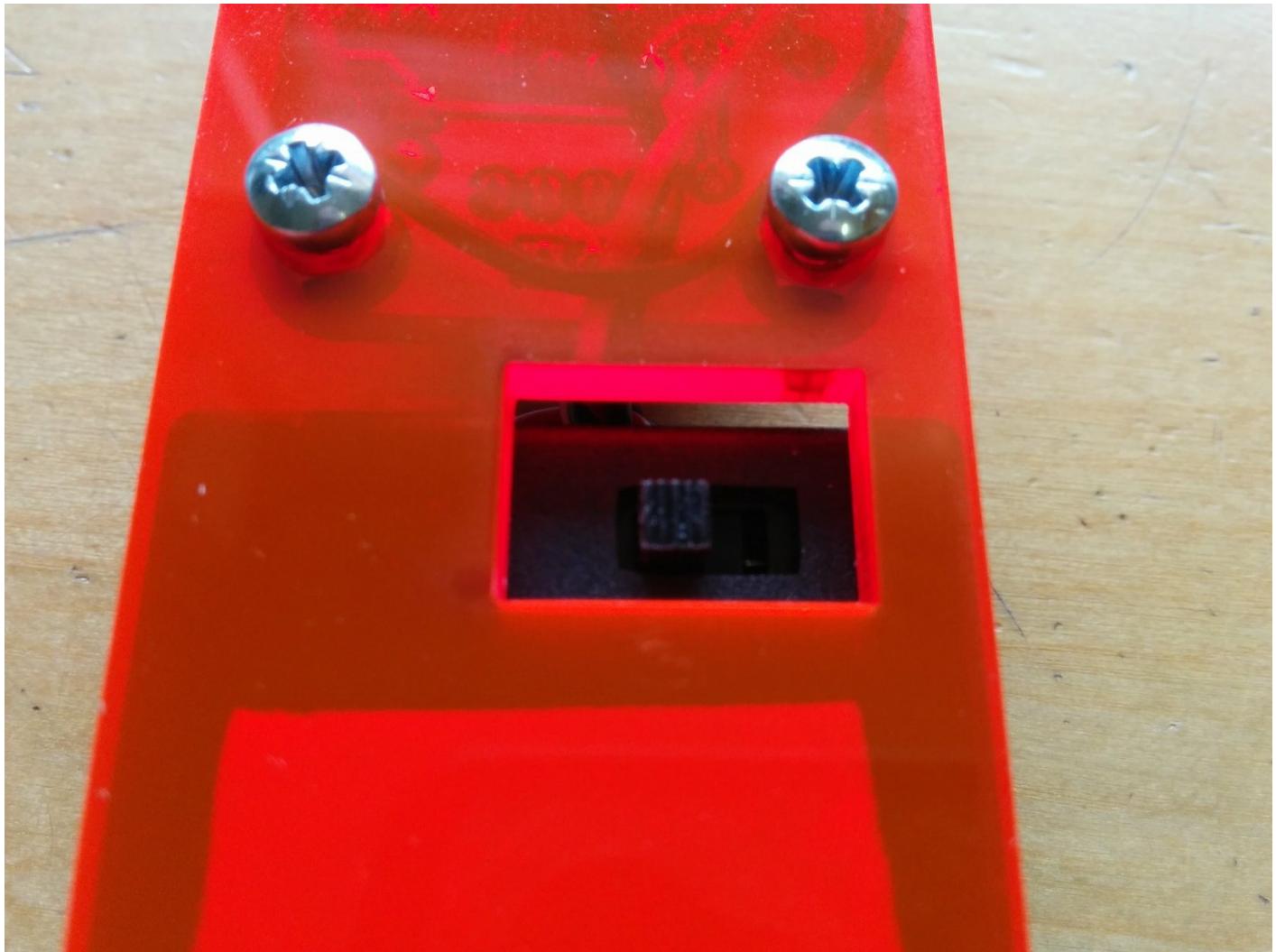
## Step 12: Attach battery box

Use the double-sided sticky pad to affix the battery box to the baseplate. Some of the battery holders do **NOT** have an on/off switch (it is not needed as the unit powers down into an ultra-low power state until the "START" button is pressed). You may need to cut the sticky pad into two pieces.



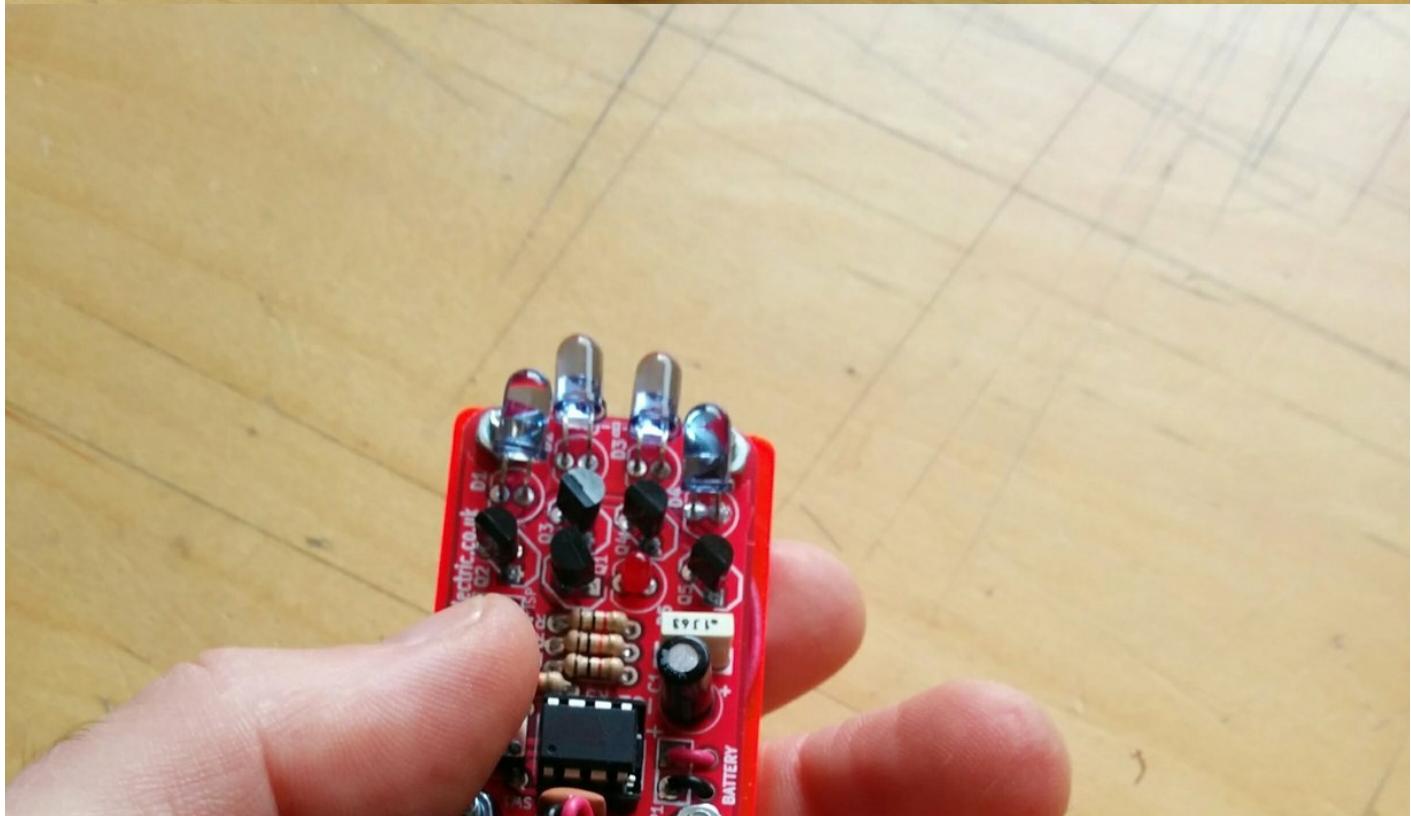
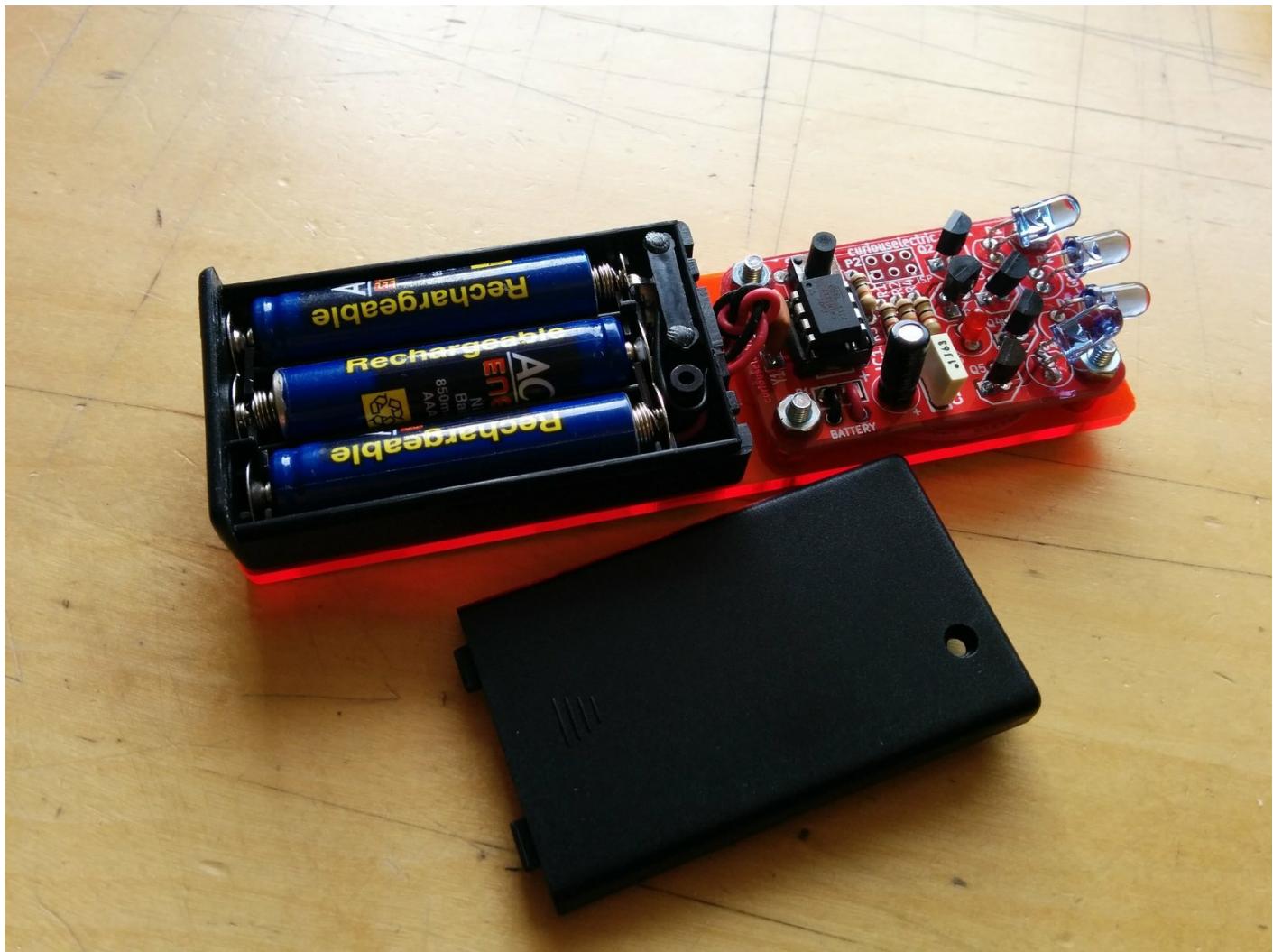






Step 13: Add 3 x AAA batteries and test!

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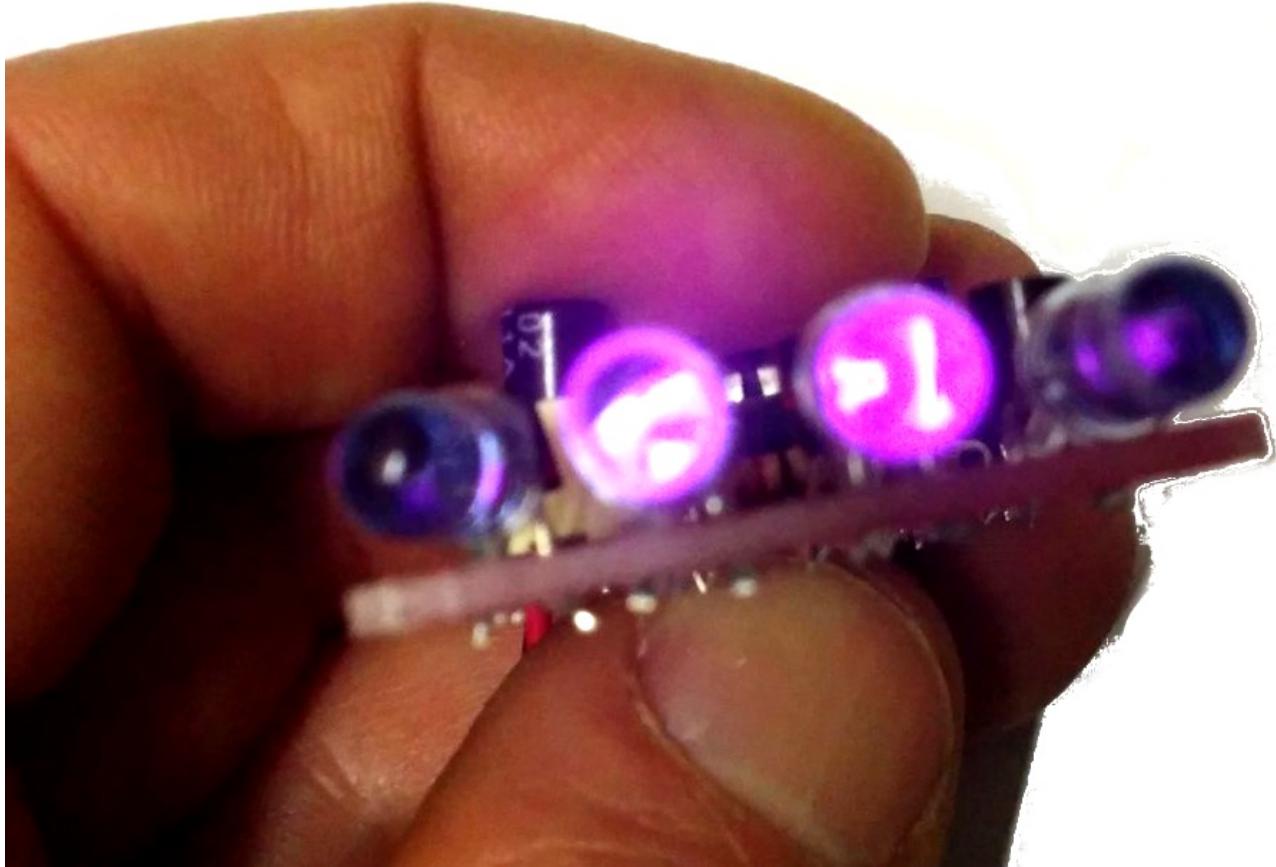


This device takes 3 x AAA batteries. Slide off the top cover of the battery holder and insert them as shown in the battery holder. The unit should spring into action with the red LED flashing. Each time the red LED flashes then a different TV 'OFF' code is sent. This means the unit is working.

If no sign of red LED flashing then please double check your soldering, the orientation and placement of all components and the IC orientation.

It will flash for around 60 seconds and then switch off. Press the black push-button switch to start the sequence again. The device sends out all the TV codes in sequence. Pressing the black button will cause it to start the sequence again.

Use a digital camera to check the IR LEDs are working. A phone camera works well for this. You should see the LEDs flashing purple, which proves the device is sending IR codes. Here is a photo of the IR flashes taken on a phone camera:



**Note:** Most popular TV codes are used first but it may take over 60 seconds to scroll through all the codes.

## Circuit Overview

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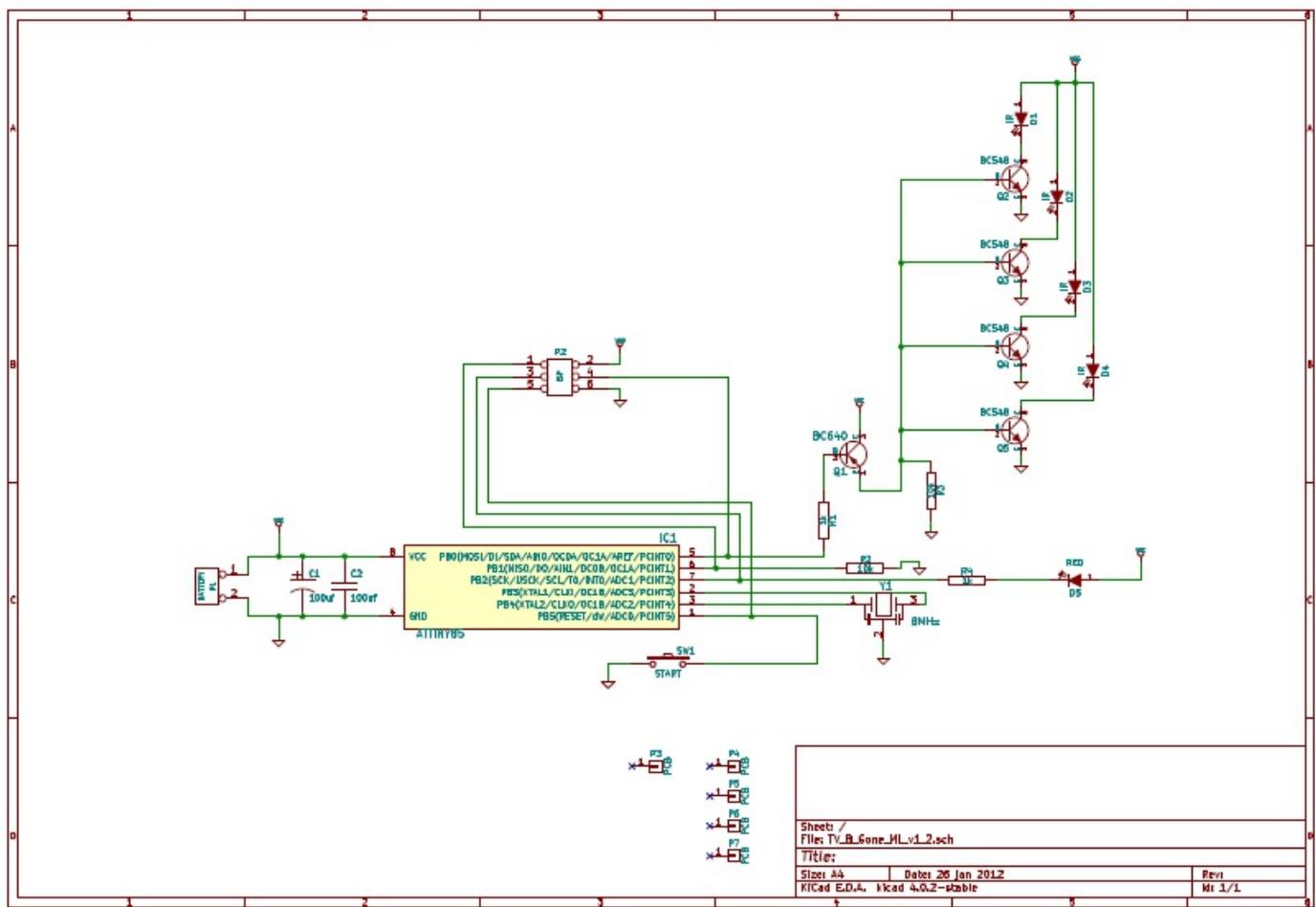
This kit is based upon a circuit originally produced by [Mitch Altman](#)

The circuit is based upon the [kit by Adafruit Industries](#)

Kit developed by [Matt Little at Curious Electric](#)

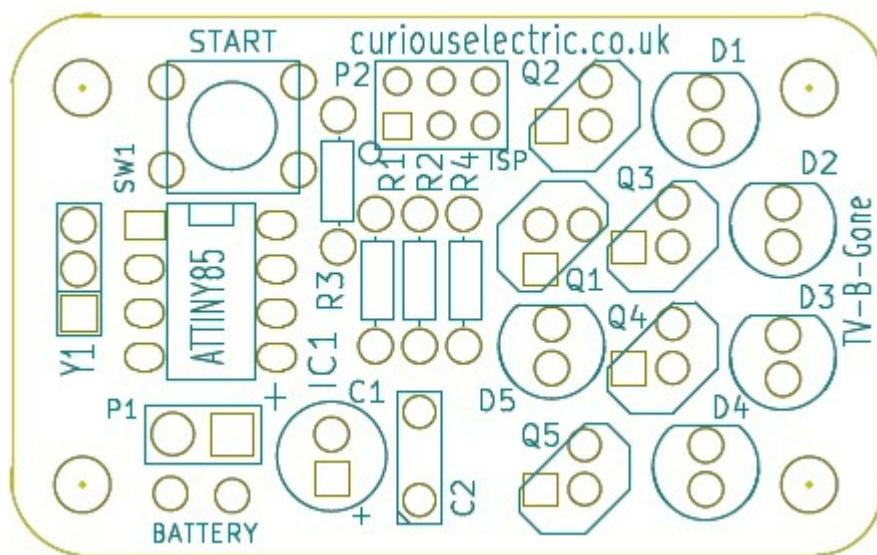
## Circuit Schematic

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And here as a .pdf

## PCB overview



And here as a .pdf

## Suppliers Information

We would like you to be happy with this kit. If you are not happy for any reason then please contact us and we will help to sort it out.

Please email [hello@curiouselectric.co.uk](mailto:hello@curiouselectric.co.uk) with any questions or comments.

Please tweet us at [@curiouselectric](#)

If any parts are missing from your kit then please email [hello@curiouselectric.co.uk](mailto:hello@curiouselectric.co.uk) with details and, if possible, where the kit was purchased.

More technical information can be found via [www.curiouselectric.co.uk](http://www.curiouselectric.co.uk)

The GITHUB repository for all the files is: <https://github.com/curiouselectric/TVBGone>

This kit has been designed and produced by:

**The Curious Electric Company**

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