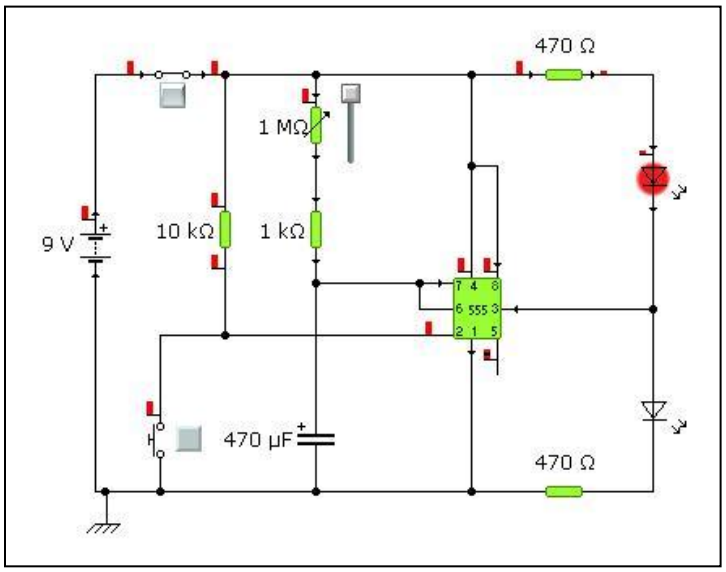
Circuit Construction – 555 Timer Monostable Project

The circuit diagram on the right is the circuit for your project (minus the drive circuit), it is called a 555 timer monostable circuit, it is called a monostable circuit as it has one stable state, once it is triggered it becomes unstable and is timing and when it stops timing it returns to its stable state.

The time it is unstable for can be calculated using a formula and is determined by the values of the timing components, the timing resistors and timing capacitor.

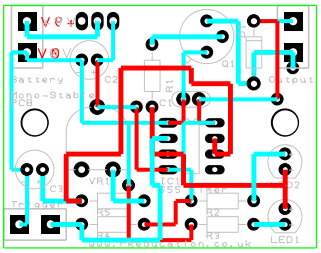


Circuit example, please see below for a schematic

Construction of circuit

You will need to collect the following equipment before you start soldering your circuit:

- Soldering iron and stand
- Damp sponge
- Solder wire
- Side cutters
- Pliers
- Components:



Q1 – BFY51 transistor
C1 – 100nF capacitor**
C2 – 10uF capacitor**
C3 – 470uF – change to suit needs
D1 – 1N4007 diode**
IC1 – IC holder and 555 timer IC
R1 – 1k resistor (brown, black, red)**
R2, R3 – 470R resistor (yellow, violet, brown)
R4 – 10k resistor (brown, black, orange)
R5 – 100k resistor* (brown, black, yellow)
VR1 – 1M preset resistor*
Power switch
Trigger – Push to make trigger switch, a terminal block may be used
Battery – Battery clip, a terminal block may be used
Output – A terminal block should be used here, your output can be insterted into the terminal block
LEDs – The LEDs used will depend on your project outcome

If a higher quality finish is required then use 5mm 2 way terminal blocks, these will add extra cost

* These components can be varied
** These components can be left out

This project PCB has been designed with maximum flexibility in mind and how it is constructed will depend on what it is you are aiming to achieve with it, for example a teacher or lecturer completing a project with a number of students will probably use it in a different way to a hobbyist with a specific task in mind. The circuit has a drive circuit that utilises a BFY51 transistor but if it is not required it is quite acceptable to leave this section out. If a buzzer is required a PCB mount buzzer can be inserted into the component marked output, a shorting link or 0R resistor will need to be used to connect pin 3 of the 555 timer to the buzzer. This should be soldered between the lower part of R1 and the lower part of D1. The circuit has space for 2 LEDs but 1 can be left out as required and if a buzzer is being used then they both may be left out. To allow the time to be varied the circuit uses a variable resistor – VR1, this can either be PCB mount or an external panel mount type. There is a fixed resistor in series with VR1 to allow extra timing flexibility, if this is not required use a 0R resistor. How the circuit is constructed is very much dependent on what it is being used for and calculations will need to be made using the following formula.

$$t = 1.1 (R \times C)$$

T = time period in seconds (s)
f = frequency in hertz (Hz)
R = resistance in ohms (Ω)
C = capacitance in farads (F)

Procedure for construction

1. Solder the resistors into your PCB, take care to insert the correct resistor into the correct place, if in doubt ask your teacher. When soldering be sure to heat the area sufficiently but not too much as it will damage the PCB.
2. Solder the remainder of the PCB mounting components in place.
3. Solder your power switch in place
4. Solder your PTM trigger in place
5. Solder your battery clip in place
6. Solder your LEDs into the PCB, if you have attached flying leads insert these, be sure to get the LED the correct way around, remember the long and short legs…

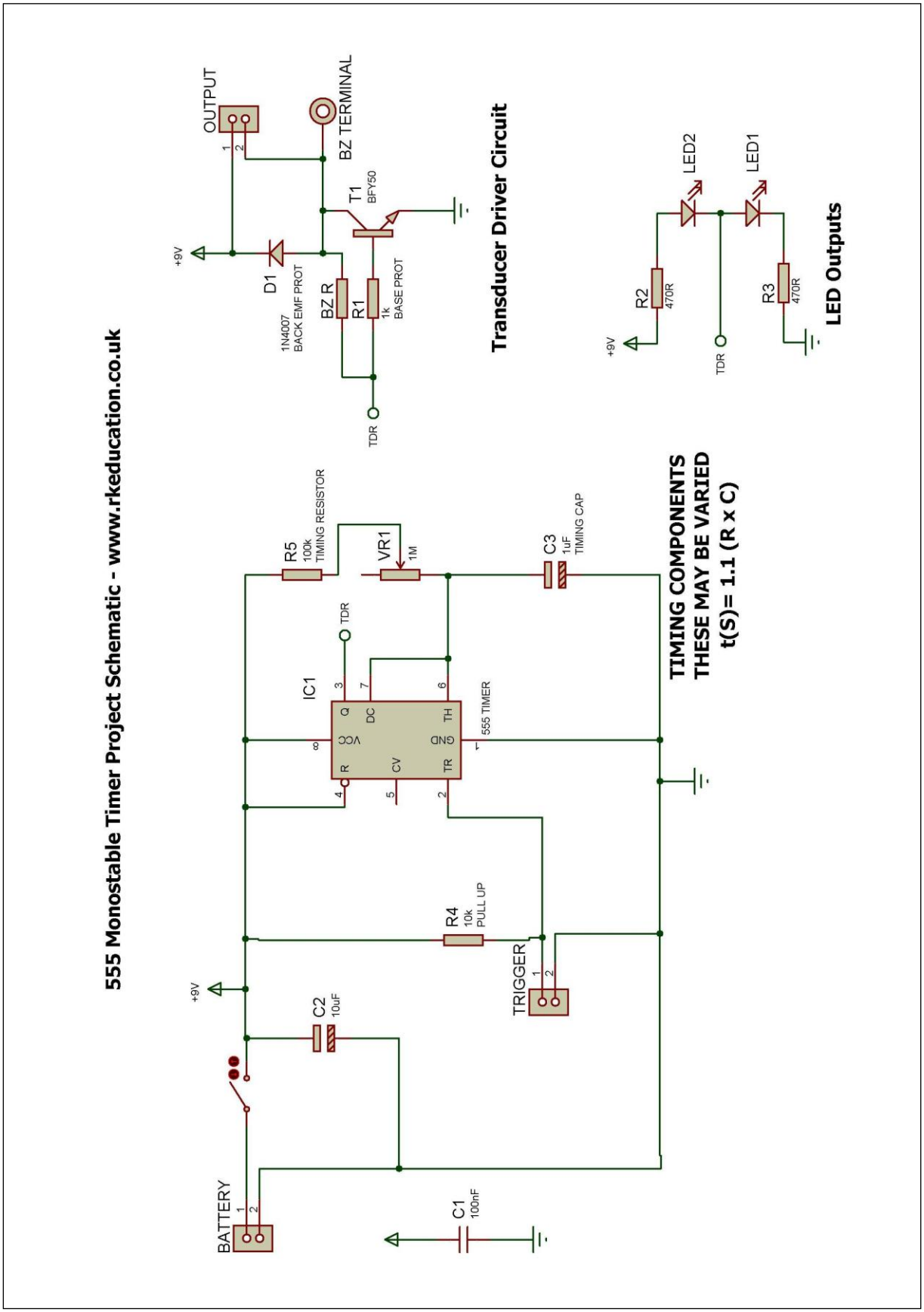
The order in which you solder and what you solder is dependent on your final outcome, always solder the lowest profile components first, for example resistors.

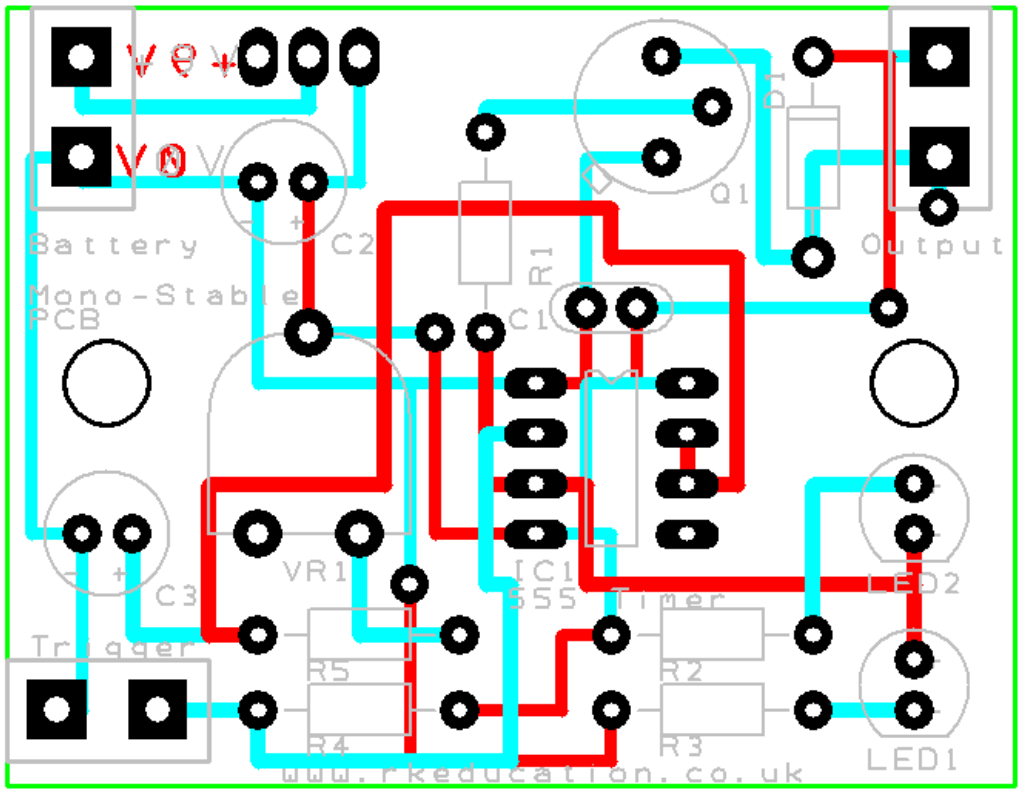
Please visit our website

www.rkeducation.co.uk

If you have any comments or queries please email us at

technical@rkeducation.co.uk


555 Monostable Timer Project Schematic - www.rkeducation.co.uk
Transducer Driver Circuit
LED Outputs
TIMING COMPONENTS
THESE MAY BE VARIED
t(S)= 1.1 (R x C)
OUTPUT
BZ TERMINAL
T1
BFY50
D1
1N4007
BACK EMF PROT
BZ R
R1
1k
BASE PROT
TDR
+9V
LED2
LED1
R2
470R
R3
470R
R5
100k
TIMING RESISTOR
VR1
1M
C3
1uF
TIMING CAP
IC1
555 TIMER
R4
10k
PULL UP
TRIGGER
C2
10uF
C1
100nF
BATTERY


+ 9V
0 V
Battery
Mono-Stable
PCB
C2
R1
C1
Q1
D1
Output
VR1
C3
Trigger
IC1
555 Timer
R5
R4
R2
R3
LED2
LED1
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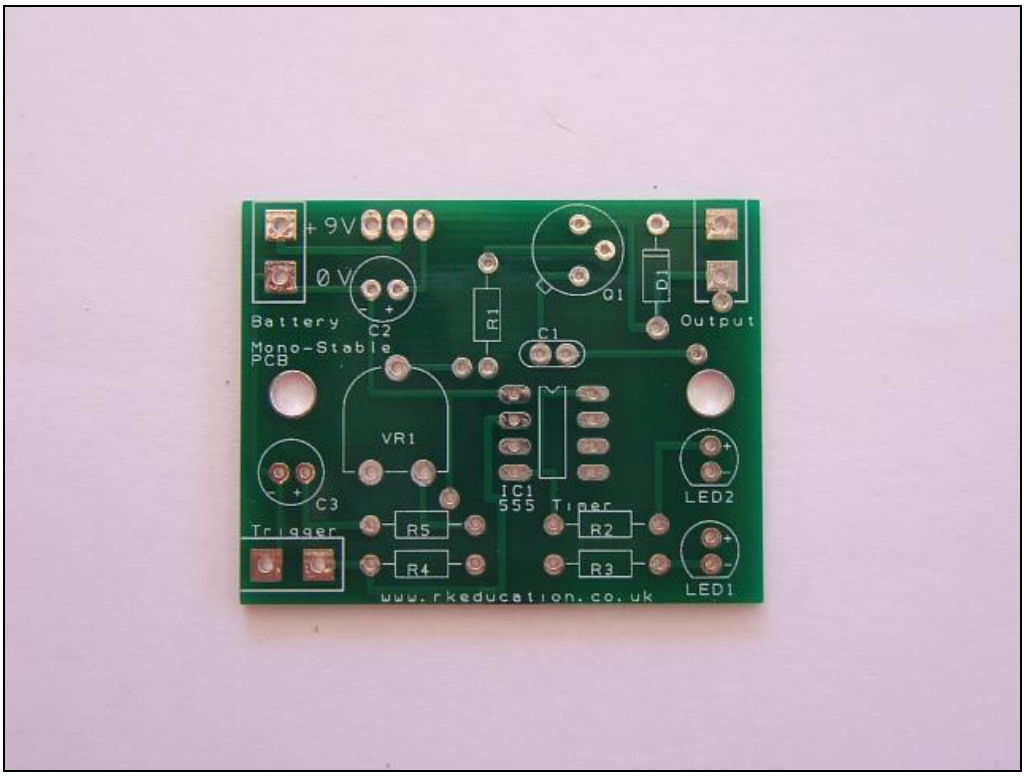
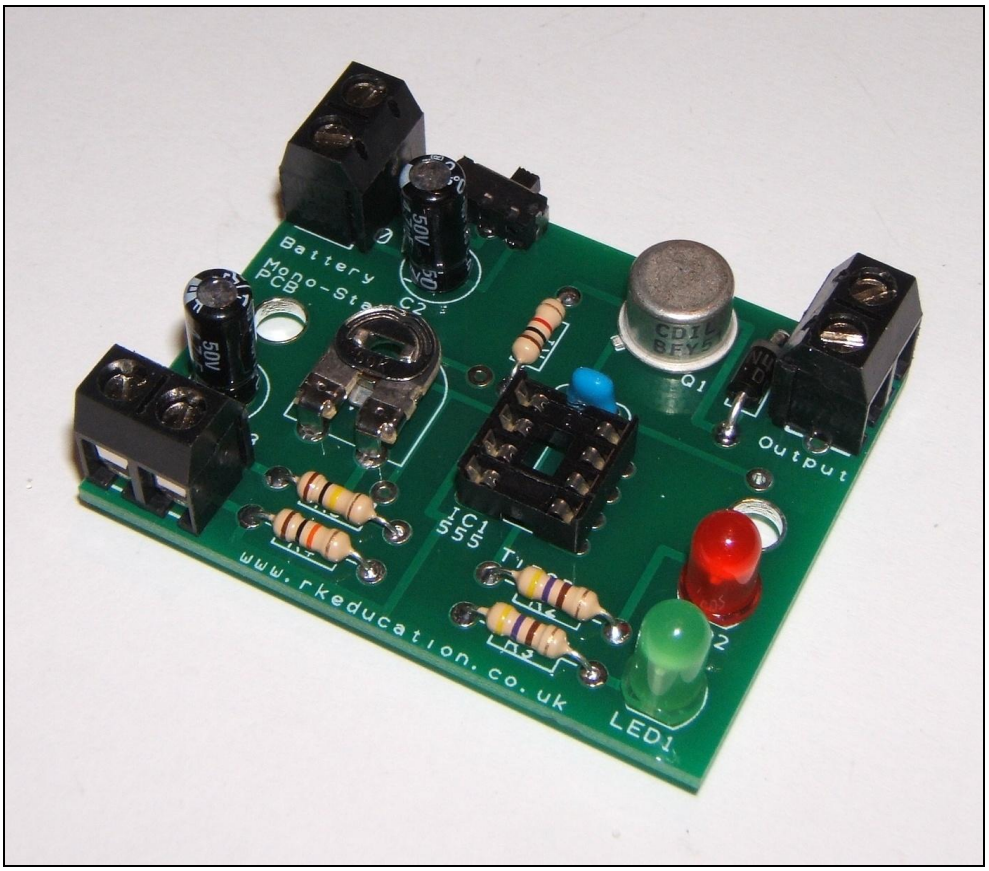

+ 9V
0 V
Battery
Mono-Stable
PCB
C2
R1
C1
Q1
D1
Output
VR1
C3
Trigger
IC1
555 Timer
R5
R4
R2
R3
LED2
LED1
www.rkeducation.co.uk


Battery
Mono-Sta
PCB
50V
Q1
Output
IC1
555
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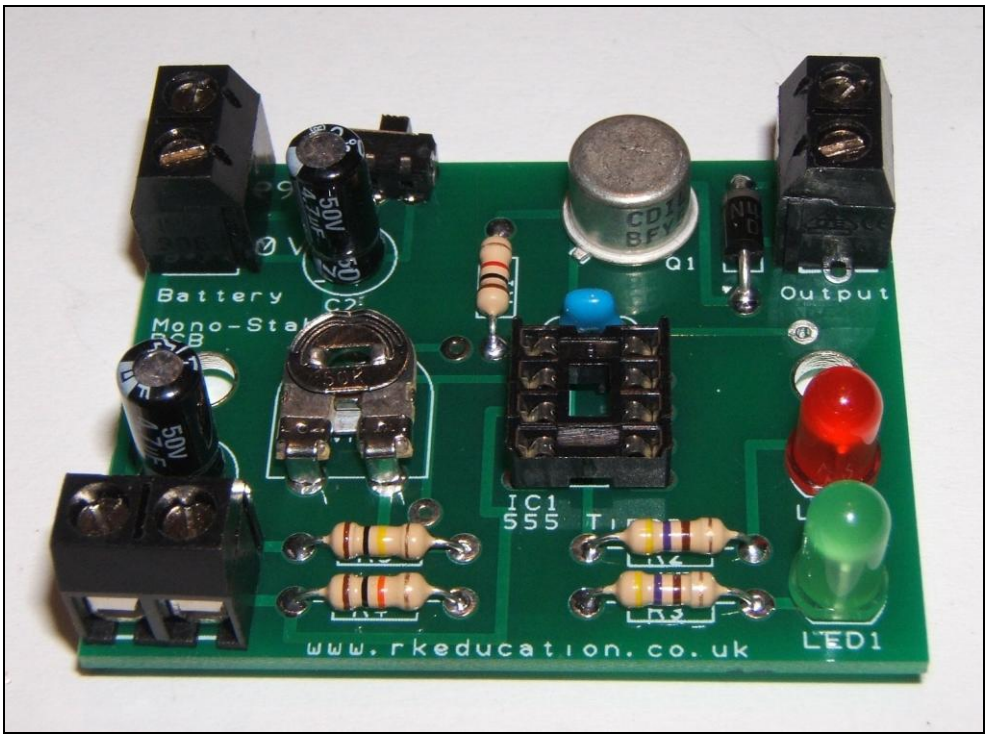
LED1


Battery
Mono-Sta
PCB
50V
Q1
Output
IC1
555
www.rkeducation.co.uk
LED1


EXTRA
HEAVY DUTY