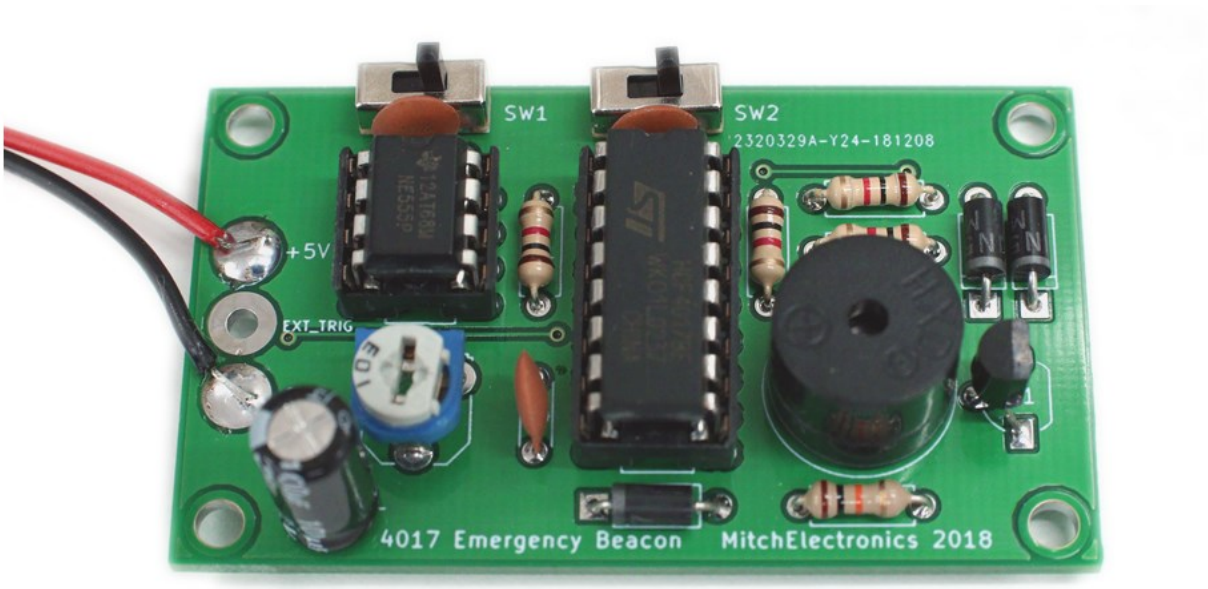
4017 Beacon Kit

MitchElectronics 2019



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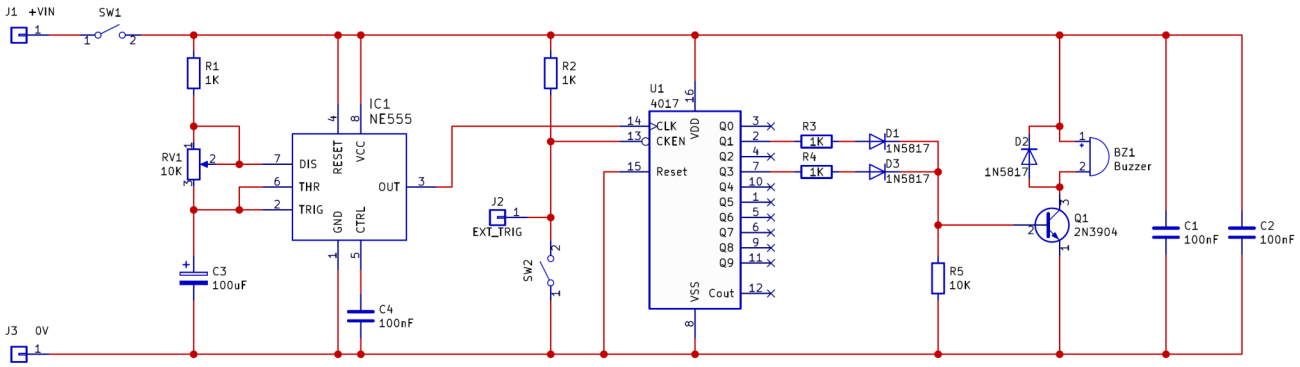
SCHEMATIC

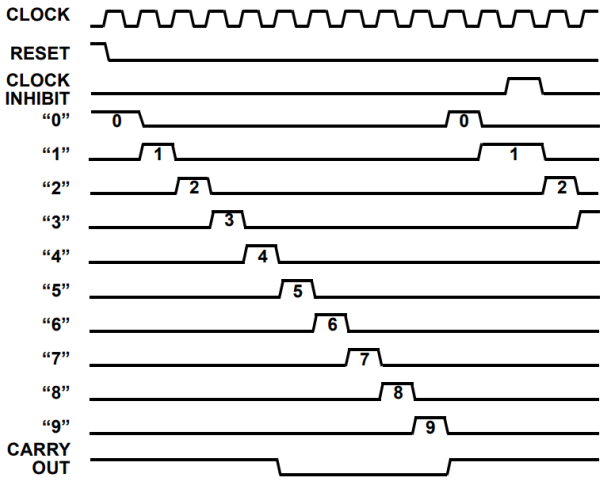
VIN: 5V



SCHEMATIC EXPLANATION

The 4017 beacon is made up of two main circuits; a 555 astable oscillator and a 4017 5-stage Johnson counter. The 555 astable circuit is made up of a single 555 timer, a potentiometer (RV1), a resistor (R1), and a capacitor (C3). This circuit outputs a square wave whose frequency is determined by the resistance of RV1 and the larger the resistance of RV1 the slower the output frequency. You can learn more about the 555 astable circuit with this kit available from MitchElectronics.

The output of the 555 astable is connected to the clock input of the 4017 and every time the output of the 555 transitions from low to high the 4017 counter transitions to the next state. The 4017 has 10 outputs that each turn on after the previous output has turned off. The best way to see this is to look at the table below that shows the output states for each clock pulse that is fed into the CLK pin.



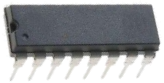
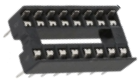
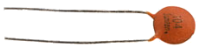
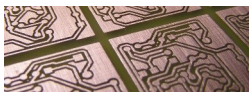
Extracted from the 4017 datasheet

In the beacon circuit only two of the outputs are used to create two quick-beeps from a buzzer that can be useful for tracking a fallen RC plane or drone. The two outputs have a series diode to prevent damage to the combined outputs (i.e. so current can't flow from one output into another output). The combine outputs (from D1 and D3) are then fed into a transistor which is used to enable the buzzer (BZ1). The buzzer has a diode in parallel that is in reverse bias mode so that any negative voltages generated by the buzzer are kept away from the transistor (negative voltages can damage transistors). The circuit starts beeping when SW2 is closed or the external trigger (EXT_TRIG) is connected to 0V and this allows for two methods for enabling the beacon.

Note—This circuit requires 5V. You can get this from our Simple Power Supply kit

MATERIALS

Check that you have the following components

Component	Component Name	Quantity	Looks like
4017 IC	U1	1	
555 IC	IC1	1	
16 DIP Socket	U1	1	
8 DIP Socket	IC1	1	
100uF Capacitor	C3	1	
100nF Capacitor	C1, C2, C4	3	
Switch	SW1	2	
1kΩ Resistor	R1, R2, R3, R4	4	
10kΩ Resistor	R5	1	
2N3904	Q1	1	
Potentiometer	RV1	1	
Diode	D1, D2, D3	3	
Red, Black, Green wire	+VIN, 0V, EXT_TRIG	3	
Buzzer	BZ1	1	
PCB	-	1	

CONSTRUCTION

Download the electronics construction manual

To learn how to construct circuits on PCBs download the Electronics Construction Manual from Mitch-Electronics using the link below. This document shows you how to install all electronic components used in MitchElectronics kits. The list below shows the sections relevant to this kit so do not worry if you see component sections in the document that don't come with this kit!

www.mitchelectronics.co.uk/electronicsConstructionManual.pdf

Relevant sections in the electronics construction manual

Resistors

Capacitors

Diodes

ICs

Switches

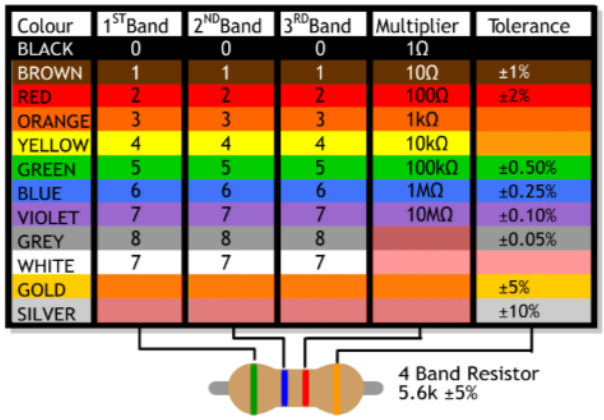
Potentiometers

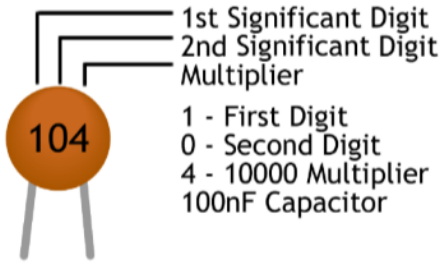
Wires

Buzzers

Transistors

RESISTOR AND CAPACITOR IDENTIFICATION

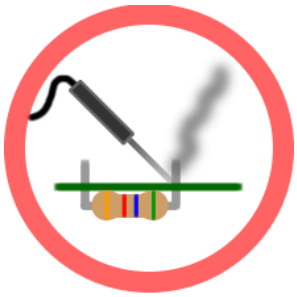




IMPORTANT INFORMATION

RoHS Compliant Kit (Lead free)

Low Voltage Kit



Caution! Soldering Required