Sound Alarm Kit

MitchElectronics 2019
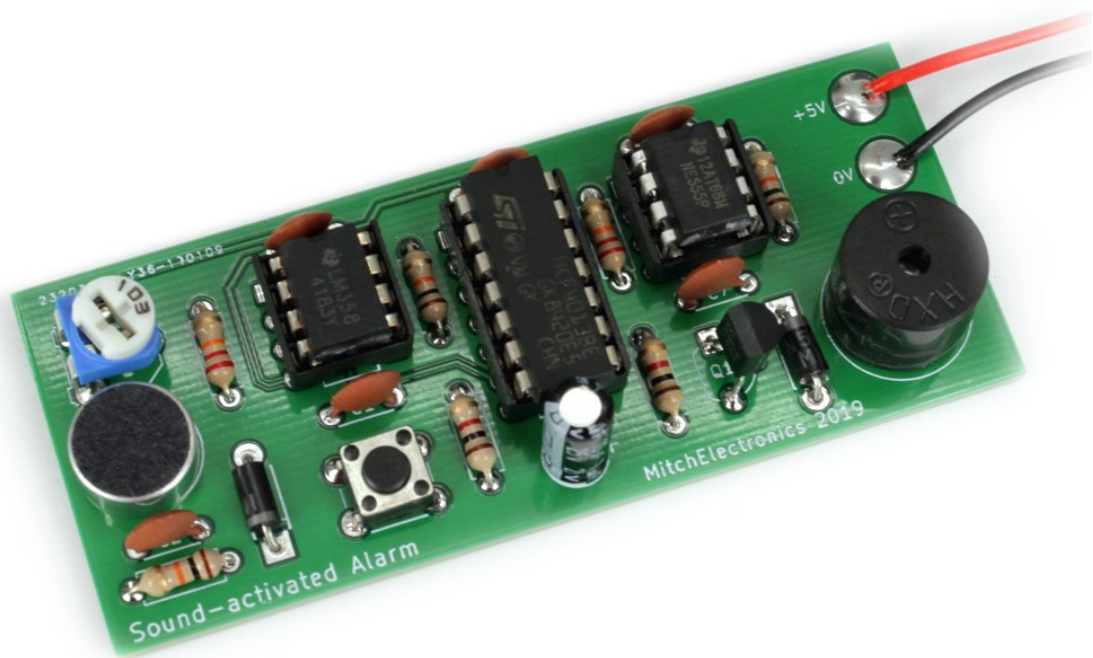
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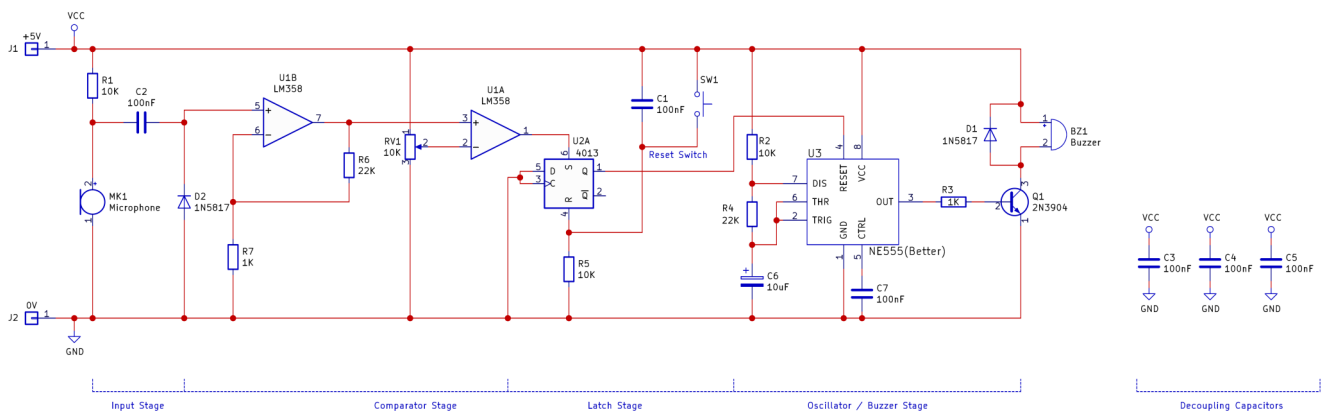
SCHEMATIC EXPLANATION

The sound activated alarm is made up of four different stages; input stage from the microphone, a comparator stage, a latch stage, and an oscillator stage.

The first stage receives signals from an electret microphone and couples the signal to an op-amp (U1B). A reverse biased diode (D2) is used to remove the negative portion of the incoming signal as this can cause the op-amp to behave erratically. This op-amp also amplifies the sound signal by around 22 x which makes detecting the signal easier in the next stage (using resistors R7 and R6).

The next stage is a comparator (using U1A). The comparator compares the signal from the amplified microphone stage to a potentiometer and if the signal becomes greater than the output of the potentiometer then the output of the comparator switches on. This causes the next stage, the latch (U2A), to switch on and stay on until the reset button (SW1) is pressed. The latch used in this circuit is from a 4013 dual D-type flip-flop that is capable of more than just a simple latch however these other configurations are not needed in this circuit.

The last stage is a 555 astable oscillator whose reset line is controlled by the latch stage. Under normal conditions (i.e. the latch output being low), the 555 astable oscillator is disabled as the RESET pin to the 555 is held low. However, when a sound signal is detected the 555 begins to oscillator and the result is the transistor Q1 being turned on and off. This turning off and on of the transistor also turns the buzzer BZ1 off and on.
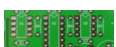
Notes on using the circuit
This circuit requires a 5V power source which [can be obtained with either the 5V source kit](#) that conveniently converts a 9V battery into a 5V output or from the [Simple Power Supply Kit](#). The potentiometer is used to adjust the sensitivity so use that when setting the sensitivity of your alarm system!
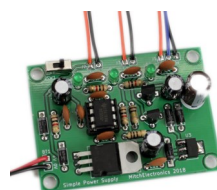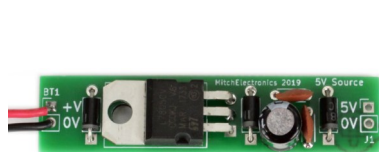
CONSTRUCTION

Check that you have the following components

Component	Component Name	Quantity	Looks like
8 DIP Socket	U1, U3	2	
14 DIP Socket	U2	1	
555 IC	U3	1	
LM358	U1	1	
4013	U2	1	
1kΩ Resistor	R3, R7	2	
10KΩ Resistor	R1, R2, R5	3	
22KΩ Resistor	R4, R6	2	
10KΩ Potentiometer	RV1	1	
100nF Capacitor	C1, C2, C3, C4, C5, C7	6	
10uF Capacitor	C6	1	
1N5817 Diode	D1, D2	2	
2N3904 NPN BJT	Q1	1	
Buzzer	BZ1	1	
Electret microphone	MK1	1	
Tactile Switch	SW1	1	
Wires	Red and Black	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 al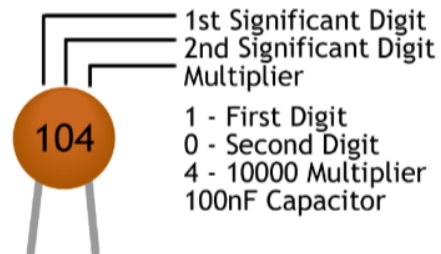l electronic components used in MitchElectronics kits. The list below shows the sections relevant to this kit so do not worry if you see component sections in the document that don't come with this kit!

www.mitchelectronics.co.uk/electronicsConstructionManual.pdf

RESISTOR AND CAPACITOR IDENTIFICATION

Colour	1STBand	2NDBand	3RDBand	Multiplier	Tolerance
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	±1%
RED	2	2	2	100Ω	±2%
ORANGE	3	3	3	1kΩ	
YELLOW	4	4	4	10kΩ	
GREEN	5	5	5	100kΩ	±0.50%
BLUE	6	6	6	1MΩ	±0.25%
VIOLET	7	7	7	10MΩ	±0.10%
GREY	8	8	8		±0.05%
WHITE	7	7	7		
GOLD					±5%
SILVER					±10%

4 Band Resistor
5.6k ±5%

1st Significant Digit
2nd Significant Digit
Multiplier

104

1 - First Digit
0 - Second Digit
4 - 10000 Multiplier
100nF Capacitor

Relevant sections in the electronics construction manual

Resistors

Capacitors

Potentiometers

Transistors

Integrated Circuits

Buzzers

Switches

Diodes

Microphones

Wires

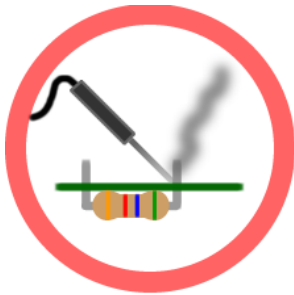# IMPORTANT INFORMATION

RoHS Compliant Kit (Lead free)

Low Voltage Kit

Caution! Soldering Required