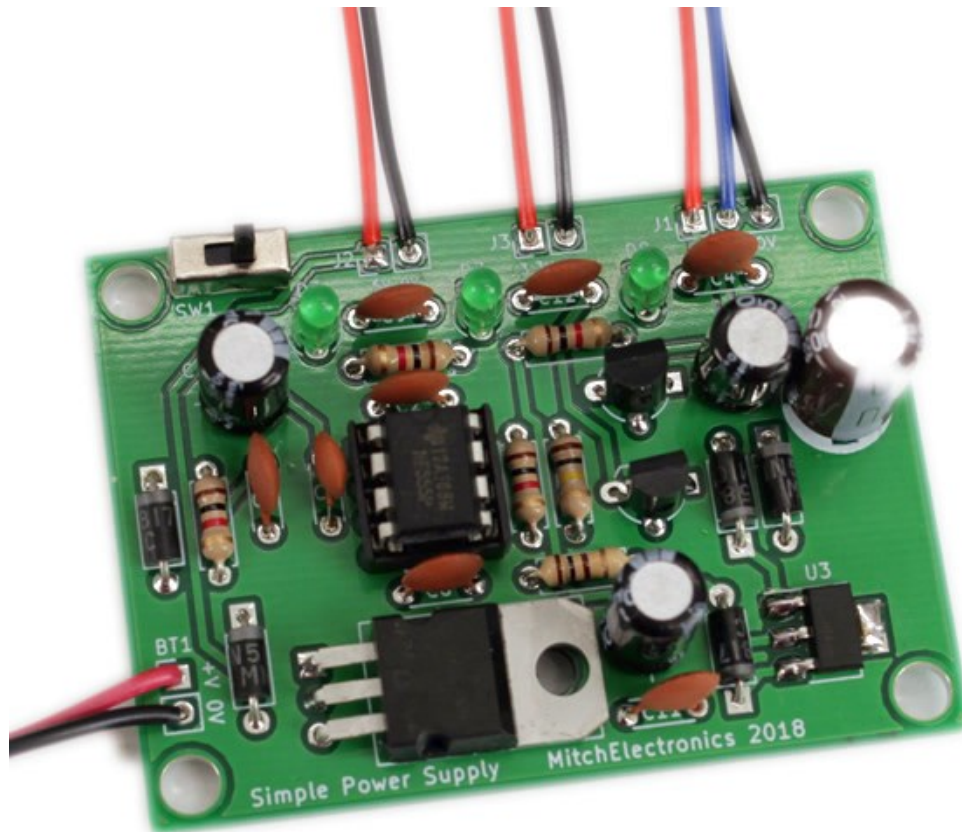


Simple Power Supply Kit

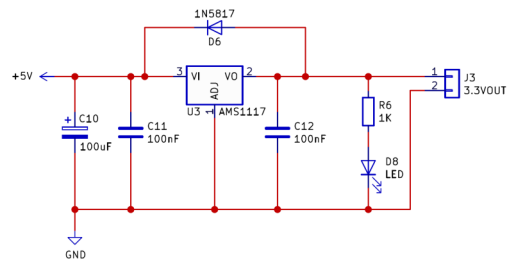
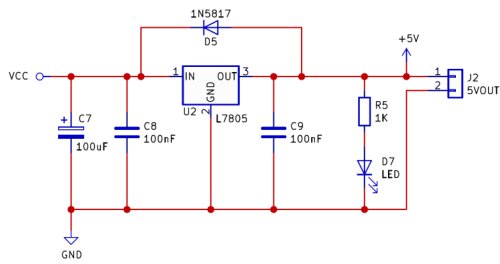
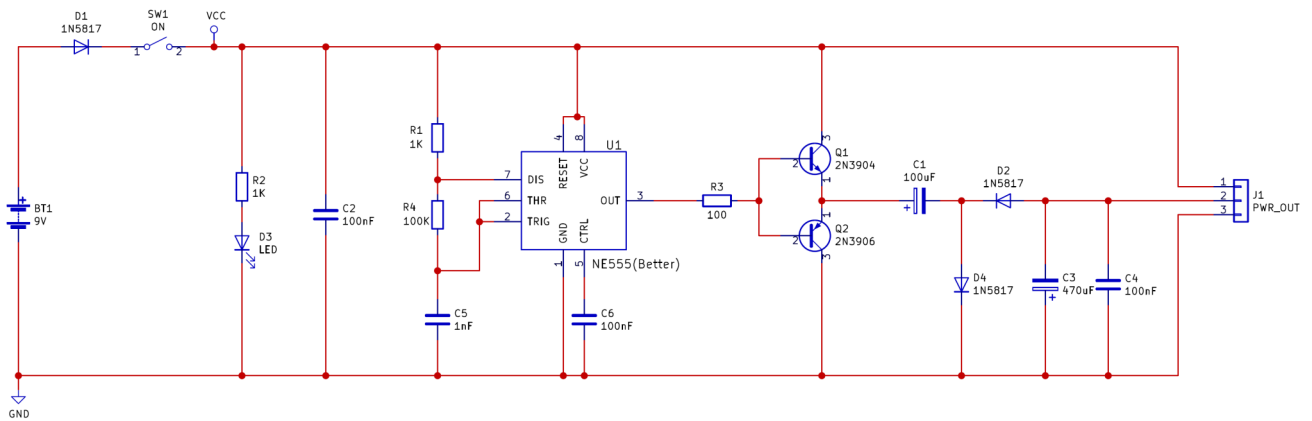
MitchElectronics 2019



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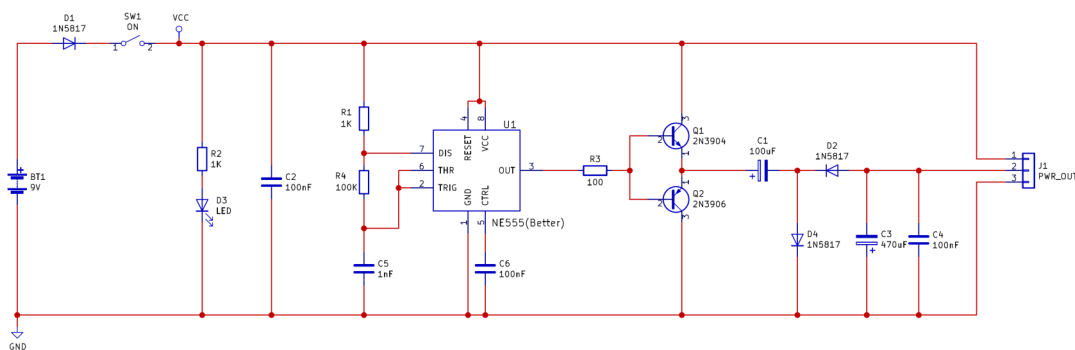
SCHEMATIC



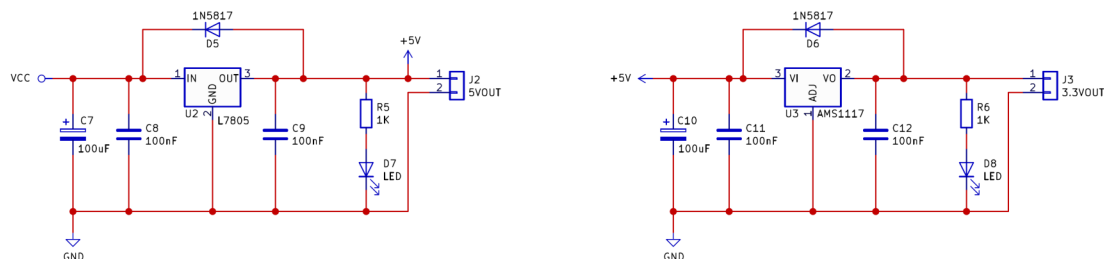
SCHEMATIC EXPLANATION

While many circuits can be powered directly with a battery some are not as easily powered. For example, some MitchElectronics kits require a specific voltage supply such as the 4017 Beacon which needs a 5V source (as the buzzer is rated for 5V operation only). In these scenarios a power supply circuit is needed which can produce the required voltage and this is where the Simple Power Supply comes in.

The Simple Power Supply is made up of three main circuits; a negative voltage generator, a 5V regulator, and a 3.3V regulator. The negative voltage generator consists of a 555 astable oscillator that drives a push pull amplifier (Q1 and Q2) which then drives a capacitor / diode network which converts the square wave pulses into a negative voltage. To learn how this works you can look at the [Negative Voltage Generator kit here](#) which describes in detail about capacitive coupling! The output of the negative voltage generator produces a negative voltage that is approximately the voltage of the input (in this case, 9V) and this voltage can be used for circuits that require dual rails (such as many op-amp circuits).



The Simple Power Supply also has two fixed voltage outputs which can be used with most modern circuitry; 5V and 3.3V. The 5V is generated with the use of a 7805 regulator IC while the 3.3V is generated with the use of an AMS1117 (some kits may be shipped with the LM1117) which converts the 5V output from the 7805 into 3.3V. Each regulator circuit has a polarised capacitor for smoothing (C7 and C10) and two decoupling capacitors (C8, C9, C11, and C12). Each regulator also has a protection diode that prevents the regulators from being damaged by ESD and other external voltage spikes.





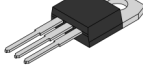




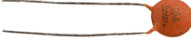
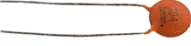



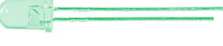








The 3.3V regulator used in this kit is an SMD type which can be tricky to solder however this is intentional. One of the aims of this kit is to show that SMD components can be used in DIY projects and makers should not be dissuaded from using them as some manufacturers are starting to phase out through-hole parts. SMD parts are not only much smaller than their through-hole counter parts but are often cheaper too which make them a viable solution for DIY enthusiasts.

Note—It is recommended that any power output does not exceed 100mA in current consumption otherwise the regulator supplying the current will get hot!

MATERIALS

Check that you have the following components

Component	Component Name	Quantity	Looks like
555 IC	U1	1	
8-DIP Socket	U1	1	
2N3904	Q1	1	
2N3906	Q2	1	
7805 Regulator	U2	1	
AMS1117 (or LM1117)	U3	1	
100Ω Resistor	R3	1	
1kΩ Resistor	R1, R2, R5, R6	4	
100kΩ Resistor	R4	1	
1nF Capacitor	C5	1	
100nF Capacitor	C2, C4, C6, C8, C9, C11, C12	7	
100uF Capacitor	C1, C7, C10	3	
470uF Capacitor	C3	1	
1N5817 Diode	D1, D2, D4, D5, D6	5	
3mm Green LED	D3, D7, D8	3	
Switch	SW1	1	
Red Wire	Positive Outputs	3	
Black Wire	Ground Outputs	3	
Blue Wire	Negative Output	1	
PP3 Connector	Battery Input	1	
PCB	-	1	

CONSTRUCTION

Download the electronics construction manual

To learn how to construct circuits on PCBs download the Electronics Construction Manual from MitchElectronics 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

Regulators

SMD

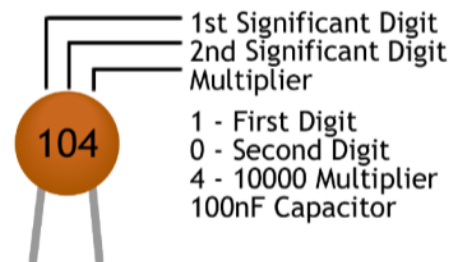
Switches

Wires

Transistors

RESISTOR AND CAPACITOR IDENTIFICATION

Colour	1 ST Band	2 ND Band	3 RD Band	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%



1st Significant Digit
2nd Significant Digit
Multiplier
1 - First Digit
0 - Second Digit
4 - 10000 Multiplier
100nF Capacitor

IMPORTANT INFORMATION



RoHS Compliant Kit (Lead free)



Low Voltage Kit



Caution! Soldering Required