4017 Light Chaser Kit

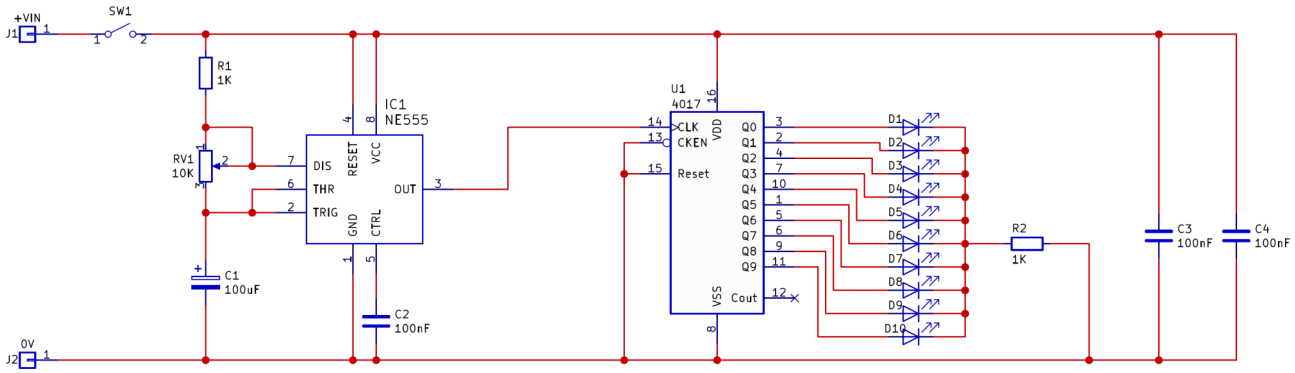
MitchElectronics 2019

www.mitchelectronics.co.uk

CONTENTS

SCHEMATIC

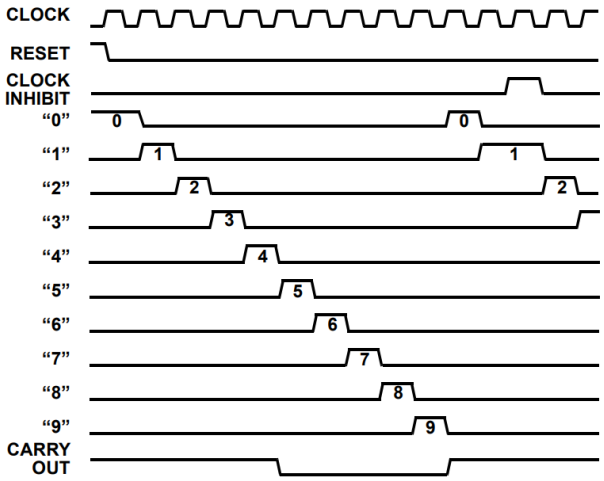
VIN: 3V to 16V



SCHEMATIC EXPLANATION

The 4017 light chaser 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 (C1). 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.



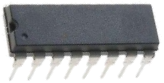
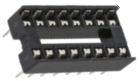
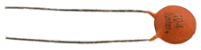
Extracted from the 4017 datasheet

Each one of the outputs of the 4017 is connected to an LED and all the LEDs are connected to a single resistor, R2, in series with ground. LEDs in parallel typically require a series resistor for each LED but in this case the circuit only requires one resistor as only one LED will ever be on and therefore, the brightness of each LED will be the same.

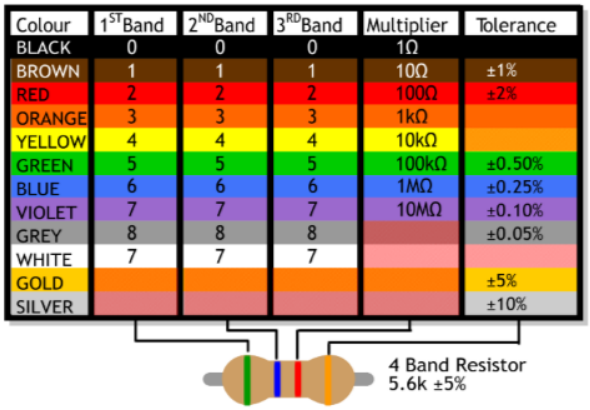
The 4017 also has two other inputs that are not used in this circuit but may be useful to learn about; CLKEN and RESET. The CLKEN pin is an active low pin and when this pin is low (i.e. 0V), the 4017 counter will count every time a clock pulse is detected. If this pin is connected to high (i.e. +V) then the counter will not count when a clock pulse is detected and can be useful for enabling / disabling the counter. The RESET pin is an active high pin and when connected to high (i.e. +V), the counter will reset all outputs. This is useful for setting the counter to a known state (output Q0 = 1).

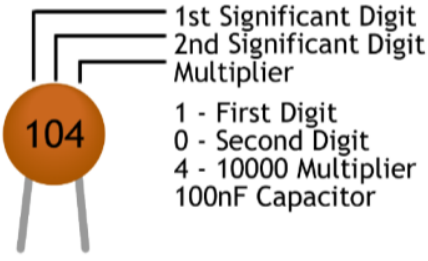
MATERIALS

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	C1	1	
100nF Capacitor	C2, C3, C4	3	
Switch	SW1	1	
1kΩ Resistor	R2, R3	2	
Potentiometer	RV1	1	
LED, Red	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10	10	
PP3 Connector	-	1	
PCB	-	1	

RESISTOR AND CAPACITOR IDENTIFICATION





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

LEDs

ICs

Switches

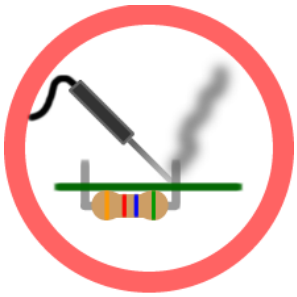
Potentiometers

Wires

IMPORTANT INFORMATION

RoHS Compliant Kit (Lead free)

Low Voltage Kit



Caution! Soldering Required