Handy Dandy Little Circuits #34

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## Fun with the CMOS 4017 Counter

Introduction

The CMOS-4017 Decade Counter/Decoder can be used in many ways in the digital mode . It can be made to count to a number and stop or recycle or it can be made to generate sequentially a number from 1 to 10 .
It can also be used as a frequency divider as in the case of the Count to a Number and Recycle circuit where the frequency input to pin 14 will be divided by the number connected back to pin 15 and the output taken from the corresponding pin number .
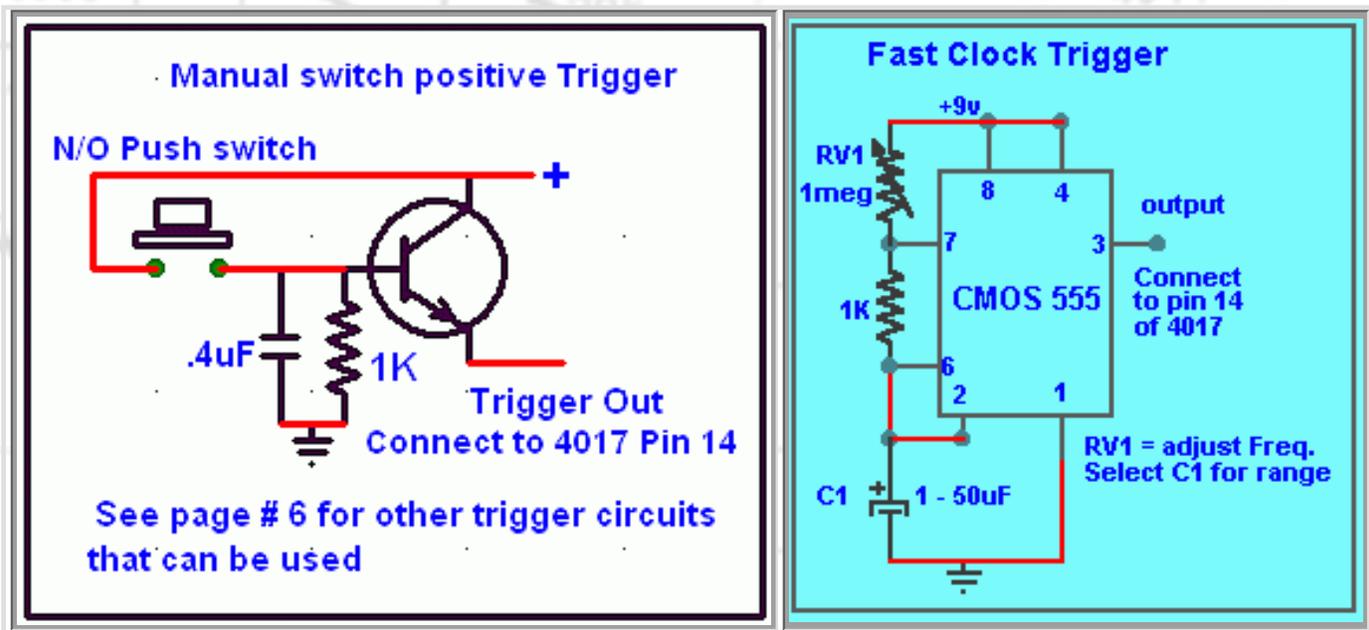
This fun project page uses the 4017 combined with LEDs and oscillator to make simple and usefull projects as described below . We can use a power supply from 3 to 18 Vdc . Since we use LEDs in these project the chosen supply is a 9v battery and point to point wiring with #22 gauge or smaller wire is recommended.

### Two basic settings of the 4017
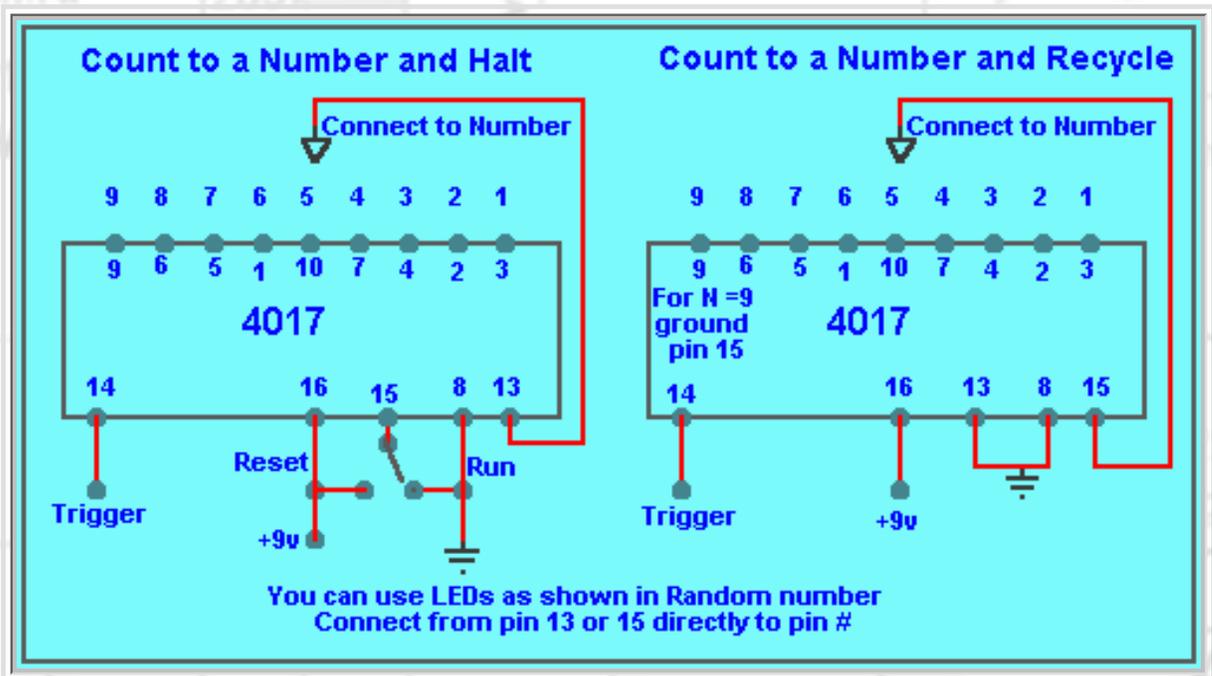
Triggering the 4017

Two methods are used , one is a simple push button switch with a debouncing signal circuit and the other is a running oscillator using a 555 IC timer .

Manual switch positive Trigger

N/O Push switch

.4uF

1K

Trigger Out
Connect to 4017 Pin 14

See page # 6 for other trigger circuits
that can be used

Fast Clock Trigger

+9v

RV1
1meg

1K

8   4

7

6

2   1

3

CMOS 555

output

Connect
to pin 14
of 4017

RV1 = adjust Freq.
Select C1 for range

C1   1 - 50uF

A Random Number Generator

This circuit can be used as a guessing number game or the lower or higher winning number or other applications of your choice . An LED is connected to each output as shown with a current limiting resistor (1K) connected to ground ..

The Fast clock circuit is used connected in series with a simple push or toggle switch connected to pin 14 of the IC as shown . The oscillator frequency can be adjusted with RV1 . Another additional ON/OFF switch should be used for the power supply to pin 16 . When the power is turned on the oscillator is activated and when the push button is depressed the LEDs will start flashing in sequence at the rate set by the oscillating Fast Clock Trigger and as the button is released only one LED will remain lit at random . Each LED could be identified as a labeled number or letter hidden behind a small amber window panel .

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
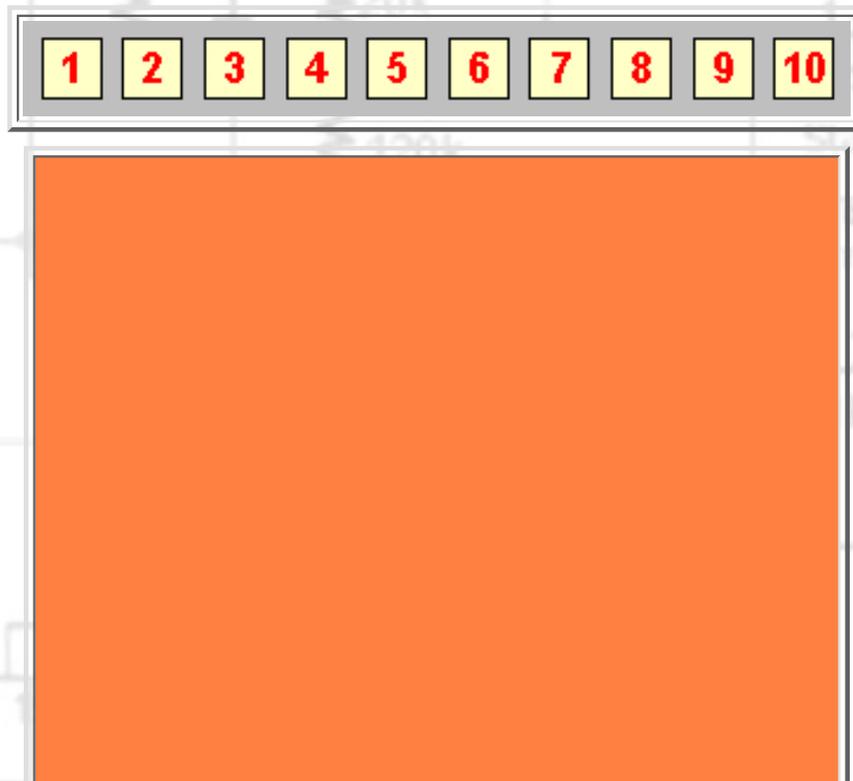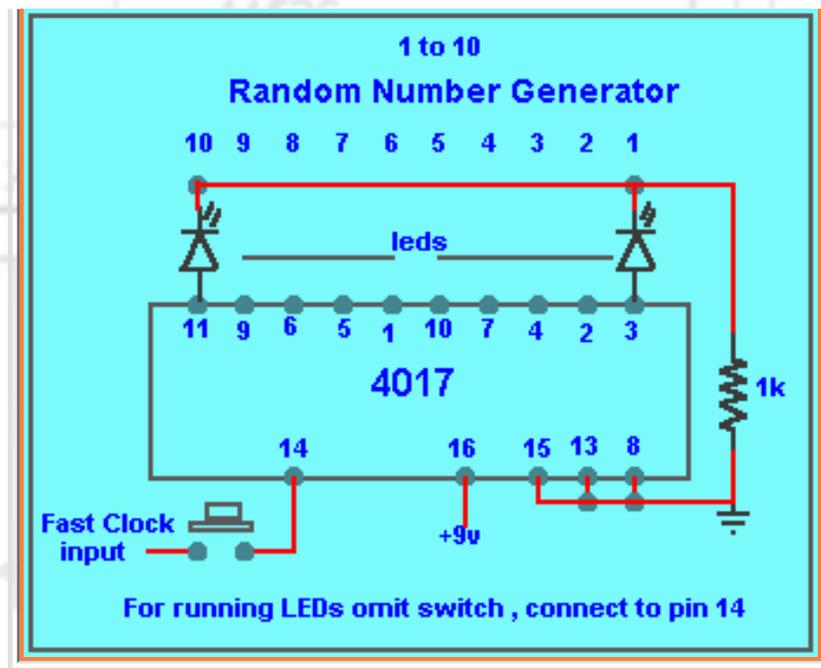
Number 1 to 20 Random Generator

As you can see the set-up is the same as above except that pin 12 of the first counter is the carry over connected to pin 14 of the second counter .
You can if you wish convert the Random Generators into Sequential Running generator by removing the push button switch and connecting the Fast Clock Trigger directly to pin 14 then adjust the trigger speed with RV1 .
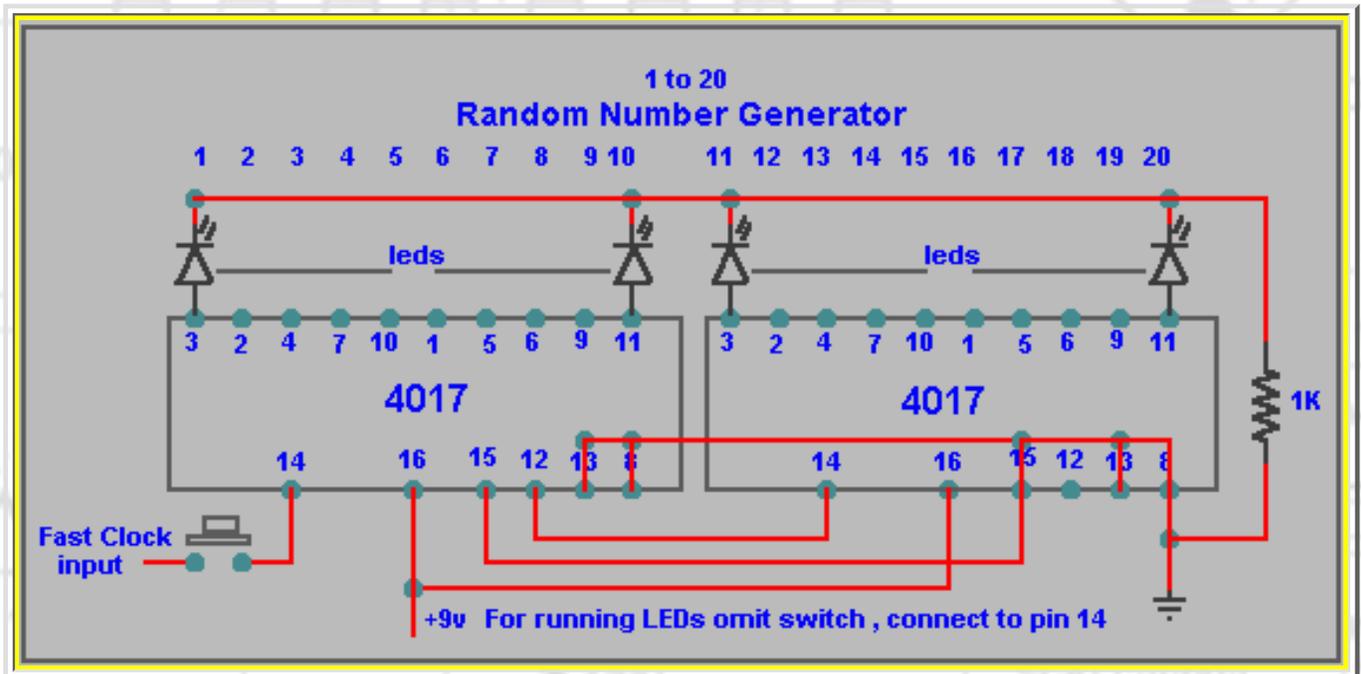

Random notes Generator

This is a basic circuit for a note generator . Resistors R1 to R9 are chosen from 0-1K to produce the notes you want and the range can be adjusted with RV1 . After closing S1 , the Manual trigger circuit can be connected to pin 14 to produce a single note in sequence at every push of the button .
As with the other generators above , the Fast Clock Trigger circuit can be connected directly to the trigger pin 14 or through a push button to produce random notes . With

patience and the right choice of R1 to R9 it can be made to play a simple tune . The system can be expanded by adding another counter as shown above .

Random notes Generator
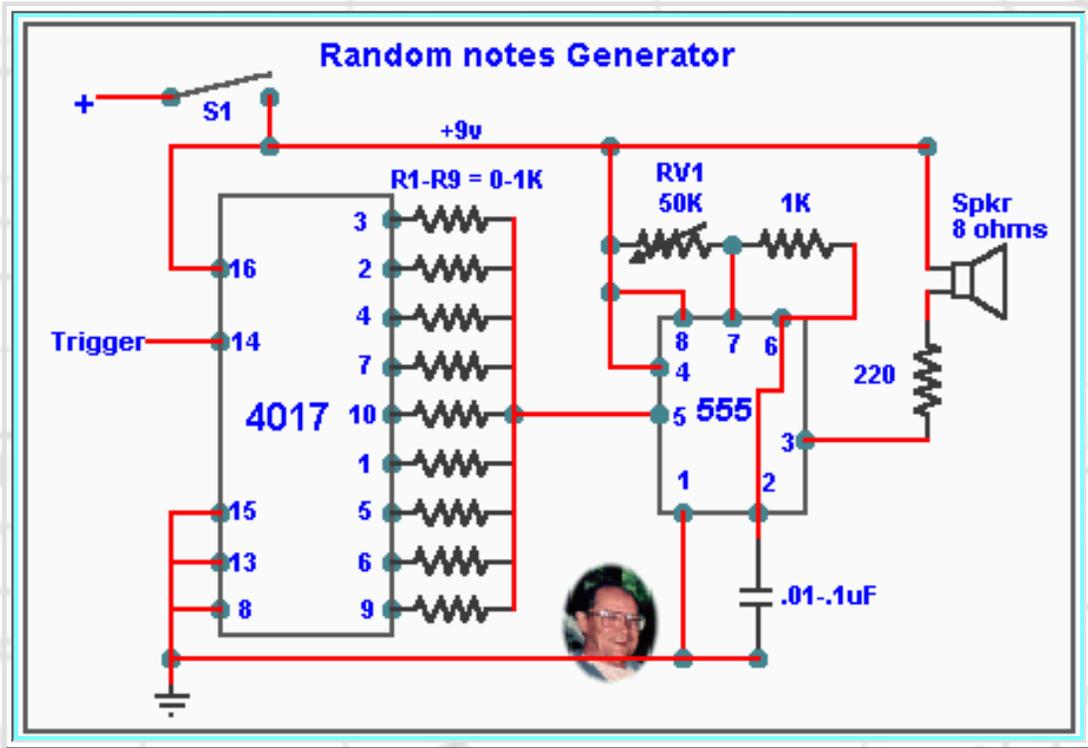
You can download Data Sheets for the CMOS ICs used in this circuit .

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