Dice Project

Press the push switch to 'throw' the dice: this makes the circuit rapidly cycle through the dice numbers so that an effectively random dice number is displayed by the LEDs when the push switch is released.

The 555 astable circuit provides clock pulses at about 5kHz for the 4017 counter which has ten outputs (Q0 to Q9). Each output becomes high in turn as the clock pulses are received. Only six counts (Q0-Q5) are needed so Q6 is connected to reset. Appropriate outputs are combined with diodes to supply the LEDs: for example Q1, Q3 and Q5 are combined for LED A. The dice sequence has been started at 2 so the ÷10 output can be used for LEDs B1 and B2, this saves diodes and simplifies the circuit. Pressing the push switch makes the disable input low so that counting occurs.

4017 counter outputs high	Dice no.	LEDs ● = LED on			
		A	B1/2	C1/2	D1/2
Q0 and ÷10	2		●●		
Q1 and ÷10	3	●	●●		
Q2 and ÷10	4		●●	●●	
Q3 and ÷10	5	●	●●	●●	
Q4 and ÷10	6		●●	●●	●●
Q5	1	●			

Drill seven 5mm holes in a dice pattern to mount the LEDs on a panel such as a plastic box lid or sheet of thin plywood. They should be a tight fit but a little glue can be applied from the underside if necessary.

Parts Required

- resistors: 330 × 3, 470, 10k × 3
- capacitors: 0.01µF, 0.1µF
- diodes: 1N4148 × 6
- on/off switch
- push switch
- stripboard: 20 rows × 22 holes

- 555 timer IC, such as NE555
- 4017 counter IC
- DIL sockets for ICs: 8-pin, 16-pin
- LEDs: red 5mm diameter × 7
- battery clip for 9V PP3

Stripboard Layout and LED connections

LED connections (view from below)
Cut all the LED short leads to be very short to make identification easier.
The long lead of the LED is + (anode).   cut here
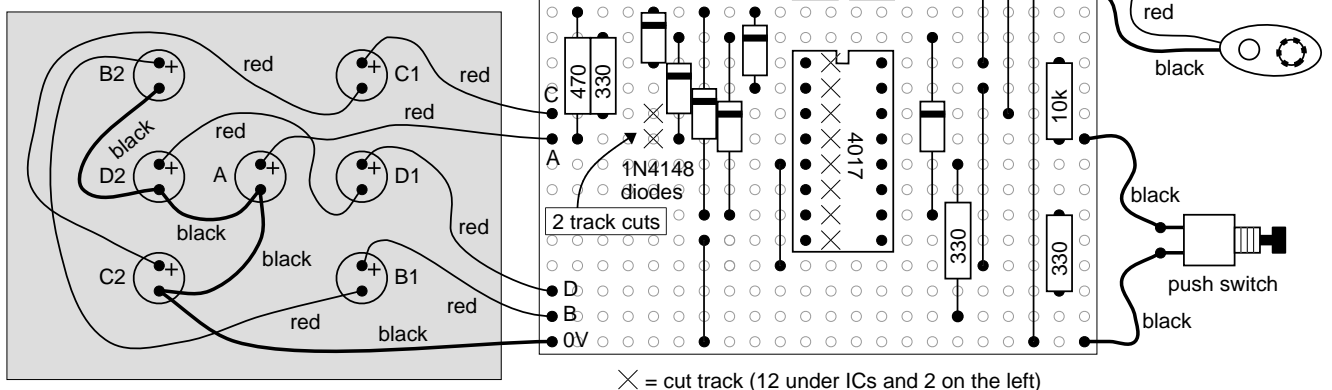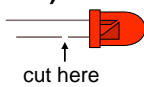
✕ = cut track (12 under ICs and 2 on the left)

Circuit diagram