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TECHNICAL AND VOCATIONAL EDUCATION  
GOVERNMENT TECHNOLOGICAL UNIVERSITY  
HINTHADA

DEPARTMENT OF ELECTRONICS  
A.G.T.I, SECOND YEAR PROJECT

**LED RUNNING LIGHT**

CREATED BY

Second Year ( E C )

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## OBJECTIVES

When you will have completed this project, you will understand.

- ⇒ How a specific operation of 555 Timer IC and CD 4017 decade counter.
- ⇒ How many pin numbers and the operation of each pin of 555 Timer IC and CD 4017 decade counter.



## List of Components

No.	Component's Name	No. of Pieces
1	Universal Board	1
2	9 V battery	1
3	555 Timer IC	1
4	CD 4017	1
5	LED (RED and BLUE)	10
6	10 k $\Omega$ resistor	1
7	variable resistor (100 k $\Omega$ )	1
8	22 $\mu$ F capacitor	1
9	0.1 $\mu$ F capacitor	1
10	680 resistor $\Omega$	1

## CHAPTER (1)

### BACKGROUND THEORY OF COMPONENTS

#### IC TIMET (555)

A most commonly used linear IC for the generation of clock pulses is the 555 IC timer. It is an 8.Pin IC as shown in figure 1.(a)with the relevant block diagram shown in the same figure 1.(b).

The function of the different pins is introduced below:

Pin no.1;(Marked as ground pin), it is the reference pin so that all the potential are measured with respect to this pin.

Pin no.2:(Shown as the trigger pin)The out put of this IC while working as a multivibrator, depends upon the anplitude f a triggering pulse injected at this pin.

Pin no.3.(Depicting output).The output can be collected between this pin and the pin showing the Ecc or that showing the ground.

Pin no.4:(Marked as the reset pin)To stop the function of the IC, already generating clock pulses, a negative pulse is applied across Pin no 4.

Pin no.5:(Control voltage Pin) connecting a potentiometer between this pin an the ground can vary the width of the generated pulses. An external voltage appled across this pin can also do the same function. Other wise it is kept grounded through a capacitor to avoid a false pick up.

Pin no.6:(Shown as the threshold pin)The non inverting input to an IC OP.AMP while working as comparator (1) is applied between this pin and the ground.

Pin no.7:(Marked as the discharge pin) Driving the transistor T(as shown in figure 1(b). to saturate brings its collector to almost ground and the discharge pin.

Pin no.8:(The supply pin showing Ecc) The positive of the dc source is connected at this pin and the negative at the ground pin, numbered as 1.

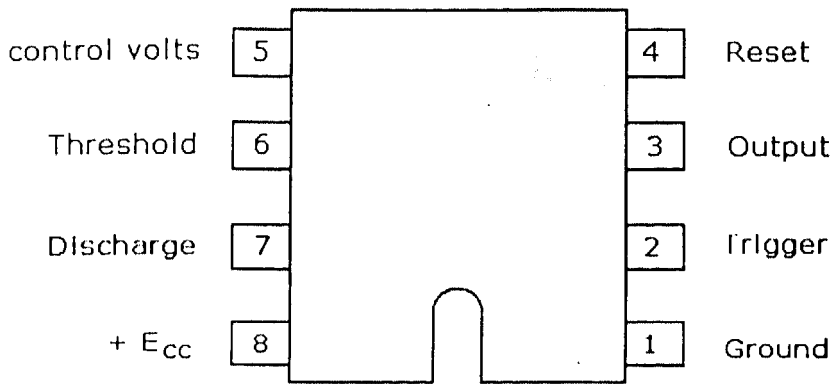


Figure 1.(a)

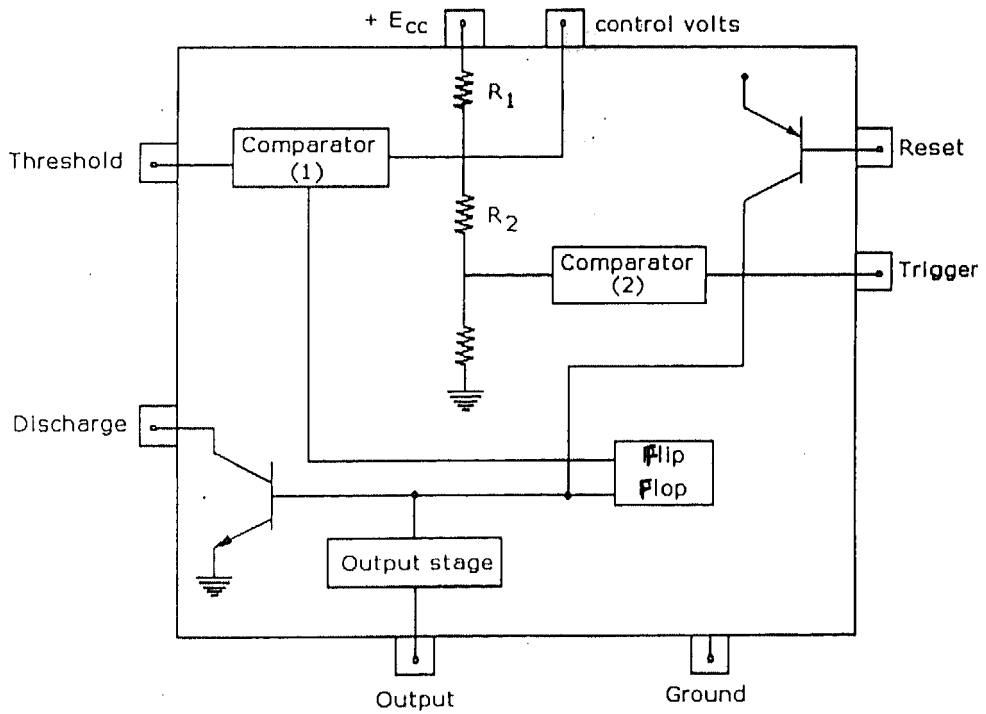
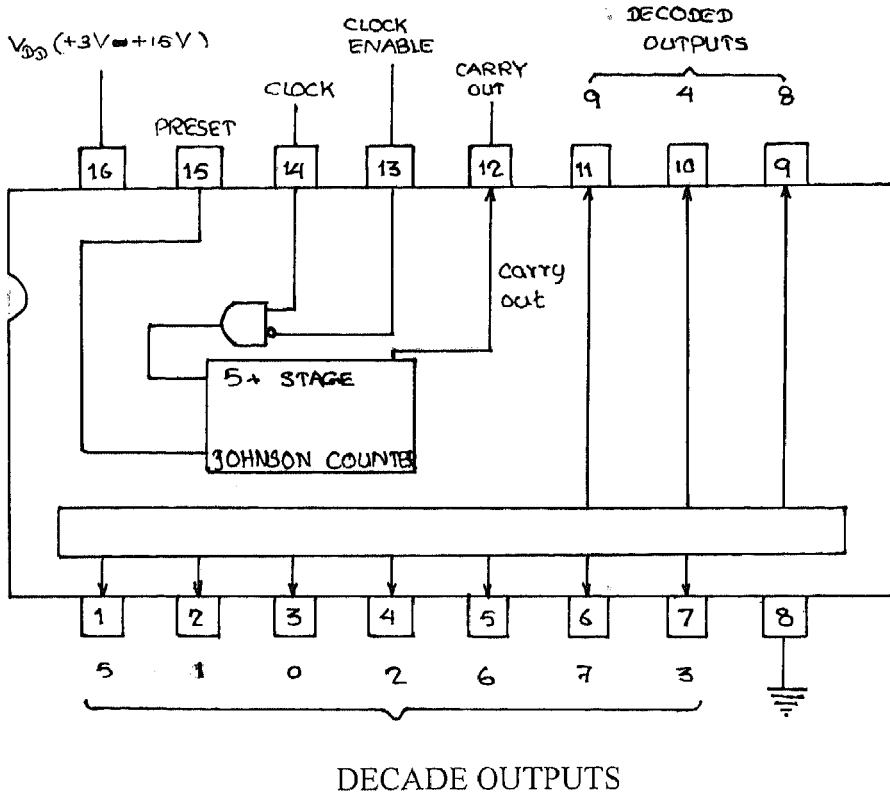


Figure (b)

## CD 4017 (Decade Counter / Decoder Counter)



### Decade Counter

CD 4017 Decade Counter is very common in electronic circuit. Whenever the clock pulse is entered, each output is high. When pin No.13 and 15 are low, it starts its counting function.

## CHAPTER (2)

### CIRCUIT OPERATION OF LED RUNNING LIGHT

In this circuit two ICs (555) Timer, CD 4017 decade counter, 10 LED, 100k preset and other components are involved as shown in figure.

Astable Oscillator, 555 Timer generated clock pulse output signal to control the decade counter (CD 4017). When the output pin of 555 Timer IC is connected to the clock pin, pin 14 of decade counter, the output, ( $Q_0$  to  $Q_9$ ) are active.

The output ( $Q_0$  to  $Q_9$ ) drives the LEDs. When  $Q_0$  is high, the anode of LED 1 receives forward bias and LED 1 is turned on. Then the next output  $Q_1$  to  $Q_9$  are also high sequentially.

By adjusting 100k $\Omega$  preset, we can control the speed of LEDs display.