

### 3 - Obstacle Avoidance and Speed Control

Monday, June 15, 2020 9:32 AM

Sensor : Ultrasonic HC-SR04

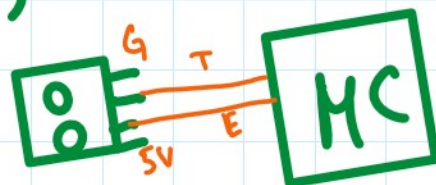


#### • Specs and Pinouts

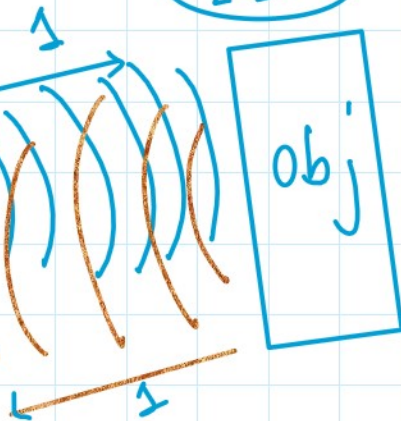
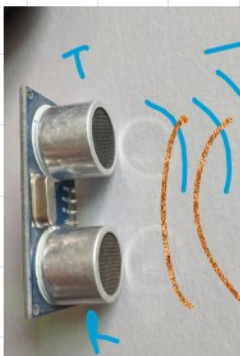
- - 5V and 15mA
- - VCC, Ground
- - Trigger, echo
- - 2cm to 400 cm

(MC)

Schematic



2 sec



#### Working

- It sends out an ultrasonic wave which returns after hitting the object in front of it.
- Distance = speed  $\times$  time

$$= 340 \frac{\text{m}}{\text{s}} \times 2$$

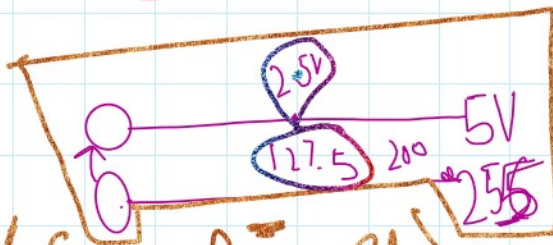
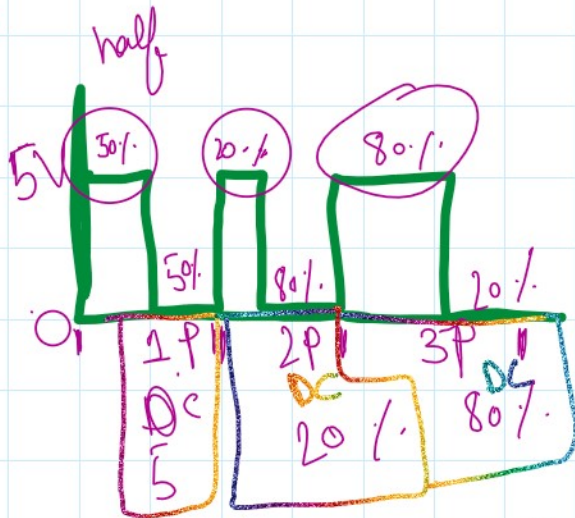
$$D = 680 \frac{\text{m}}{\text{s}}$$

$$= 340 \times 2 \text{ ms.}$$

$$D = 30 \text{ cm} \quad 10^{-6}$$

# Speed Control

PWM :



LED (freq, Res, Ch)  
(5k, 8, 0)

10cm  
0-100

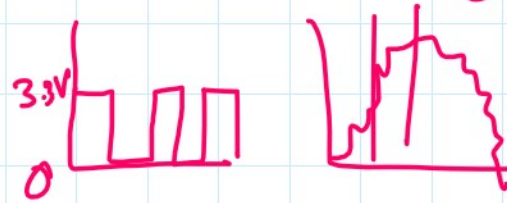
5cm  
0

255  
(200)

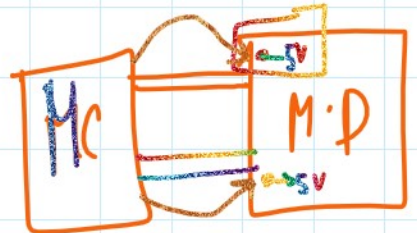
200

> 10

Digital    Analogy



DC : Duty Cycle.



$2^8 = 256$   
 $2^{10} = 1024$