

## Ultrasonic Measurement

### Experiment: 9(a)

<b>Objective:</b>	Measurement of the distance using ultrasonic sensors.
<b>Equipments Needed:</b>	Ultrasonic Measurement Trainer Kit, Flat Object, Mains Cord.
<b>Procedure:</b>	
1.	Connect the mains cord to the Trainer. Switch 'on' the power supply.
2.	Now select Clock Generator for frequency of 40 KHz at mode '2'.
3.	Select display at frequency of 40 KHz.
5.	Adjust the Threshold Voltage such that the display shows exact reading of distance.
6.	Take the reflector plate from the accessories box and hold it with the hands in the Ultrasonic range.
7.	Move the reflector plate up and down parallel to the ultrasonic sensors (Transmitter and Receiver).
8.	Observe the display as it shows the distance (in cm) between the ultrasonic sensors and the object.
9.	Note the reading of distance and compare it by taking a meter scale. <b>Note :</b> Object should be placed more than 28 cm. far from the Ultrasonic sensors

#### OBSERVATION TABLE:

Sr.No	Distance measured	
	Using Ultrasonic Sensor (cm)	Using Meter scale (cm)
1	32	30
2	41	40
3	55	50
4	65	60
5	77	70
6	87	80

<b>Result:</b>	Reading of Distance taken by ultrasonic sensor & meter scale are comparable.
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## PHYSICS

**Experiment: 9(b)**

<b>Objective:</b>	Study of Object detection using Ultrasonic Sensors.
<b>Equipments Needed:</b>	Ultrasonic trainer kit, mains cord, flat object.
<b>Procedure:</b>	
1.	Connect the mains cord to the trainer. Then switch 'on' the power supply.
2.	Now select Clock Generator for frequency of 40 KHz at mode '1'.
3.	Select display at frequency of 40 KHz.
4.	Select object detection as shown in figure.
5.	Initially set the threshold voltage to the maximum position. Buzzer will make Sound.
6.	Now slowly adjust the threshold voltage & stop where, the Buzzer just stops sounding.
7.	Bring the reflector plate parallel to the Ultrasonic sensors(Transmitter & receiver)
8.	Observe that when the Object is in the proximity of Sensor, buzzer will make sound else buzzer will not make any sound.
9.	So one can detect the object placed in the path of Ultrasonic signal.

<b>Result:</b>	The far object can be detected using Ultrasonic sensors.
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PHYSICS