COMPARISON OF ULTRASONIC TRANSDUCERS

4 ultrasonic transducers are used for the testing

- Multicomp Pro ultrasonic transducer
- Multicompo ultrasonic transducer
- Transducer salvaged from HC SR04
- Transducer salvaged from US100

Procedure

- Take 2 Transievers
- One connected to Arduino mega 2560 board. and the other transiever connected to DSO.
- connect signal pin to D10 of the arduino and ground it.
- Program

```
void setup()
{
pinMode(10,INPUT); /*For testing, the signal pin from the transiever
                     connected to D10 pin of the arduino*/
tone(10,40000);
}

void loop()
{

}
```

Fig 1

Results

Multicomp Pro

Fig 2

Item	Specification
Part Number	MCUSD16P40B12RO
Construction	Open struct
Using Method	Dual Use
Frequency	40 ± 1kKz
Transmitting Sound Pressure Level	min. 112dB (30cm/10V rms Sine Wave)
Receive Sensitive	min.-74dB/V/ µbar
-6dB Directivity	50°
Aftershock Time	max. 1.5ms
Sensitivity Distance	0.6m to 16m
Capacitance	3,000pF 20% at1kHz
Soldering conditions	350°C to 400°C
Operating Temperature. Range	-30°C to 85°C
Allowable Input Voltage	120Vp-p (40kHz)
Housing Material	Plastic

Table 1

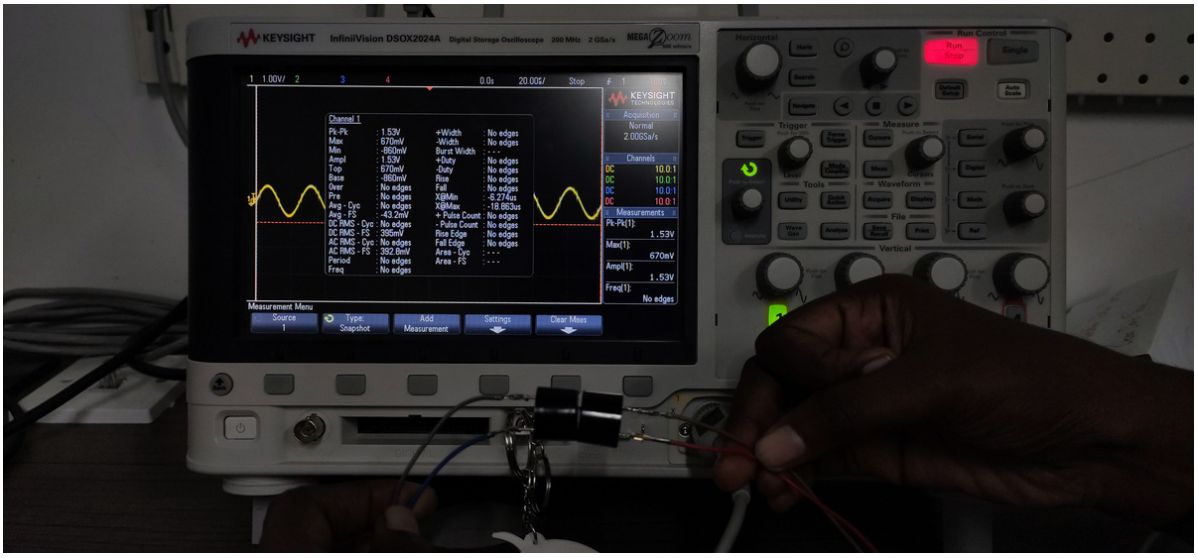

Fig 2.1.a

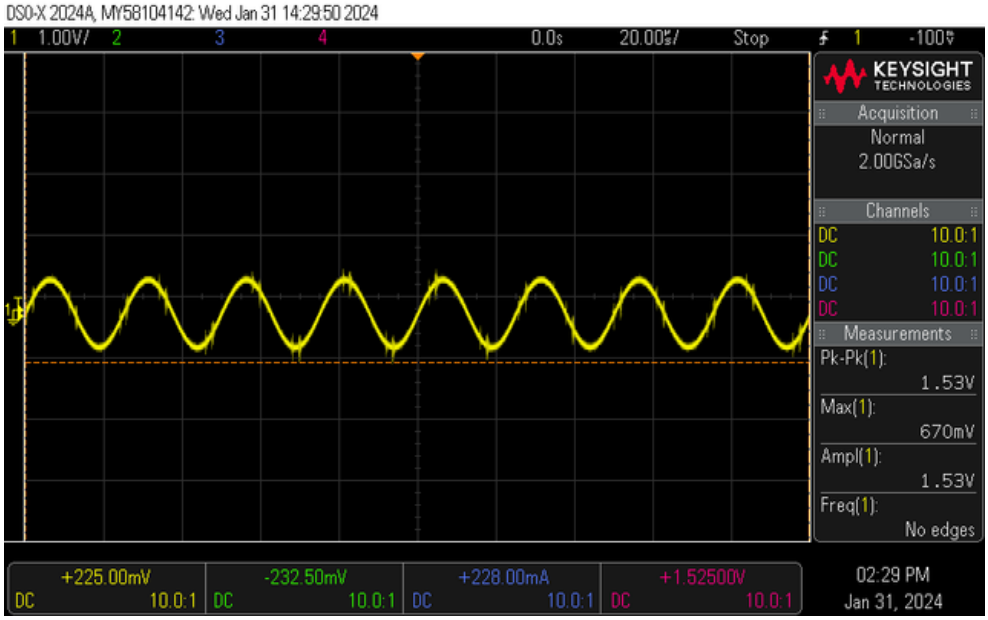

Fig 2.1.b

Fig 2.1.a Multicomp pro transducer are arranged very closely.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 2.1.b.

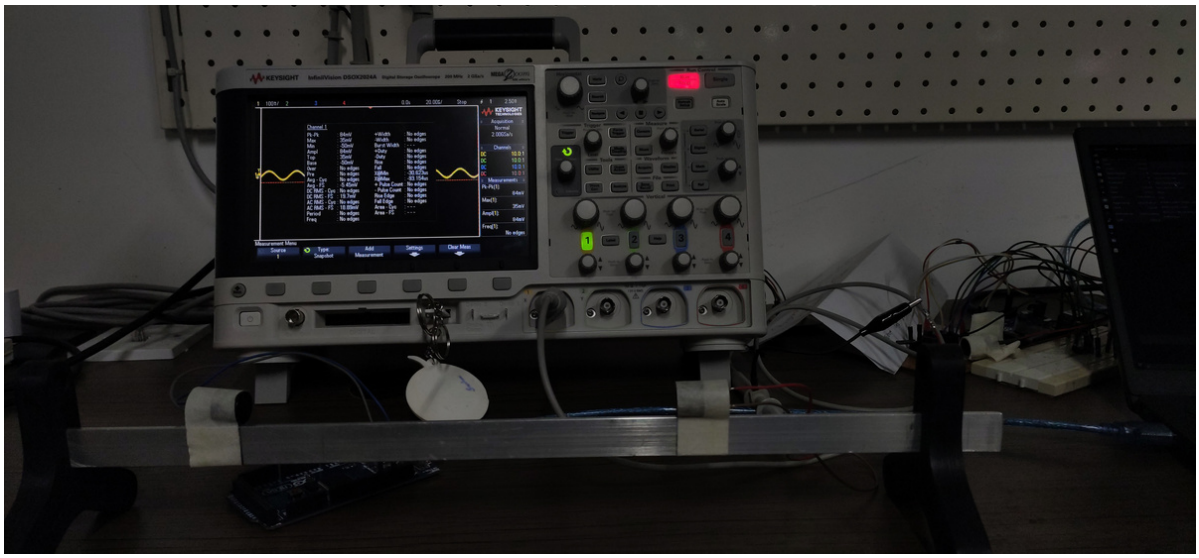

Fig 2.1.c

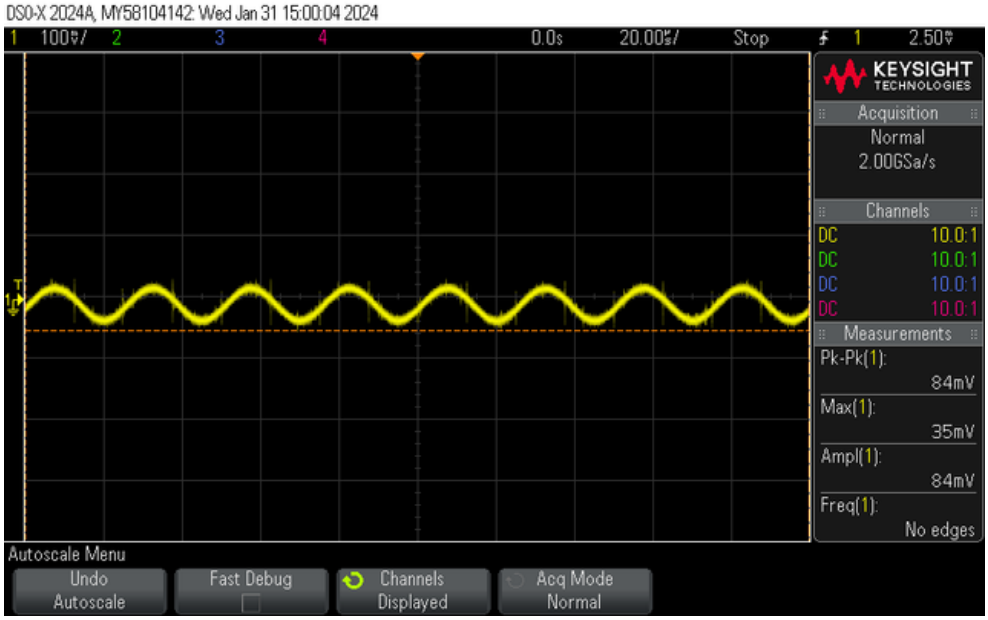

Fig 2.1.d

Fig 2.1.c Multicomp pro transducer are kept at a distance 20cm.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 2.1.d.

Multicomp

Fig 3

Item	Specification
Part Number	MCUSD14A58S9RS-30C
Construction	Water Proof
Using Method	Dual Use
Centre Frequency	58 ± 1kKz
Sound Pressure Level (dB)	≥85 (30cm/10V rms)
Sensitivity (dB)	≥-90dB/V/μbar
Beam pattern	110 × 50°
Capacitance (pF)	2,000 ± 25% at1kHz
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Allowable Input Voltage (Vp-p)	160Vp-p
Housing Material	Aluminium

Table 2

Fig 3.1.a

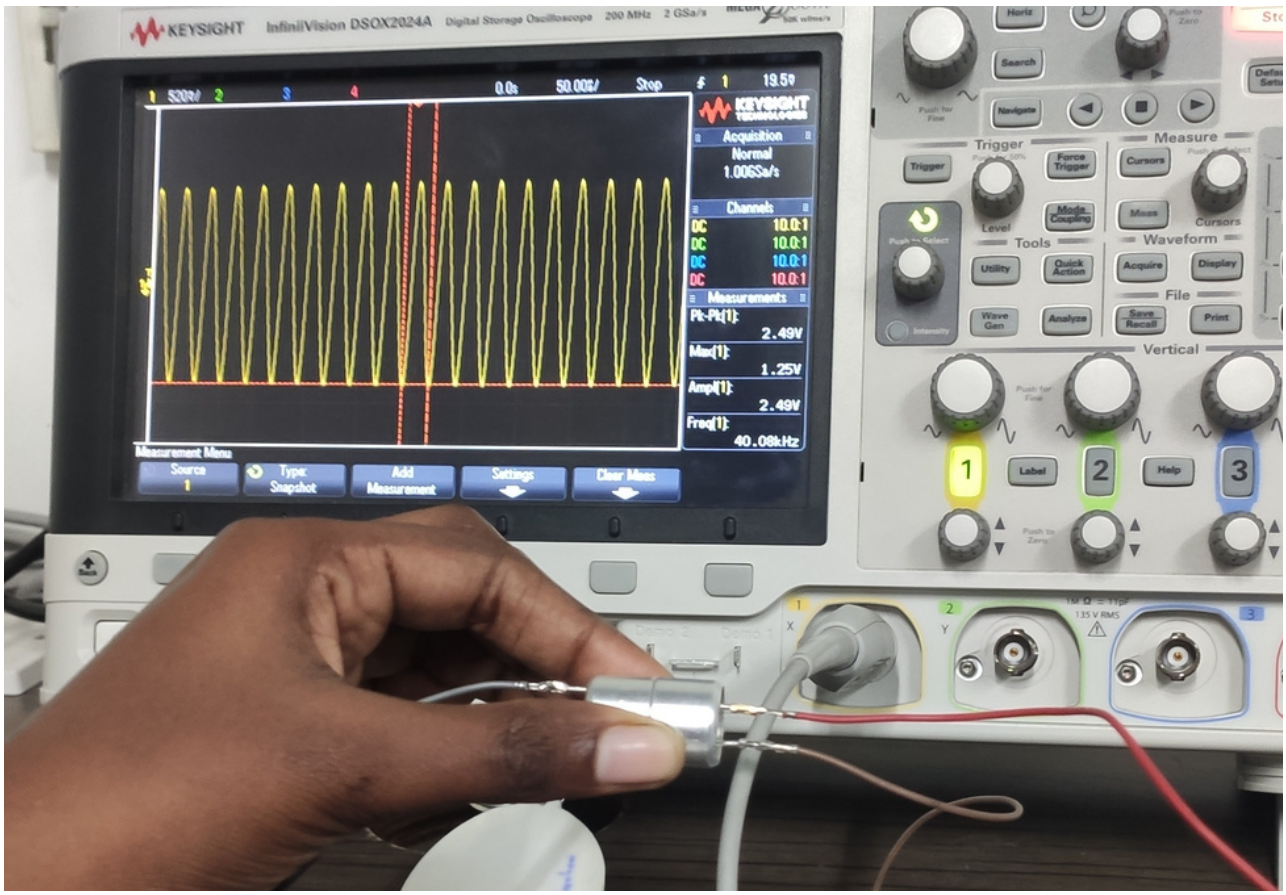

Fig 3.1.b

Fig 3.1.a Multicomp transducer are arranged very closely.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 3.1.b.

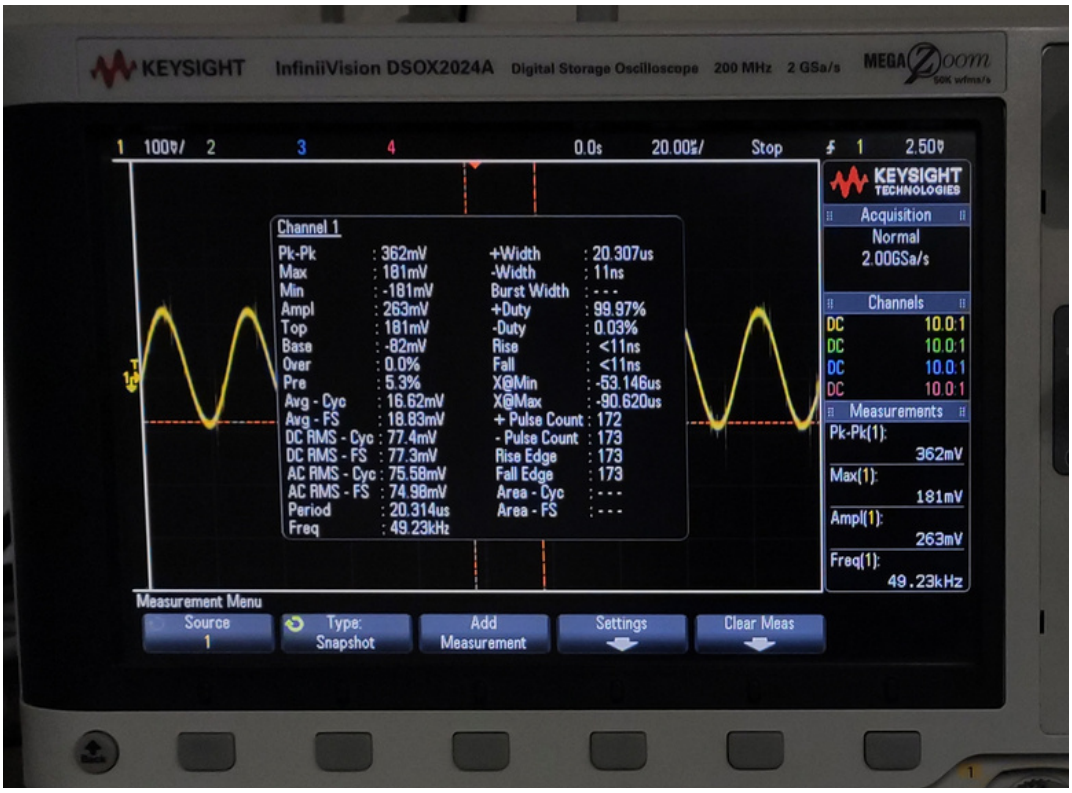

Fig 3.1.c

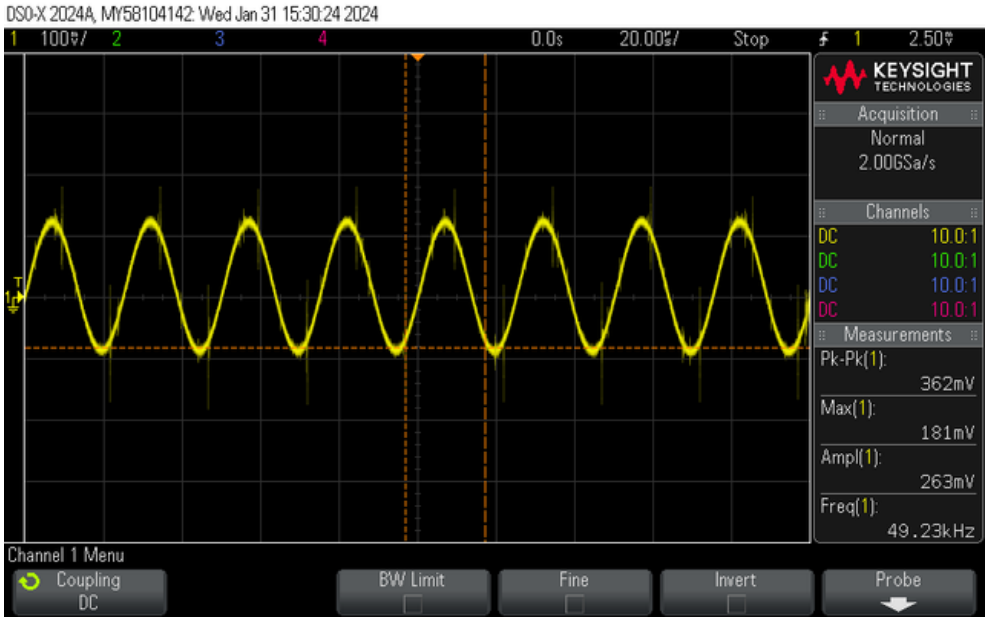

Fig 3.1.d

Fig 3.1.c Multicomp pro transducer are kept at a distance 20cm.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 3.1.d.

Transducer from HCSR04

The transducers are salvaged from HCSR04 module.It has transmitter and receiver section. During the previous experiments, found that the transmitter and receiver has different peak to peak voltage and other parameters too. Here, check the transmitter to receiver side transducer test and receiver to transmitter test at 0 cm and 20cm.

Transmitter To Receiver

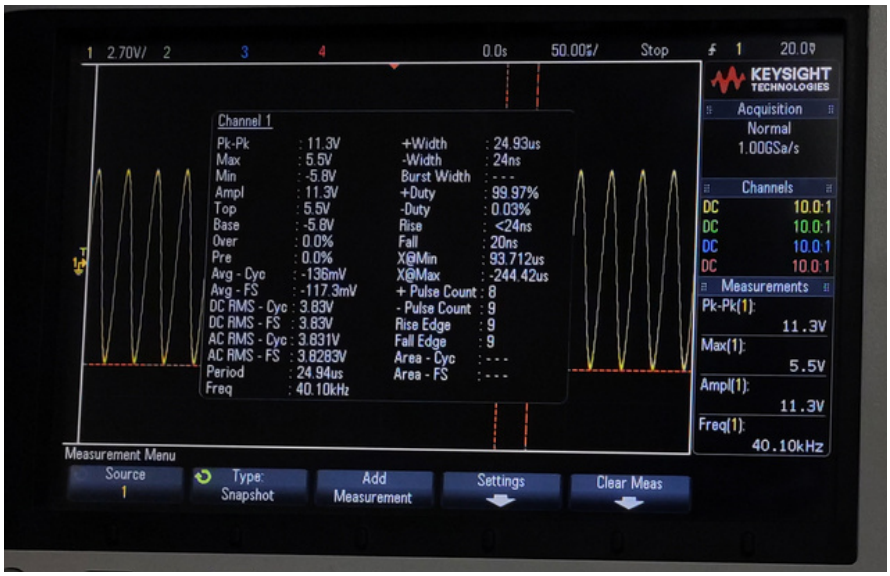

Fig 4.1.a

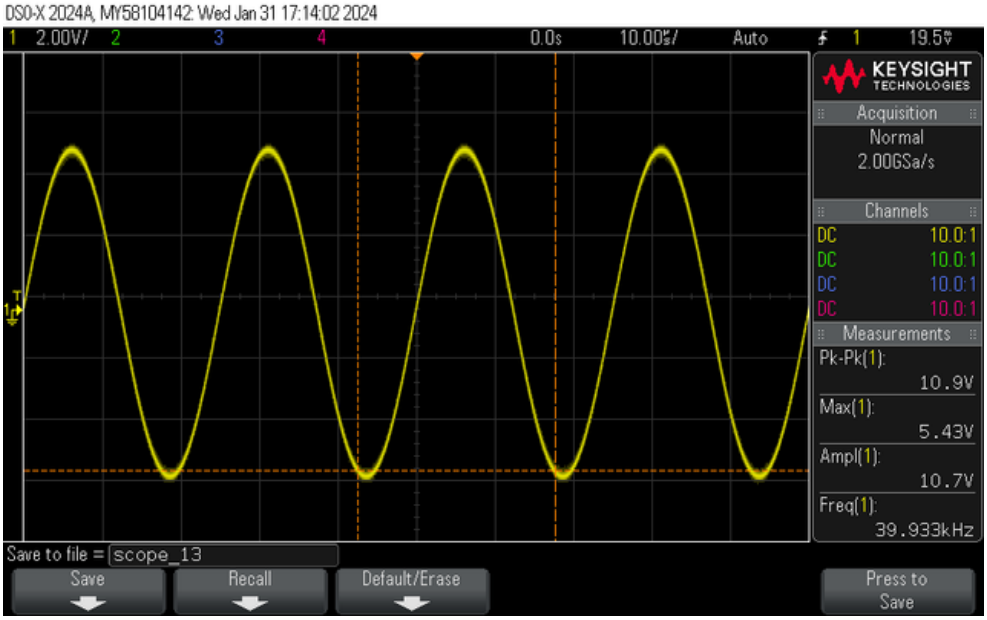

Fig 4.1.b

Fig 4.1.a HCSR04 transducer are arranged very closely.The transducer modules were found to be marked as R & T respectively by the manufacturers, while in operation, T to R (from HCSR04) arrangements shown above . All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 4.1.b.

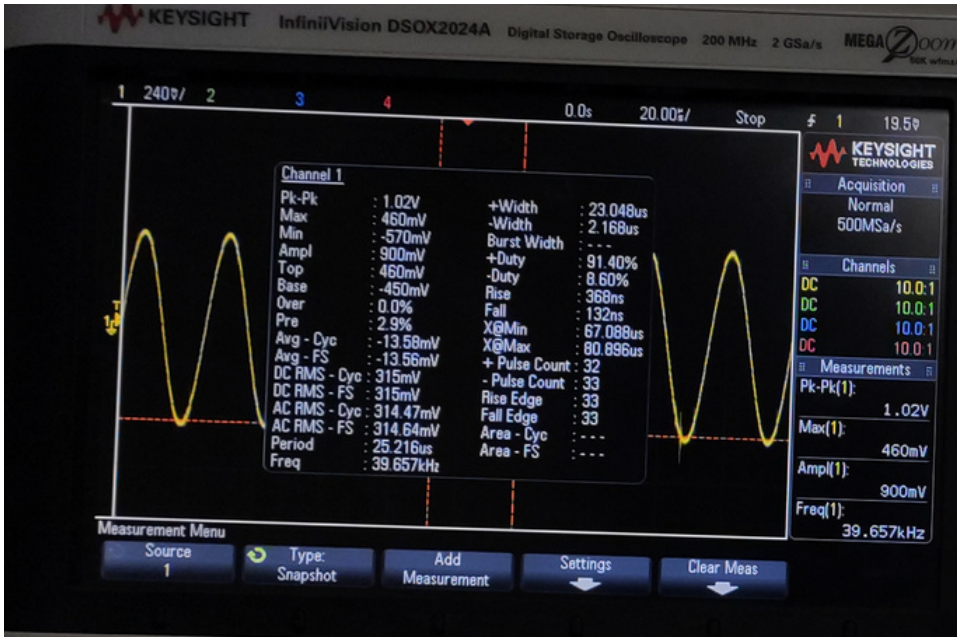

Fig 4.1.c

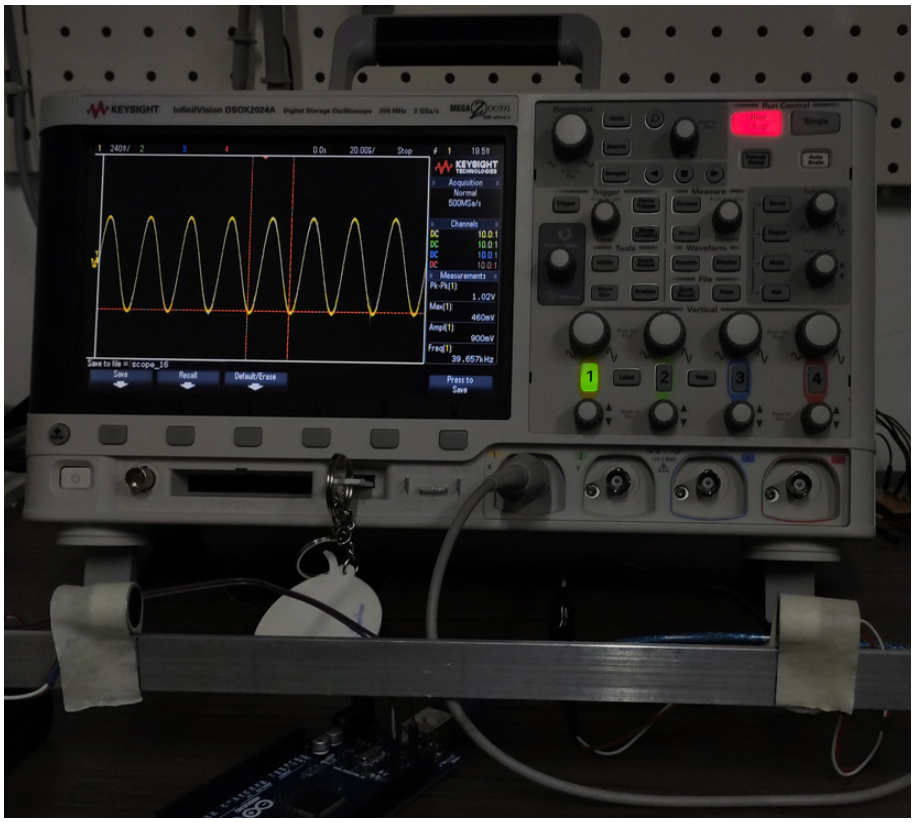

Fig 4.1.d

Fig 4.1.c HCSR04 transducer are kept at a distance 20cm.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 4.1.d.

Receiver to Transmitter

Fig 4.2.a

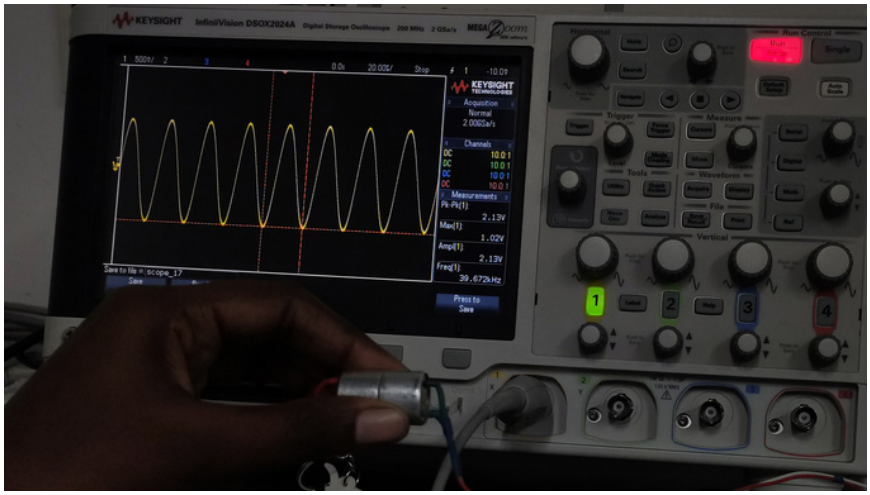

Fig 4.2.b

Fig 4.2.a HCSR04 transducer are arranged very closely.The transducer modules were found to be marked as R & T respectively by the manufacturers, while in operation, R to T (from HCSR04) arrangements shown above . All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 4.2.b.

Fig 4.2.c

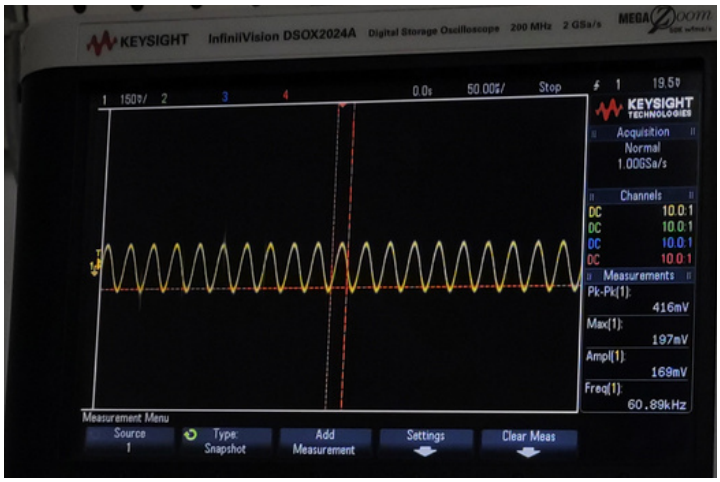

Fig 4.2.d

Fig 4.2.c HCSR04 transducer are kept at a distance 20cm.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 4.2.d.

Transducer from US100

The transducers are salvaged from US100 module.It has transmitter and receiver section. During the previous experiments, found that the transmitter and receiver has different peak to peak voltage and other parameters too. Here, check the transmitter to receiver side transducer test and receiver to transmitter test at 0 cm and 20cm.

Transmitter to Receiver

Fig5.1.a

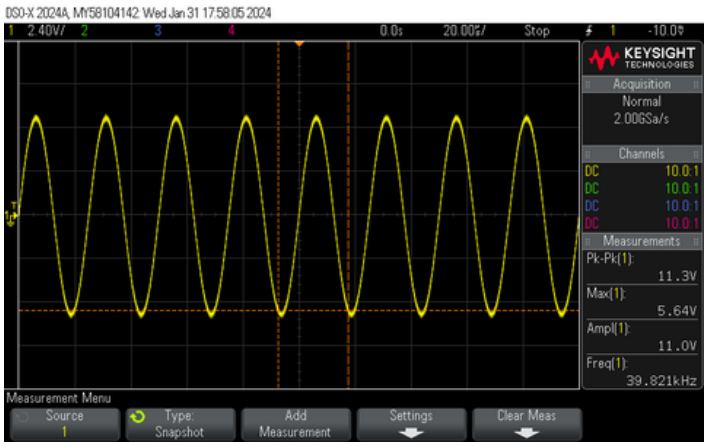

Fig5.1.b

Fig 5.1.a US100 transducer are arranged very closely.The transducer modules were found to be marked as R & T respectively by the manufacturers, while in operation, T to R (from US100) arrangements shown above . All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 5.1.b.

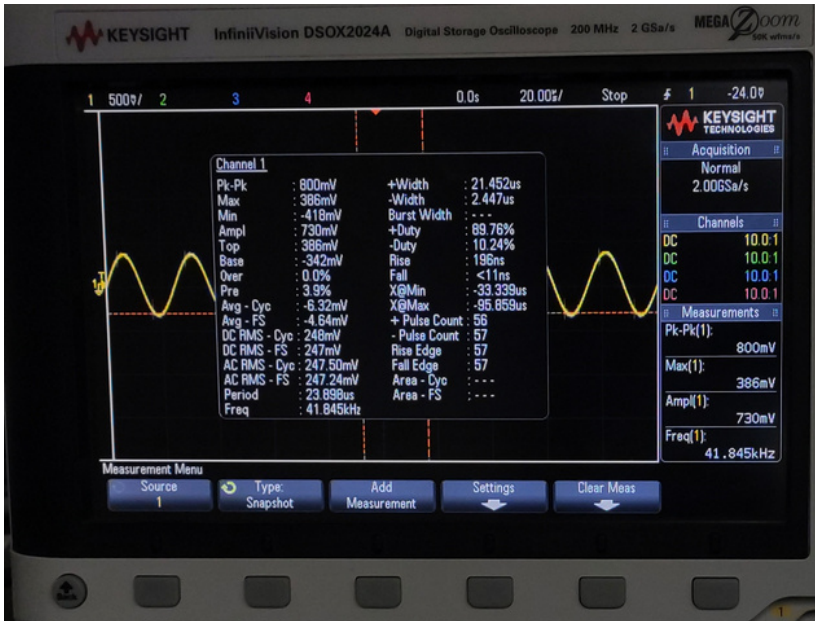

Fig5.1.c

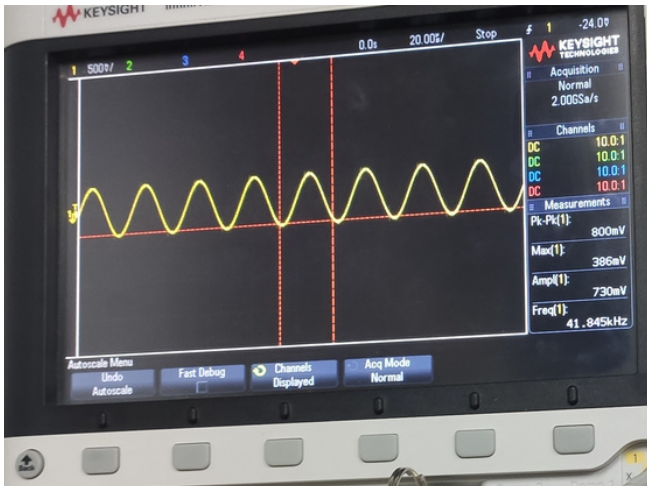

Fig5.1.d

Fig 5.1.c US100 transducer are kept at a distance 20cm.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 5.1.d.

Receiver to Transmitter

Fig5.2.a

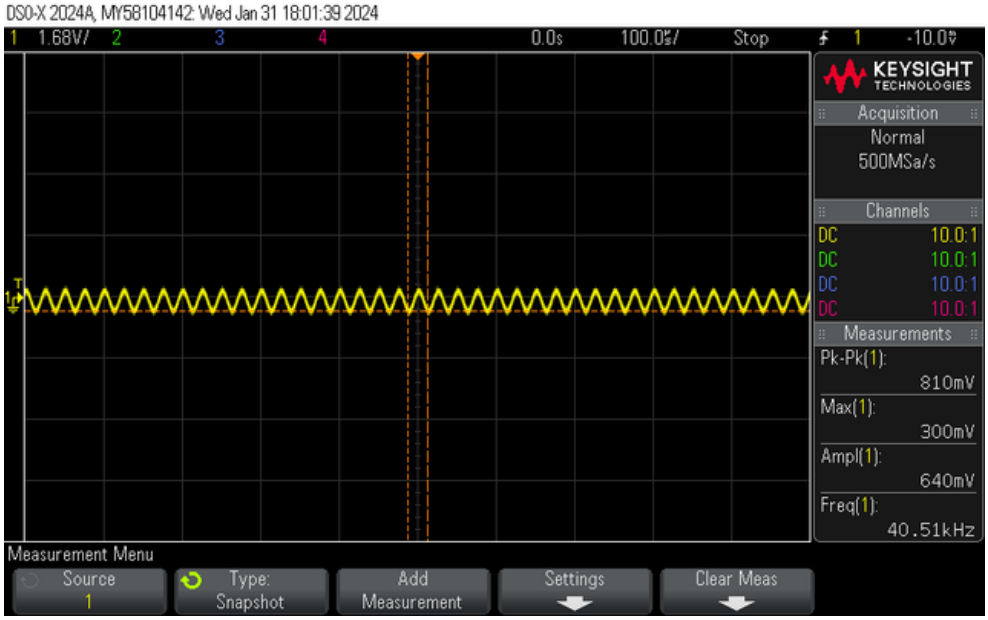

Fig5.2.b

Fig 5.2.a US100 transducer are arranged very closely.The transducer modules were found to be marked as R & T respectively by the manufacturers, while in operation, R to T (from US100) arrangements shown above . All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 5.2.b.

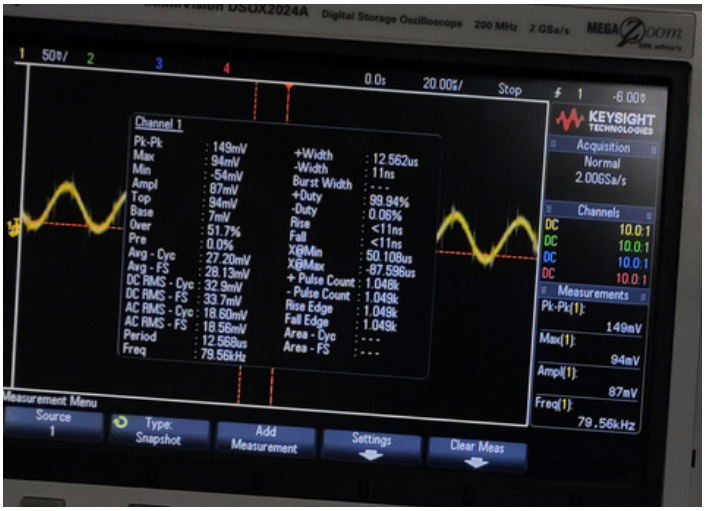

Fig5.2.c

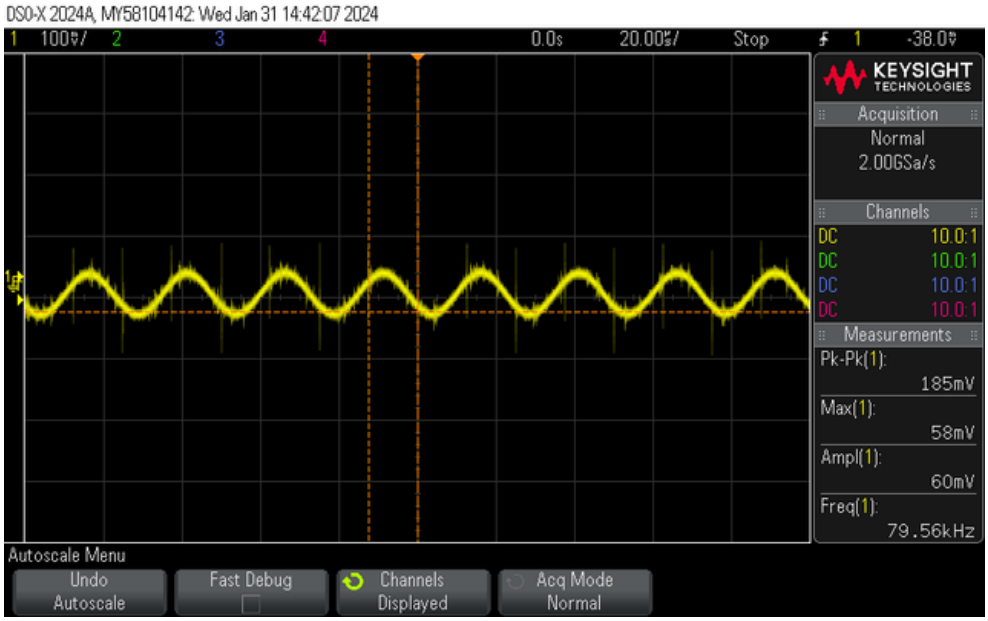

Fig5.2.d

Fig 5.2.c US100 transducer are kept at a distance 20cm.All measurements are represented by the fig. The waveform generated from the DSO shows in Fig 5.2.d.

Comparison Results

	Ultrasonic Transducers at distance 0 cm					
(V)	Multicomp Pro	Multicomp	HCSR04 (T to R)	HCSR04 (R to T)	US100(T to R)	US100(R to T
Vpp	1.53	2.49	11.3	2.13	11.3	0.81
Vm	0.67	1.25	5.5	1.02	5.64	0.3
Amplitude	1.53	2.49	11.3	2.13	11	0.64
	Ultrasonic Transducers at distance 20 cm					
	Multicomp Pro	Multicomp	HCSR04 (T to R)	HCSR04 (R to T)	US100(T to R)	US100(R to T)
Vpp	0.084	0.362	1.02	0.416	0.8	0.149
Vm	0.035	0.181	0.46	0.197	0.386	0.094
Amplitude	0.084	0.263	0.9	0.169	0.73	0.087