

Grove - Ultrasonic Ranger



This Grove - Ultrasonic ranger is a non-contact distance measurement module which works at 40kHz. When we provide a pulse trigger signal with more than 10µs through signal pin, the Grove_Ultrasonic_Ranger will issue 8 cycles of 40kHz cycle level and detect the echo. The pulse width of the echo signal is proportional to the measured distance. Here is the formula: $\text{Distance} = \text{echo signal high time} * \text{Sound speed} (340\text{M/S})/2$. Grove_Ultrasonic_Ranger's trig and echo signal share 1 SIG pin.

!!!Warning

Do not hot plug Grove-Ultrasonic-Ranger, otherwise it will damage the sensor. The measured area must be no less than 0.5 square meters and smooth.

[Get One Now !\[\]\(d66ff64371a51729ac8c1cdaa685ba6f_img.jpg\)](#)

Version

Product Version	Changes	Released Date
Grove-Ultrasonic ranger V1.0	Initial	Mar 2012
Grove-Ultrasonic ranger V2.0	Improve the power stability with low-voltage main board with below changes: 1. Added an capacitance C14 2. Redesigned the layout to make it more tidy 3. Compatible with 3.3V voltage system	July 2017

Specification

Parameter	Value/Range
Operating voltage	3.2~5.2V
Operating current	8mA
Ultrasonic frequency	40kHz

Measuring range	2-350cm
Resolution	1cm
Output	PWM
Size	50mm X 25mm X 16mm
Weight	13g
Measurement angle	15 degree
Working temperature	-10~60 degree C
Trigger signal	10uS TTL
Echo signal	TTL

!!!Tip

More details about Grove modules please refer to [Grove System](#)




Platforms Supported

Getting Started

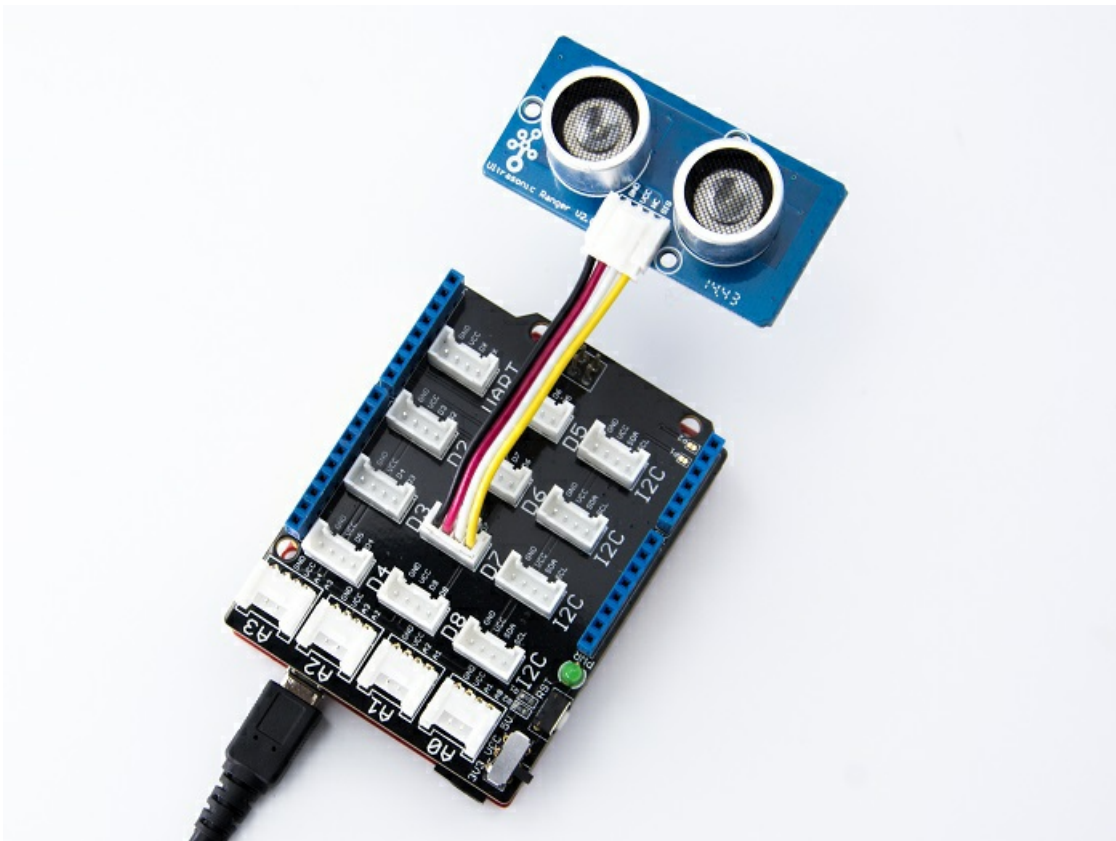
Play With Arduino

Hardware

- Step 1. Prepare the below stuffs:

Seeeduino V4.2	Base Shield	Grove - Ultrasonic Ranger
		
Get ONE Now	Get ONE Now	Get ONE Now

- Step 2. Connect Ultrasonic Ranger to port D7 of Grove-Base Shield.
- Step 3. Plug Grove - Base Shield into Arduino.
- Step 4. Connect Arduino to PC through a USB cable.



!!!Note

If we don't have Grove Base Shield, We also can directly connect Grove_Ultrasonic_Ranger to Arduino as below .

Seeeduino	Grove-Ultrasonic Ranger
5V	Red
GND	Black
Not Conencted	White
D7	Yellow

Software

- Step 1. Dow nload the [UltrasonicRanger Library](#) from Github.
- Step 2. Refer [How to install library](#) to install library for Arduino.
- Step 3. Copy the code into Arduino IDE and upload.

```
#include "Ultrasonic.h"

Ultrasonic ultrasonic(7);
void setup()
{
  Serial.begin(9600);
}
void loop()
{
  long RangeInInches;
  long RangeInCentimeters;

  Serial.println("The distance to obstacles in front is: ");
  RangeInInches = ultrasonic.MeasureInInches();
  Serial.print(RangeInInches);//0~157 inches
  Serial.println(" inch");
  delay(250);

  RangeInCentimeters = ultrasonic.MeasureInCentimeters(); // two measurements should keep an interval
  Serial.print(RangeInCentimeters);//0~400cm
  Serial.println(" cm");
  delay(250);
}
```




- Step 4. We will see the distance display on terminal as below.

```
The distance to obstacles in front is:
2 inches
6 cm
The distance to obstacles in front is:
2 inches
6 cm
The distance to obstacles in front is:
2 inches
6 cm
```

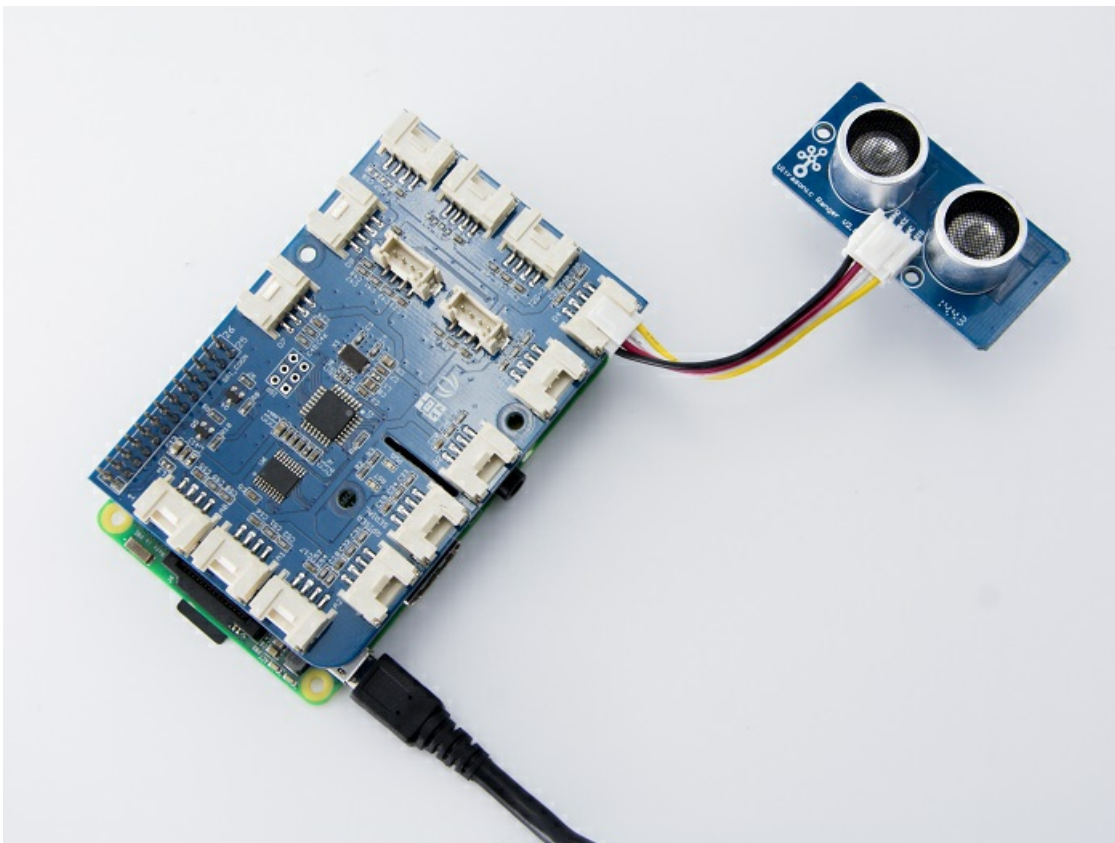
Play With Raspberry Pi

Hardware

- Step 1. Prepare the below stuffs:

Raspberry pi	GrovePi_Plus	Grove - Ultrasonic Ranger
		
Get ONE Now	Get ONE Now	Get ONE Now

- Step 2. Plug the GrovePi_Plus into Raspberry.
- Step 3. Connect Grove-Ultrasonic ranger to D4 port of GrovePi_Plus.
- Step 4. Connect the Raspberry to PC through USB cable.



Software

- Step 1. Follow [Setting Software](#) to configure the development environment.
- Step 2. Git clone the Github repository.

```
cd ~
git clone https://github.com/DexterInd/GrovePi.git
```

- Step 3. Execute below commands to use the ultrasonic_ranger to measure the distance.

```
cd ~/GrovePi/Software/Python
python grove_ultrasonic.py
```

Here is the grove_ultrasonic.py code.

```
# GrovePi + Grove Ultrasonic Ranger

from grovepi import *

# Connect the Grove Ultrasonic Ranger to digital port D4
# SIG,NC,VCC,GND

ultrasonic_ranger = 4

while True:
    try:
        # Read distance value from Ultrasonic
        print ultrasonicRead(ultrasonic_ranger)

    except TypeError:
        print "Error"
    except IOError:
        print "Error"
```

- Step 4. We will see the distance display on terminal as below.

```
pi@raspberrypi:~/GrovePi/Software/Python $ python grove_ultrasonic.py
9
9
9
9
9
9
9
9
9
9
9
9
```

FAQs

Please click [here](#) to see all Grove-Ultrasonic Ranger FAQs.

Resources

- **[PDF]** [Download Wiki PDF](#)
- **[PDF]** [Grove_Ultrasonic Ranger Schematic](#)
- **[Library]** [Grove_Ultrasonic Ranger library](#)
- **[Project]** [The Color Helix](#)
- **[Project]** [Indoor Lightning Cloud](#)
- **[Project]** [Automatic Water Level Controller](#)
- **[Example]** [Example_Measure_distance_and_led_display](#)
- **[Example]** [Example_Measure_and_display_the_distance](#)