Grove - Ultrasonic Ranger

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Version： 1.0

Wiki: http://www.seeedstudio.com/wiki/Grove_-_Ultrasonic_Ranger

Bazaar: http://www.seeedstudio.com/depot/Grove-Ultrasonic-Ranger-p-960.html

Document Revision History

Revision	Date	Author	Description
1.0	Sep 21, 2015	Victor.He	Create file

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Disclaimer

For physical injuries and possessions loss caused by those reasons which are not related to product quality, such as operating without following manual guide, natural disasters or force majeure, we take no responsibility for that.

Under the supervision of Seeed Technology Inc., this manual has been compiled and published which covered the latest product description and specification. The content of this manual is subject to change without notice.

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1. Introduction

This Grove - Ultrasonic sensor is a non-contact distance measurement module which works at 42 KHz, suitable for projects that require middle distance measurement.



2. Specifications

- Operating voltage: 3.3/5.0VDC
- Operating current: 15mA
- Ultrasonic frequency: 42kHz
- Measuring range: 3-400cm
- Resolution: 1cm
- Output: PWM
- Suli-compatible Library

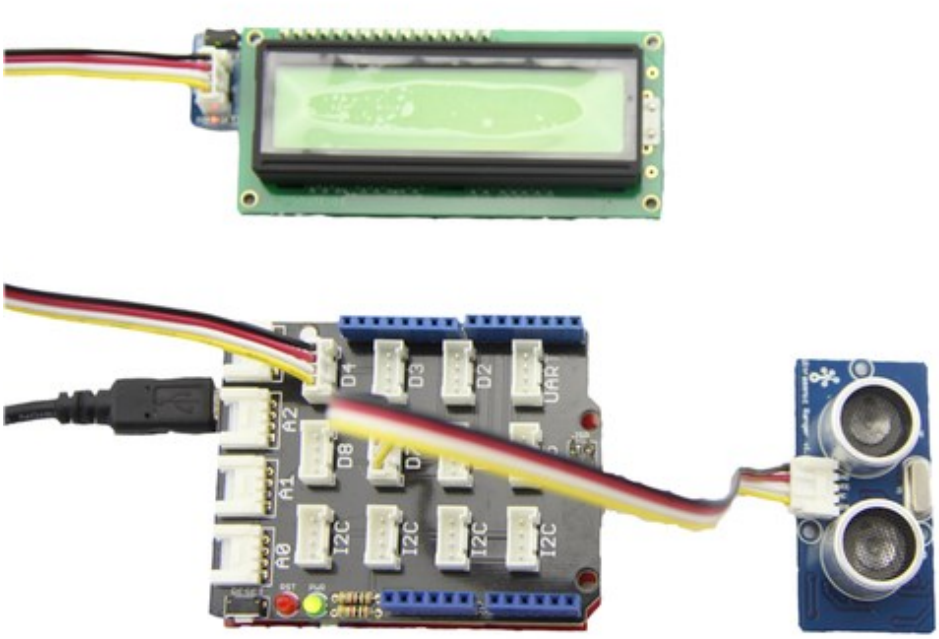
Note: *More details about Suli-compatible Library, please refer to Suli*

3. Usage

3.1 With Arduino

Here we demonstrate how to use Grove - Ultrasonic Ranger to obtain distance message.

Connect Serial LCD to D4/D5 pins of Grove - Base Shield and connect Ultrasonic Ranger to D7.



Download the UltrasonicRanger Library and SerialLCD Library from Github. For this libraries, rather than from Arduino library files, they are from other pages. You need to install them to Arduino Library. Please refer to the course “How to install library" of wiki page to learn the specific steps.

open code from the path：

File->Examples->UltrasonicRanger->examples->UltraDisOnSeeedSerialLcd and upload.

```
/*************************************************************************
***/
// Function: Measure the distance to obstacles in front and display the
//                     result on seeedstudio serialLcd. Make sure you
installed the
//                     serialLCD, SoftwareSerial and Ultrasonic library.
//       Hardware: Grove - Ultrasonic Ranger, Grove - Serial LCD
//       Arduino IDE: Arduino-1.0
//       Author:        LG
//       Date:         Jan 17,2013
```

```
//       Version: v1.0 modified by FrankieChu
//       by www.seeedstudio.com

/*****************************************************************************
*****/


#include <SoftwareSerial.h>
#include <SerialLCD.h>
#include "Ultrasonic.h"

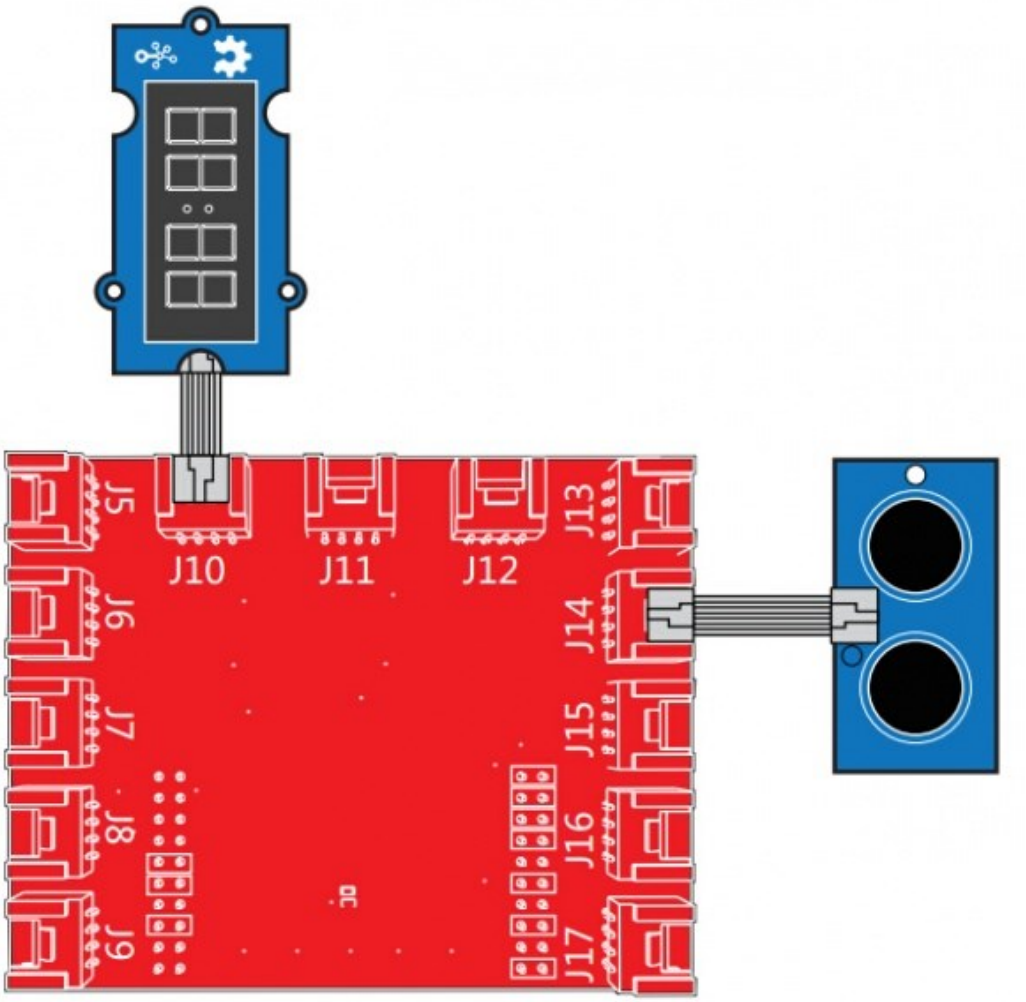
SerialLCD slcd(11,12);
Ultrasonic ultrasonic(7);
void setup()
{
    slcd.begin();
}
void loop()
{
    long RangeInCentimeters;
    RangeInCentimeters = ultrasonic.MeasureInCentimeters();
    delay(150);
    slcd.clear();
    slcd.setCursor(0,0);
    slcd.print("The distance:");
    slcd.setCursor(0,1) ;
    slcd.print(RangeInCentimeters,DEC);
    slcd.setCursor(5,1) ;
    slcd.print("cm");
}
```

Also we shot a video about it. Find it in the Resources! It can give you a more straightforward instruction.

3.2 With TI LaunchPad

Sensing the Distance (Ultrasonic Ranger Sensor)

This example shows how to measure the distance to obstacles using the ultrasonic sensor and display the value on a 4-Digital-Display (centimeters).




```
/*
Ultrasonic-Ranger to 4-digit-display
Measure the distance to obstacles in front and display the value on
4-digital-display

The circuit:
* Ultrasonic Ranger attached to SPI plug on Grove Base BoosterPack
* one side pin (either one) to ground
* the other side pin to +VCC
* LED anode (long leg) attached to RED_LED
* LED cathode (short leg) attached to ground

* Note:


This example code is in the public domain.

http://www.seeedstudio.com/wiki/Grove - Ultrasonic Ranger
*/
```

```
#include "TM1637.h"
#include "Ultrasonic.h"
/* Macro Define */
#define CLK             40                /* 4-digital display clock pin
*/
#define DIO             39               /* 4-digital display data pin */
#define BLINK_LED        RED_LED           /* blink led */
#define ULTRASONIC_PIN    38                /* pin of the Ultrasonic
Ranger */

/* Global Variables */
TM1637 tm1637(CLK, DIO);                /* 4-digital display object */
Ultrasonic ultrasonic(ULTRASONIC_PIN);    /* Ultrasonic Ranger object */
int distance = 0;                      /* variable to store the distance
to obstacles in front */
int blink_interval = 0;                 /* led delay time */
int8_t bits[4] = {0};                   /* array to store the single bits
of the value */

/* the setup() method runs once, when the sketch starts */
void setup() {

    /* Initialize 4-digital display */
    tm1637.init();
    tm1637.set(BRIGHT_TYPICAL);

    /* declare the red_led pin as an OUTPUT */
    pinMode(RED_LED, OUTPUT);

}

/* the loop() method runs over and over again */
void loop() {

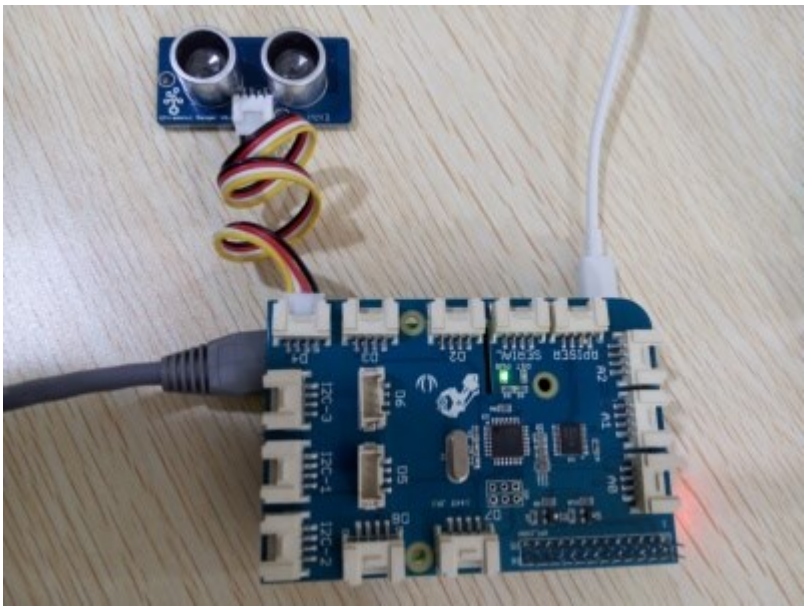
    distance = ultrasonic.MeasureInCentimeters();   /* read the value from
the sensor */

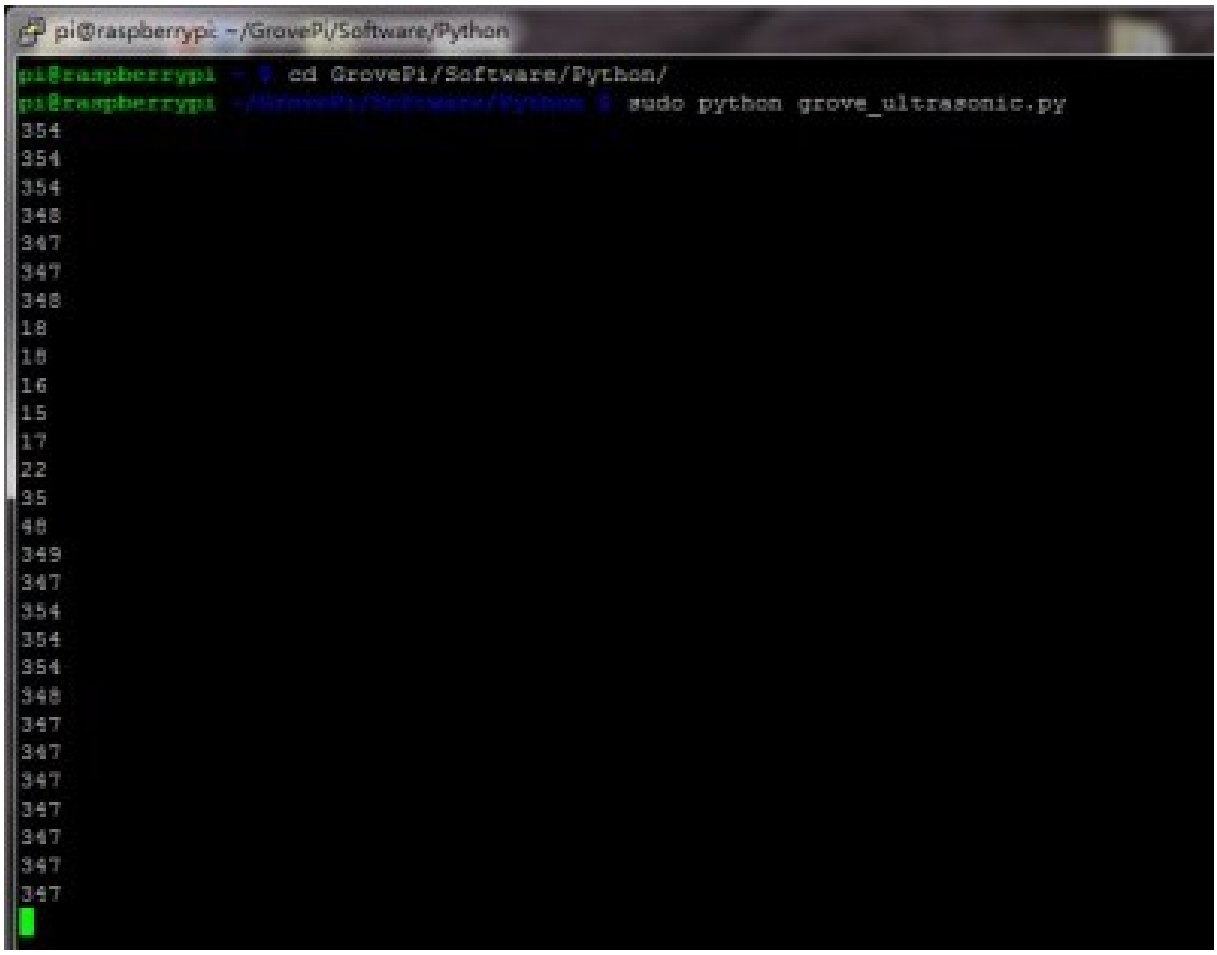
    memset(bits, 0, 4);                         /* reset array when we use
it */
    for(int i = 3; i >= 0; i--) {
        /* get single bits of the analog value */
        bits[i] = distance % 10;
        distance = distance / 10;
```

```
        tm1637.display(i, bits[i]);                /* display by 4-digital
display */
    }
    delay(100);
}
```

3.3 With Raspberry Pi

First step, you should connect Ultrasonic to Port D4. Run the program below. It will print distance information on you terminal, as the figure below.






```
# 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"
```

Run the Program

- Find the path to the file(According to your own path)

```
cd GrovePi/Software/Python/
```

- Run Program

```
sudo python grove_ultrasonic.py
```

4. Resources

Ultrasonic Ranger library

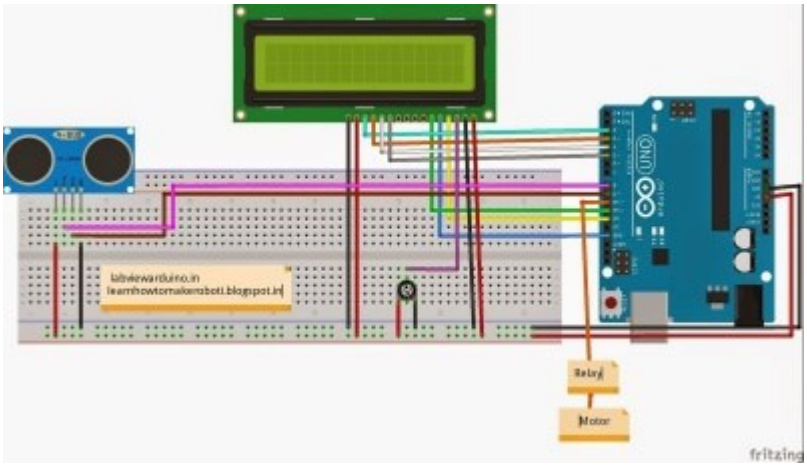
Video demonstration

Github repository for Grove_Ultrasonic_Ranger Library (new)

5. Related Projects

If you want to make some awesome projects by Grove - Ultrasonic Ranger, here's some projects for reference.

Automatic Water Level Controller



This is an IoT demo make by Arduino and Grove.

There are many ways like using a float sensor to determine the water level, or using probes to detect peak and low level in the tank. How to measure water level without using probe or contacting with water? yeah there is a way just using a Ultrasonic sensor, this is very simple where the level of water is measured using ultrasonic sensor which gives the depth , by determining the tank depth we can set the maximum and minimum level

I want to make it.

Indoor Lightning Cloud

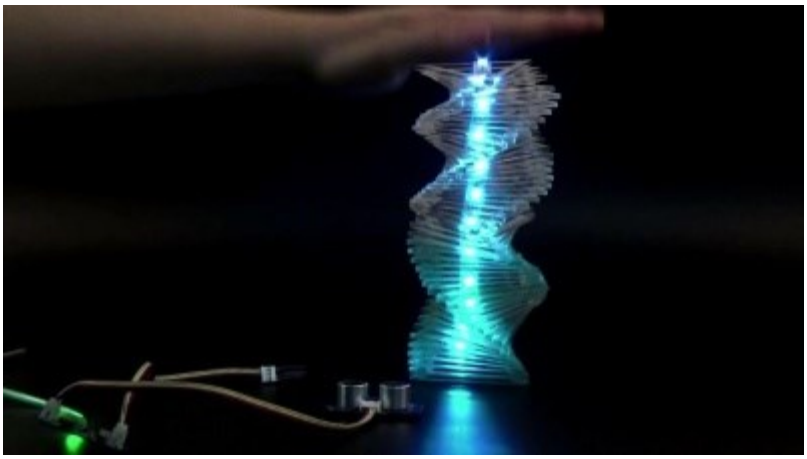


This is an IoT demo make by Seeeduino and Grove.

Make an indoor lightning Cloud, hang it up right over your door mat, blast whoever passing under it, feel the the beauty of nature in the house.

I want to make it.

The Colour Helix



This is an IoT demo make by Seeeduino and Grove.

Our artist Shihui Wang recently showed me her another amazing work of art: the Colour Helix. Again with few simple components she presented us the beauty of the combination of art and electronics.

With a Grove - Ultrasonic Ranger she can magically control the number of illuminated LEDs inside the Helix by raising or lower her palm in the air.

I want to make it.

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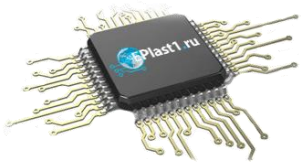
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- Техническая поддержка проекта;
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