A01NYUB Waterproof Ultrasonic Sensor Wiki - DFRobot

(https://

www.dfrobot.com/product-1918.html)

Introduction

Ultrasonic distance sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse. A01NYUB is an waterproof ultrasoinic sensor module with 7.5m effective ranging distance. It is compatible with 3.3V~5V device like Arduino, Raspberry Pi, etc. The average current of A01NYUB is only 15mA so it can be powered by most controllers' IO port.

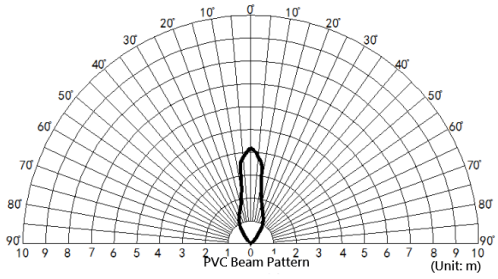
The ultrasonic sensor adopts closed probe of transmitter & receiver, waterproof and dustproof, which could be well suitable for harsh and moist measuring

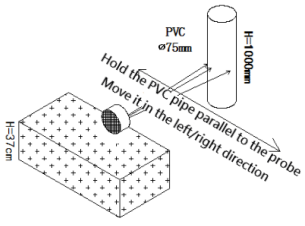
environment. It reserves 2.54-4P interface and adopts UART communication. ME007YS ultrasonic sensor has experienced long-term test and constant optimization so it can offer a pretty fast response time, high stability and sensitivity, and low power consumption.

Use the sensor with Arduino controller to build up your projects, such as backing car annunciator, obstacle avoidance robot, object approaching detection etc.

Specification

- Operating Voltage: 3.3V-5v
- Average Current: ≤15mA
- Blind Zone Distance: 0-28cm
- Ranging Distance for Flat Object: 28-750cm
- distance resolution: 1mm
- Output: UART
- Response Time: 100ms
- Probe Center Frequency: 40K±1.0K
- Operating Temperature: -15~60°C
- Storage Temperature: -25~80°C
- Protection Rate: IP67





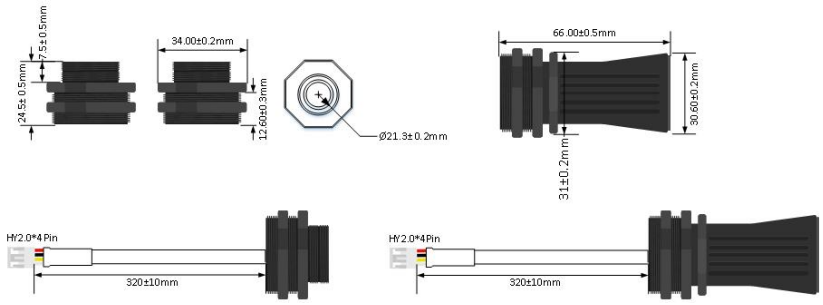
Features

- High Protection Rate
- Strong Resistance
- Stable Output
- Low Power

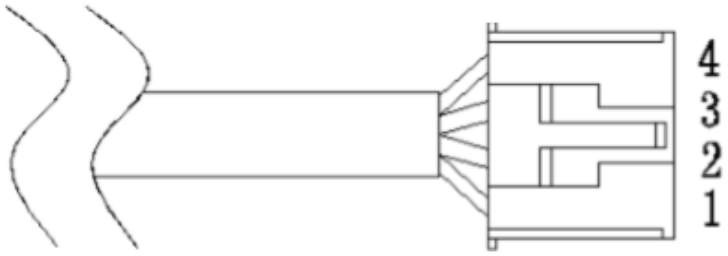
- Fast Response
- High Antistatic Performance
- Wide Operating Temperature

- High Accuracy
- Small in Size

Installation Dimension



Pinout



Label	Name	Description
1	VCC	Power Input
2	GND	Ground
3	RX	Processed Value/Real-time Value Output Selection
4	TX	UART Output

UART Output

Output Communication

When "RX" floats or input High level, the module outputs processed value, the data is more steady, response time: 150-300ms; when input Low level, the

module outputs real-time value, response time: 150ms.

UART	Data bit	Stop bit	Parity	Band rate
TTL level	8	1	none	9600bps

UART Output Form

Frame Data	Description	Byte
Header	0xFF	1 byte
DATA_H	Distance Data High 8-bits	1 byte
DATA_L	Distance Data Low 8-bits	1 byte
SUM	Checksum	1 byte

UART Output

Header	DATA_H	DATA_L	SUM
0xFF	0x07	0xA1	0xA7

Note: checksum only reserves the low 8-bits of the accumulated value.

```
SUM=(Header+Data_H+Data_L)&0x00FF
=(0XFF + 0X07 + 0XA1)&0x00FF
=0XA7;
```

Distance= Data_H*256+ Data_L=0X07A1;

Equal to 1953 when converted into decimal;

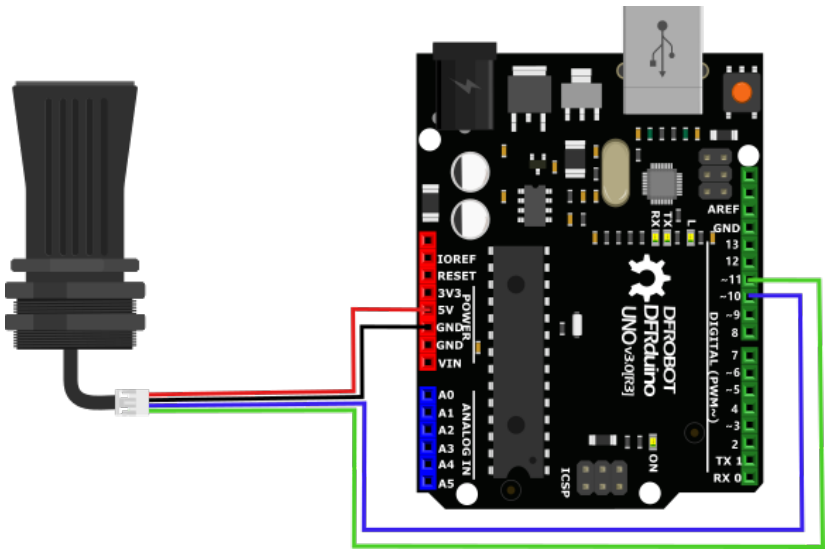
Represent the current measured distance is 1953mm.

Arduino Platform

Preparation

- Arduino UNO
- UNO IO Sensor Expansion Board
- A01NYUB Ultrasonic Sensor
- 4P Connector

Connection



Sample Code

```
/*
       @File  : DFRobot_Distance_A01.ino
       @Brief : This example use A01NYUB ultraso
                With initialization completed, W
       @Copyright [DFRobot](https://www.dfrobot.
                  GUN Lesser General Pulic Licen
       @version V1.0
       @data  2019-8-28
*/

#include <SoftwareSerial.h>

SoftwareSerial mySerial(11, 10); // RX, TX
unsigned char data[4] = {};
float distance;

void setup()
{
  Serial.begin(57600);
  mySerial.begin(9600);
}

void loop()
{
  do {
    for (int i = 0; i < 4; i++)
    {
      data[i] = mySerial.read();
    }
  } while (mySerial.read() == 0xff);

  mySerial.flush();

  if (data[0] == 0xff)
  {
    int sum;
    sum = (data[0] + data[1] + data[2]) & 0x00FF
    if (sum == data[3])
    {
      distance = (data[1] << 8) + data[2];
      if (distance > 280)
      {
        Serial.print("distance=");
```

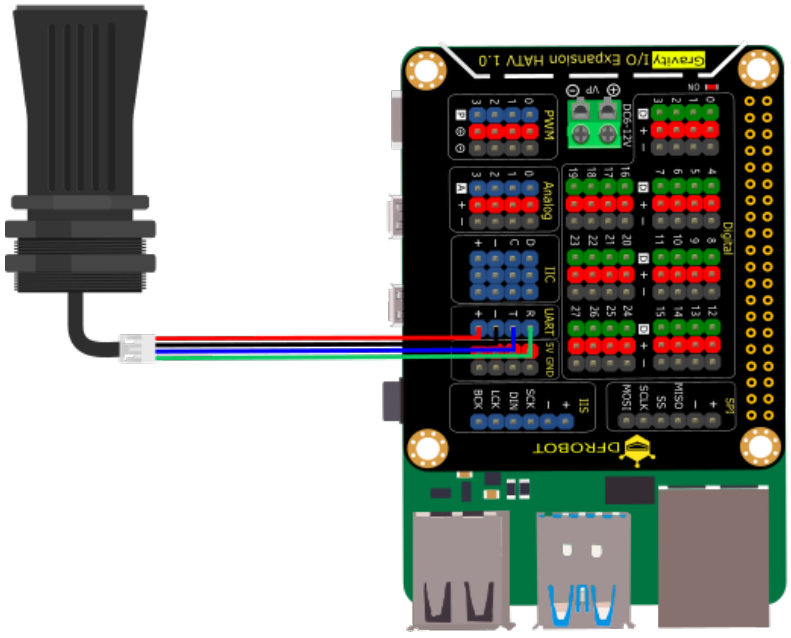
```
        Serial.print(distance / 10);
        Serial.println("cm");
      } else
      {

        Serial.println("Below the lower limit");
      }
    } else Serial.println("ERROR");
  }
  delay(150);
}
```

Raspberry Pi Platform

Preparation

- Raspberry Pi 4B
- Raspberry Pi IO Expansion Board
- A01NYUB Ultrasonic Sensor
- 4P Connector

Raspberry Pi Connection



Sample Code

Download the Ultrasonic Sensor Library (https://github.com/DFRobot/DFRobot_RaspberryPi_A02YYUW)

```
# -*- coding:utf-8 -*-

'''!
  @file DFRobot_RaspberryPi_A02YYUW.py
  @brief Ranging distance sensor。
  @copyright   Copyright (c) 2010 DFRobot Co.Ltd
  @license     The MIT License (MIT)
  @author      Arya(xue.peng@dfrobot.com)
  @version     V1.0
  @date        2021-08-30
  @url https://github.com/DFRobot/DFRobot_Raspbe
'''

import serial

import time

class DFRobot_A02_Distance:

  ## Board status
  STA_OK = 0x00
  STA_ERR_CHECKSUM = 0x01
  STA_ERR_SERIAL = 0x02
  STA_ERR_CHECK_OUT_LIMIT = 0x03
  STA_ERR_CHECK_LOW_LIMIT = 0x04
  STA_ERR_DATA = 0x05

  ## last operate status, users can use this var
  last_operate_status = STA_OK

  ## variable
  distance = 0

  ## Maximum range
  distance_max = 4500
  distance_min = 0
  range_max = 4500

  def __init__(self):
    '''
      @brief    Sensor initialization.
    '''
    self. ser = serial.Serial("/dev/ttvAMA0". 96
```

```
    if self._ser.isOpen() != True:
      self.last_operate_status = self.STA_ERR_SE

  def set_dis_range(self, min, max):

    self.distance_max = max
    self.distance_min = min

  def getDistance(self):
    '''
      @brief    Get measured distance
      @return    measured distance
    '''
    self._measure()
    return self.distance

  def _check_sum(self, l):
    return (l[0] + l[1] + l[2])&0x00ff

  def _measure(self):
    data = [0]*4
    i = 0
    timenow = time.time()

    while (self._ser.inWaiting() < 4):
      time.sleep(0.01)
      if ((time.time() - timenow) > 1):
        break

    rlt = self._ser.read(self._ser.inWaiting())
    #print(rlt)

    index = len(rlt)
    if(len(rlt) >= 4):
       index = len(rlt) - 4
       while True:
         try:
           data[0] = ord(rlt[index])
         except:
           data[0] = rlt[index]
         if(data[0] == 0xFF):
           break
         elif (index > 0):
           index = index - 1
         else:
           break
       #print(data)
       if (data[0] == 0xFF):
         try:
```

```
        try:
          data[1] = ord(rlt[index + 1])
          data[2] = ord(rlt[index + 2])
          data[3] = ord(rlt[index + 3])
        except:

          data[1] = rlt[index + 1]
          data[2] = rlt[index + 2]
          data[3] = rlt[index + 3]
        i = 4
    #print(data)
    if i == 4:
      sum = self._check_sum(data)
      if sum != data[3]:
        self.last_operate_status = self.STA_ERR_
      else:
        self.distance = data[1]*256 + data[2]
        self.last_operate_status = self.STA_OK
      if self.distance > self.distance_max:
        self.last_operate_status = self.STA_ERR_
        self.distance = self.distance_max
      elif self.distance < self.distance_min:
        self.last_operate_status = self.STA_ERR_
        self.distance = self.distance_min
    else:
      self.last_operate_status = self.STA_ERR_DA
    return self.distance
```

FAQ

> For any questions, advice or cool ideas to share, please visit the **DFRobot Forum** (https://www.dfrobot.com/forum)

More Documents

- STP Model (https://dfimg.dfrobot.com/62b2fb5caa613609f271523c/wiki/622e26575da60e887776c26a41a8a1fb.rar)

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