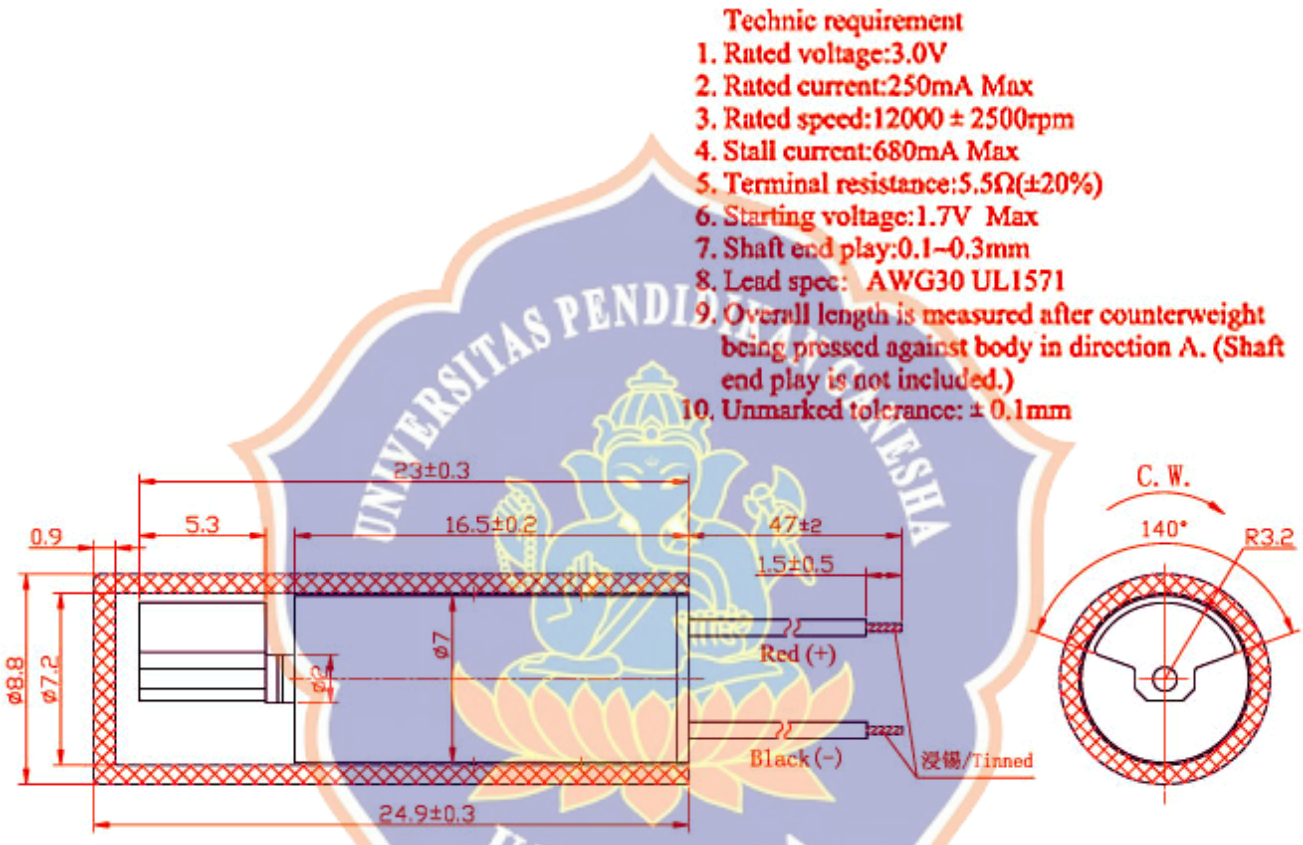
Part No. **Z7AL2B1692082**



1. General scope

1-1 This specification applies to cylindrical permanent magnetic DC vibration motor model **Z7AL2B1692082**.

2. Operating conditions

Items		Specifications	Condition & Remarks
2-1	Rated voltage	3.0V DC	
2-2	Rated load	Counter weight	As specified in 10. Outline drawing.
2-3	Rotation	C.W/C.C.W (clockwise or counter clockwise)	

2-4	Motor position	All positions	
2-5	Operating voltage	2.2 ~ 3.6V DC	
2-6	Operating conditions	-30 ~ 70°C, ordinary humidity Humidity :65±20%RH	No condensation of moisture.
2-7	Storage conditions	-40 ~ 80°C, ordinary humidity Humidity :65±20%RH	No condensation of moisture.

3. Measuring conditions

Items		Specifications	Condition & Remarks
3-1	Temperature	20±2°C	
3-2	Humidity	(63 ~ 67%) RH	
3-3	Motor position	Motor Shaft horizontal	Lock the motor in a test fixture.

3-4 All data are based on the measurement under the temperature of 20 °C and humidity 65 %RH. However, the ranges of temperature 5~35 °C and humidity 45~85 %RH are to be applicable as long as no problems.

4. Mechanical specifications

Items		Specifications	Condition & Remarks
4-1	Configuration	As specified in 10. Outline drawing	Outline drawing No: **Z7AL2B1692082**.
4-2	Appearance	There shall be no evidence of mechanical damage and shall not have inadequate corrosion and so on	Visual examination (allowable extent is based on boundary sample)
4-3	Shaft end play	0.1 ~ 0.3mm	
4-4	Holding strength of vibration weight	49N (5kgf) min.	

5. Performance and characteristics

Items		Specifications	Condition & Remarks
5-1	Rated speed	12,000±2,500rpm	At rated voltage and rated load (Counterweight).
5-2	Rated current	250mA max	
5-3	Stall current	680mA max	At rated voltage.
5-4	Starting voltage	1.7V DC max	(Counterweight) any position of rotor.
5-5	Insulation resistance	1M• min	At DC 100V between terminal and case.
5-6	Terminal resistance	5.5• approx. (±20%)	At 20°C.
	Mechanical noise	50db (A) max	

Measured at rated voltage and rated load (counterweight).
Background noise: 28db (A) max. @ 10cm.
Measuring instruments: B & K.
The weight of jig: 700g.

5-7

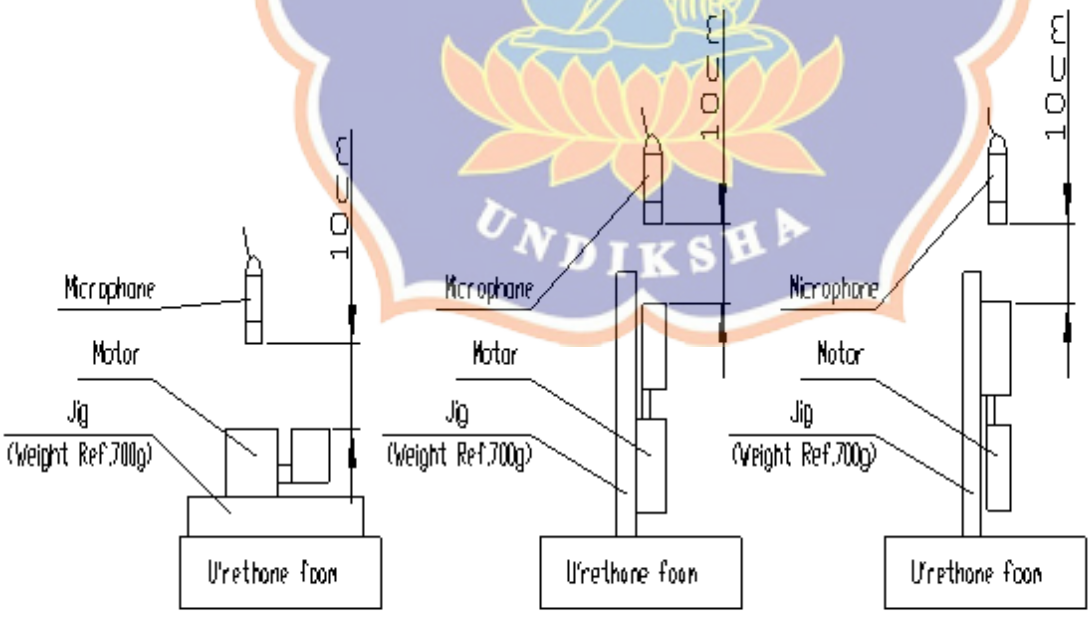
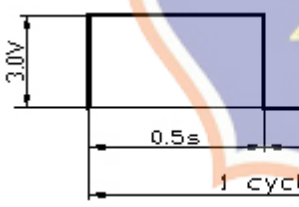
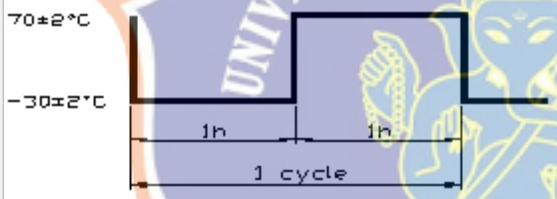


Fig. A Fig. B Fig. C

6. Reliability Test

<table>
<tr><th colspan="2">Items</th><th>Standard test conditions</th><th>Condition & Remarks</th></tr>
<tr><td>6-1</td><td>Life test</td><td> 

<table>
<tr><td>Position</td><td>Voltage</td><td>Load</td><td>Temperature</td><td>Humidity</td><td>Life</td></tr>
<tr><td>Horizontal</td><td>Rated</td><td>weight</td><td>20 °C</td><td>65 %</td><td>200,000 cycles</td></tr>
</table></td><td>After 2 hours exposure in ordinary temperature and humidity, Motors shall be approved as specified in item 7-1.</td></tr>
<tr><td>6-2</td><td>Low Temp exposure</td><td>Temperature: -40±2°C
Time: 96hrs</td><td rowspan="2">After 2 hours exposure in ordinary temperature and humidity, Motors shall be approved as specified in item 7-2.</td></tr>
<tr><td>6-3</td><td>High Temp exposure</td><td>Temperature: 60±2°C
Time: 96hrs</td></tr>
</table>

6-4	Humidity exposure	Temperature: 40±2°C Humidity: 90 ~ 95% RH Exposure time: 96hrs No condensation of moisture	
6-5	Vibration	Displacement: 1.5mm (p-p) Frequency: 10 ~ 55Hz Acceleration: 22m/s2 Period: 20 Mins log sweep (10 ~ 55 ~ 10Hz) Direction: x, y, z Time: Every 2 hours	After the test motors shall be approved as specified in item 7-2.
6-6	Free fall	Test state: Set the motor to the approximately 75 g (include the motor) weight of block drop the motor on the concrete floor. Height: 1.5 m Direction: 6/6faces Number of times: Twice each	After the test motors shall be approved as specified in item 7-2.
6-7	Heat shock	Test cycle: 20 cycles 	After 2 hours exposure in ordinary temperature and humidity, Motors shall be approved as specified in item 7-2.

7. Requirements

Items		Requirements	
7-1	Table A	1) Rated speed: 2) Rated current: 3) Starting voltage:	Initial data -30% Min, Initial data +60% Max ±30%/Initial data±30% max 2.0 V DC max
7-2	Table B	1) Rated speed: 2) Rated current: 3) Starting voltage:	±30%/Initial data±30% max ±30%/Initial data±30% max 2.0V DC max

8. Matters to be paid attention to when using motor

8-1 Please lay the motors carefully in transportation to avoid any serious damage to the motor body or its electric function because of collision.

8-2 Please use and storage motors according to N0.2 item (Operating Conditions) in specification, or else motor characteristics would be affected.

8-3 Make arrangement to limit the storage period to 6 months or less. Condensation of atmosphere must be avoided in motor usage or opening the packaging of the motor.

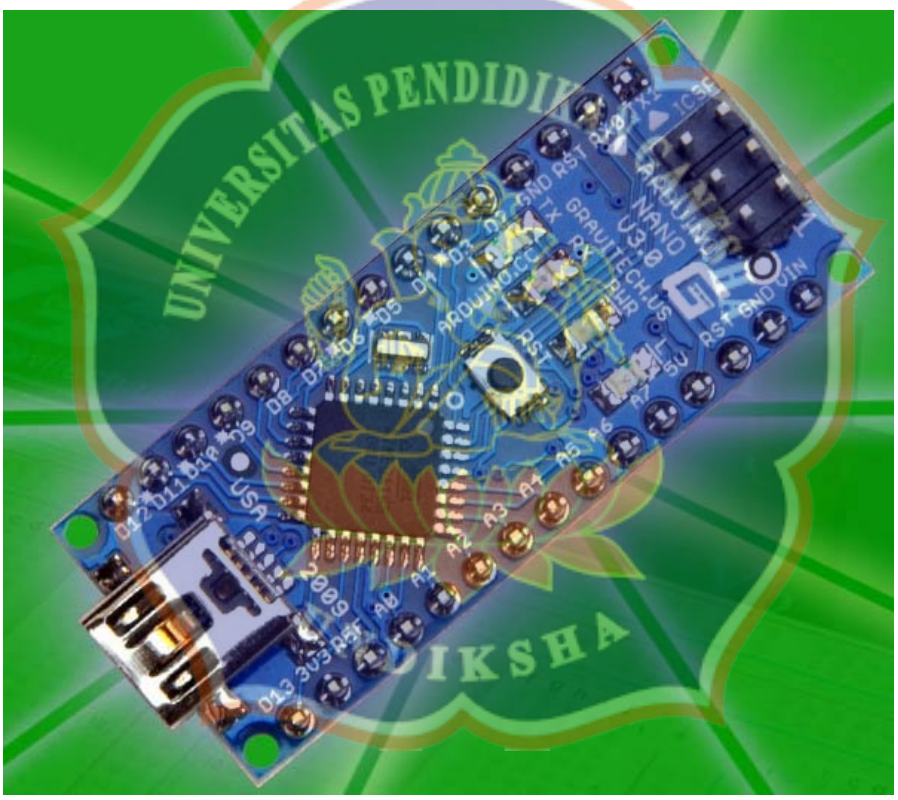
8-4 For proper operation. storage and operating environment must not contain corrosive gases. For example H2S. SO2. NO2. CL2. etc. In addition storage environment must not have materials that emit corrosive gases especially from silicon. cyanic. formalin and phenol group. In the mechanism or the set. existence of corrosive gases may cause no rotation in motor.

8-5 Please don't stall the shaft for a long time after powering, and not to touch the weight when motor is rotating.

8-6 There should be no sundries (such as grain, fibre, hair, small tape, glue etc.) in the shaft end play.

Arduino Nano (V3.0)

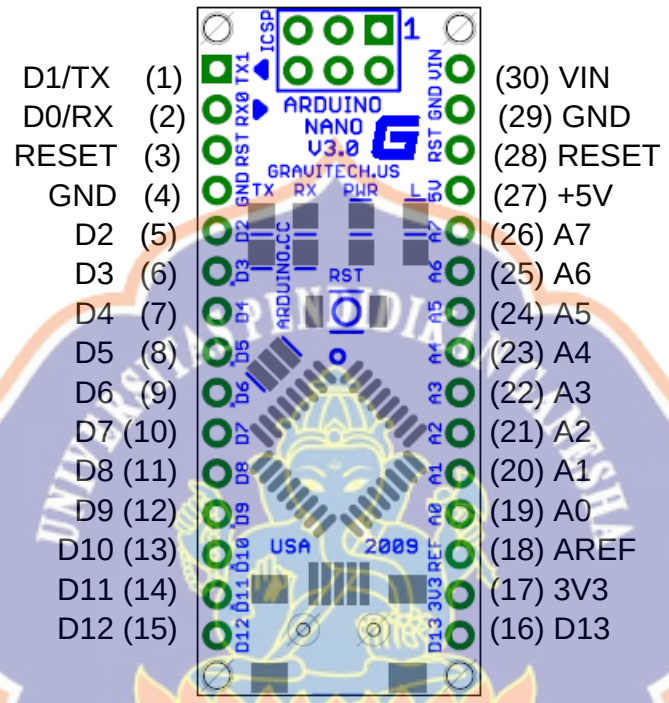
User Manual



More information:

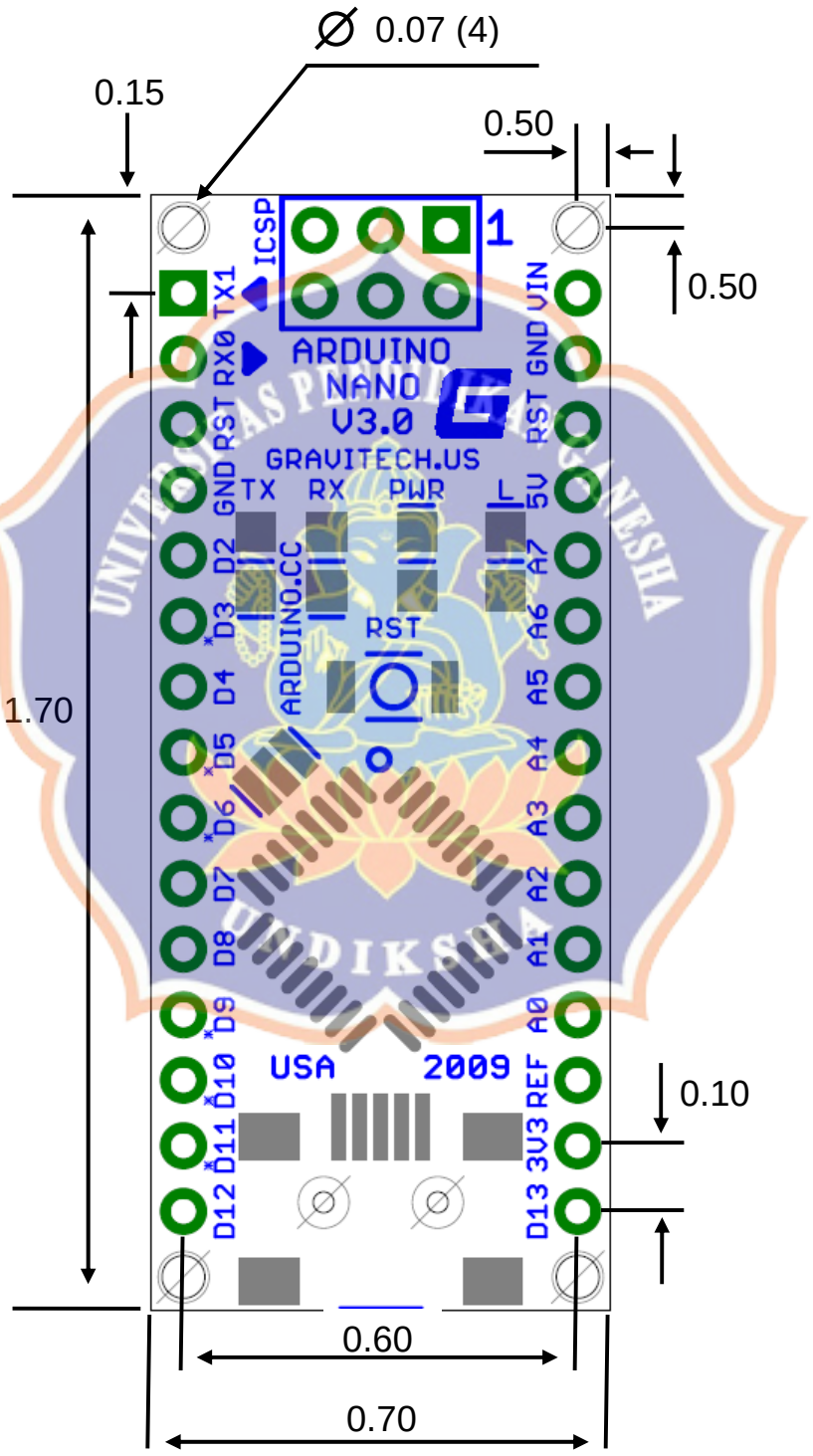
www.arduino.cc Rev 3.0

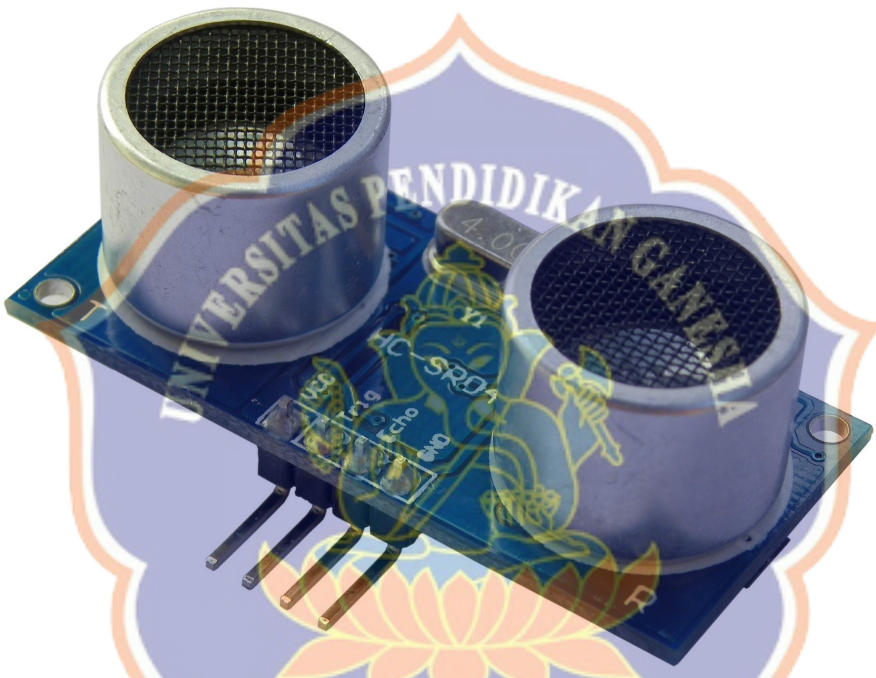
Arduino Nano Pin Layout



Pin No.	Name	Type	Description
1-2, 5-16	D0-D13	I/O	Digital input/output port 0 to 13
3, 28	RESET	Input	Reset (active low)
4, 29	GND	PWR	Supply ground
17	3V3	Output	+3.3V output (from FTDI)
18	AREF	Input	ADC reference
19-26	A0-A7	Input	Analog input channel 0 to 7
27	+5V	Output or Input	+5V output (from on-board regulator) or +5V (input from external power supply)
30	VIN	PWR	Supply voltage

Arduino Nano Mechanical Drawing





User's Manual

V1.0

May 2013

Index

1.0 INTRODUCTION

The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats or dolphins do. It offers excellent non-contact range detection with high accuracy and stable readings in an easy-to-use package. From 2cm to 400 cm or 1" to 13 feet. It operation is not affected by sunlight or black material like Sharp rangefinders are (although acoustically soft materials like cloth can be difficult to detect). It comes complete with ultrasonic transmitter and receiver module.

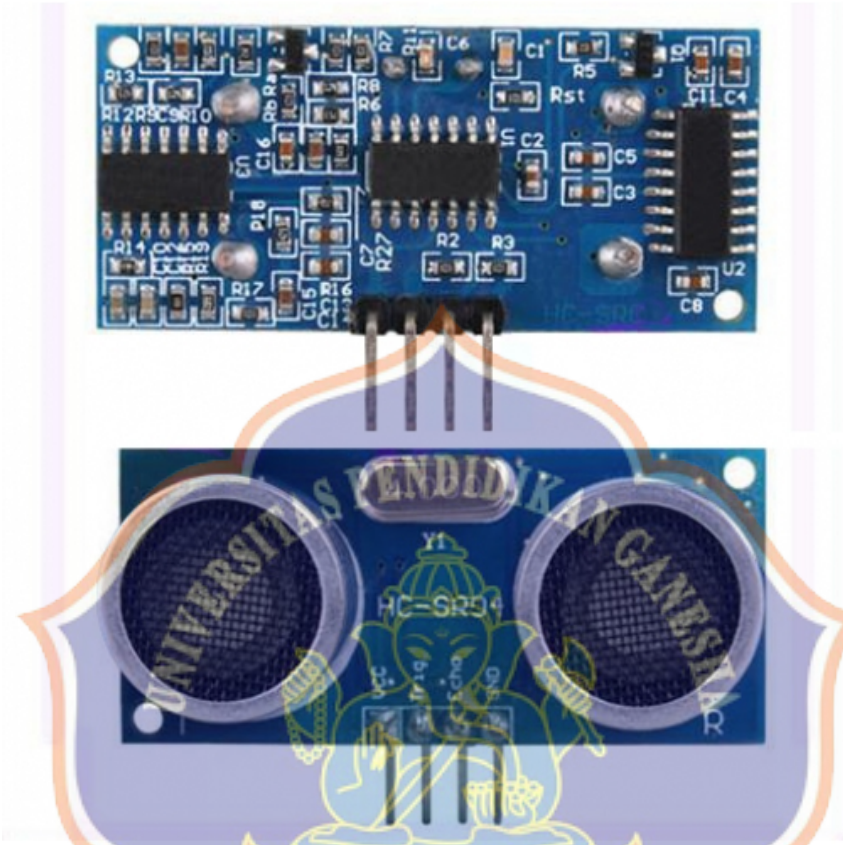
Features:

- Power Supply :+5V DC
- Quiescent Current : <2mA
- Working Currnt: 15mA
- Effectual Angle: <15°
- Ranging Distance : 2cm – 400 cm/1" - 13ft
- Resolution : 0.3 cm
- Measuring Angle: 30 degree
- Trigger Input Pulse width: 10uS
- Dimension: 45mm x 20mm x 15mm

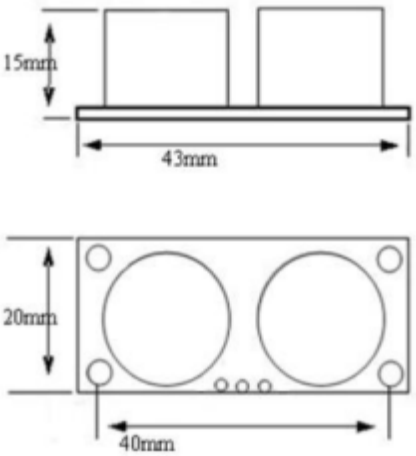
2.0 PACKING LIST

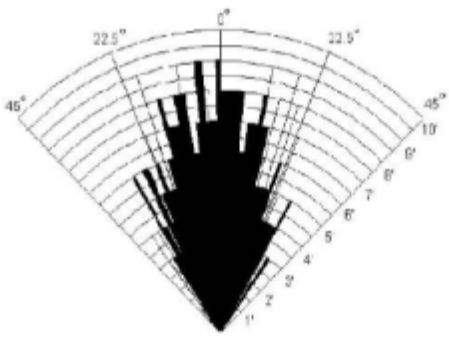
1. 1 x HC-SR04 module

3.0 PRODUCT LAYOUT



VCC = +5VDC
Trig = Trigger input of Sensor
Echo = Echo output of Sensor
GND = GND





Practical test of performance,
Best in 30 degree angle

4.0 PRODUCT SPECIFICATION AND LIMITATIONS

Parameter	Min	Typ.	Max	Unit
Operating Voltage	4.50	5.0	5.5	V
Quiescent Current	1.5	2	2.5	mA
Working Current	10	15	20	mA
Ultrasonic Frequency	-	40	-	kHz

5.0 OPERATION

The timing diagram of HC-SR04 is shown. To start measurement, Trig of SR04 must receive a pulse of high (5V) for at least 10us, this will initiate the sensor will transmit out 8 cycle of ultrasonic burst at 40kHz and wait for the reflected ultrasonic burst. When the sensor detected ultrasonic from receiver, it will set the Echo pin to high (5V) and delay for a period (width) which proportion to distance. To obtain the distance, measure the width (Ton) of Echo pin.

Time = Width of Echo pulse, in uS (micro second)

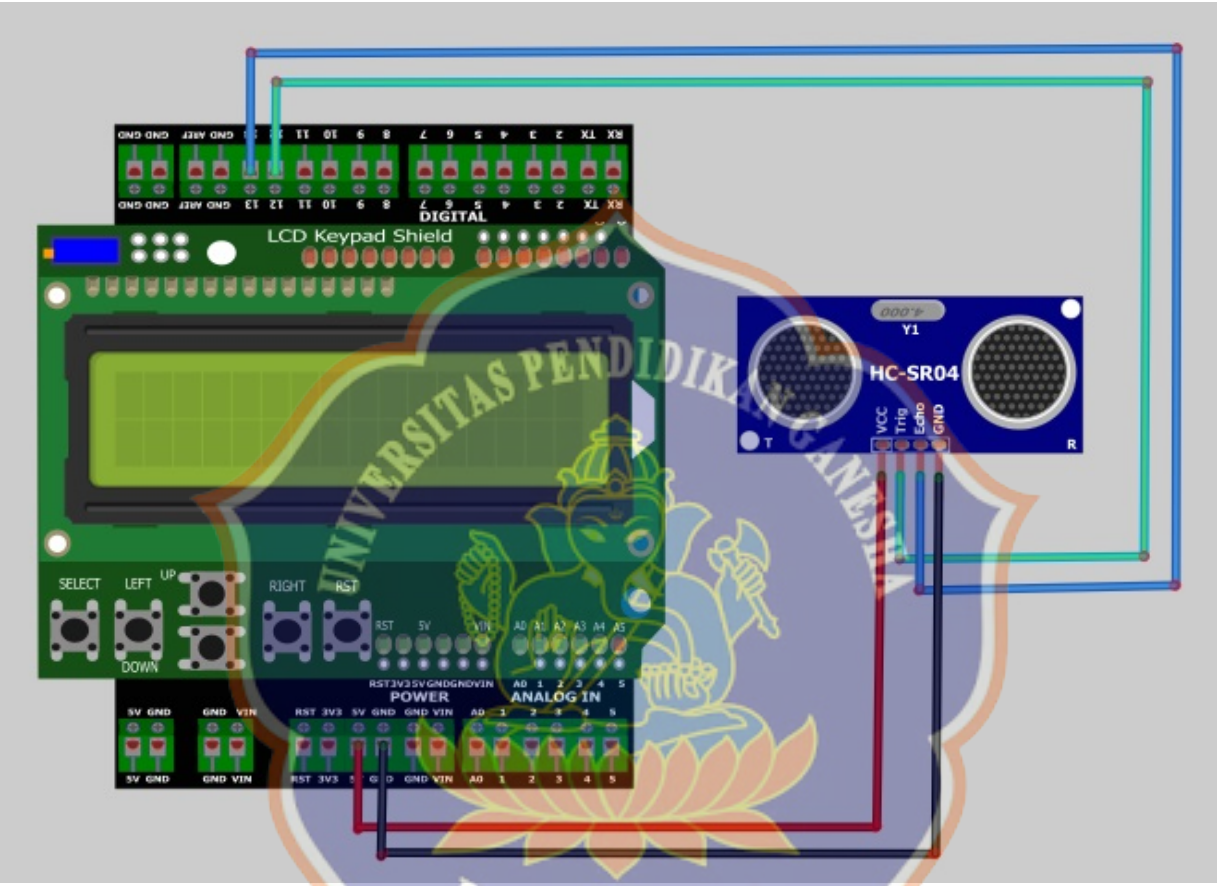
- Distance in centimeters = Time / 58
- Distance in inches = Time / 148
- Or you can utilize the speed of sound, which is 340m/s

Note:

- Please connect the GND pin first before supplying power to VCC.
- Please make sure the surface of object to be detect should have at least 0.5 meter^2 better performance.

6.0 HARDWARE INTERFACE

Here is example connection for Ultrasonic Ranging module to Arduino UNO board. It can be interface with any microcontroller with digital input such as PIC, SK40C, SK28A, SKds40A, Arduino series.



7.0 EXAMPLE CODE

This is example code Ultrasonic Ranging module. Please download the complete code at the product page.

```
#include "Ultrasonic.h"
#include <LiquidCrystal.h>
LiquidCrystal lcd(8, 9, 4, 5, 6, 7);
Ultrasonic ultrasonic(12,13);

void setup() {
lcd.begin(16, 2);
lcd.setCursor(0, 0);
lcd.print("HC-SR4 testing..");
delay(1000);

}

void loop()
{
  //lcd.clear();
  lcd.setCursor(0, 1);
  lcd.print(ultrasonic.Ranging(CM));
  lcd.print("cm  ");

  delay(100);
}
```

8.0 WARRANTY

- Product warranty is valid for 6 months.
- Warranty only applies to manufacturing defect.
- Damaged caused by miss-use is not covered under warranty
- Warranty does not cover freight cost for both ways.

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URL: www.cytron.com.my
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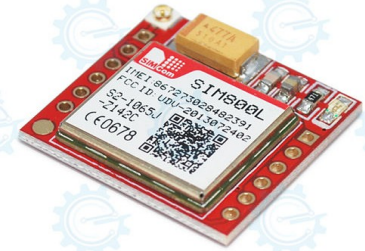
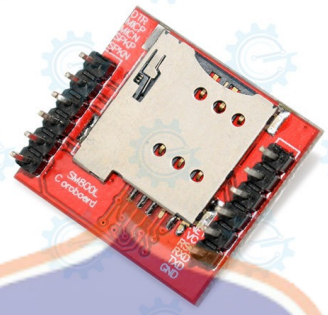
sales@cytron.com.my

SIM800L GSM Module

Technical Manual Rev 1r0





The SIM800L is a quad-band GSM/GPRS module, that works on frequencies GSM850MHz, EGSM900MHz,DCS1800MHz and PCS1900MHz where it can meet all the space requirements in user applications, such as smart phone, PDA and other mobile devices. It has a microSIM slot. antenna for the network signal, microphone, speaker pin outs and ring. The power supply requirements for this module is restrictly 3.4 to 4.4V DC with the minimum 2A. (Note: Do not use this directly to the Arduino board or any 5V source without regulator, it also needs a voltage translator for better serial communications).

Features:

- With power saving technique for low current consumption.
- Audio channel which includes two microphone input, a receiver output and a speaker output.
- External antenna pad

General Specifications:

Power Supply: 3.4 to 4.4VDC (4.0V Typical)
Current Required: 1A-2.6A(MAX)
Band Frequency: Quad-band
Default baud rate : 9600bps
Working Temperature range: -40 °C ~ +85 °C
SIM Interface: 1.3V, 3V
Timing Functions : Use AT Commands Set
PCB Dimensions: 23 mm x 25 mm

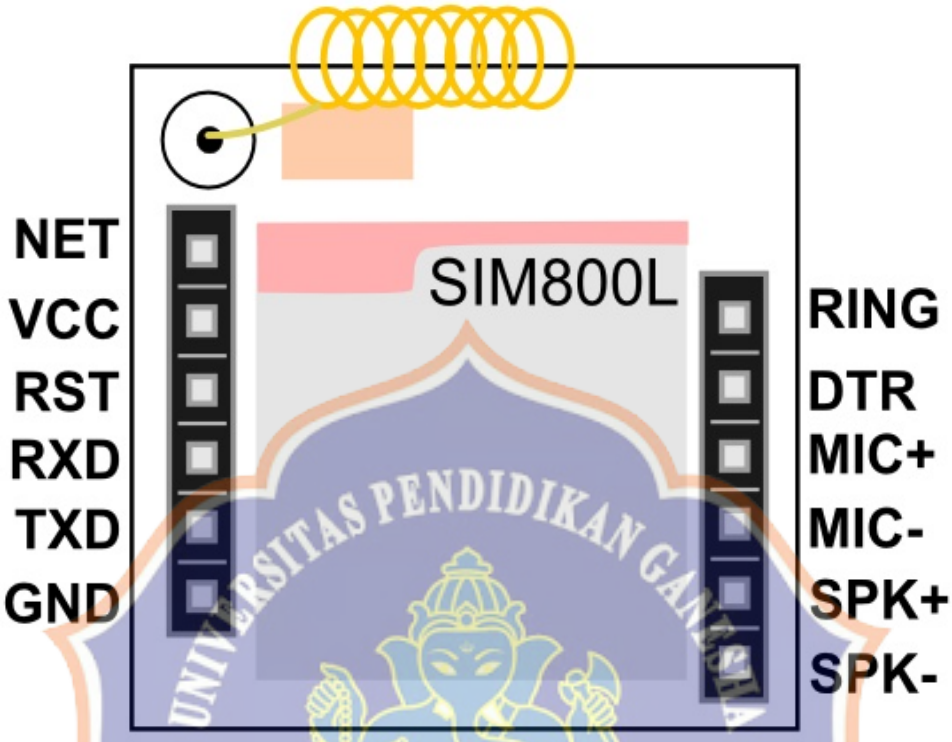
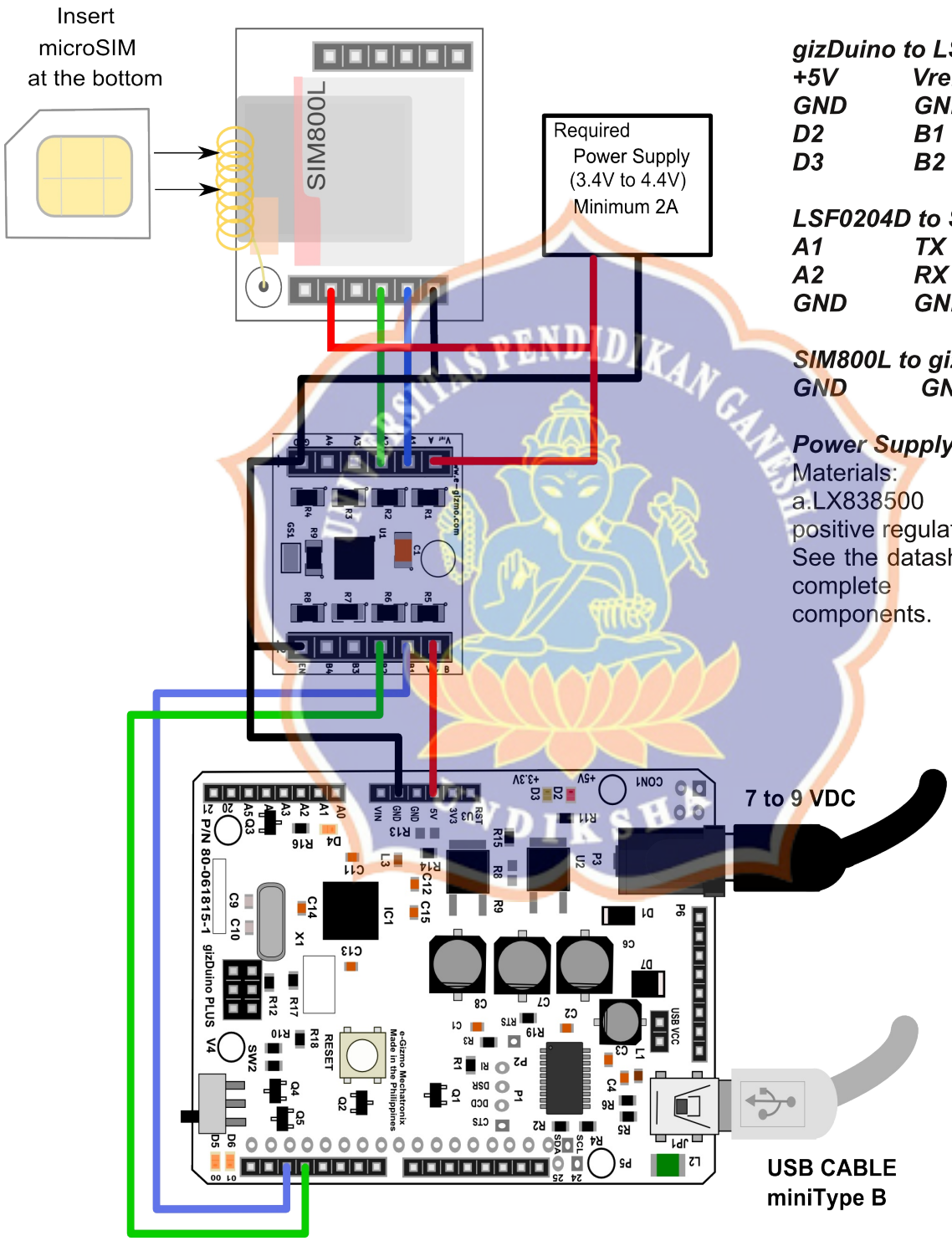


Figure 1. Major Part of SIM800L GSM Module with adaptor.

TABLE 1.

Name	Descriptions
GND	*Ground*
TXD	*Transmit Data*
RXD	*Receive Data*
RST	*SIM Reset*
VCC	*4.0V Input Supply (Typical)*
NET	*Network Status*
SPK-	*Differential audio output (SpeakerN)*
SPK+	*Differential audio output (SpeakerP)*
MIC-	*Differential audio input (MicrophoneN)*
MIC+	*Differential audio input (MicrophoneP)*
DTR	*Data terminal ready*
RING	*Ring Indicator*



gizDuino to LS0204D

+5V	***Vref_B***
GND	***GND***
D2	***B1***
D3	***B2***

LSF0204D to SIM800L

A1	***TX***
A2	***RX***
GND	***GND***

SIM800L to gizDuino

GND	***GND***

Power Supply for SIM800L

Materials:

a.LX838500 (3A Lowdrop positive regulator)

See the datasheet to get the complete supporting components.

Download the GPRS_Shield_Arduino library

1.Visit the Product page: goo.gl/7N7qFg
OR direct link: goo.gl/MgdMGC

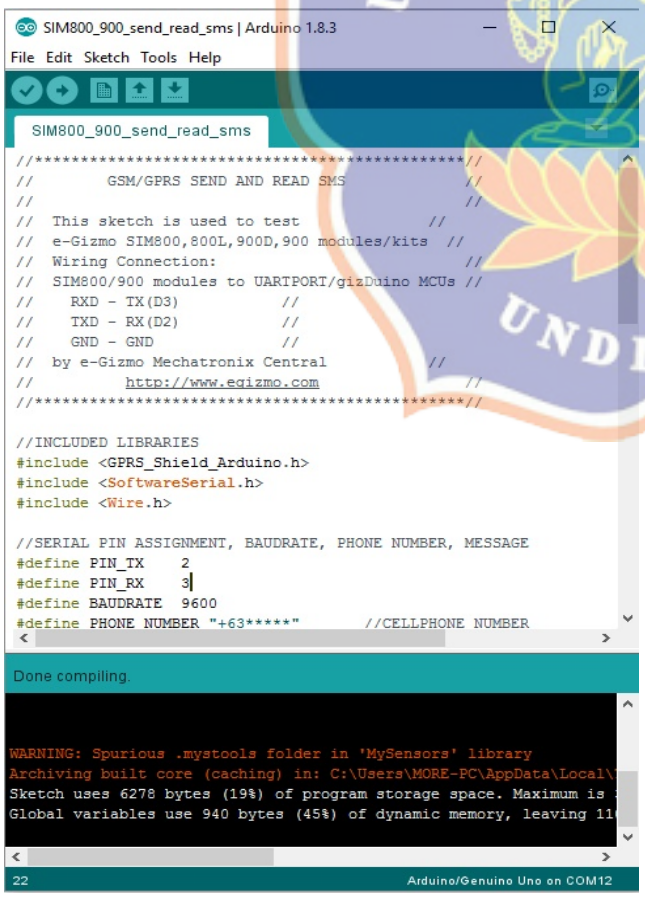
2. Unzip the file. Copy the
GPRS_Shield_Arduino folder.

3. Go to My Documents>Arduino>libraries>
(paste it)

4. Restart Arduino IDE.

Opening the Sampe codes.

1. In Arduino IDE, File>Open..
Find the SIM800_900_send_read_sms.ino.



Codes Explaination

Make sure you included these libraries

```
//INCLUDED LIBRARIES
#include <GPRS_Shield_Arduino.h>
#include <SoftwareSerial.h>
#include <Wire.h>
```

Setting the Serial pin connections

```
#define PIN_TX    2
#define PIN_RX    3
#define BAUDRATE  9600
```

Note: If you are using...
a. gizDuino ATMEGA328P or Arduino UNO
b. gizDuino PLUS ATMEGA644P
you may use these boards in pin_tx 2 and pin _rx 3.

Furthermore,In...
a. gizDuino X ATMEGA1281
b. Arduino MEGA 2560
change the pins assignment to pin_tx 18 and pin_rx 19.

Set the Phone number and Compose your message.

```
#define PHONE_NUMBER "+63*****"
#define MESSAGE  "YOUR_MESSAGE_HERE"
```

Upload this code. Wait for the SIM800L module to get a Signal then press RESET button.

If INIT ERROR occur, Check your connections and make sure you put a correct cellphone number and the module has a better signal.

u-blox Neo-6M GPS Module

User Manual

Content

u-blox Neo-6M GPS Module

1. **Features**
   a.) Standalone GPS receiver.
   b.) Base on U-BLOX NEO-6M modular, it is compact and excellent performance.
   c.) Built in ceramic antenna and MAXIM 20.5dB high gain LNA chip, strong satellite searching capabilities.
   d.) Able to set parameters via the serial port and save in EEPROM.
   e.) Comes with IPX interface, you can connect a variety of active antenna, strong adaptability.
   f.) It is compatible with 3.3V level, easy to connect to any Micro-controller.
   g.) Comes with a rechargeable backup battery for storing satellite searching data.
   h.) The module's interface is RS232(TTL level, 3.3V for 'H', 0V for 'L'), it supports 4800、9600、19200、**38400（ default）**、57600、115200、230400 baud rates.

   *Note: After the main power is off, the backup battery can sustain half an hour for storing satellite data, so that it take shorter time for positioning on hot or warm start.

2. **Parameters**

Items	Description	
Interface	TTL level, 3.3V.	
Receiver type	50-channel u-blox 6 engine GPS L1 C/A code SBAS: WAAS, EGNOS, MSAS	
Navigation update rate	5Hz	
Accuracy	Position	2.5 m CEP
	SBAS	2.0 m CEP
Acquisition	Cold starts:	27s
	Aided starts:	< 3s
	Hot starts:	1s
Sensitivity	Tracking:	–162 dBm
	Cold starts:	–147 dBm
	Hot starts:	–156 dBm

3. **Electrical**

Items	Description
Operating Voltage	DC3.3V~5.0V
Operating Current	45mA
TXD/RXD Impedance	510 ohm

4. **How to use**

4.1 **Pins Definition**

Pin #	Pin Name	Description
1	PPS	Time Pulse output
2	RXD	Rx. Connect to Micro-controller's Tx pin.
3	TXD	Tx. Connect to Micro-controller's Rx pin.
4	GND	Connect to ground.
5	VCC	Connect to 3.3V ~ 5V.

PPS pin is connected to a status indicator LED: PPS, this pin is connected to the port UBLOX NEO-6M TIMEPULSE module, the output characteristics of the port can be set by the program. PPS pin, by default, there are two states:

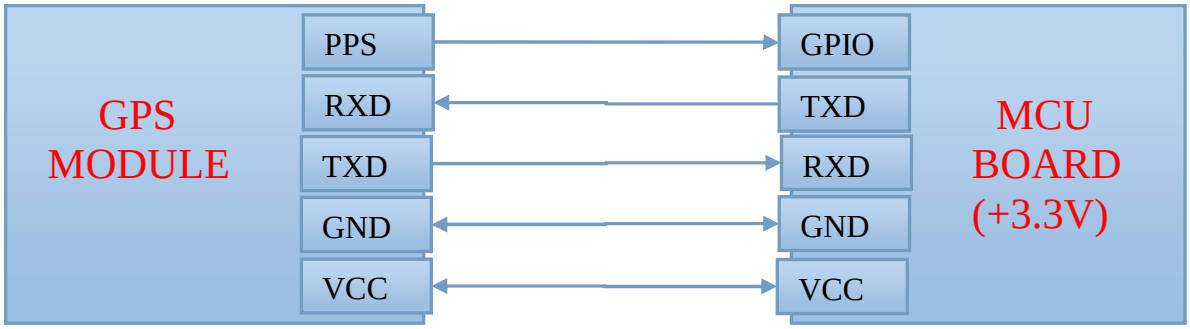
(i) Always on, which means that the module has started to work, but have not yet achieved positioning.
(ii) Flashing (100ms off, 900ms bright), which means that the module has been successful positioning.

Thus, by PPS indicator, we can easily determine the current state of the module, easy to use.

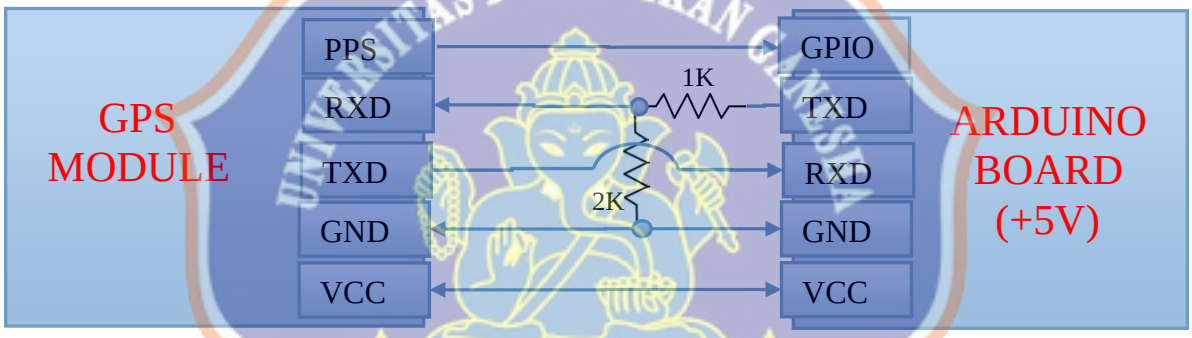
4.2 **External active antenna**

There is an IPX interfaces for connecting to an external active antenna to further improve the reception capability of the module. So that we can do the indoor positioning where the module is at indoor and active antenna at outdoor.

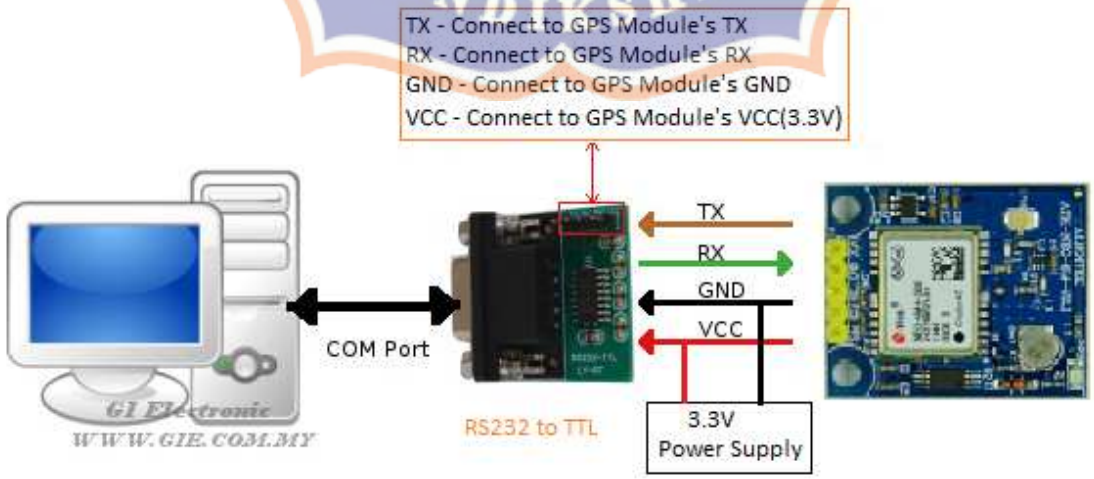
4.3 **Connect to 3.3V Micro-controller Board**



4.4 **Connect to 5V Arduino Board**

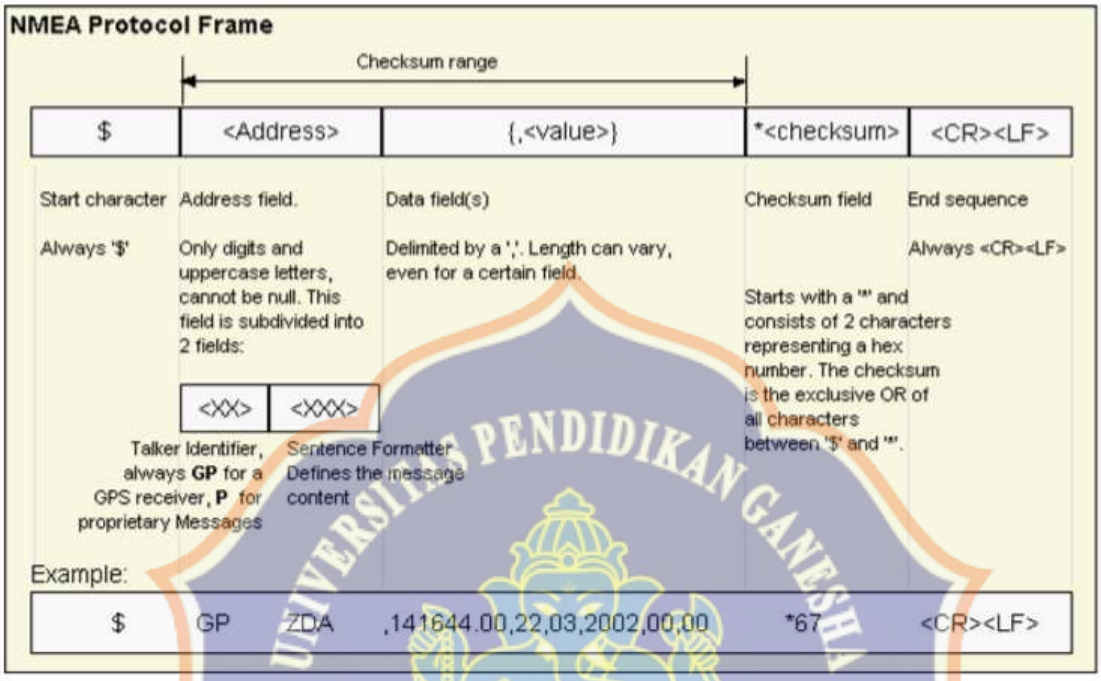


4.5 **Connect to PC**



4.6 **NMEA Protocol**

NMEA messages sent by the GPS receiver are based on NMEA 0183 Version 2.3. The following picture shows the structure of a NMEA protocol message.



4.6.1 **Reference documentation**

(i) http://en.wikipedia.org/wiki/NMEA_0183

(ii) http://www.u-blox.com/images/downloads/Product_Docs/u-blox6_ReceiverDescriptionProtocolSpec_%28GPS.G6-SW-10018%29.pdf

4.7 **Using u-center**

The u-center GNSS evaluation software provides a powerful tool for evaluation, performance analysis and configuration of u-blox GNSS receivers. Its unique flexibility makes the u-center GNSS evaluation software an invaluable tool for evaluation, analysis and configuration of u-blox GNSS receivers. u-blox GNSS receivers can be configured using the u-center evaluation software.

You can download from

https://www.u-blox.com/images/Support/Support_Products/EvaluationSoftware/u-centersetup_v8.10.zip

5. **Note**

5.1 GPS module was built with a ceramic antenna, however it must facing to the sky or it may not receive GPS signals.

5.2 If you want to use the module indoor, you need a external active antenna to put outside the window to achieve positioning.

6. **Kit Contents**

a.) U-Blox Neo-6M GPS Module x1

7. **Warranty**
   a.) Product warranty is valid for 3 months.
   b.) Warranty is only applies to manufacturing defect.
   c.) Damage caused by improper use is not cover under warranty.
   d.) Warranty does not cover freight cost for both ways.