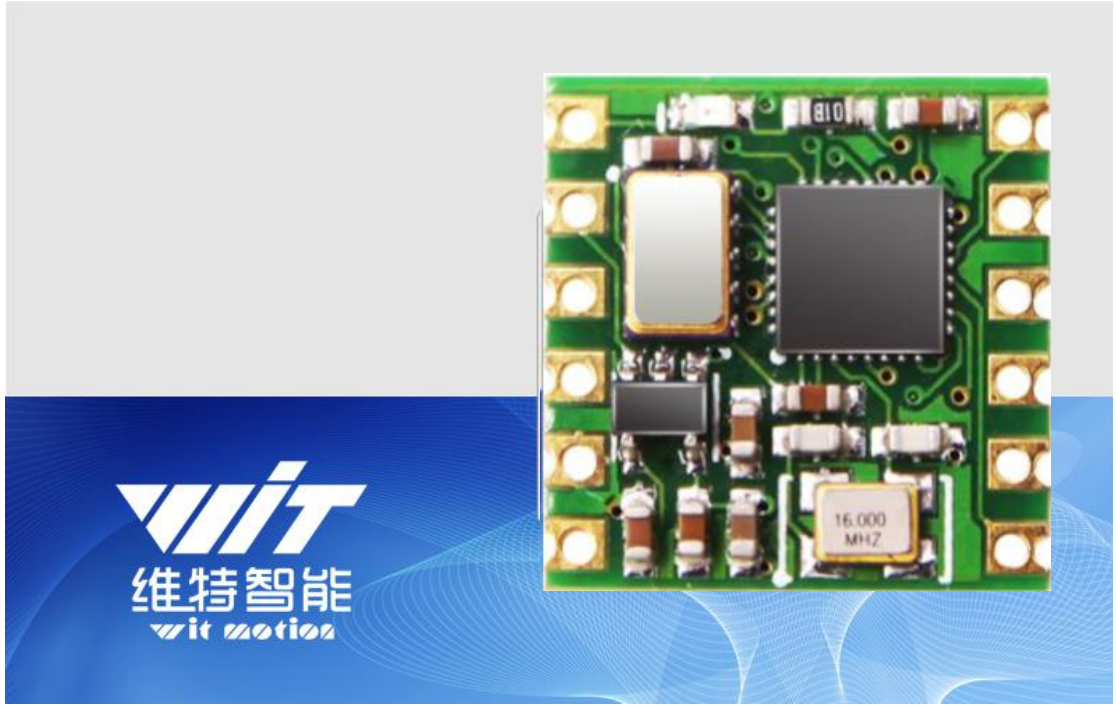
HWT101 Yaw-axis Angle Senor



Model ： HWT101

Description ： HWT101 Single-axis Crystal Gyroscope Sensor

Quality control system standard: ISO9001:2016

Tilt switch production standard：GB/T191SJ 20873-2016

Criterion of detection：GB/T191SJ 20873-2016

Revision date：2019.09.09

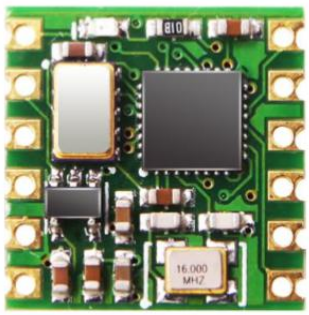
Catalog

1 Description

- The module integrates high-precision crystal gyro sensor with high-performance microprocessor and advanced dynamic solution and Kalman dynamic filtering algorithm to quickly solve the current real-time motion attitude of the module.
- Using advanced digital filtering technology, it can effectively reduce measurement noise and improve measurement accuracy.
- The module integrates an attitude solver with dynamic Kalman filter algorithm to accurately output in a dynamic environment.
- The module integrates an attitude solver with dynamic Kalman filter algorithm to accurately output in a dynamic environment.
- The current attitude of the module, the attitude measurement accuracy is static 0.05 degree, the dynamic 0.1 degree, the stability is extremely high, and the performance is even better than some professional inclinometers.
- Stamp hole gold plating PCB design, can be embedded in the user´s PCB board.
- The module has its own voltage stabilization circuit, the working voltage is 3.3v~5v, and the pin level is compatible with 3.3V/5V embedded system.
- Support serial port and IIC two digital interfaces. It is convenient for users to choose the best connection method. The serial port rate is adjustable from

2400bps to 921600bps, and the IIC interface supports full speed 400K.

- Up to 500Hz data output rate. Input content can be arbitrarily selected, output rate can be adjusted from 0.1 to 500HZ
- Retain 4 expansion ports, which can be configured as analog input, digital input, digital output, PWM output, etc.
- With GPS connectivity. Accepts serial GPS data in accordance with NMEA-0183 standard to form GPS-IMU integrated navigation unit
- 4-layer PCB board process, thinner, smaller, and more reliable



2 Product parameters

1) Voltage: 3.3V-5V

2) Current: <25 mA

3) Size : 15.24mmx 15.24mm X 2mm

4) Pad pitch: up and down100mil (2.54mm), left and right 600mil(15.24mm).

5) Measurement Dimension: Angle: 1 dimension (Z axis)

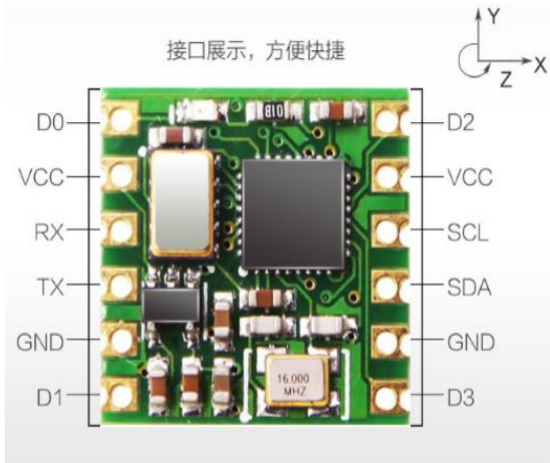
6) Range: Angle: ±180°

7) Attitude stabilization measurement: 0.01°

8) Data output frequency : 0.1Hz~500Hz.

9) Data interface: serial port (TTL level, baud rate support 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600), I2C (maximum support high speed IIC rate 400K)

3 Pin description



Pin	Function
VCC	Power supply,3.3v/5v input
RX	UART TTL Receiver
TX	UART TTL Transmitter
GND	GND
SCL	I2C clock line
SDA	I2C data line
D0	Expansion port 0
D1	Hardware Z-axis angle to zero
D2	Expansion port 2
D3	Expansion port 3

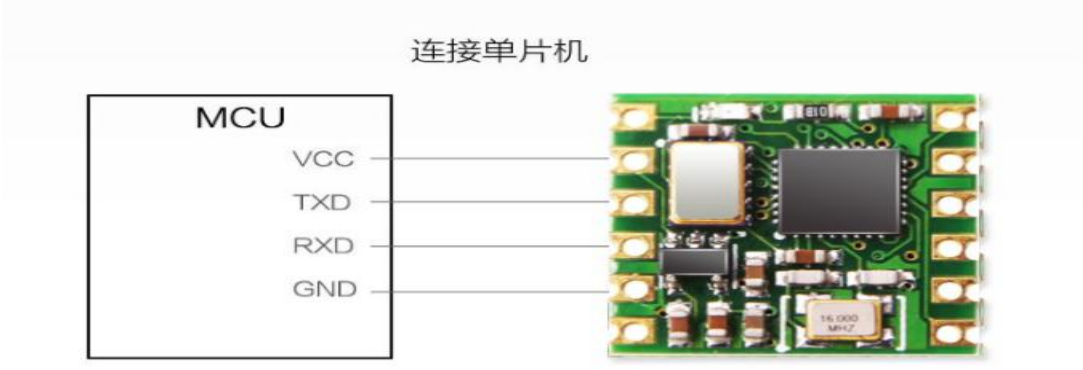
4 Axial direction

As shown in the figure above, the coordinates of the module are indicated, and the right is the X-axis, the upper is Y axis, the Z axis is perpendicular to the surface of the paper to yourself. The direction of rotation is defined by the right hand rule. that is, the thumb of the right hand is pointed to the axial direction, and the four is the direction of the bending of the right hand.

5 Connection

5.1 Serial connection

5.1.1 Connect to MCU

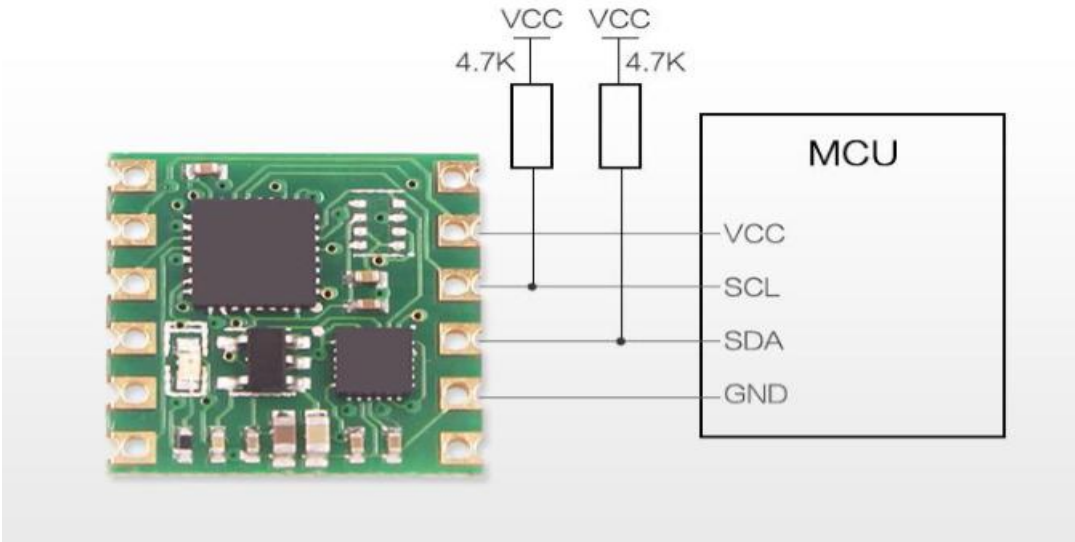


5.1.2 IIC Connection

JY-901 modules can be connected through the IIC interface to MCU, connection method as shown below. Note that, in order to connect several modules on IIC bus, module IIC bus is open-drain output, MCU need a 4.7K resistor pulled to VCC when connecting the module.

Reminder: The power supply VCC is 3.3V which should be powered by other power. The direct use of the power supply of the module may cause voltage drop, so

that the actual voltage of the module can not reach to 3.3-5V.



5.2 Connect with PC software

Note: Please download .net framework4.0 the users who cannot run the PC Software: http://www.microsoft.com/zh-cn/download/details.aspx?id=17718

Hardware connection :

USB - TTL serial module: Firstly connect the module with the USB - TTL and then connect them to the computer. The ways of connecting module with USB -TTL are: VCC TX RX GND of the module connected to +5V RX TX GND of the serial module respectively. It is noteworthy that TX and RX need to be crossed--- RX connected to TX,TX connected to RX.

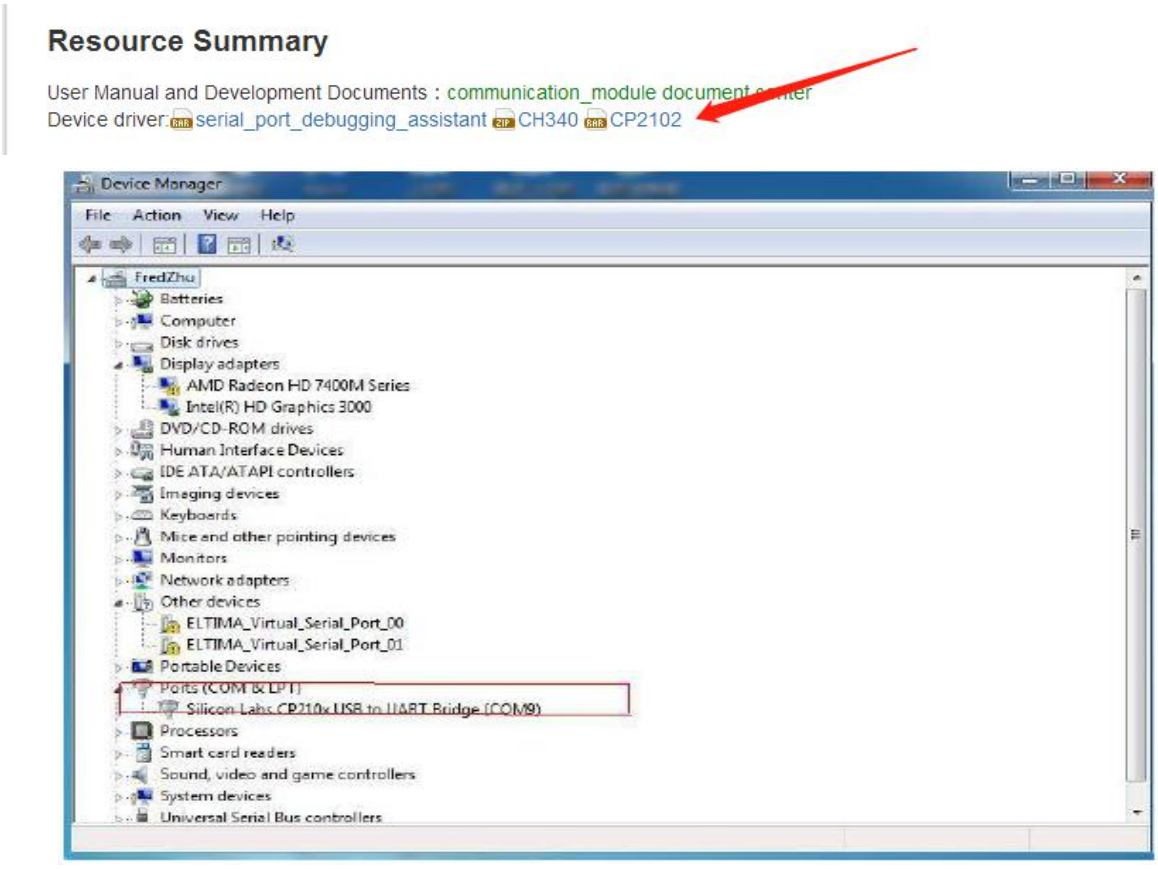
Module 6 in 1 Convert:

https://www.aliexpress.com/item/Free-shipping-usb-converter-cp2102-usb-ttl-485-232-3-3v-and-5v-output-Six-multifunctional/32607767675.html

Driver installation:

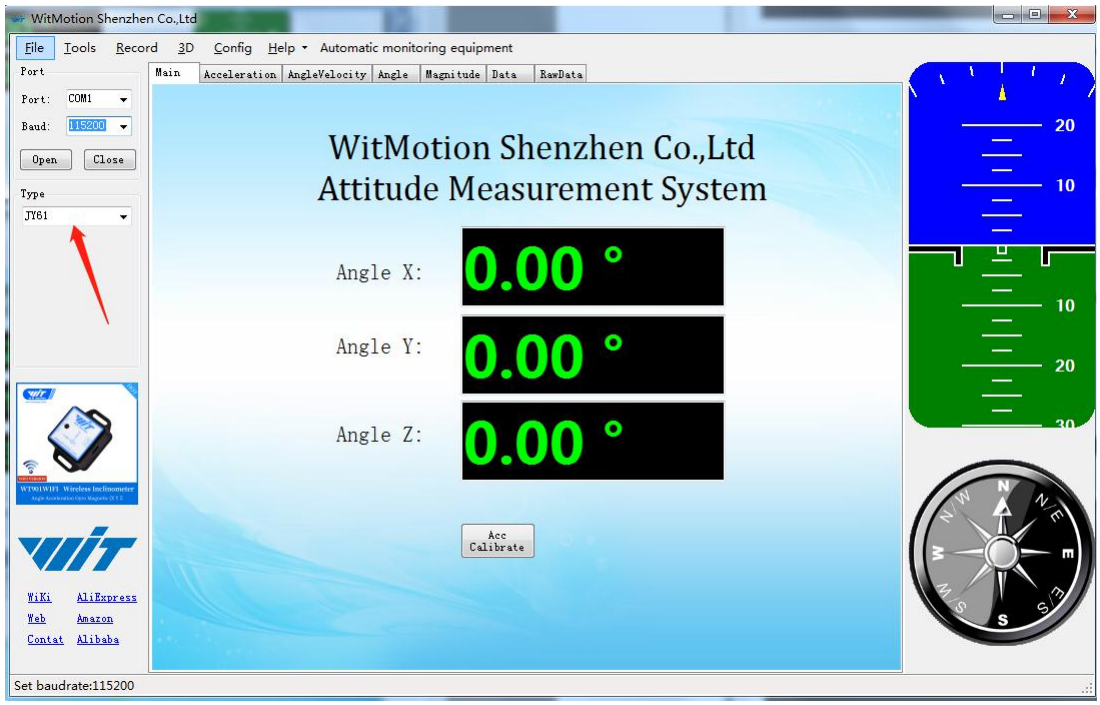
Fisrt, install the driver CP2102 when we used the USB serial module ,after installed the driver. then get the corresponding Com number in the device manager. Driver as followed:

https://wiki.wit-motion.com/english/doku.php?id=communication_module



Then Open the software “MiniIMU.exe” and select the Com number which you have got in the device manager before.

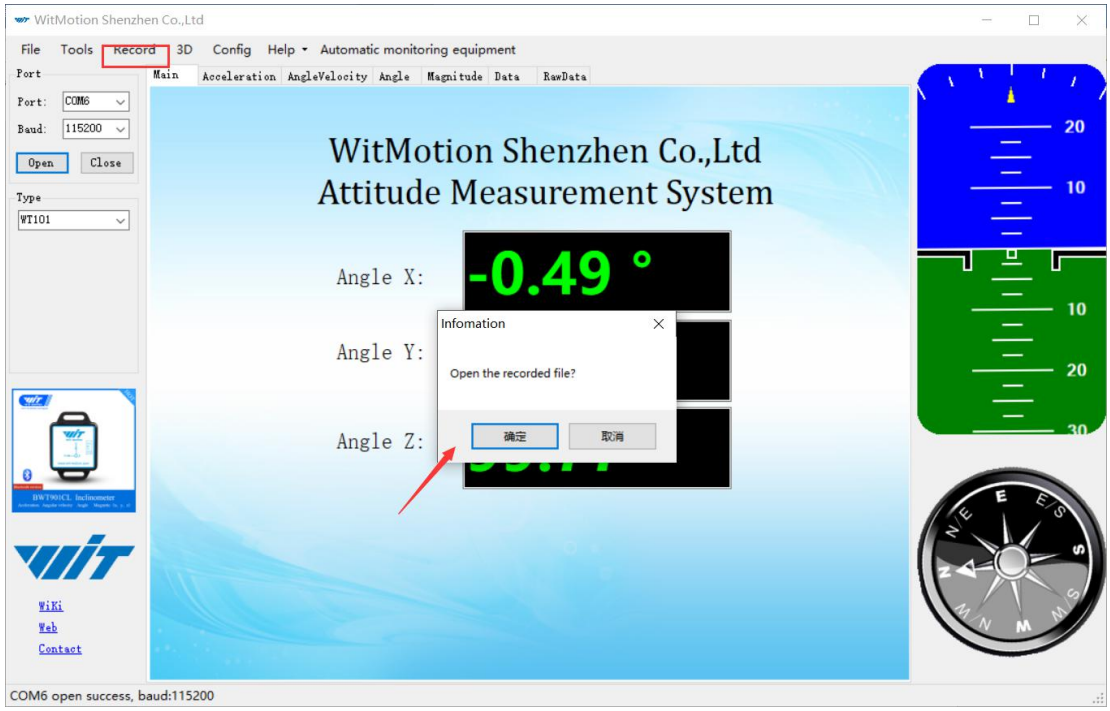
Click the menu “Type” , Select the model as “WT101” in the software.



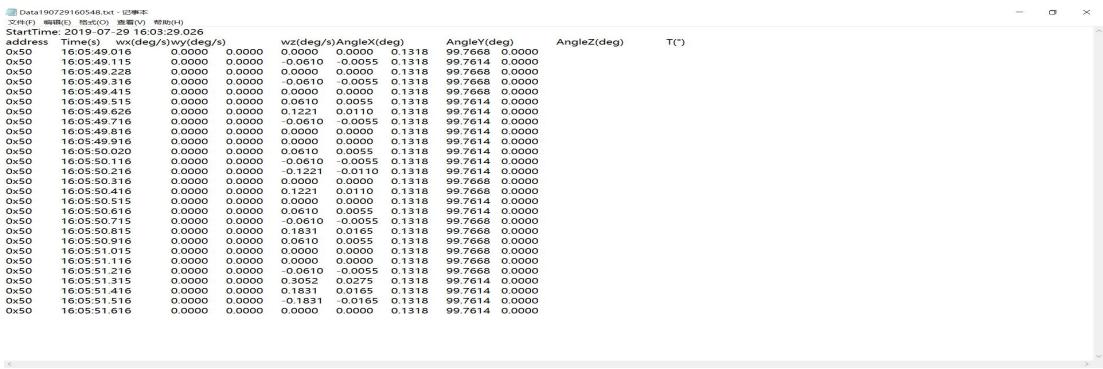
Click the menu “Baud ” in the software and then select 115200, then the software will show the data.

Note: Plesae ignore the data output with X and Y Axis angles.

Clicking the button “Record” can save the data as a file.



The files are saved in the directory Data.tsv: of the software.



StartTime: 2019-07-29 16:03:29.026

address	Time(s)	wx(deg/s)	wy(deg/s)	wz(deg/s)	AngleX(deg)	AngleY(deg)	AngleZ(deg)	T(°)
0x50	16:05:49.016	0.0000	0.0000	0.0000	0.0000	0.1318	99.7668	0.0000
0x50	16:05:49.115	0.0000	0.0000	-0.0610	-0.0055	0.1318	99.7614	0.0000
0x50	16:05:49.228	0.0000	0.0000	0.0000	0.0000	0.1318	99.7668	0.0000
0x50	16:05:49.316	0.0000	0.0000	-0.0610	-0.0055	0.1318	99.7668	0.0000
0x50	16:05:49.415	0.0000	0.0000	0.0000	0.0000	0.1318	99.7668	0.0000
0x50	16:05:49.515	0.0000	0.0000	0.0610	0.0055	0.1318	99.7614	0.0000
0x50	16:05:49.626	0.0000	0.0000	0.1221	0.0110	0.1318	99.7614	0.0000
0x50	16:05:49.716	0.0000	0.0000	-0.0610	-0.0055	0.1318	99.7614	0.0000
0x50	16:05:49.816	0.0000	0.0000	0.0000	0.0000	0.1318	99.7614	0.0000
0x50	16:05:49.916	0.0000	0.0000	0.0000	0.0000	0.1318	99.7614	0.0000
0x50	16:05:50.020	0.0000	0.0000	0.0610	0.0055	0.1318	99.7614	0.0000
0x50	16:05:50.116	0.0000	0.0000	-0.0610	-0.0055	0.1318	99.7614	0.0000
0x50	16:05:50.216	0.0000	0.0000	-0.1221	-0.0110	0.1318	99.7614	0.0000
0x50	16:05:50.316	0.0000	0.0000	0.0000	0.0000	0.1318	99.7668	0.0000
0x50	16:05:50.416	0.0000	0.0000	0.1221	0.0110	0.1318	99.7668	0.0000
0x50	16:05:50.515	0.0000	0.0000	0.0000	0.0000	0.1318	99.7614	0.0000
0x50	16:05:50.616	0.0000	0.0000	0.0610	0.0055	0.1318	99.7614	0.0000
0x50	16:05:50.715	0.0000	0.0000	-0.0610	-0.0055	0.1318	99.7668	0.0000
0x50	16:05:50.815	0.0000	0.0000	0.1831	0.0165	0.1318	99.7668	0.0000
0x50	16:05:50.916	0.0000	0.0000	0.0610	0.0055	0.1318	99.7668	0.0000
0x50	16:05:51.015	0.0000	0.0000	0.0000	0.0000	0.1318	99.7668	0.0000
0x50	16:05:51.116	0.0000	0.0000	0.0000	0.0000	0.1318	99.7668	0.0000
0x50	16:05:51.216	0.0000	0.0000	-0.0610	-0.0055	0.1318	99.7668	0.0000
0x50	16:05:51.315	0.0000	0.0000	0.3052	0.0275	0.1318	99.7614	0.0000
0x50	16:05:51.416	0.0000	0.0000	0.1831	0.0165	0.1318	99.7614	0.0000
0x50	16:05:51.516	0.0000	0.0000	-0.1831	-0.0165	0.1318	99.7614	0.0000
0x50	16:05:51.616	0.0000	0.0000	0.0000	0.0000	0.1318	99.7614	0.0000

5.3 calibration(calibration on PC software)

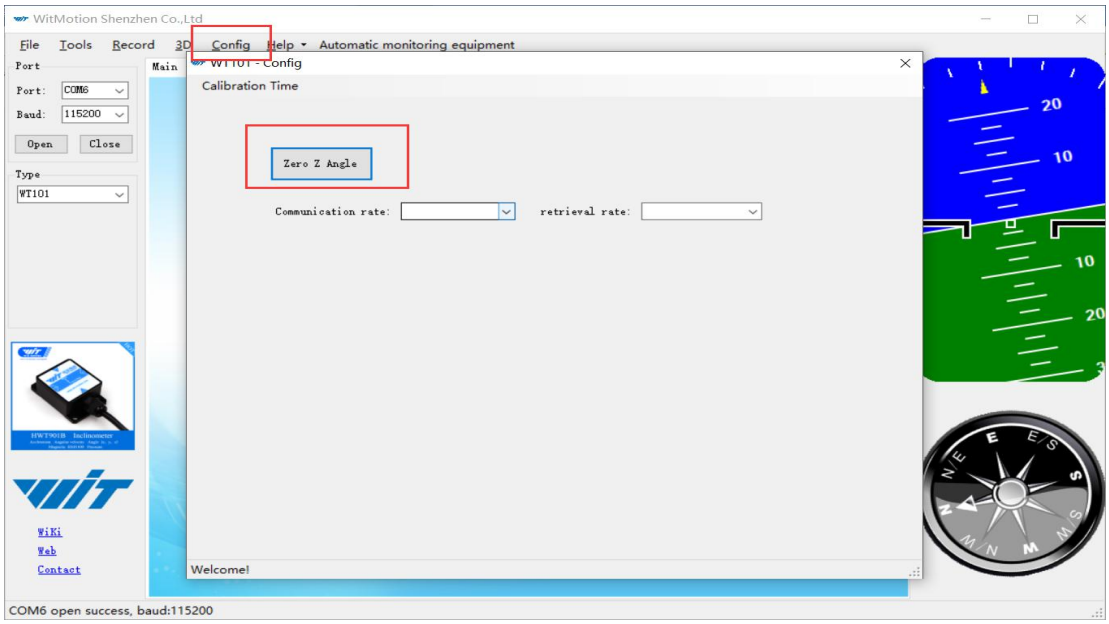
5.3.1 A-axis to 0

The module should be calibrated before you use it. The module calibrate includes

Z-axis to 0 , Accelerometer calibration.

The z axis is 0 is the module z axis angle initial state is relative 0 degree angle

When the module is used before and z - axis drift is large, the z - axis can be calibrated



Then the data will show

5.4 Dormancy and break dormancy

Dormancy: The module pauses working and enters the standby state, dormancy

can reduce power consumption.

Break dormancy：The module enters the working state from the standby state.

How to use：The default state of the module is working state，Click “Sleep” in the “config” of the PC software to enter the standby state, click “Sleep” again the module will break the dormancy.

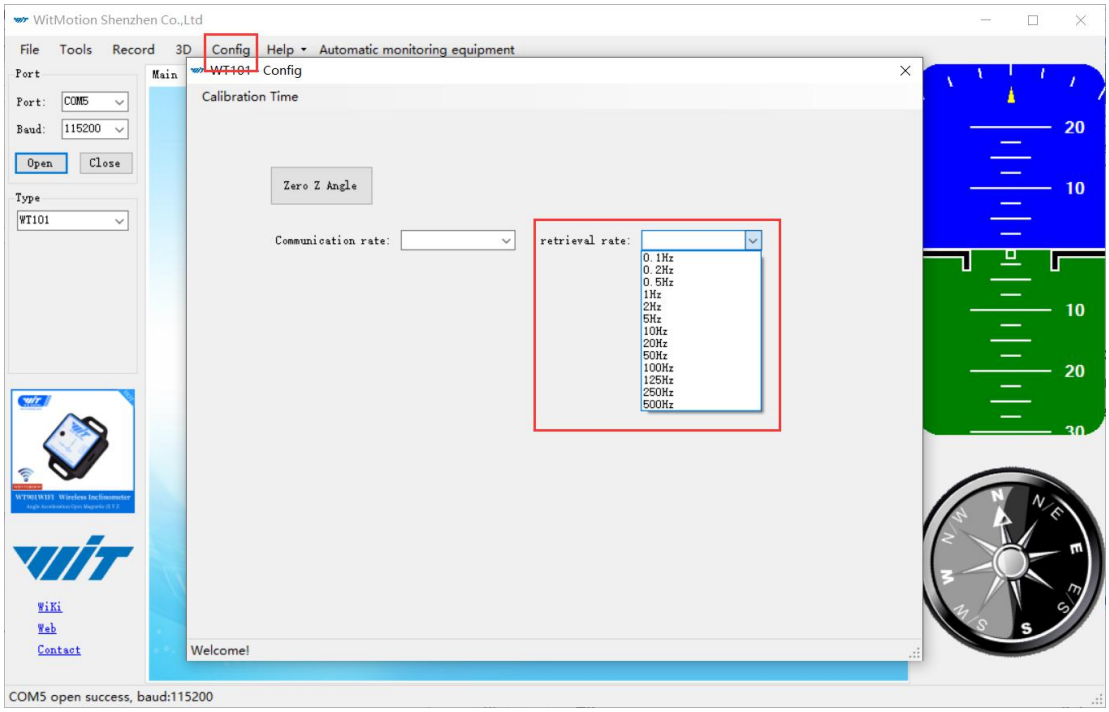
5.5 Set the return rate

Setting method: Click the upper computer configuration option, and select the return rate from 0.1 to 500HZ in the configuration bar.

The default return rate of the module is 10Hz, and the return rate is up to 500Hz.

10HZ means that 1S returns 10 packets, and the default is 1 packet is 11 bytes.

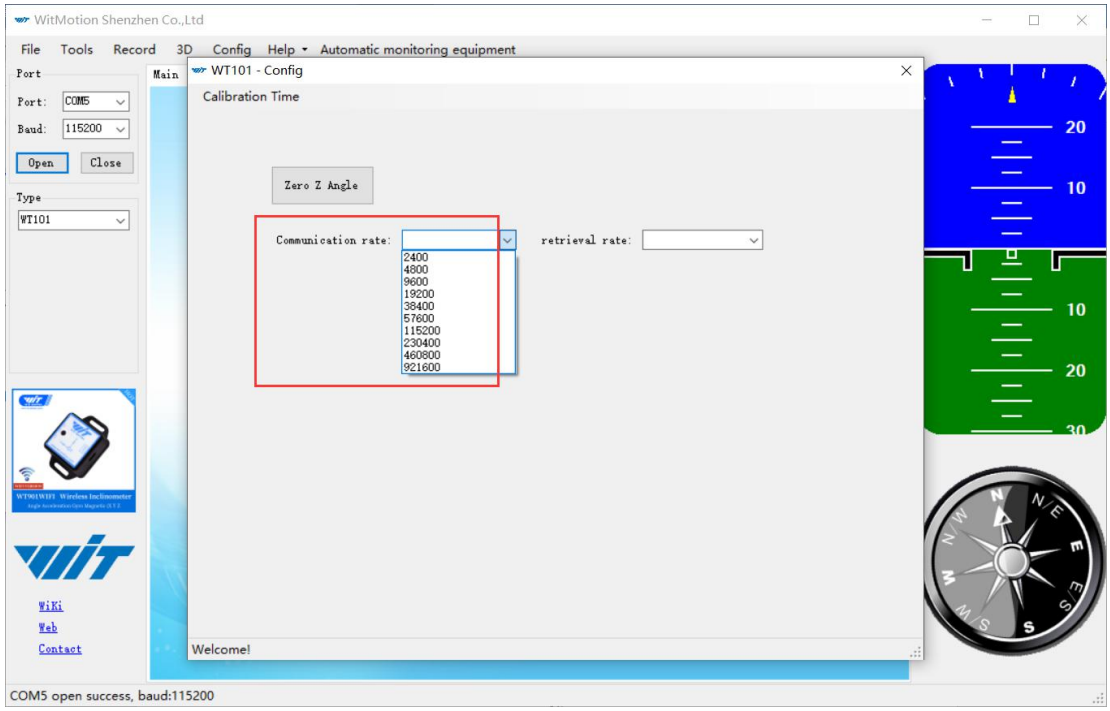
Note: If there are more backhaul content and the baud rate of communication is lower, it may not be able to transmit so much data. At this time, the module will automatically down-convert and output at the maximum allowable output rate. To put it simply, if the return rate is high, the baud rate should also be set higher, generally 115200. (Note: 115200 baud for 250hz and 921600 baud for 500hz)



5.6 Set communication baud rate

Setting method: The module supports multiple baud rates, and the default baud rate is 9600. To set the baud rate of the module, you need to select the baud rate to be changed in the communication rate drop-down box in the configuration bar (JY9Config) based on the correct connection between the software and the module.

Note: After the change, the module will not output data at the original baud rate. To re-select the baud rate that has been changed in the main interface of the host computer, the data will be output.


WitMotion Shenzhen Co.,Ltd
File
Tools
Record
3D
Config
Help
Automatic monitoring equipment
Port
Port:
COM5
Baud:
115200
Open
Close
Type
WT101
Main
WT101 - Config
Calibration Time
Zero Z Angle
Communication rate:
retrieval rate:
2400
4800
9600
19200
38400
57600
115200
230400
460800
921600
Welcome!
WiKi
Web
Contact
COM5 open success, baud:115200

6 Application area

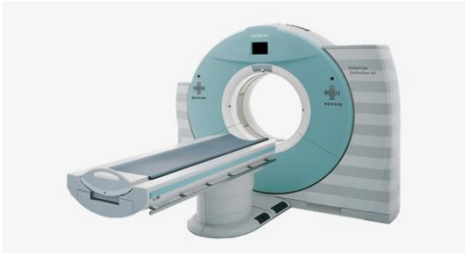
Agricultural machinery

Internet of things

Solar energ

Power monitoring

Medical instruments



Construction machinery

Geological monitoring

WitMotion ShenZhen Co., Ltd

HWT101 Single-axis Crystal Gyroscope Sensor

Contact: Mr. Kyle Tsang

E-mail : support@wit-motion.com

Skype: live:kyle_8394

WhatsApp: +86 136 523 39539

Amazon in USA: www.amazon.com/witmotion

Amazon in Canada: www.amazon.ca/witmotion

Amazon in Japan: www.amazon.co.jp/witmotion

Official Direct Store: www.aliexpress.com/store/4709011

Address : Honghai building 1405 Songgang town Baoan District

Shenzhen Guangdong Province China