CATCAN SmartSensor Pro Edition

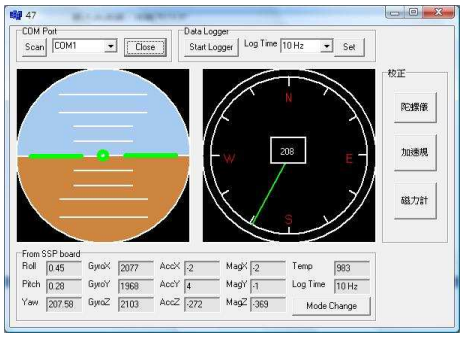
SmartSensor Pro is a highly integrated motion sensor，including

1. A MEMS sensor of 3 axis magnetic.
2. S MEMS sensor of 3 axis of acceleration.
3. 3 MEMS sensor of single axis gyros.
4. A 32bit ARM **Coretex-M3 at 64MHz** for built in enhance Kalman filter.

Smart sensor Pro provides an easy use motion and direction detection with USB or serial out put and recoding function with micro SD.

Dimension：43.2 x 33　x 23.8　/mm
Acceleration sensing range（**X/Y/Z**）：+/- 16G
Magnetic sensing range（**X/Y/Z**）：+/-2 Gauss
Gyro sensing range（**X/Y/Z**）：+/-300 degree/second
Data Log frequency：1Hz/2Hz/5Hz/10Hz/20Hz/50Hz
Temperature sensing：-40℃ - 125℃
Working voltage：5V
interface：USB-Serial or UART on J7 connector
UART parameter：115200bps 8n1
Refresh rate: < 100Hz
Support user define coordination.
M Coretex-M3@64MHz

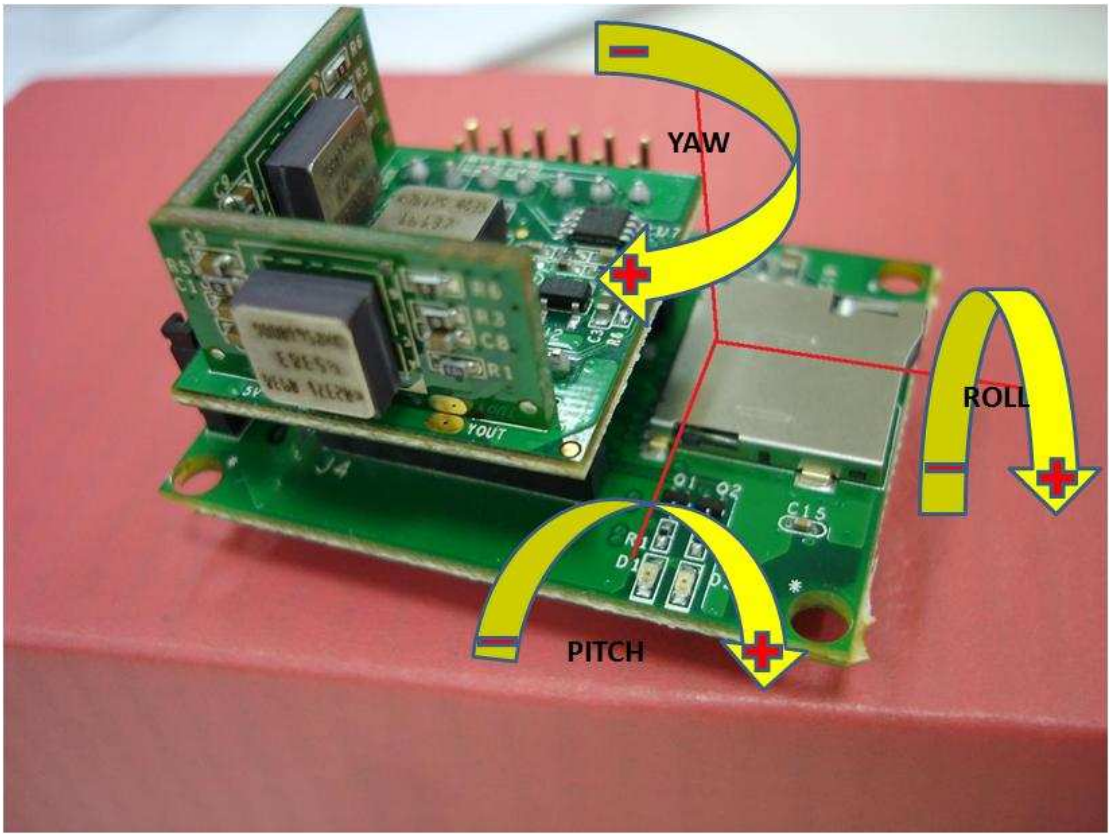
We provide a C++ demo program.



Visualization of current direction and raw data from MEMS sensors

Including calibration function and recording comminding.

Axi definition:

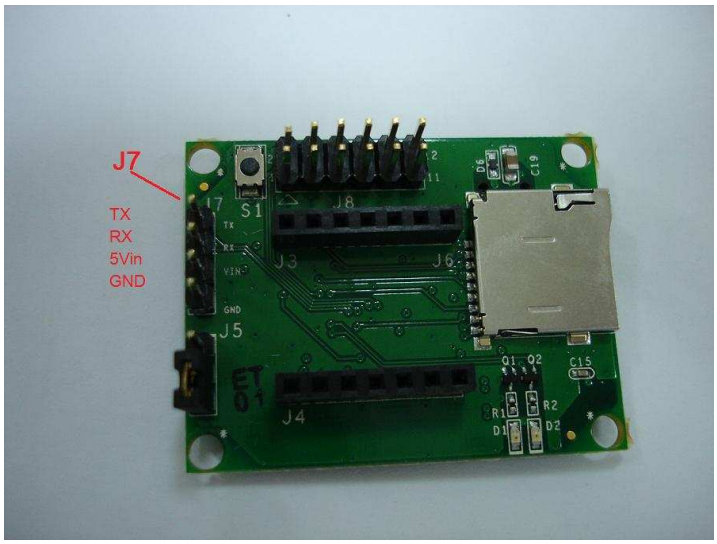


Data output: Smart Sensor Pro send out data package with 8bytes in each package.

Base on he package ID we are able to identify out the data.

Smart sensor Pro send out data through USB or the serial TX/RX pins on J7.

ON J7 TX/RX are 3.3V level signal, if USB is not connected, regulated 5V should be connected to Vin.



1 **.orientation package**

Byte Number	Data Format	Note
0	0x55	Header
1	Roll Angle (LSB)	Roll=(MSB<<8+LSB)/100-180 unit: Deg
2	Roll Angle (MSB)	
3	Pitch Angle (LSB)	Pitch=(MSB<<8+LSB)/100-180 unit: Deg
4	Pitch Angle (MSB)	
5	Heading (LSB)	Heading= ((MSB<<8+LSB)/100)-180 unit: Deg
6	Heading (MSB)	
7	0xaa	Package ID

2.Gyro raw data package

Byte Number	Data Format	Note
0	0x55	Header

1	Roll Rate (LSB)	Roll Rate=(MSB<<8+LSB)
2	Roll Rate (MSB)	1 unt=0.203125 deg/s
3	Pitch Rate (LSB)	Pitch Rate=(MSB<<8+LSB)
4	Pitch Rate (MSB)	1 unit=0.203125 deg/s
5	Yaw Rate (LSB)	Yaw Rate=(MSB<<8+LSB)
6	Yaw Rate (MSB)	1 unit=0.203125 deg/s
7	0xab	Package ID

3.acceleration raw package

Byte Number	Data Format	note
0	0x55	Header
1	Acc X (LSB)	Acc X=(MSB<<8+LSB)
2	Acc X (MSB)	1 unit=0.0039 g
3	Acc Y (LSB)	Acc Y=(MSB<<8+LSB)
4	Acc Y (MSB)	1 unit =0.0039 g
5	Acc Z (LSB)	Acc Z=(MSB<<8+LSB)
6	Acc Z (MSB)	1 unit =0.0039 g
7	0xac	Package ID

4.Magnetic raw data package:

Byte Number	Data Format	note
0	0x55	Header

1	Mag X (LSB)	Mag X=(MSB<<8+LSB) 1 unit =0.000976 Gauss
2	Mag X (MSB)	
3	Mag Y (LSB)	Mag Y=(MSB<<8+LSB) 1 unit =0.000976 Gauss
4	Mag Y (MSB)	
5	Mag Z (LSB)	Mag Z=(MSB<<8+LSB) 1 unit =0.000976 Gauss
6	Mag Z (MSB)	
7	0xad	Package ID

5.Temperature sensor and log time interval:

Byte Number	Data Format	Note
0	0x55	Header
1	Temperature (LSB)	Temp=(MSB<<8+LSB) 1LSB=0.0008056640625 V ℃=(0.0008056640625 *Temp-0.5)*100
2	Temperature (MSB)	
3	Log Time (LSB)	LT=(MSB<<8+LSB)*0.02+1 Hz=1000/LT
4	Log Time (MSB)	
5	NULL	
6	NULL	
7	0xae	ID

1. Data Log Frequency can be set as following:

Passing ASCII code"LTN" to config logging frequency.

N='1' 50Hz

N='2' 20Hz

N='3' 10Hz

N='4' 5Hz

N='5' 2Hz

N='6' 1Hz

Example: LT1 set 50 times/second

LT2 set 20 times/second…etc

2.User define coordination:

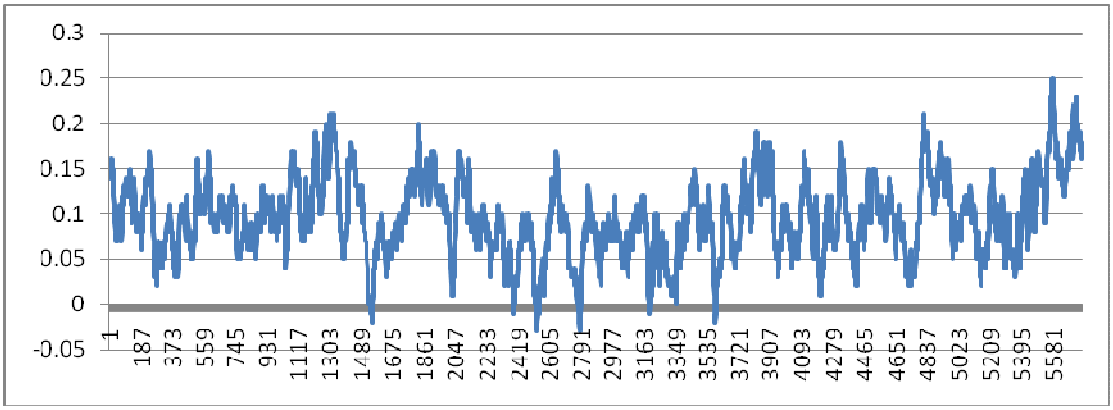
Put smart sensor Pro in the desired coordination, and Passing ASCII code "MOD" to smart sensor will reset the current position as coordination base.

Orientation stability:

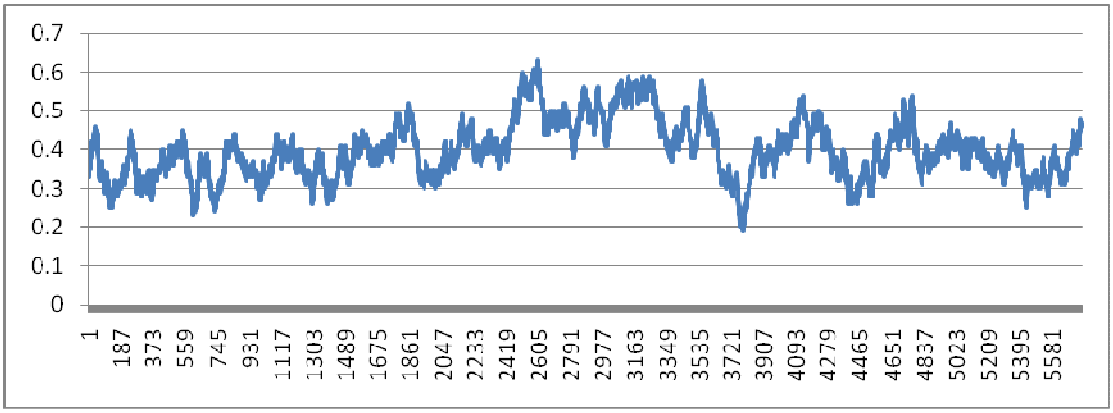
Following 3 charts are measured when placing sensor Pro in a stationary position and measure the output.

Y axis is in deg/unit, X axis is in 0.02 sec/unit

Roll angle:



Pitch angle:



Heading angle