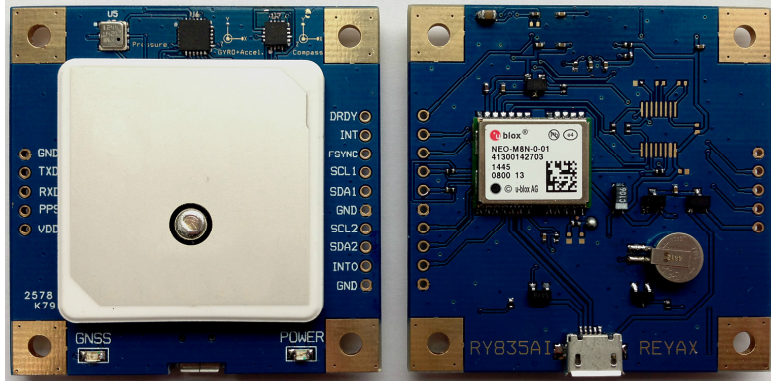


REYAX



RY835AI high performance GPS&Glonass/GPS&BeiDou

Parallel mode antenna module with Compass, Gyroscope, Accelerometer, Pressure Sensor



Product description

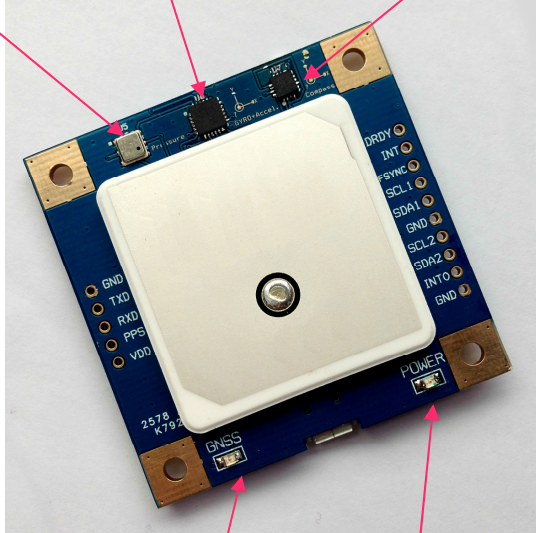
The REYAX RY835AI GNSS receiver module with embedded GPS/Glonass/BeiDou antenna enables high performance navigation in the most stringent applications and solid fix even in harsh GPS/Glonass/BeiDou visibility environments.

Features

- u-blox NEO-M8N GNSS(GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS) engine..
- Bosch BMP180 Pressure Sensor .
- Honeywell HMC5983 Compass IC.
- InvenSense MPU-6050 Gyroscope & Accelerometer Motion Tracking device.
- Embedded GPS/Glonass/BeiDou Antenna.
- 7 days battery backup time.
- RY835AI UART and RY835DI RS-232 interface option
- USB 2.0 interface connect to computer easily.
- Max. 18Hz Navigation update rate
- Position accuracy 2.0 m CEP
- GNSS & POWER LED Indicator
- Dimension 50mm*50mm*7mm

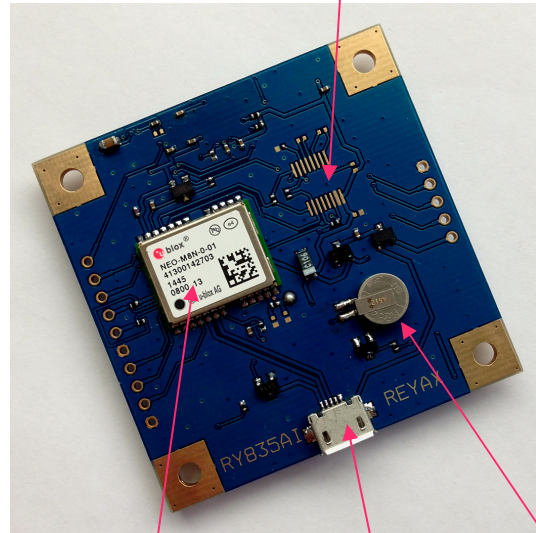
Part

Bosch BMP180 InvenSense MPU-6050 Honeywell HMC5983



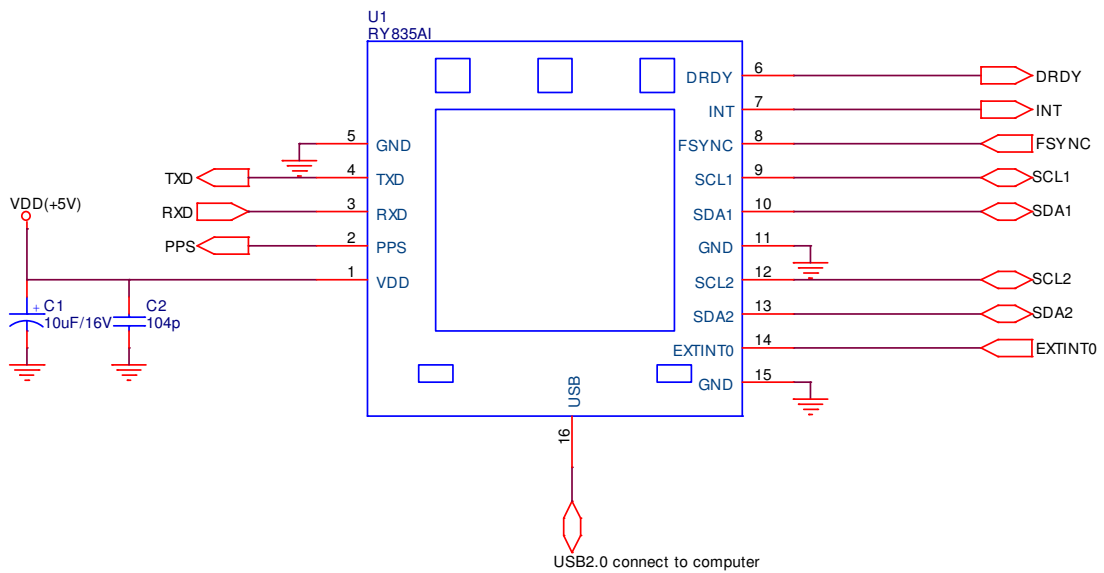
RED GNSS LED GREEN POWER LED

RS-232 (RY835DI)



u-blox NEO-M8N Micro USB Recharge battery

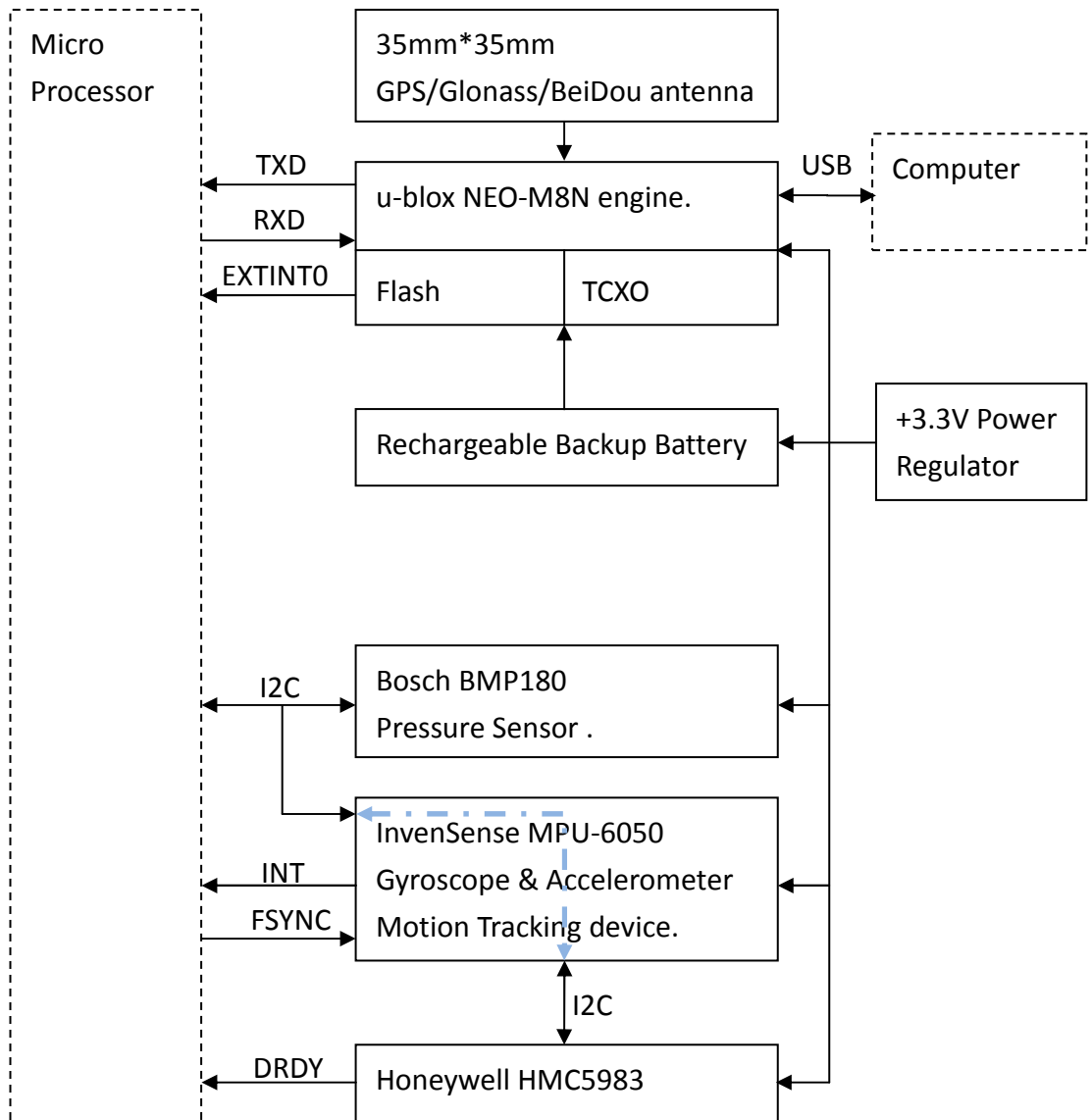
Application Schematic



Pin Description

Pin	Name	I/O	Condition
1	VDD	I	Supply voltage
2	PPS	O	u-blox NEO-M8N
			Time pulse
3	RXD	I	u-blox NEO-M8N
			Serial Port
4	TXD	O	u-blox NEO-M8N
			Serial Port
5	GND	-	Ground
6	DRDY	O	Honeywell HMC5983
			Data Ready, Interrupt Pin. Internally pulled high. Optional connection. Low for >200 μ sec when data are placed in the data output registers.
7	INT	O	InvenSense MPU-6050
			Interrupt digital output (totem pole or open-drain)
8	FSYNC	I	InvenSense MPU-6050
			Regulator filter capacitor connection Frame synchronization digital input. Connect to GND if unused.
9	SCL1	I/O	Bosch BMP180, Honeywell HMC5983, InvenSense MPU-6050 I2C interface, +3.3V 2.2K Ω pull up.
10	SDA1	I/O	Bosch BMP180, Honeywell HMC5983, InvenSense MPU-6050 I2C interface, +3.3V 2.2K Ω pull up.
11	GND	-	Ground
12	SCA2	I/O	u-blox NEO-M8N
			DDC Data
13	SCL2	I/O	u-blox NEO-M8N
			DDC Clock
14	EXTINT0	I	u-blox NEO-M8N
			External Interrupt Pin Leave open if not used.
15	GND	-	Ground

Block Diagram



Specification

Item	Min.	Typical	Max.	Unit	Condition
Operation Voltage	3.9		5.5	V	VDD
Current		38.65		mA	u-blox NEO-M8N 34mA Bosch BMP180 0.65mA Honeywell HMC5983 0.1mA InvenSense MPU-6050 3.9mA
Battery backup time		7		Day	
TXD/RXD DIO voltage		3.3		V	RY835AI UART version
TXD/RXD RS-232 voltage		12		V	RY835DI RS-232 version
Baud Rate		9600		bps	NMEA, Configurable
USB Interface					V2.0
Logic I/O Voltage		3.3		V	
GNSS Center Frequency		1561.098 1575.42 1602.5625		MHz	BeiDou GPS Glonass
Navigation update rate		1	18	Hz	Configurable
Accuracy		2		M	CEP
Cold starts		26		Sec.	
Aided starts		2		Sec.	
Hot starts		1.5		Sec.	
Tracking Sensitivity		-167		dBm	
Cold starts Sensitivity		-148		dBm	
Hot starts Sensitivity		-156		dBm	
Operating Temperature	-40	25	+85	°C	
Antenna					35mm*35mm Embedded
Weight		24		g	

*Other sensors specification, please refer to the original datasheet.

Configuration Hardware tool

Please plug a micro USB cable to the RY835AI.



Configuration software tool

Please download the u-blox u-center <http://www.u-blox.com> and Access Port <http://www.sudt.com/>

Please execute the u-center and run the messages-UBX-CFG.

Set to receive GPS&Glonass (default)

The screenshot displays the u-center software interface. The main window is titled 'COM21 - u-center 8.13 - [Messages - UBX - CFG (Config) - GNSS (GNSS Config)]'. The 'CFG (Config)' window is open, showing the 'GNSS (GNSS Config)' tab. A table lists the configured GNSS systems:

GNSS ID	configure	GNSS name	enable	Channels min	max	Signals
0	<input checked="" type="checkbox"/>	GPS	<input checked="" type="checkbox"/>	8	16	
1	<input checked="" type="checkbox"/>	SBAS	<input checked="" type="checkbox"/>	1	3	
2	<input type="checkbox"/>	Galileo	<input type="checkbox"/>	0	0	
3	<input checked="" type="checkbox"/>	BeiDou	<input type="checkbox"/>	8	16	
4	<input type="checkbox"/>	IMES	<input type="checkbox"/>	0	0	
5	<input checked="" type="checkbox"/>	QZSS	<input checked="" type="checkbox"/>	0	3	
6	<input checked="" type="checkbox"/>	GLONASS	<input checked="" type="checkbox"/>	8	14	

The 'Number of channels available' is set to 32. Below the table, a hex dump shows the configuration data: 0000 B5 62 06 3E 2C 00 00 00 20 05 班 >, 000A 00 08 10 00 01 00 01 01 01 01 01, 0014 03 00 01 00 01 01 03 08 10 00, 001E 00 00 01 01 05 00 03 00 01 00, 0028 01 01 06 08 0E 00 01 00 01 01, 0032 FF 3D. The interface also shows a signal strength graph and a status panel on the right with coordinates: Longitude 121.5884402, Latitude 25.077421, Altitude 87.800 m. The system tray shows 'COM21 9600 u-blox 7' and the date '2015/1/31'.

Set to receive GPS&BeiDou

The screenshot shows the 'GNSS (GNSS Config)' window in COM21 software. The configuration is set to receive both GPS and BeiDou signals.

GNSS ID	configure	GNSS name	enable	Channels min	Channels max	Signals
0	<input checked="" type="checkbox"/>	GPS	<input checked="" type="checkbox"/>	8	16	
1	<input checked="" type="checkbox"/>	SBAS	<input checked="" type="checkbox"/>	1	3	
2	<input checked="" type="checkbox"/>	Galileo	<input type="checkbox"/>	0	0	
3	<input checked="" type="checkbox"/>	BeiDou	<input checked="" type="checkbox"/>	8	16	
4	<input checked="" type="checkbox"/>	IMES	<input type="checkbox"/>	0	0	
5	<input checked="" type="checkbox"/>	QZSS	<input checked="" type="checkbox"/>	0	3	
6	<input checked="" type="checkbox"/>	GLONASS	<input type="checkbox"/>	8	14	

Number of channels available: 32

Hex dump of received data:

```

0000 B5 62 06 3E 2C 00 00 20 05  00 00 00 00 00 00 00 00 00 00
000A 00 08 10 00 01 00 01 01 01 01
0014 03 00 01 00 01 01 03 08 10 00
001E 01 00 01 01 05 00 03 00 01 00
0028 01 01 06 0E 0E 00 00 00 01 01
0032 FF 4D
    
```

The signal strength graph shows a strong signal for GPS and BeiDou, with a signal strength of approximately 45 dBm.

Positioning data:

- Longitude: 121.894395
- Latitude: 25.077417
- Altitude: 73.900 m
- ITF: 0
- Fix Mode: 3D (GPS)
- 3D Acc: 0.00 m
- HDOP: 0.00
- PDOP: 0.15
- Satellites: 18

Set Baud rate (9600 default)

The screenshot shows the 'PRT (Ports)' window in COM21 software. The configuration is set to receive data from the UART1 port at a baud rate of 9600.

Target: 1 - UART1

Protocol in: 0+1+2 - UBX+NMEA+RT

Protocol out: 0+1 - UBX+NMEA

Baudrate: 9600

Hex dump of received data:

```

0000 B5 62 06 00 14 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00
000A D0 08 00 00 80 25 00 00 07 00 00 00 00 00 00 00 00 00 00 00
0014 03 00 00 00 00 00 A2 B5
    
```

The signal strength graph shows a strong signal for GPS and BeiDou, with a signal strength of approximately 45 dBm.

Positioning data:

- Longitude: 121.894395
- Latitude: 25.077417
- Altitude: 73.200 m
- ITF: 0
- Fix Mode: 3D (GPS)
- 3D Acc: 0.13 m
- HDOP: 0.06
- PDOP: 0.13
- Satellites: 18

Set Navigation update rate (1Hz default)

COM21 - u-center 8.13 - [Messages - UBX - CFG (Config) - RATE (Rates)]

File Edit View Player Receiver Tools Window Help

UBX - CFG (Config) - RATE (Rates)

Time Source: 1 - GPS time

Measurement Period: 56 [ms]

Measurement Frequency: 17.86 [Hz]

Navigation Rate: 1 [Hz]

Navigation Frequency: 17.00 [Hz]

```

0000 B5 62 06 08 06 00 38 00 01 00  00  8
000A 01 00 4E 0A
    
```

GPS G13
E1 51 A2 312
CNO -

GPS G15
E1 51 A2 343
CNO -

GPS G16
E1 51 A2 177
CNO -

GPS G21
E1 51 A2 312
CNO -

GPS G22
E1 51 A2 85
CNO -

GPS G18
E1 18 A2 307
CNO -

GPS G2
E1 18 A2 190
CNO -

Longitude 121.584399
Latitude 25.077408
Altitude 73.700 m
TTFF
Fix Mode 2D
3D Acc
2D Acc
PDOP 0 2.0 10
HDOP 0 1.1 10
Satellites

ERROR: Field has an invalid format or exceeds its parameters range

COM21 11520 u-blox 7 No file open NMEA 00:07:26 03:49:29

上午 11:49
2015/1/31

Save Configuration in flash

COM21 - u-center 8.13 - [Messages - UBX - CFG (Config) - CFG (Configuration)]

File Edit View Player Receiver Tools Window Help

UBX - CFG (Config) - CFG (Configuration)

Revert to last saved configuration

Revert all but ANT default configuration

Revert to default configuration

Save current configuration

User defined operation

Devices

- 0 - BSR
- 1 - FLASH
- 2 - I2C EEPROM
- 4 - SPI FLASH

Clear Save Load

0 - PRT	1 - MSG	10 - ANT
1 - MSG	2 - INF	11 - I2C
2 - INF	3 - NAV	
3 - NAV	4 - RDM	
4 - RDM	5 - Unused	
5 - Unused	6 - Unused	
6 - Unused	7 - Unused	
7 - Unused	8 - Unused	
8 - Unused	9 - RWV	
9 - RWV	10 - ANT	
10 - ANT	11 - I2C	

```

0000 B5 62 06 09 00 00 00 00 00  00  00
000A FF FF 00 00 00 00 00 00 02  1C
0014 AA
    
```

GPS G13
E1 51 A2 312
CNO 15

GPS G15
E1 51 A2 343
CNO 15

GPS G16
E1 51 A2 177
CNO 15

GPS G21
E1 51 A2 312
CNO 15

GPS G22
E1 51 A2 85
CNO 15

GPS G18
E1 18 A2 307
CNO 15

GPS G2
E1 18 A2 190
CNO 15

GPS G14
E1 18 A2 190
CNO 15

GPS G15
E1 18 A2 190
CNO 15

GPS G16
E1 18 A2 190
CNO 15

GPS G17
E1 18 A2 190
CNO 15

GPS G18
E1 18 A2 190
CNO 15

GPS G19
E1 18 A2 190
CNO 15

GPS G20
E1 18 A2 190
CNO 15

GPS G21
E1 18 A2 190
CNO 15

GPS G22
E1 18 A2 190
CNO 15

GPS G23
E1 18 A2 190
CNO 15

GPS G24
E1 18 A2 190
CNO 15

GPS G25
E1 18 A2 190
CNO 15

GPS G26
E1 18 A2 190
CNO 15

GPS G27
E1 18 A2 190
CNO 15

GPS G28
E1 18 A2 190
CNO 15

GPS G29
E1 18 A2 190
CNO 15

GPS G30
E1 18 A2 190
CNO 15

GPS G31
E1 18 A2 190
CNO 15

GPS G32
E1 18 A2 190
CNO 15

GPS G33
E1 18 A2 190
CNO 15

GPS G34
E1 18 A2 190
CNO 15

GPS G35
E1 18 A2 190
CNO 15

GPS G36
E1 18 A2 190
CNO 15

GPS G37
E1 18 A2 190
CNO 15

GPS G38
E1 18 A2 190
CNO 15

GPS G39
E1 18 A2 190
CNO 15

GPS G40
E1 18 A2 190
CNO 15

GPS G41
E1 18 A2 190
CNO 15

GPS G42
E1 18 A2 190
CNO 15

GPS G43
E1 18 A2 190
CNO 15

GPS G44
E1 18 A2 190
CNO 15

GPS G45
E1 18 A2 190
CNO 15

GPS G46
E1 18 A2 190
CNO 15

GPS G47
E1 18 A2 190
CNO 15

GPS G48
E1 18 A2 190
CNO 15

GPS G49
E1 18 A2 190
CNO 15

GPS G50
E1 18 A2 190
CNO 15

GPS G51
E1 18 A2 190
CNO 15

GPS G52
E1 18 A2 190
CNO 15

GPS G53
E1 18 A2 190
CNO 15

GPS G54
E1 18 A2 190
CNO 15

GPS G55
E1 18 A2 190
CNO 15

GPS G56
E1 18 A2 190
CNO 15

GPS G57
E1 18 A2 190
CNO 15

GPS G58
E1 18 A2 190
CNO 15

GPS G59
E1 18 A2 190
CNO 15

GPS G60
E1 18 A2 190
CNO 15

GPS G61
E1 18 A2 190
CNO 15

GPS G62
E1 18 A2 190
CNO 15

GPS G63
E1 18 A2 190
CNO 15

GPS G64
E1 18 A2 190
CNO 15

GPS G65
E1 18 A2 190
CNO 15

GPS G66
E1 18 A2 190
CNO 15

GPS G67
E1 18 A2 190
CNO 15

GPS G68
E1 18 A2 190
CNO 15

GPS G69
E1 18 A2 190
CNO 15

GPS G70
E1 18 A2 190
CNO 15

GPS G71
E1 18 A2 190
CNO 15

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CNO 15

GPS G73
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CNO 15

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CNO 15

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CNO 15

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CNO 15

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CNO 15

GPS G90
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CNO 15

GPS G91
E1 18 A2 190
CNO 15

GPS G92
E1 18 A2 190
CNO 15

GPS G93
E1 18 A2 190
CNO 15

GPS G94
E1 18 A2 190
CNO 15

GPS G95
E1 18 A2 190
CNO 15

GPS G96
E1 18 A2 190
CNO 15

GPS G97
E1 18 A2 190
CNO 15

GPS G98
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CNO 15

GPS G99
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CNO 15

GPS G100
E1 18 A2 190
CNO 15

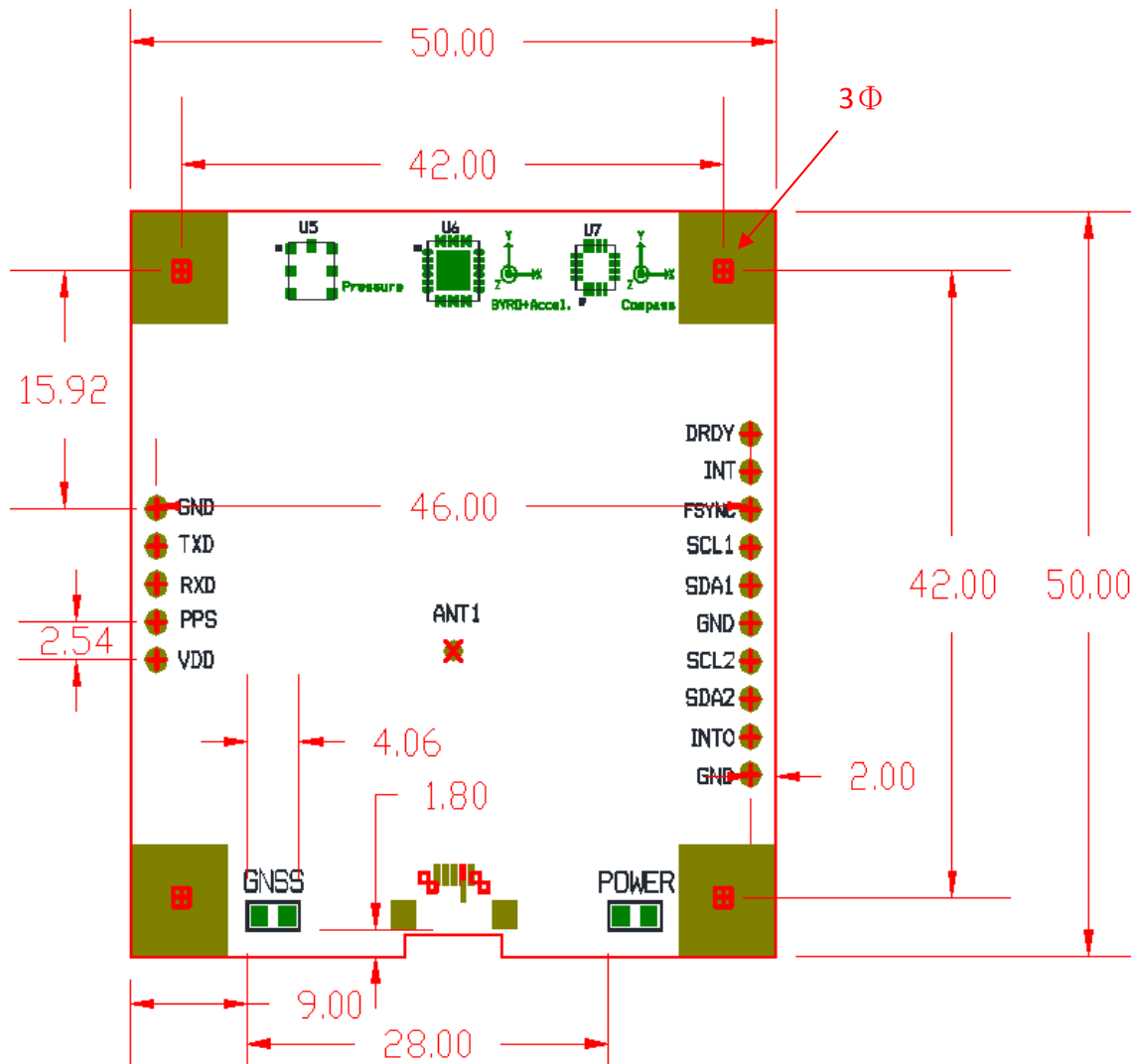
Longitude 121.584407
Latitude 25.077410
Altitude 76.500 m
TTFF
Fix Mode 2D/DGPS
3D Acc
2D Acc
PDOP 0 11.1 5
HDOP 0 0.5 5
Satellites

Ready

COM21 11520 u-blox 7 No file open NMEA 00:09:30 03:51:31

上午 11:51
2015/1/31

Dimensions



unit: mm

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