



# **MULTI HORNETELLA (ORG1208) INTEGRATED GNSS MODULE**

Evaluation Kit Quick Start Guide

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## INDEX

1.	SCOPE.....	4
2.	DISCLAIMER .....	4
3.	SAFETY INFORMATION .....	4
4.	ESD SENSITIVITY .....	4
5.	CONTACT INFORMATION .....	4
6.	RELATED DOCUMENTATION.....	4
7.	REVISION HISTORY .....	4
8.	GLOSSARY .....	5
9.	ABOUT THE MODULE .....	6
10.	ABOUT ORIGINGPS.....	6
11.	PACKAGING LIST.....	7
11.1.	EVALUATION BOARD.....	7
11.2.	THE TTL-232R-3V3 USB-SERIAL CONVERTER CABLE.....	7
11.3.	SOFTWARE CD.....	8
11.4.	THE ORG9805 ACTIVE ANTENNA .....	8
11.5.	THE I-PEX MHFIII™ TO SMA-TYPE COAXIAL CABLE ADAPTOR.....	8
12.	SETUP.....	9
12.1.	OPEN CD.....	9
12.2.	INSTALL DRIVER.....	9
12.3.	CONNECT THE CONVERTER CABLE TO PC.....	9
12.4.	INSTALL SOFTWARE.....	10
12.5.	ASSEMBLE THE I-PEX MHFIII™ TO SMA-TYPE ADAPTOR .....	10
12.6.	CONNECT THE CONVERTER CABLE TO THE EVB.....	10
13.	EVALUATION SOFTWARE.....	11
13.1.	COMMUNICATION WITH THE EVK.....	11
13.2.	TOOLBAR FUNCTIONS .....	12
13.3.	MAIN VIEW .....	12
13.4.	SCATTER PLOT .....	13
13.5.	POSITION PLOT.....	13
13.6.	NMEA MONITOR .....	14
13.7.	COMMANDS.....	15
13.7.1.	COLD START .....	15
13.7.2.	HOT START .....	15
14.	TYPICAL OUTPUT MESSAGES.....	15
15.	DISPOSAL INFORMATION .....	17
16.	ORDERING INFORMATION.....	18

## TABLE INDEX

TABLE 1 – RELATED DOCUMENTATION .....	4
TABLE 2 – REVISION HISTORY.....	4
TABLE 3 – PIN HEADER SOCKET PIN-OUT .....	8
TABLE 4 – ORDERING OPTIONS .....	18
TABLE 5 – ORDERABLE DEVICES .....	18

## FIGURE INDEX

FIGURE 1 – EVB COMPONENT ASSEMBLY .....	7
FIGURE 2 – TTL-232R-3V3 APPEARANCE .....	7
FIGURE 3 – PIN HEADER SOCKET PIN-OUT .....	7
FIGURE 4 – ORG9805 APPEARANCE .....	8
FIGURE 5 – I-PEX MHFIII™ TO SMA-TYPE ADAPTOR MECHANICAL OUTLINE.....	9



FIGURE 6 – CD APPLICATION MAIN SCREEN ..... 9  
FIGURE 7 – VIRTUAL COM PORT APPEARANCE..... 10  
FIGURE 8 – EVALUATION SOFTWARE SETUP ..... 10  
FIGURE 9 – EVB TO PC CONNECTION ..... 11  
FIGURE 10 – EVALUATION SOFTWARE START SCREEN ..... 11  
FIGURE 11 – CONNECT TO GPS DIALOG BOX..... 12  
FIGURE 12 – TOOLBAR ..... 12  
FIGURE 13 – MAIN VIEW ..... 12  
FIGURE 14 – SCATTER PLOT..... 13  
FIGURE 15 – POSITION PLOT ..... 14  
FIGURE 16 – NMEA MONITOR..... 14



## 1. SCOPE

This document is the Quick Start Guide for the Evaluation Kit associated with the ORG1208 GNSS receiver module with integrated RF connector.

## 2. DISCLAIMER

All trademarks are properties of their respective owners.

Performance characteristics listed in this document do not constitute a warranty or guarantee of product performance.

OriginGPS assumes no liability or responsibility for any claims or damages arising out of the use of this document, or from the use of integrated circuits based on this document.

OriginGPS assumes no liability or responsibility for unintentional inaccuracies or omissions in this document. OriginGPS reserves the right to make changes in its products, specifications and other information at any time without notice.

OriginGPS navigation products are not recommended to use in life saving or life sustaining applications.

## 3. SAFETY INFORMATION

Improper handling and use can cause permanent damage to the product.

There is a possible risk of personal injury from mechanical trauma or shocking hazard.

For personal safety do not operate this product while driving a vehicle.

## 4. ESD SENSITIVITY

This product is ESD sensitive device and must be handled with care.



## 5. CONTACT INFORMATION

Support - info@origingps.com or Online Form

Marketing and sales - marketing@origingps.com

Web – www.origingps.com

## 6. RELATED DOCUMENTATION

No	DESCRIPTION	DOCUMENT NAME	ISSUED BY
1	Datasheet of the ORG1208 Evaluation Kit	ORG1208-EVK-DS	OriginGPS
2	NMEA Reference Manual	ORG12XX-NMEA	OriginGPS
3	Datasheet of the ORG12XX series module	ORG1208-DS	OriginGPS

TABLE 1 – RELATED DOCUMENTATION

## 7. REVISION HISTORY

REVISION	DATE	CHANGE DESCRIPTION
A00	October 20, 2013	First release
2.0	January 14, 2015	Format update

TABLE 2 – REVISION HISTORY



## 8. GLOSSARY

**A-GNSS** Assisted **GNSS**  
**AEC** Automotive Electronics Council  
**BPF** Band Pass Filter  
**CE** European Community conformity mark  
**COMPASS PRC GNSS** (same as **BDS BeiDou-2** Navigation Satellite System)  
**CMOS** Complementary **Metal-Oxide Semiconductor**  
**EMC** Electro-**Magnetic Compatibility**  
**ESD** Electro-**Static Discharge**  
**EVB** Evaluation Board  
**EVK** Evaluation Kit  
**FCC** Federal Communications Commission  
**GALILEO EU GNSS**  
**GLONASS** **Global Navigation Satellite System**  
**GNSS** **Global Navigation Satellite System**  
**GPS** **Global Positioning System**  
**IC** **Integrated Circuit**  
**I<sup>2</sup>C** **Inter-Integrated Circuit**  
**ISO** **International Organization for Standardization**  
**EGNOS** **European Geostationary Navigation Overlay Service**  
**LDO** **Low Dropout** regulator  
**LGA** **Land Grid Array**  
**LNA** **Low Noise Amplifier**  
**MSAS** **Multi-functional Satellite Augmentation System**  
**NMEA** **National Marine Electronics Association**  
**NFZ™** **Noise-Free Zones System**  
**MEMS** **MicroElectroMechanical Systems**  
**PCB** **Printed Circuit Board**  
**PPS** **Pulse Per Second**  
**QZSS** **Quasi-Zenith Satellite System**  
**RF** **Radio Frequency**  
**REACH** **Registration, Evaluation, Authorisation and Restriction of Chemical substances**  
**RHCP** **Right-Hand Circular Polarized**  
**RoHS** **Restriction of Hazardous Substances directive**  
**RTC** **Real-Time Clock**  
**RTCM** **Radio Technical Commission for Maritime services**  
**SAW** **Surface Acoustic Wave**  
**SBAS** **Satellite-Based Augmentation Systems**  
**SIP** **System In Package**  
**SMD** **Surface Mounted Device**  
**SMT** **Surface-Mount Technology**  
**SOC** **System On Chip**  
**SPI** **Serial Peripheral Interface**  
**TCXO** **Temperature-Compensated Crystal Oscillator**  
**TTL** **Transistor-Transistor Logic**  
**UART** **Universal Asynchronous Receiver/Transmitter**  
**WAAS** **Wide Area Augmentation System**



## 9. ABOUT THE MODULE

OriginGPS GNSS receiver modules have been designed to address markets where stand-alone operation, highest level of integration, power consumption and design flexibility are very important.

The ORG1208 module is a miniature GPS/GALILEO/GLONASS receiver that continuously tracks all satellites in view and provides real-time positioning data in industry's standard NMEA format.

The ORG1208 module is capable to decode extremely weak satellite signals simultaneously from GPS and GLONASS thereby offering best-in-class positioning availability, unparalleled accuracy and extremely fast fixes under challenging signal conditions, such as in built-up urban areas, dense foliage or even indoor. Featuring OriginGPS proprietary Noise-Free Zone System (NFZ™) technology the ORG1208 module offers the ultimate in high sensitivity satellite navigation combined with high immunity.

The ORG1208 module is a complete SiP featuring miniature LGA SMT footprint designed to commit unique integration features for high volume, low power and cost sensitive applications.

Internal GNSS SOC incorporating high-performance microprocessor and sophisticated GNSS firmware keeps positioning payload off the host allowing integration in embedded solutions even with low computing resources.

Key features:

- + Autonomous operation
- + W.FL™ RF connector on-board
- + Active or passive antenna support
- + Fully integrated with:
  - + RF Connector, GNSS SAW Filter, GNSS LNA, TCXO, RTC Crystal, RF Shield, RAM, Flash Memory,
  - + Load Switch, Power Management Unit
- + SBAS (WAAS, EGNOS, MSAS, QZSS) support
- + 32 Tracking channels
- + Jammer Barrier filtering and removal
- + Assisted GNSS (A-GNSS) support
- + Fast position fix of < 1s
- + High sensitivity of -162dBm
- + Precise accuracy of < 1.5m
- + Timing accuracy < 30ns
- + Update rate up to 10Hz
- + Low power mode of < 0.1mW during Backup state
- + Single voltage supply
- + Miniature footprint of 17mm x 17mm
- + Operating from -40°C to +85°C
- + FCC, CE, VCCI certified
- + Pb-Free RoHS/REACH compliant
- + ISO/TS 16949 manufacturing standard

## 10. ABOUT ORIGINGPS

OriginGPS is a world leading designer, manufacturer and supplier of miniature positioning modules, antenna modules and antenna solutions.

OriginGPS modules introduce unparalleled sensitivity and noise immunity by incorporating Noise Free Zone system (NFZ™) proprietary technology for faster position fix and navigation stability even under challenging satellite signal conditions.

Founded in 2006, OriginGPS is specializing in development of unique technologies that miniaturize RF modules, thereby addressing the market need for smaller wireless solutions.



## 11. PACKAGING LIST

Evaluation Kit of the ORG1208 GNSS module contains:

### 11.1. EVALUATION BOARD

The EVB incorporates ORG1208 module, 3.3V LDO regulator, UART interface connector header and various test points. The EVB is 2 layers 1.6mm thickness FR4 PCB with ENIG contact pads.

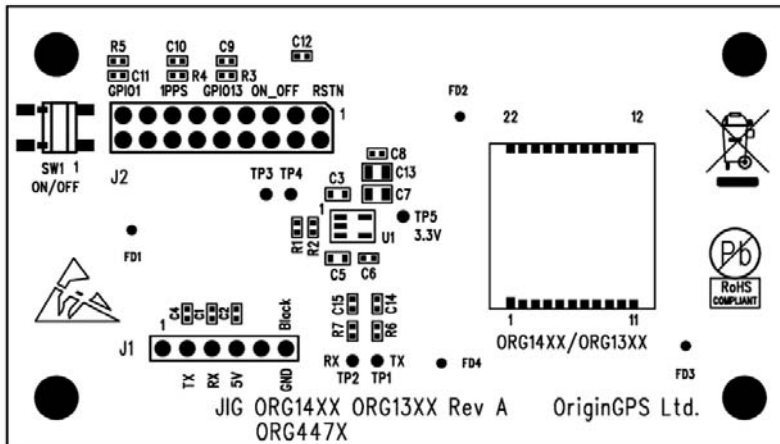
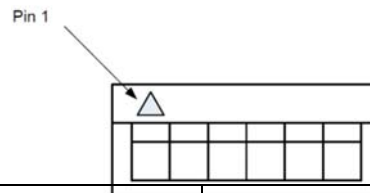


FIGURE 1 – EVB COMPONENT ASSEMBLY

### 11.2. THE TTL-232R-3V3 USB-SERIAL CONVERTER CABLE

The TTL-232R-3V3 uses an FTDI FT232RQ IC which is housed inside the USB Type 'A' connector and is terminated at the end of a 1.8 meter cable (6 ft.) with a 2.54mm ("0.1) pitch header socket which provides an access to UART standard Transmit Data (TxD) and Receive Data (RxD).



PIN No	COLOR	NAME	TYPE	DESCRIPTION	FUNCTION
1	BLACK	GND	POWER	Ground supply	Main Ground connection
2	BROWN	$\overline{\text{CST}}$	INPUT	Clear To Send input	Not in use
3	RED	VCC	POWER	+5V power source	USB specified

FIGURE 2 – TTL-232R-3V3 APPEARANCE

FIGURE 3 – PIN HEADER SOCKET PIN-OUT



4	ORANGE	TXD	OUTPUT	Asynchronous Data output	Module input
5	YELLOW	RXD	INPUT	Asynchronous Data input	Module output
6	GREEN	$\overline{\text{RTS}}$	OUTPUT	Request To Send output	Not in use

TABLE 3 – PIN HEADER SOCKET PIN-OUT

### 11.3. SOFTWARE CD

The software CD contains GNSS simulator software, drivers for PC and documentation

### 11.4. THE ORG9805 ACTIVE ANTENNA

The ORG9805 Active Antenna incorporates high-efficiency ceramic patch element, band-pass SAW filter with high out-of-band rejection, LNA with low Noise Figure and high gain - all enclosed in plastic case, with coaxial cable terminated by standard SMA-type plug.

The ORG9805 Active Antenna with highest GNSS-band performance and notch filtering for out-of-band signals provides exceptional sensitivity, high selectivity and noise immunity.

The ORG9805 Active Antenna is built of highest quality materials and components.

Key features:

- + Antenna element with high efficiency for excellent coverage of GNSS satellites
- + GNSS SAW filter for rejection of out-of-band signals
- + GNSS LNA with low Noise Figure and high gain for high sensitivity
- + Plastic case with magnetic base
- + RG174 flexible coaxial cable of 5m length
- + SMA-type gold plated plug



FIGURE 4 – ORG9805 APPEARANCE

### 11.5. THE I-PEX MHFIII™ TO SMA-TYPE COAXIAL CABLE ADAPTOR





FIGURE 5 – I-PEX MHFIII™ TO SMA-TYPE ADAPTOR MECHANICAL OUTLINE

## 12. SETUP

### 12.1. OPEN CD

The following screen will automatically pop-up upon insertion of CD.

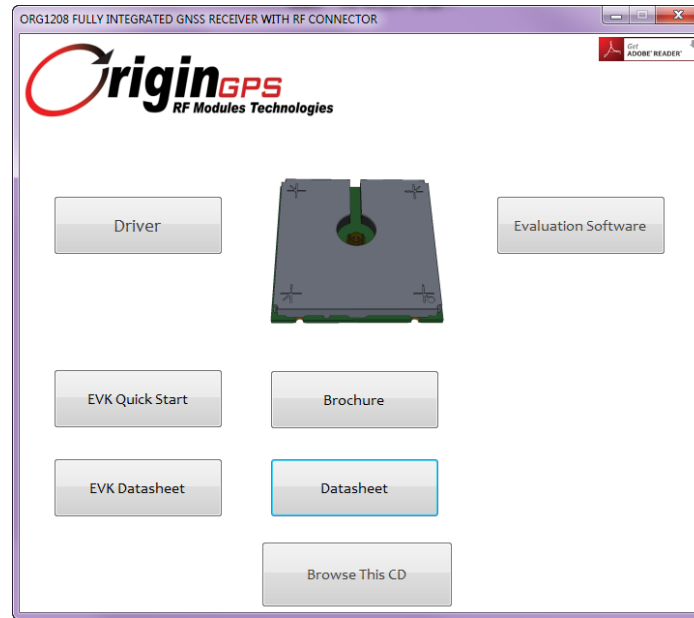


FIGURE 6 – CD APPLICATION MAIN SCREEN

If no pop-up occurs, manually browse for autorun.exe file.

### 12.2. INSTALL DRIVER

Install the TTL-232R-3V3 USB-SERIAL converter cable driver by pressing Driver button.

Driver setup process is done in “silent” mode without user interaction.

### 12.3. CONNECT THE CONVERTER CABLE TO PC

Connect the TTL-232R-3V3 USB-SERIAL converter cable to the standard USB port of PC.

Successful cable connection install will result in Virtual COM Port (VCP) appearance on PC.

Presence and enumeration of VCP can be verified via Control Panel → System → Device Manager.

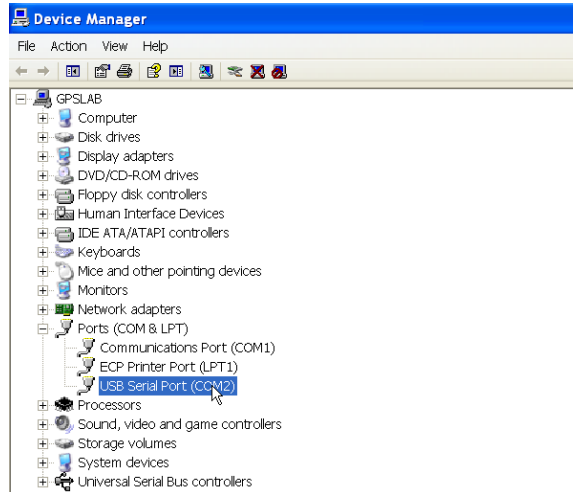


FIGURE 7 – VIRTUAL COM PORT APPEARANCE

## 12.4. INSTALL SOFTWARE

Install VisualGPSView software by pressing Evaluation Software button.

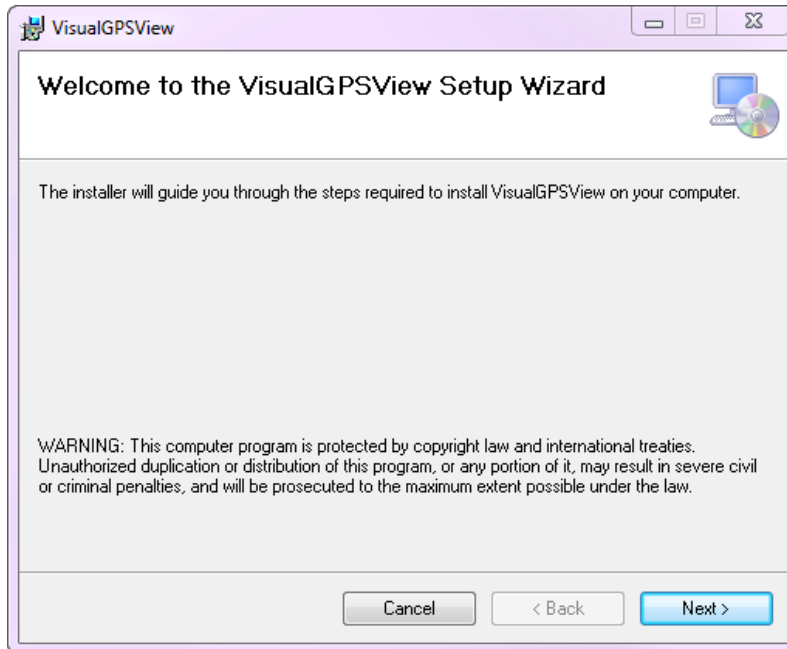


FIGURE 8 – EVALUATION SOFTWARE SETUP

Follow on-screen instructions during setup process.

## 12.5. ASSEMBLE THE I-PEX MHFIII™ TO SMA-TYPE ADAPTOR

Carefully assemble the MHFIII™ to SMA-type coaxial cable adaptor to the W.FL® RF connector of the ORG1208 module. Screw the SMA-type plug of the ORG9805 active antenna on to the MHFIII™ to SMA-type coaxial cable adaptor.

## 12.6. CONNECT THE CONVERTER CABLE TO THE EVB

Connect socket of the converter cable to the J1 pin header of the EVB.

Observe polarity by aligning black colored wire of the socket to pin marked Black on the EVB.



FIGURE 9 – EVB TO PC CONNECTION

## 13. EVALUATION SOFTWARE

### 13.1. COMMUNICATION WITH THE EVK

Open VisualGPSView software.

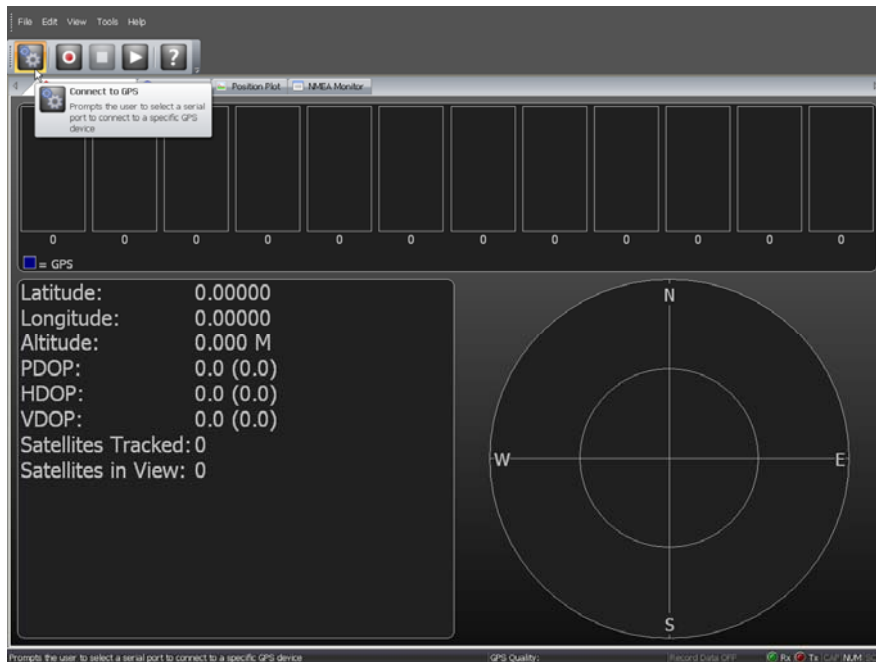


FIGURE 10 – EVALUATION SOFTWARE START SCREEN

Press Connect to GPS button on the toolbar.

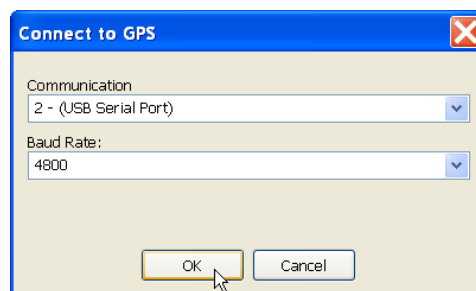


FIGURE 11 – CONNECT TO GPS DIALOG BOX

Select communication port associated with VCP assigned to the USB-SERIAL converter cable.  
Select Baud Rate of 4,800bps.

### 13.2. TOOLBAR FUNCTIONS



FIGURE 12 – TOOLBAR

1. Connect to GPS – prompts the user to select a serial port on PC to connect the receiver.
2. Record Data – record NMEA data to a specified file.
3. Stop – stops playback or recording.
4. Playback Data – playback saved NMEA file.

### 13.3. MAIN VIEW

The receiver automatically starts searching for all GNSS satellites in-view.

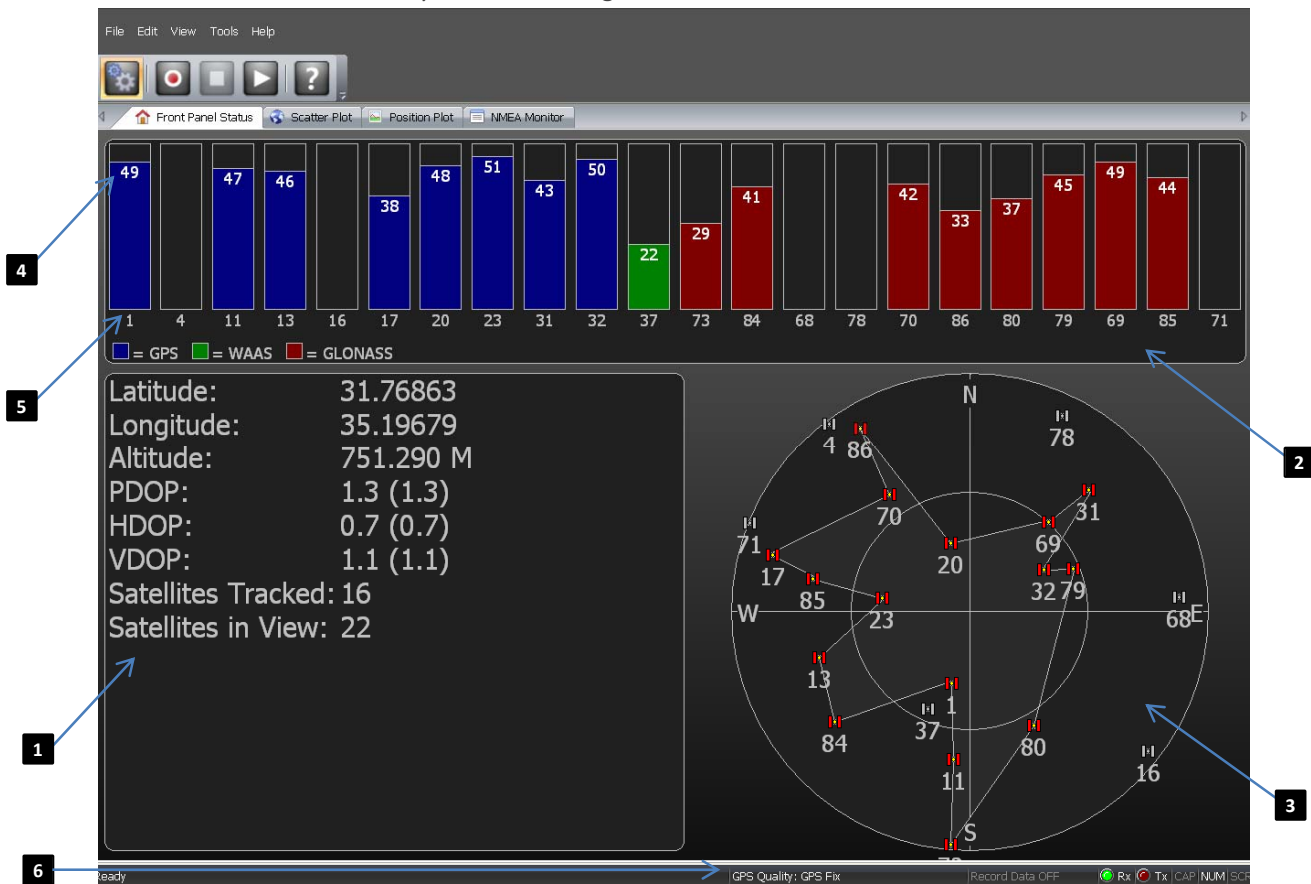


FIGURE 13 – MAIN VIEW

1. GNSS data view – position, DOP, satellites in-view and tracked.
2. GNSS signal view – satellites numbers and their associated C/N0s.
3. Dimmed colors represent in-view satellites. Vivid colors represent tracked satellites.
4. Satellite position plot. Highlighted signs represent tracked satellites.
5. Satellite signal C/N0 in dB-Hz.



6. Satellite id number.
7. 1-32 for GPS, 65-92 for GLONASS, 33-64 for SBAS (WAAS, EGNOS, QZSS), GALILEO TBD.
8. Status bar – GPS valid fix status, data Rx/D and Tx/D indicators, data logging status.

### 13.4. SCATTER PLOT

Scatter plot used to evaluate the accuracy of the receiver.

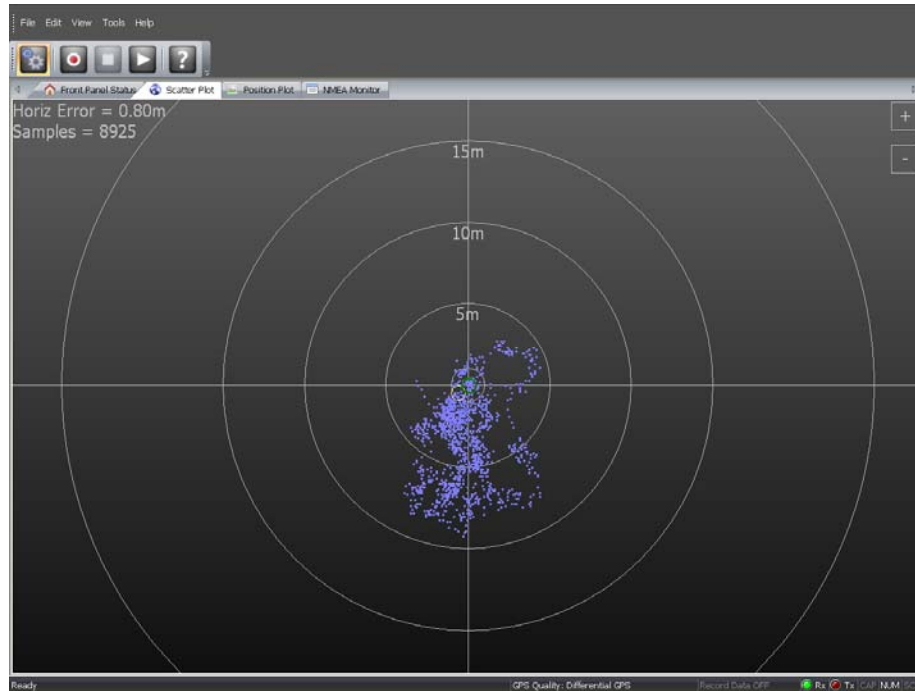


FIGURE 14 – SCATTER PLOT

### 13.5. POSITION PLOT

Position plot used to evaluate instant position fluctuation referenced to mean average and least square average.









```

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 \$GLGSV,3,1,11,73,04,185,32,84,22,229,39,68,09,088,,78,06,023,\*6A  
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 \$GLGSV,3,3,11,69,44,045,48,85,28,279,44,71,01,294,,,,\*54  
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 \$GNGSA,A,3,,,,,,1.2,0.7,1.0\*29  
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 \$GPRMC,183808.000,A,3146.11762,N,03511.80718,E,0.0,0.0,091013,,,A\*6D  
 \$GPGGGA,183808.000,3146.11762,N,03511.80718,E,1,17,0.7,751.43,M,16.2,M,,\*65  
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 \$GPGSV,3,1,12,01,60,194,48,04,03,323,28,07,00,205,,11,32,186,47\*7D  
 \$GPGSV,3,2,12,13,32,255,47,16,06,126,,17,11,284,40,20,65,347,49\*7D  
 \$GPGSV,3,3,12,23,57,283,51,31,24,043,39,32,57,064,50,37,50,204,\*7E  
 \$GLGSV,3,1,11,73,04,185,33,84,22,229,40,68,09,088,,78,06,023,\*65  
 \$GLGSV,3,2,11,70,37,328,41,86,10,326,32,80,44,149,37,79,48,063,45\*64  
 \$GLGSV,3,3,11,69,44,045,48,85,28,279,45,71,01,294,,,,\*55

NOTE 2 – HIGHLIGHTED BLOCK APPEARS ONCE AFTER POWER-UP

## 15. DISPOSAL INFORMATION

This product must not be treated as household waste.





For more detailed information about recycling electronic components contact your local waste management authority.

## 16. ORDERING INFORMATION

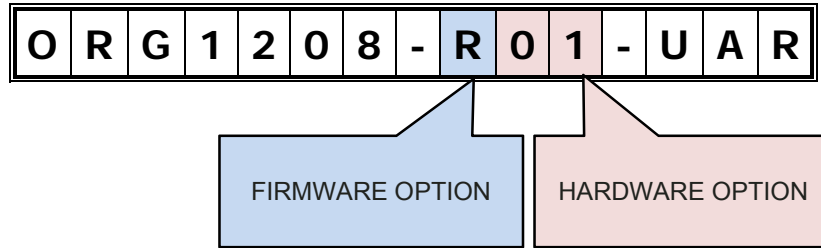


TABLE 4 – ORDERING OPTIONS

PART NUMBER	INTERFACE	PROTOCOL	BAUD RATE	MESSAGE SET	UPDATE RATE
ORG1208-R01-UAR	UART	NMEA	4,800bps	STANDARD	1Hz

TABLE 5 – ORDERABLE DEVICES