



MULTI HORNETELLA (ORG1208) INTEGRATED GNSS MODULE

Evaluation Kit Datasheet

OriginGPS.com



INDEX

1.	SCOPE.....	3
2.	DISCLAIMER	3
3.	SAFETY INFORMATION	3
4.	ESD SENSITIVITY	3
5.	CONTACT INFORMATION	3
6.	RELATED DOCUMENTATION.....	3
7.	REVISION HISTORY	3
8.	GLOSSARY	4
9.	ABOUT THE MODULE	5
10.	ABOUT ORIGINGPS.....	5
11.	DESCRIPTION.....	6
12.	EVALUATION BOARD.....	6
12.1.	BILL OF MATERIALS	6
12.2.	SCHEMATIC DIAGRAM.....	7
12.3.	COMPONENT ASSEMBLY	8
12.4.	PCB LAYOUT	8
13.	THE TTL-232R-3V3 USB-SERIAL CONVERTER CABLE	10
14.	THE ORG9805 ACTIVE ANTENNA	11
14.1.	ABOUT THE ANTENNA.....	11
14.2.	ANTENNA BLOCK DIAGRAM	11
14.3.	MECHANICAL SPECIFICATIONS	11
15.	THE I-PEX MHFIII™ TO SMA-TYPE COAXIAL CABLE ADAPTOR.....	12
16.	COMPLIANCES.....	12
17.	DISPOSAL INFORMATION	13
18.	ORDERING INFORMATION.....	13

TABLE INDEX

TABLE 1 – RELATED DOCUMENTATION	3
TABLE 2 – REVISION HISTORY	3
TABLE 3 – EVB BILL OF MATERIALS.....	6
TABLE 5 – PIN HEADER SOCKET PIN-OUT	10
TABLE 6 – TTL-232R-3V3 OPERATING CONDITIONS.....	10
TABLE 6 – ORG9805 MECHANICAL SPECIFICATIONS.....	11
TABLE 7 – ORDERING OPTIONS	13
TABLE 8 – ORDERABLE DEVICES	13

FIGURE INDEX

FIGURE 1 – EVB SCHEMATIC DIAGRAM	7
FIGURE 2 – EVB COMPONENT ASSEMBLY	8
FIGURE 3 – EVB SOLDER MASK TOP LAYER.....	8
FIGURE 4 – EVB TOP LAYER	9
FIGURE 5 – EVB BOTTOM LAYER	9
FIGURE 6 – TTL-232R-3V3 APPEARANCE	10
FIGURE 7 – PIN HEADER SOCKET PIN-OUT.....	10
FIGURE 8 – ACTIVE ANTENNA BLOCK DIAGRAM.....	11
FIGURE 9 – ORG9805 MECHANICAL OUTLINE	12
FIGURE 10 – ORG9805 APPEARANCE	12
FIGURE 11 – I-PEX MHFIII™ TO SMA-TYPE ADAPTOR MECHANICAL OUTLINE.....	12



1. SCOPE

This document describes the content of 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	Quick Start Guide for the ORG1208-EVK	ORG1208-EVK-QSG	OriginGPS
2	NMEA Reference Manual	ORG12XX-NMEA	OriginGPS
3	Datasheet of the ORG12XX series module	ORG1208-DS	OriginGPS
4	Datasheet of the ORG9805 active antenna	ORG9805-DS	OriginGPS

TABLE 1 – RELATED DOCUMENTATION

7. REVISION HISTORY

REVISION	DATE	CHANGE DESCRIPTION
A00	October 08, 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

I²C 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. DESCRIPTION

Evaluation Kit of the ORG1208 GNSS Receiver Module comprises the Evaluation Board (EVB), USB to UART converter cable, I-PEX MHFIII™ (Hirose W.FL™) to SMA-type Coaxial Cable Adaptor, ORG9805 Active Antenna, CD containing GNSS simulator software, drivers for PC and documentation.

The EVB incorporates ORG1208 module, 3.3V LDO regulator, UART interface connector header and various test points.

12. EVALUATION BOARD

12.1. BILL OF MATERIALS

REFERENCE	VALUE	DESCRIPTION	PART NUMBER	MANUFACTURER
C2, C8	18pF	CAP SMT 0402 18pF ±5% 50V COG	GRM1555C1H180JZ01D	MURATA
C1, C4, C10, C14, C15	100pF	CAP SMT 0402 100pF ±5% 50V COG	GRM1555C1H101JA01D	MURATA
C3, C5	1μF	CAP SMT 0603 1μF ±10% 6.3V X5R	GRM188R60J105KA01J	MURATA
C7, C13	4.7μF	CAP SMT 0805 4.7μF ±10% 16V X5R	GRM21BR61C475KA88L	MURATA
R1	1Ω	RES SMT 0402 1Ω ±1%	CRCW04021R00FKED	VISHAY
R4, R6, R7	33Ω	RES SMT 0402 33Ω ±1%	CRCW040233R0FKED	VISHAY
R2	100KΩ	RES SMT 0402 100KΩ ±1%	CRCW0402100KFKED	VISHAY
J1	HDR	HEADER 6 POS. "0.1 RIGHT ANGLE	2211S-06G-F1	NELTRON
U1	LDO	3.3V 150mA LDO Reg. SOT23	ADP160AUJZ-3.3-R7	ANALOG DEVICES
U2	ORG1208	GNSS MODULE W. RF CONN.	ORG1208-R01	ORIGINGPS

TABLE 3 – EVB BILL OF MATERIALS



12.2. SCHEMATIC DIAGRAM

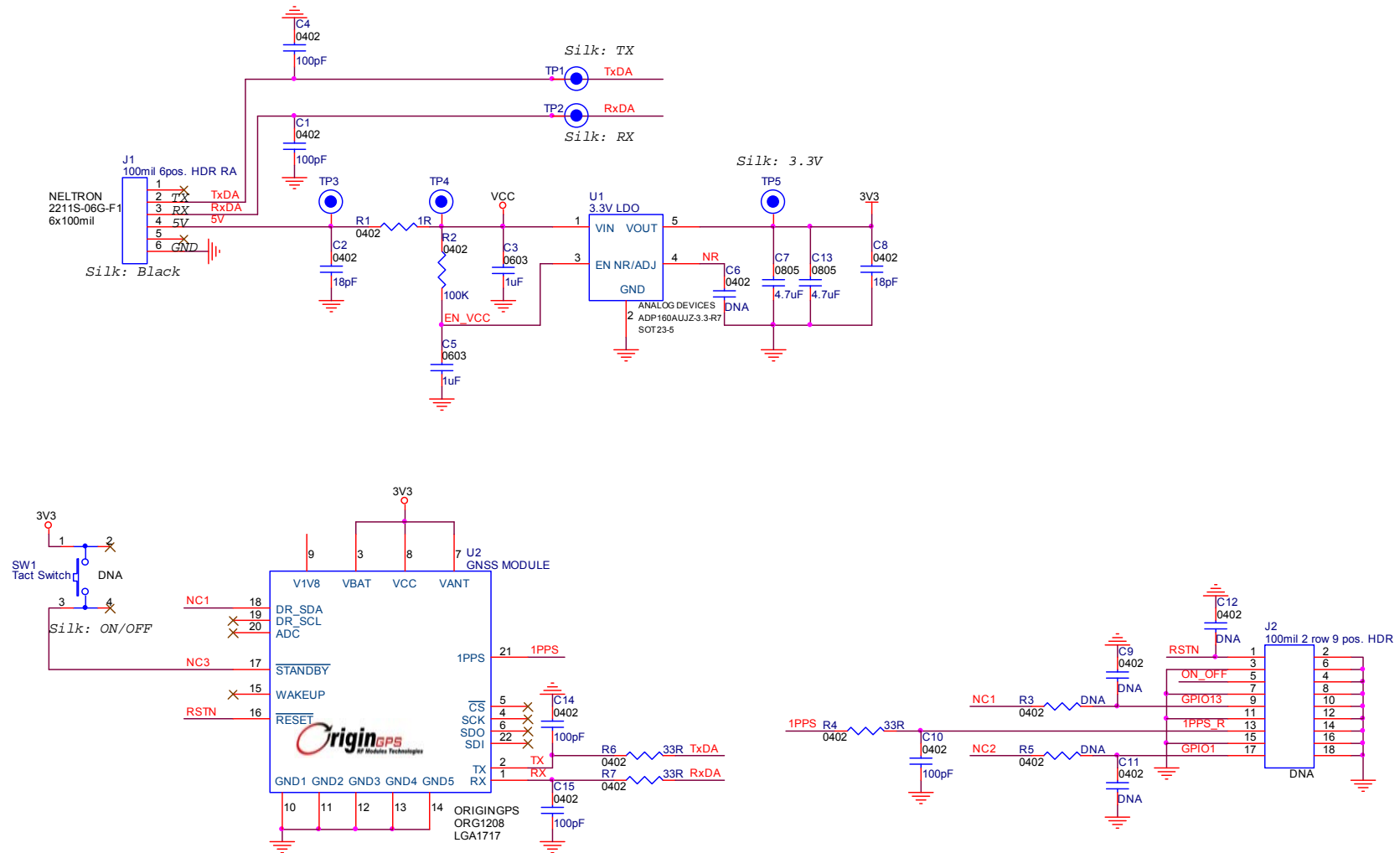


FIGURE 1 – EVB SCHEMATIC DIAGRAM

12.3. COMPONENT ASSEMBLY

The EVB of the ORG1208 module is 2 layers 1.6mm thickness FR4 PCB with ENIG contact pads.

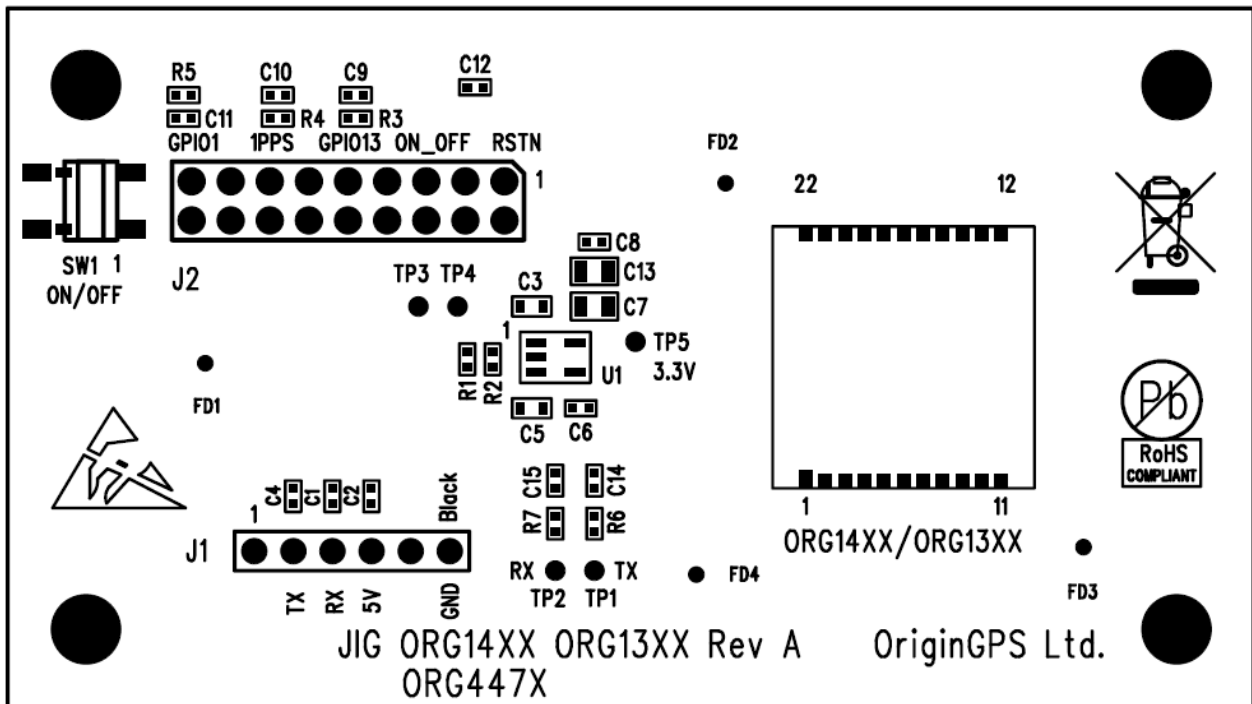


FIGURE 2 – EVB COMPONENT ASSEMBLY

12.4. PCB LAYOUT

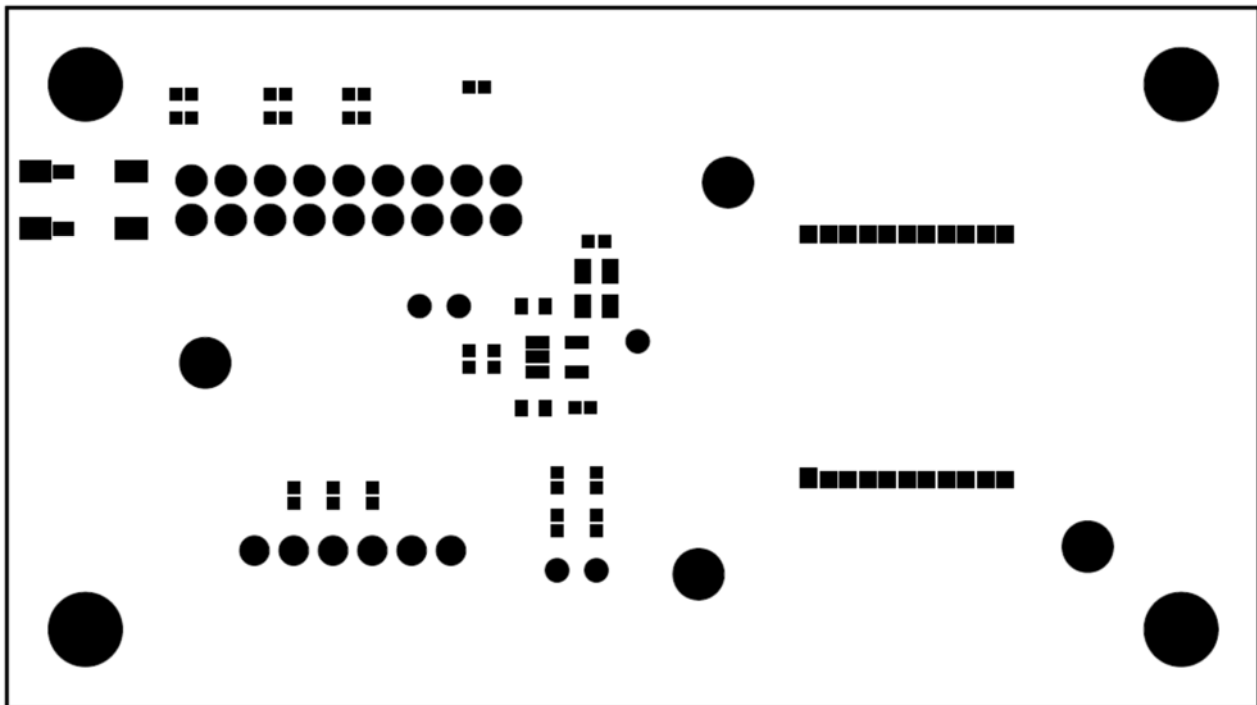


FIGURE 3 – EVB SOLDER MASK TOP LAYER

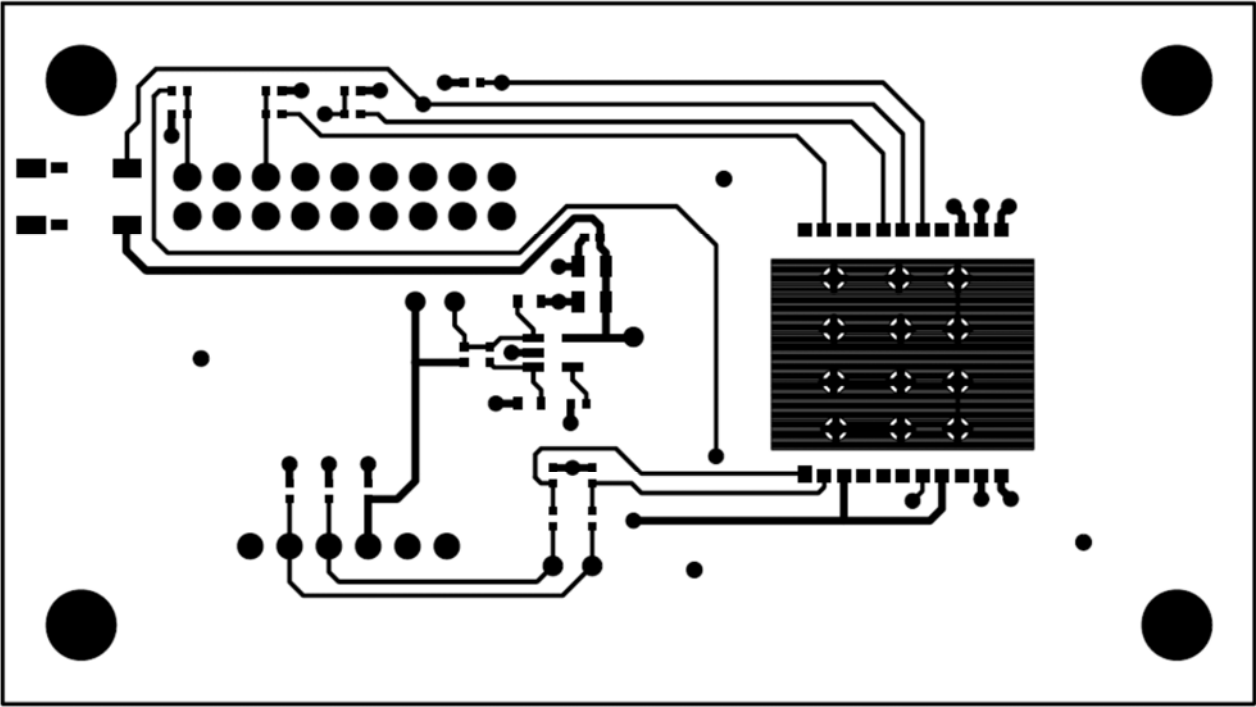


FIGURE 4 – EVB TOP LAYER

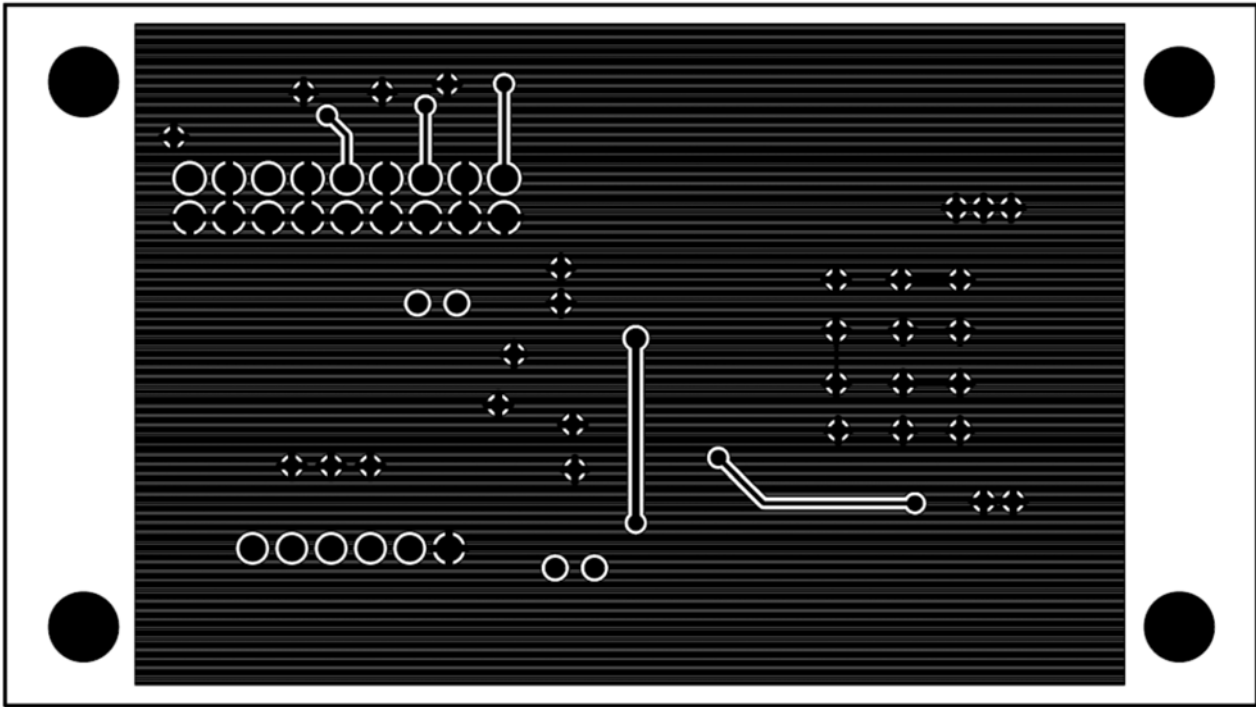


FIGURE 5 – EVB BOTTOM LAYER

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

The TTL-232R-3V3 is a USB to Serial converter cable that provides a simple way to connect devices with UART interface to PC.

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).

These lines are operating at 3.3V LVTTTL levels. Also brought out on the header are +5V and GND.



FIGURE 6 – TTL-232R-3V3 APPEARANCE

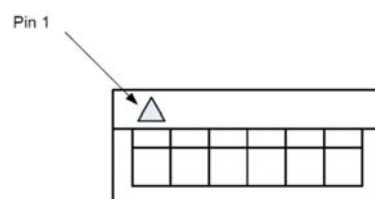


FIGURE 7 – PIN HEADER SOCKET PIN-OUT

PIN №	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
4	ORANGE	TXD	OUTPUT	Asynchronous Data output	Module input
5	YELLOW	RXD	INPUT	Asynchronous Data input	Module output
6	GREEN	RTS	OUTPUT	Request To Send output	Not in use

TABLE 4 – PIN HEADER SOCKET PIN-OUT

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Power Supply Voltage	VCC	Defined by USB VBUS	4.25	5.0	5.25	V
Power Supply Current	IO		-	-	75	mA
Output Voltage Low State	VOL	IOL = 8mA	0.3	0.4	0.6	V
Output Voltage High State	VOH	IOH = -3mA	2.2	2.8	3.2	V
Input Voltage State Switching Threshold	VIN	Low → High High → Low	1.0	1.2	1.5	V
Input Voltage State Switching Hysteresis	VHYST		20	25	30	mV
Operating Temperature	TAMB		-40	+25	+85	°C

TABLE 5 – TTL-232R-3V3 OPERATING CONDITIONS



14. THE ORG9805 ACTIVE ANTENNA

14.1. ABOUT THE 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

14.2. ANTENNA BLOCK DIAGRAM

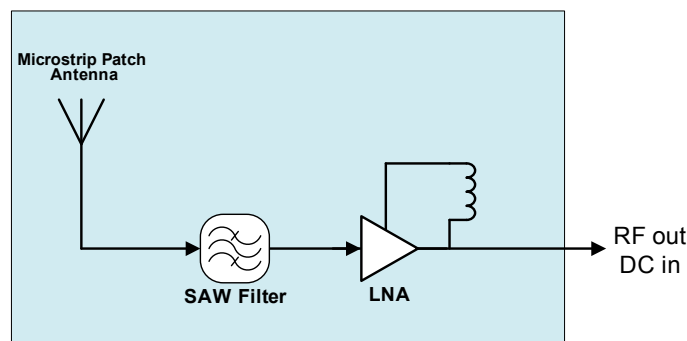


FIGURE 8 – ACTIVE ANTENNA BLOCK DIAGRAM

14.3. MECHANICAL SPECIFICATIONS

PARAMETER	VALUE	UNIT	NOTE
Size (L x W x T)	48.6 x 39.2 x 15.2	mm	tolerance: $\pm 0.5\text{mm}$
Weight	106 (approx.)	g	including cable
Housing	PC		
Color	Black		
Mounting	Magnetic base		
Orientation	Horizontal surface		
Cable Type	RG174		diameter: $2.7 \pm 0.1\text{mm}$
Cable Length	5	m	
Connector Type	SMA plug		Gold plated

TABLE 6 – ORG9805 MECHANICAL SPECIFICATIONS

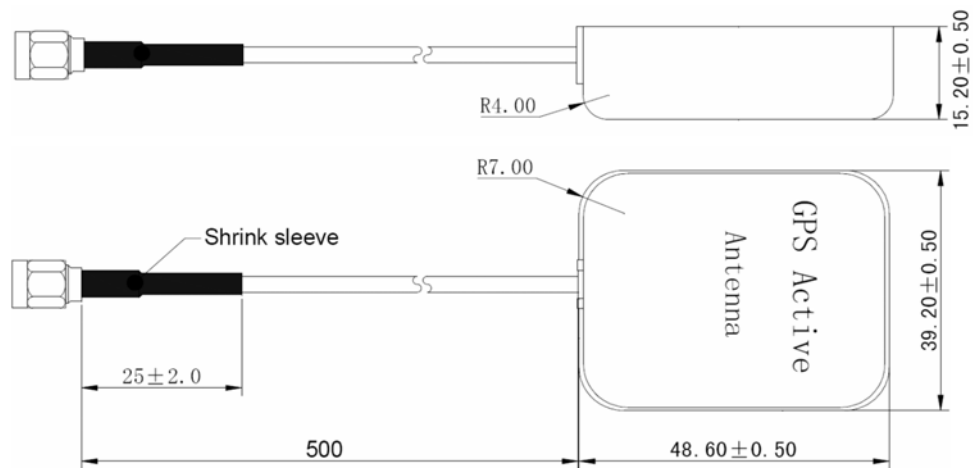


FIGURE 9 – ORG9805 MECHANICAL OUTLINE



FIGURE 10 – ORG9805 APPEARANCE

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

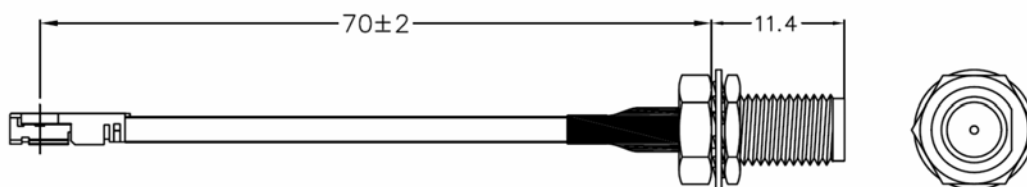


FIGURE 11 – I-PEX MHFIII™ TO SMA-TYPE ADAPTOR MECHANICAL OUTLINE

16. COMPLIANCES

The following standards are applied on the production of ORG1208 modules and EVBs:

- + IPC-6011/6012 Class2 for PCB manufacturing
- + IPC-A-600 Class2 for PCB inspection
- + IPC-A-610D Class2 for SMT acceptability

ORG1208 modules and EVBs are manufactured in ISO 9001:2008 accredited facilities.

ORG1208 modules and EVBs are manufactured in ISO 14001:2004 accredited facilities.

ORG1208 modules and EVBs are manufactured in OHSAS 18001:2007 accredited facilities.

ORG1208 modules and EVBs are manufactured under ISO/TS 16949:2009 standard.

ORG1208 modules and EVBs are designed, manufactured and handled to comply with and according to Pb-Free/RoHS Directive 2002/95/EC.

ORG1208 modules and EVBs are manufactured in facilities under EU REACH regulation.

ORG1208 modules and EVBs comply with the following EMC standards:

- + EU CE EN55022:06+A1(07), Class B
- + US FCC 47CFR Part 15:09, Subpart B, Class B
- + JAPAN VCCI V-3/2006.04



17. 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.



18. ORDERING INFORMATION

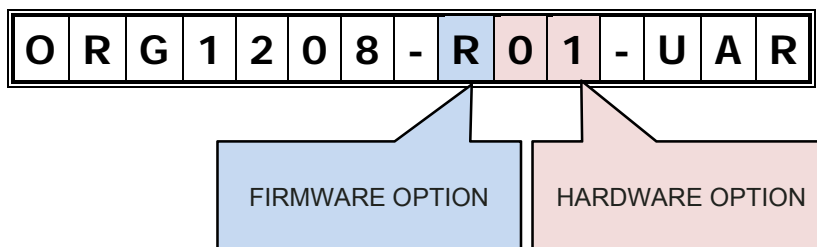


TABLE 7 – ORDERING OPTIONS

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

TABLE 8 – ORDERABLE DEVICES