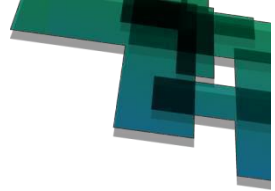




## MULTI SISO HORNET

### EVALUATION KIT (ORG4502-R01-UAR)

## Datasheet



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## 1. SCOPE

This document describes the features and specifications of Multi SISO Hornet ORG4502 evaluation kit.

## 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 reserves the right to conduct, from time to time, and at its sole discretion, firmware upgrades. As long as those FW improvements have no material change on end customers, PCN may not be issued. 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.

## 4. ESD SENSITIVITY

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



## 5. CONTACT INFORMATION

Support - [support@origingps.com](mailto:support@origingps.com) or [Online Form](#)

Marketing and sales - [marketing@origingps.com](mailto:marketing@origingps.com)

Web – [www.origingps.com](http://www.origingps.com)

## 6. RELATED DOCUMENTATION

No	DOCUMENT NAME
1	Multi SISO Hornet – ORG4502 Datasheet
2	Spider and Hornet - NMEA Protocol Reference Manual
3	Spider and Hornet - OSP® Reference Manual
4	Spider and Hornet - OSP® GNSS Extensions Reference Manual
5	Spider and Hornet - Low Power Modes Application Note
6	Spider and Hornet - Client Generated Extended Ephemeris Application Note
7	Spider and Hornet - Server Generated Extended Ephemeris Application Note
8	Spider and Hornet - Ephemeris Push Application Note

TABLE 1 – RELATED DOCUMENTATION



## 7. REVISION HISTORY

REVISION	DATE	CHANGE DESCRIPTION
1.0	February 16, 2016	First release
1.1	May 25, 2016	Addition of ZIF cable type
1.2	July 4, 2016	Pressing On_Off to start the module update

TABLE 2 – REVISION HISTORY

## 8. ABOUT HORNET FAMILY

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

OriginGPS' Hornet family breaks size barrier, offering the industry's smallest fully-integrated, highly-sensitive GPS and GNSS modules with integrated antennas or on-board RF connectors.

Hornet family features OriginGPS' proprietary NFZ™ technology for high sensitivity and noise immunity even under marginal signal condition, commonly found in urban canyons, under dense foliage or when the receiver's position in space rapidly changes.

Hornet family enables the shortest TTM (Time-To-Market) with minimal design risks.

Just connect power supply on a single layer PCB.

## 9. ABOUT MULTI SISO HORNET MODULE

Multi SISO (Snap In – Snap Out) Hornet is a complete SiP featuring miniature LGA SMT footprint designed to commit unique integration features for high volume cost sensitive applications.

Designed to support compact and traditional applications, Multi Micro Hornet ORG4502 module is a miniature multi-channel GPS/ GLONASS with SBAS, QZSS and other regional overlay systems receiver that continuously tracks all satellites in view, providing real-time positioning data in industry's standard NMEA format.

Multi Micro Hornet ORG4502 module offers superior sensitivity and outstanding performance, achieving rapid TTFF in less than one second, accuracy of approximately < 1.5m, and tracking sensitivity of -165dBm.

Multi SISO Hornet module integrates OriginGPS proprietary on-board GNSS antenna, dual-stage LNA, RF LDO, SAW filter, TCXO, RTC crystal and RF shield with market-leading SiRFstarV™ GNSS SoC.

Multi SISO Hornet ORG4502 module is introducing industry's lowest energy per fix ratio, unparalleled accuracy and extremely fast fixes even under challenging signal conditions, such as in built-up urban areas, dense foliage or even indoor.

Integrated GPS SoC incorporating high-performance microprocessor and sophisticated firmware keeps positioning payload off the host, allowing integration in embedded solutions with low computing resources.

Innovative architecture can detect changes in context, temperature, and satellite signals to achieve a state of near continuous availability by maintaining and opportunistically updating its internal fine time, frequency, and satellite ephemeris data while consuming mere microwatts of battery power.



## 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 ORG4502 GNSS Module comprises the Demo Board, USB to UART Serial Converter Cable, ORG9802 Miniature Passive Antenna Assembly, support Disk-on-key with GPS simulator software for PC and documentation.

The Demo Board assembly is built of Main Board, incorporating 1.8V LDO voltage regulator, UART connector, push-button tactile switch for Push-To-Fix™ interrupt and various test points.

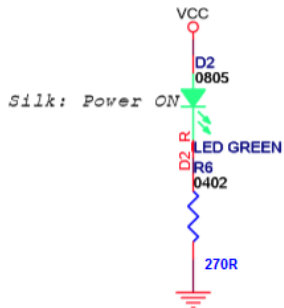
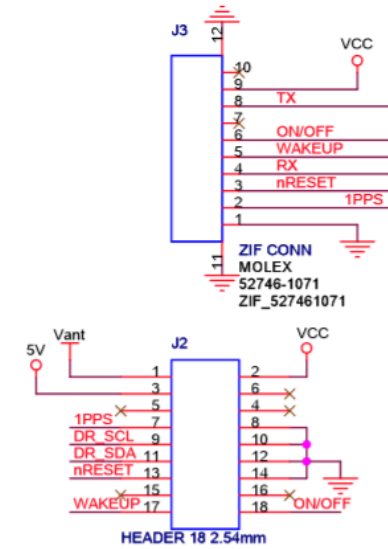
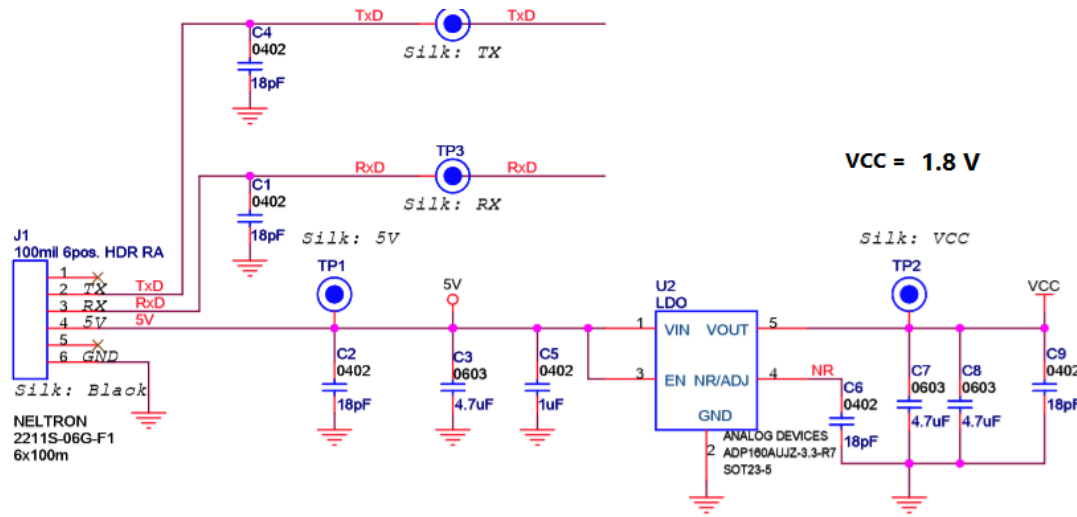
The ORG4502 GNSS Module is connected to the Main Board through ZIF connector.

### **Important:**

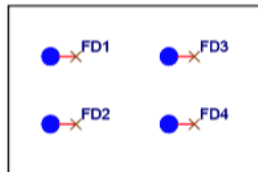
When working with ORG4502 EVK, after connecting the FTDI cable – you must press the On/Off switch on the EVK board. Only after pressing this switch the module will start working and sending NMEA messages.



# Main Board



The module is connected via. J3 ZIF connector.  
Optional connection is via. J1 UART connector



Silk: ORG4402 ORG14XX ORG12XX ORG447X ORG457X EVB Rev B





## 13. BILL OF MATERIALS

### 13.1 MAIN BOARD BILL OF MATERIALS

Reference	Value	Description	P/N	MFG
C1, C2, C4, C9 C10, C11	18pF	CAP SMT – 18pF ±5% 50V COG	GRM1555C1H180JZ01D	MURATA
C3,C7,C8	4.7μF	CAP SMT 0603 4.7μF ±10% 6.3V X5R	GRM188R60J475KE19D	MURATA
C5	1μF	CAP SMT 0402 1μF ±10% 10V X5R	GRM155R61A105KE15D	MURATA
D2	LED GREEN	LED BLUE SMT 0805 20mA	APT2012SGC	KINGBRIGHT
J3	ZIF CONN	10pos. 0.5mm pitch FPC ZIF SMT Conn.	52746-1071	MOLEX
Q1	BSS138	N-CH 0.2A 50V SOT23 Power MOSFET	BSS138LT1G	ON
R3, R4, R6	33R	RES SMT 0402 33R ±1%	RM04FTN033R	TA-I
R5	270R	RES SMT 0402 270R ±1%	RM04FTN270R	TA-I
J1	HDR	HEADER 6 POS. "0.1 RIGHT ANGLE	2211S-06G-F1	NELTRON
U1	LDO	3.3V 200mA LDO W. Discharge Reg. SOT23	ADP160AUJZ-3.3-R7	AD
J2	Connector	18 pin connector		
SW1		SMD TACT SWITCH	TJ-532-V-T/R	TJ-532 CS SW1

TABLE 3 - MAIN BOARD BILL OF MATERIALS



## 14. ASSEMBLY AND LAYOUT

### 14.1 MAIN BOARD PCB

Main Board for the ORG4502 GNSS Module is 2-layer 1.6mm thickness FR4 PCB.

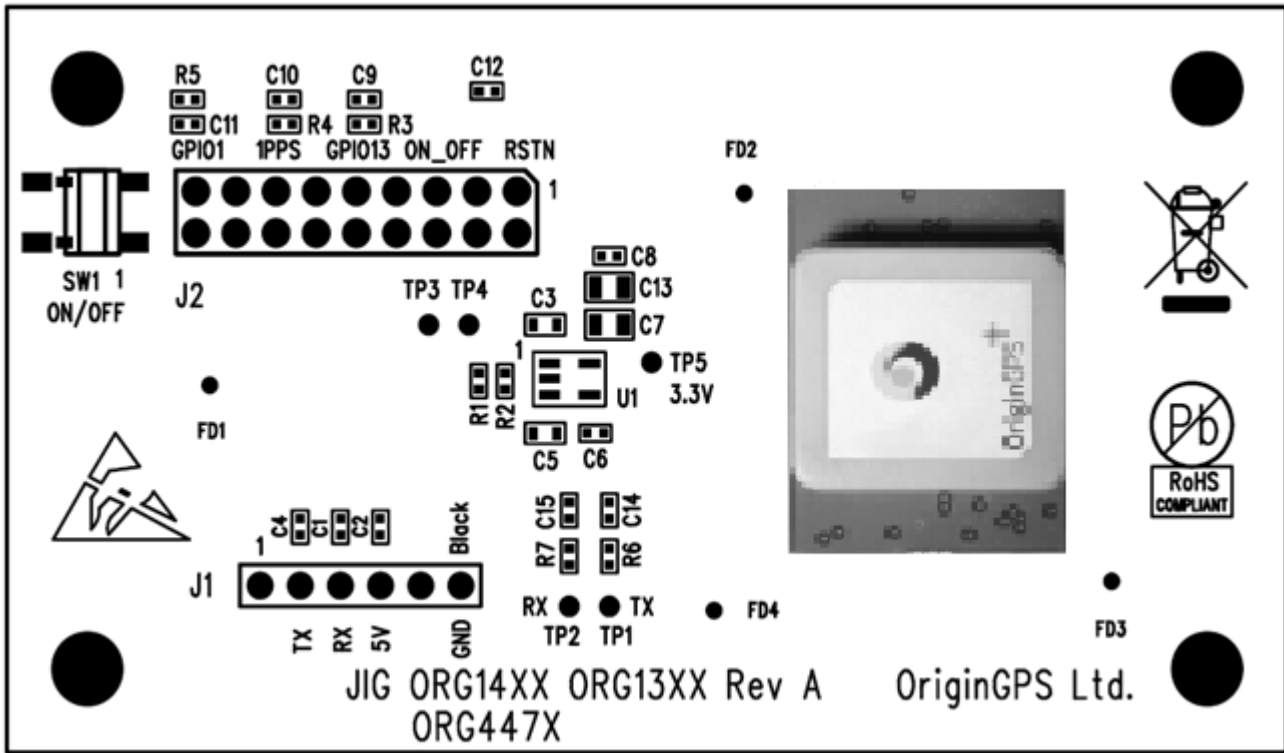


FIGURE 2 - MAIN BOARD COMPONENTS PLACEMENT

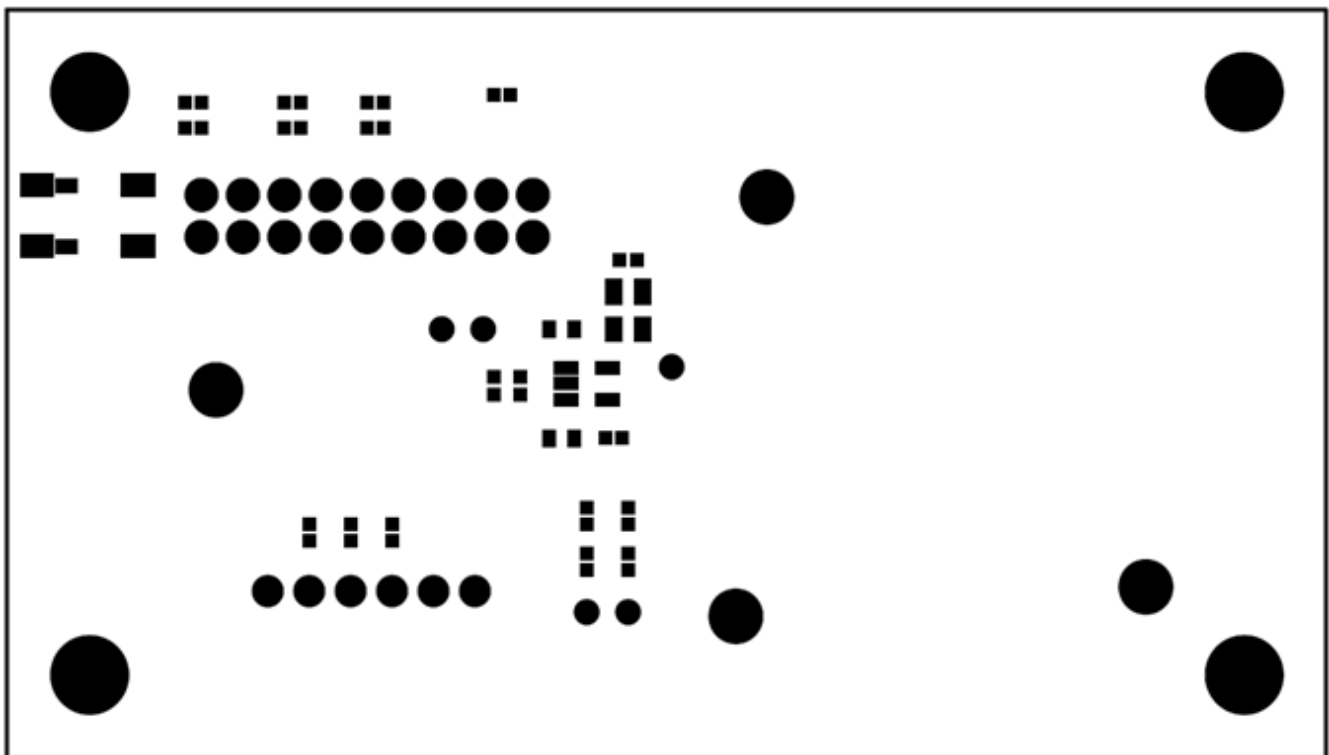


FIGURE 3 - MAIN BOARD SOLDER MASK

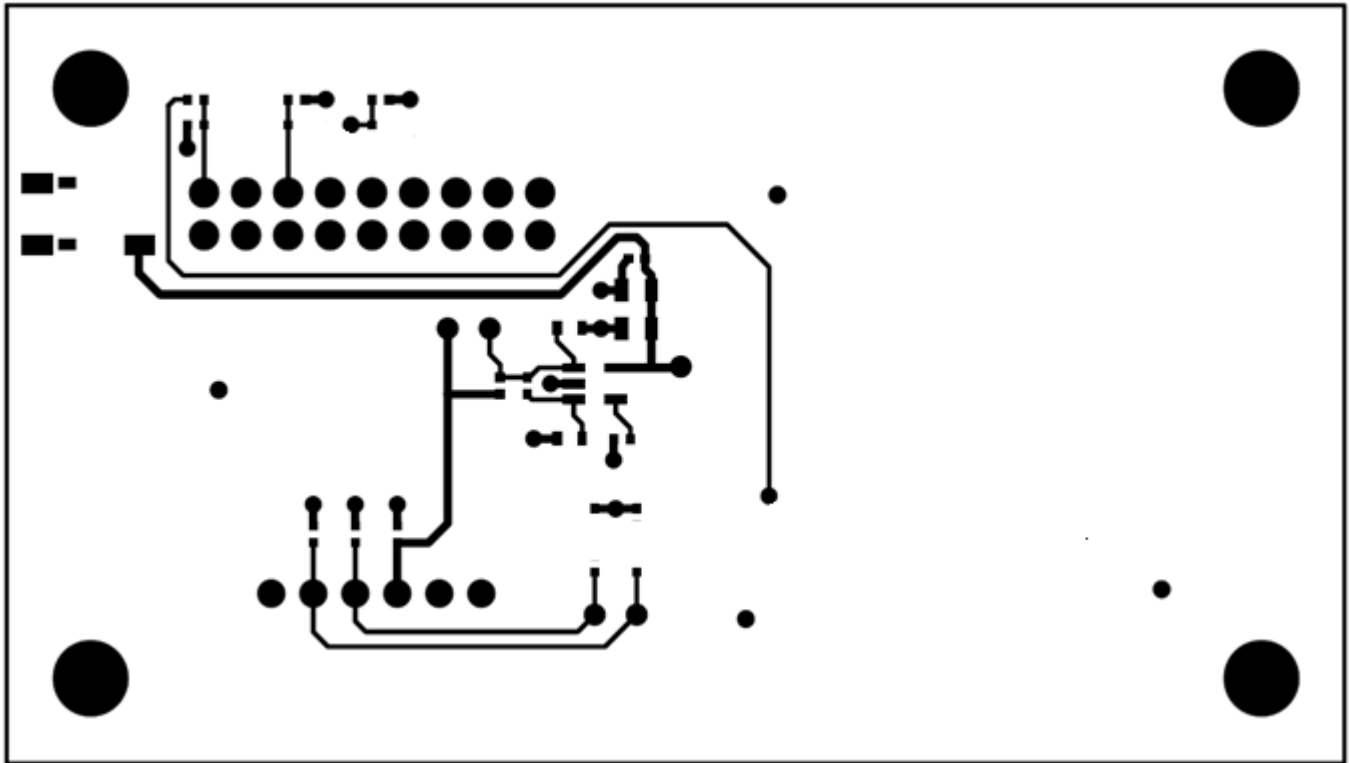


FIGURE 4 – MAIN BOARD TOP LAYER ROUTING

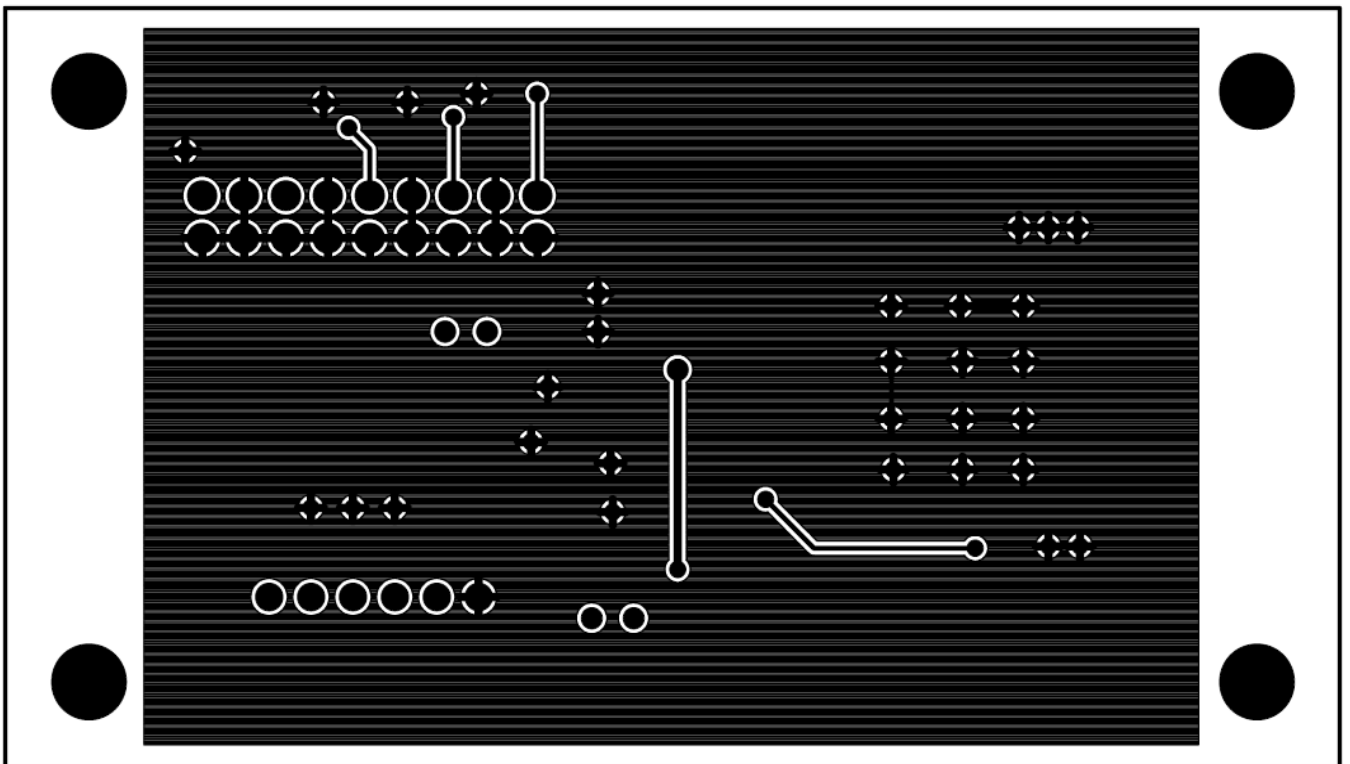


FIGURE 5 – MAIN BOARD BOTTOM LAYER ROUTING



## 15. 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 - PIN HEADER SOCKET BOTTOM VIEW

Pin Number	Name	Type	Colour	Description
1	GND	Power	Black	Ground supply pin
2	CTS	Input	Brown	Clear To Send input – not in use
3	VCC	Power	Red	+5V power source, USB specified
4	TXD	Output	Orange	Asynchronous Data output – GPS input
5	RXD	Input	Yellow	Asynchronous Data input – GPS output
6	RTS	Output	Green	Request To Send output – not in use

TABLE 4 - USB-SERIAL CONVERTER CABLE HEADER PIN-OUT

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Power Supply Voltage	V <sub>CC</sub>	Defined by USB V <sub>BUS</sub>	4.25	5.0	5.25	V
Power Supply Current	I <sub>O</sub>		-	-	75	mA
Output Voltage Low State	V <sub>OL</sub>	I <sub>OL</sub> = 8mA	0.3	0.4	0.6	V
Output Voltage High State	V <sub>OH</sub>	I <sub>OH</sub> = -3mA	2.2	2.8	3.2	V
Input Voltage State Switching Threshold	V <sub>IN</sub>	Low → High	1.0	1.2	1.5	V
Input Voltage State Switching Hysteresis	V <sub>HYST</sub>	High → Low	20	25	30	mV
Operating Temperature	T <sub>AMB</sub>		-40	+25	+85	°C

TABLE 5 - USB-SERIAL CONVERTER CABLE OPERATING PARAMETERS

\*Note: For more information refer to FTDI Ltd. TTL-232R TTL To USB Serial Converter Range Of Cables Datasheet, Document Reference No.: FT\_000054



## 16. ORDERING INFORMATION

O	R	G	4	5	0	2	-	R	0	1	-	U	A	R
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 7 – ORDERING INFORMATION

PART NUMBER	FW VERSION	HW OPTION	V <sub>CC</sub> RANGE	PACKAGING	SPQ
ORG4502-R01-UAR	1	01	5V USB	EVALUATION KIT	1

TABLE 6 – ORDERABLE DEVICES

Recommender ZIF cable: Manufacturer: Molex, P.N. 0982660107

For more ZIF cable options: [press here](#)