



MULTI HORNET (ORG1518-MK06)

Evaluation Kit (ORG1518MK06-UAR)

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	4
8.	ABOUT HORNET FAMILY	5
9.	ABOUT MULTI MICRO HORNET MODULE.....	5
10.	ABOUT ORIGINGPS	6
11.	DESCRIPTION	6
12.	DEFAULT EVK STATE	7
12.1.	EVK ORG1518-MK06 OVERVIEW.....	7
12.2.	PCB VIEW.....	8
12.3.	Power Supply View	9
12.4.	Interface View	10
13.	SCHEMATICS	11
14.	BILL OF MATERIALS.....	13
15.	ASSEMBLY AND LAYOUT	13
16.	TTL-232R-3V3 USB-Serial CONVERTER CABLE*.....	15

FIGURE INDEX

Figure 1 – EVK PCB	Error! Bookmark not defined.
Figure 2 – Schematics Page1	11
Figure 3 – Schematics Page2	11
Figure 4 – Schematics Page3	12
Figure 5 – MAIN BOARD COMPONENTS PLACEMENT (Top Side)	13
Figure 6 – MAIN BOARD COMPONENTS PLACEMENT (Bottom Side)	13
Figure 7 – Gerber Top Side CS Layer	14
Figure 8 – Gerber Bottom Side PS Layer	14
Figure 9 – PIN HEDER SOCKET BOTTOM VIEW.....	15
Table 2 – USB-SERIAL CONVERTER CABLE HEADER PIN-OUT	15
Table 3 – USB-SERIAL CONVERTER CABLE OPERATING PARAMETERS.....	15



1. SCOPE

This document describes the features and specifications of Multi Micro Hornet ORG1518-MK06 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. If 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

Marketing and sales - marketing@origingps.com

Web – www.origingps.com

6. RELATED DOCUMENTATION

No	DOCUMENT NAME
1	Multi Micro Hornet – ORG1518-MK06 Datasheet

TABLE 1 – RELATED DOCUMENTATION



7. REVISION HISTORY

REVISION	DATE	CHANGE DESCRIPTION
1.0	March 17, 2019	First release
1.1	January 16, 2020	Added Block Diagrams and explanation about using OriginGPS EVB

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 MICRO HORNET MODULE

In o Multi Micro 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 such as smart watches, wearable devices, asset trackers, Multi Micro Hornet ORG1518-MK06 module is a 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 ORG1518-MK06 module offers superior sensitivity and outstanding performance, achieving rapid

TTFF in less than one second, accuracy of approximately two meters, and tracking sensitivity of -167dBm.

Sized only 18mm x 18mm Multi Micro Hornet ORG1518-MK06 module is industry's small sized, record breaking solution.

Multi Micro Hornet module integrates OriginGPS proprietary on-board GNSS antenna, dual-stage LNA, RF Switch, LDO, SAW filter, TCXO, RTC crystal and RF shield with market-leading MT3333 GNSS SoC.

Multi Micro Hornet ORG1518-MK06 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 GNSS 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.



10. ABOUT ORIGINGPS

This 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

The Evaluation Kit of the ORG1518-MK06 GNSS Antenna Module comprises the Demo Board, USB to UART cable and CD with GPS simulator software for PC and documentation.

The Demo Board is built of Main Board, incorporating 1.8V and 3.3V LDO regulator, UART connector, push-button and various test points with lot of features for R&D process.

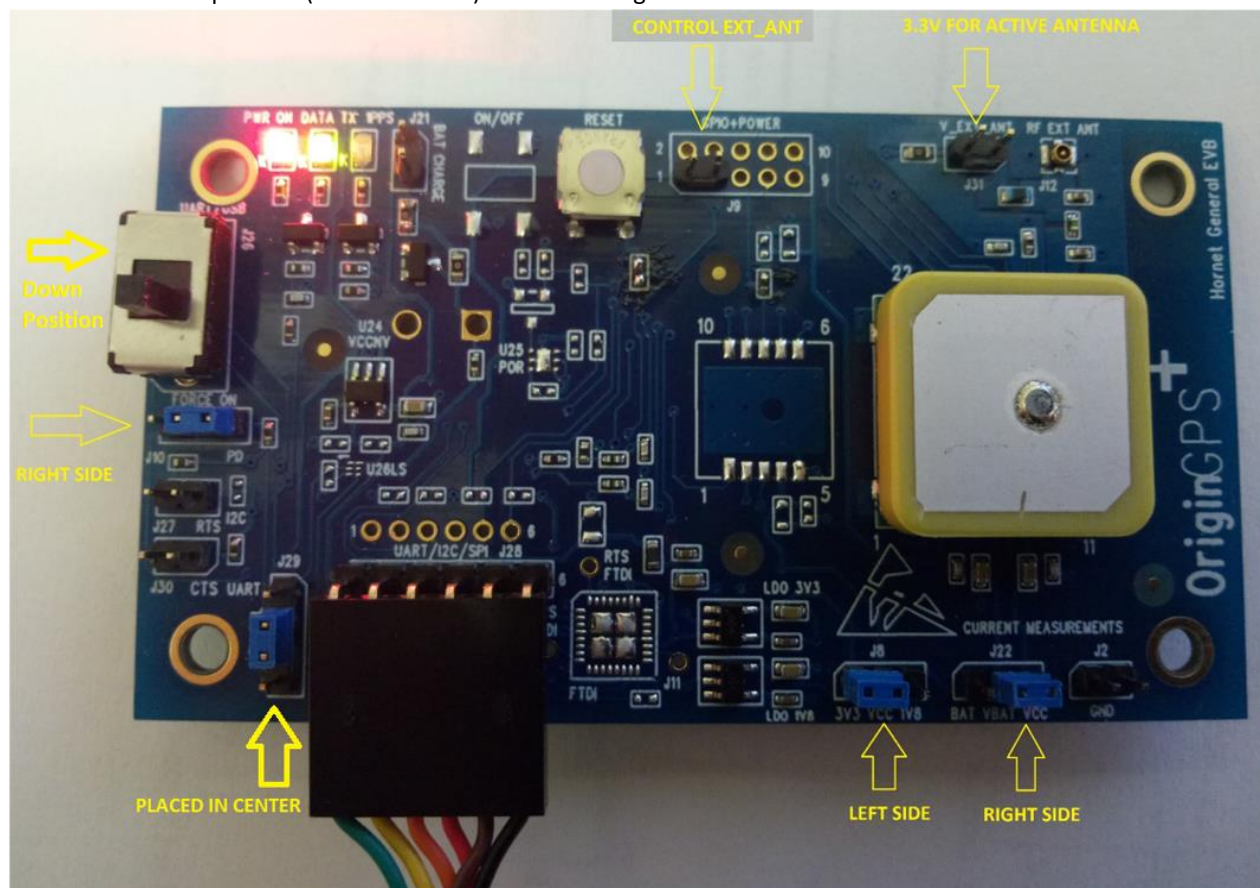
In addition, supports external passive / active antenna connected to uFl connector.

12. DEFAULT EVK STATE

12.1. EVK ORG1518-MK06 OVERVIEW

- J8 – Vcc connected to internal LDO 3.3V
- J22 – Vbat connected to Vcc
- J10 – FORCE_ON connected to pull-down
- J29 – J29.2 connected to J29.3 by this connection, TX connected without level shifter to J26
- J26 – switch between UART throw FTDI cable and micro USB connection.

Down position (same as below) is a state using the FTDI cable



12.2. PCB VIEW

The picture below describes all the functionality of the board. The purpose of this view is user-friendly for understanding the board by the silk on it.

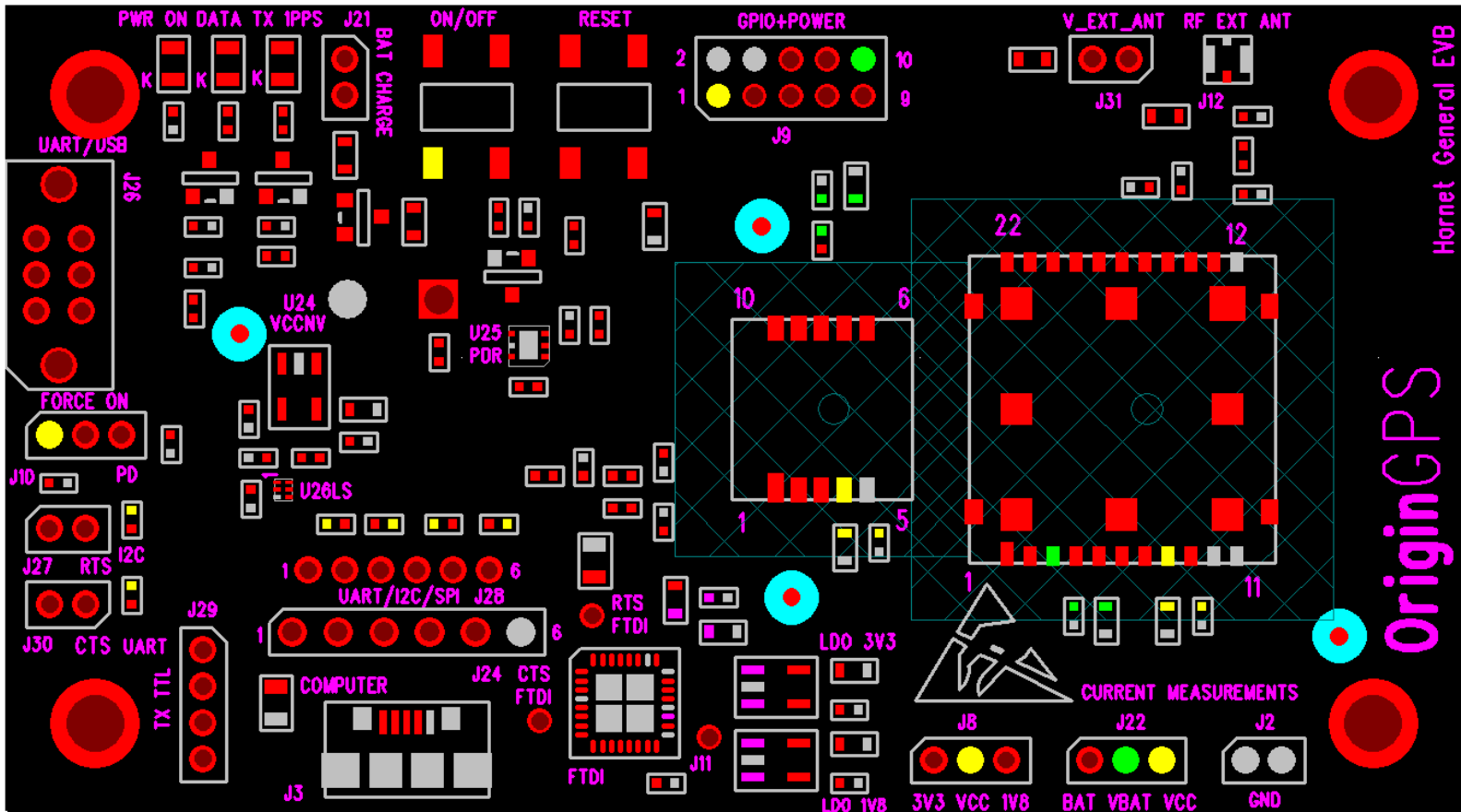
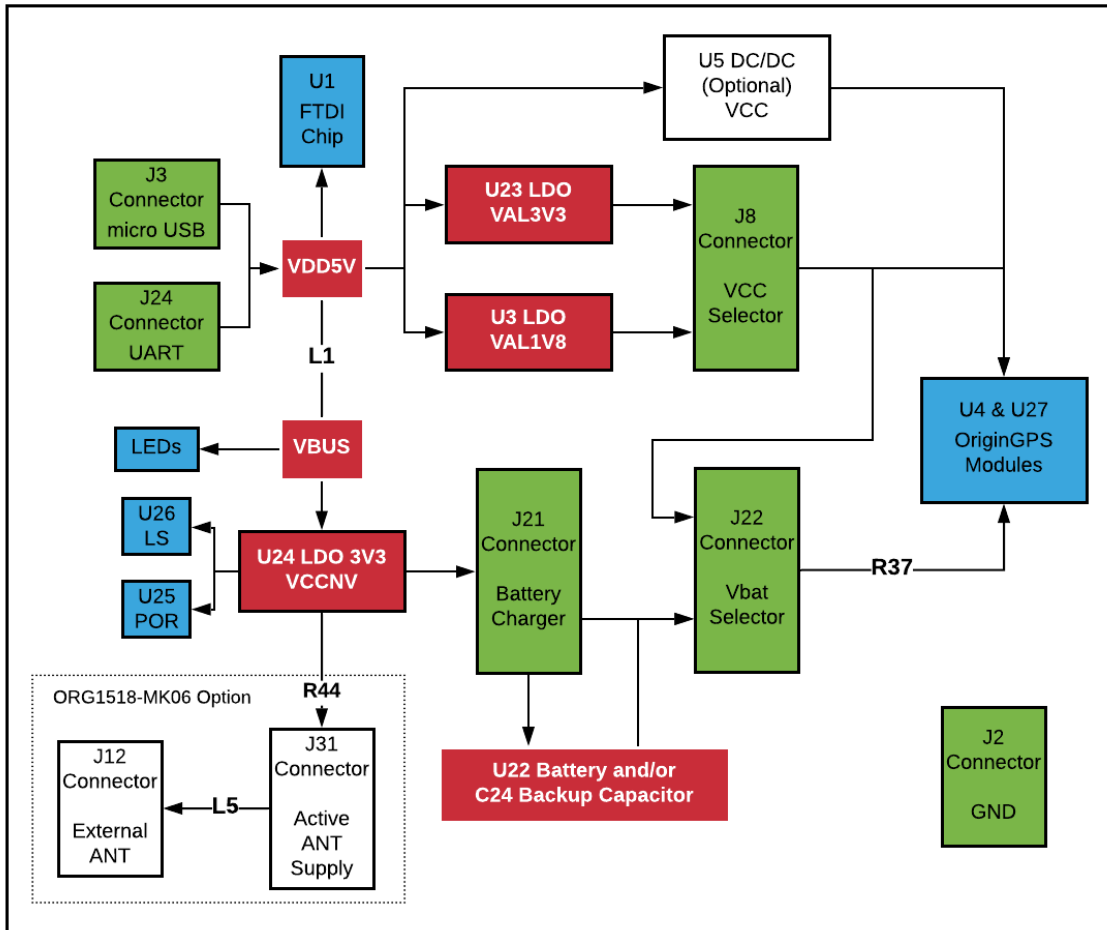


Figure 1 – EVK PCB

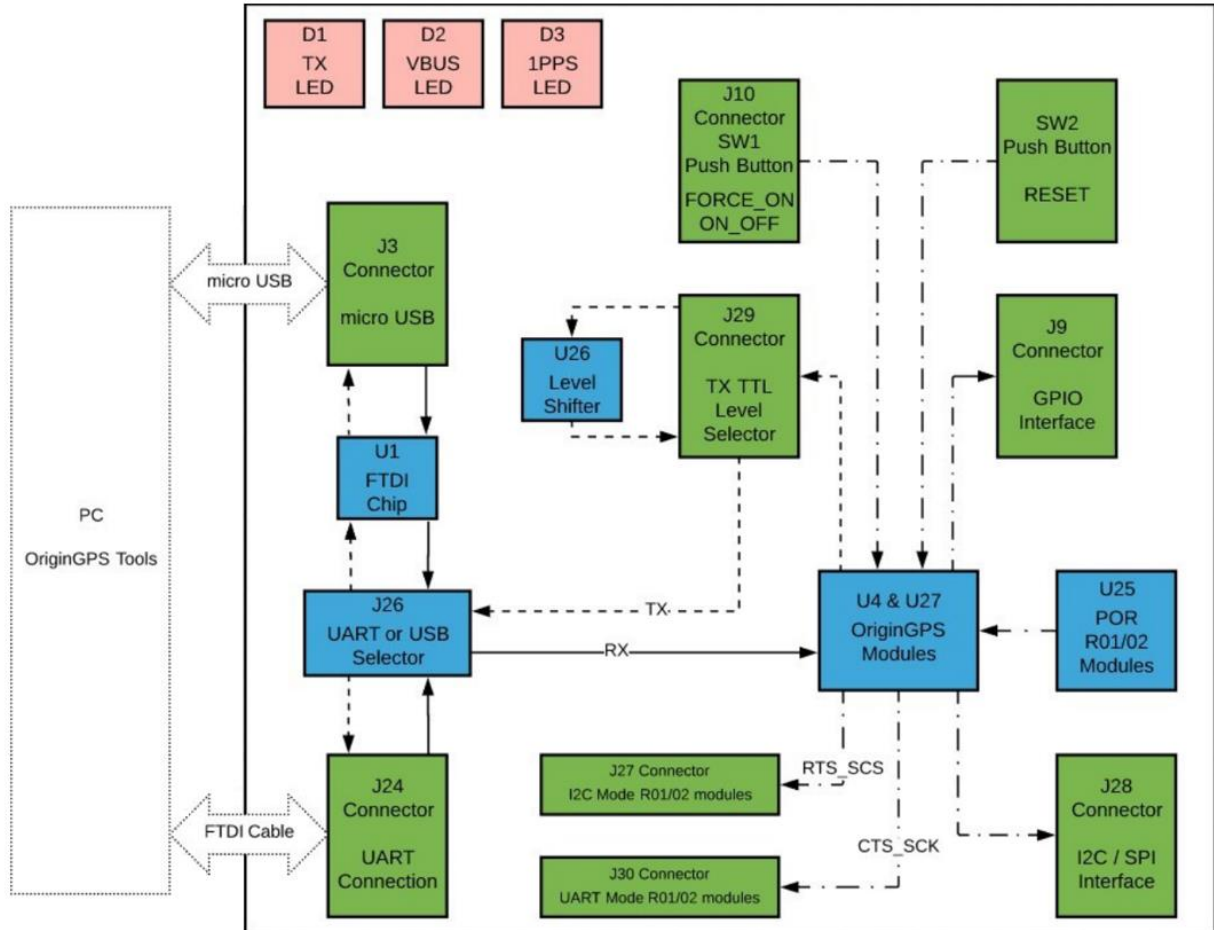
12.3. Power Supply View

The Block Diagram below describes all the functionality of the board regarding the sources of Power suppliers inside the board. The purpose of this view is user-friendly for understanding the board, each connector inside the board and all the options for manual control of the OriginGPS EVK.



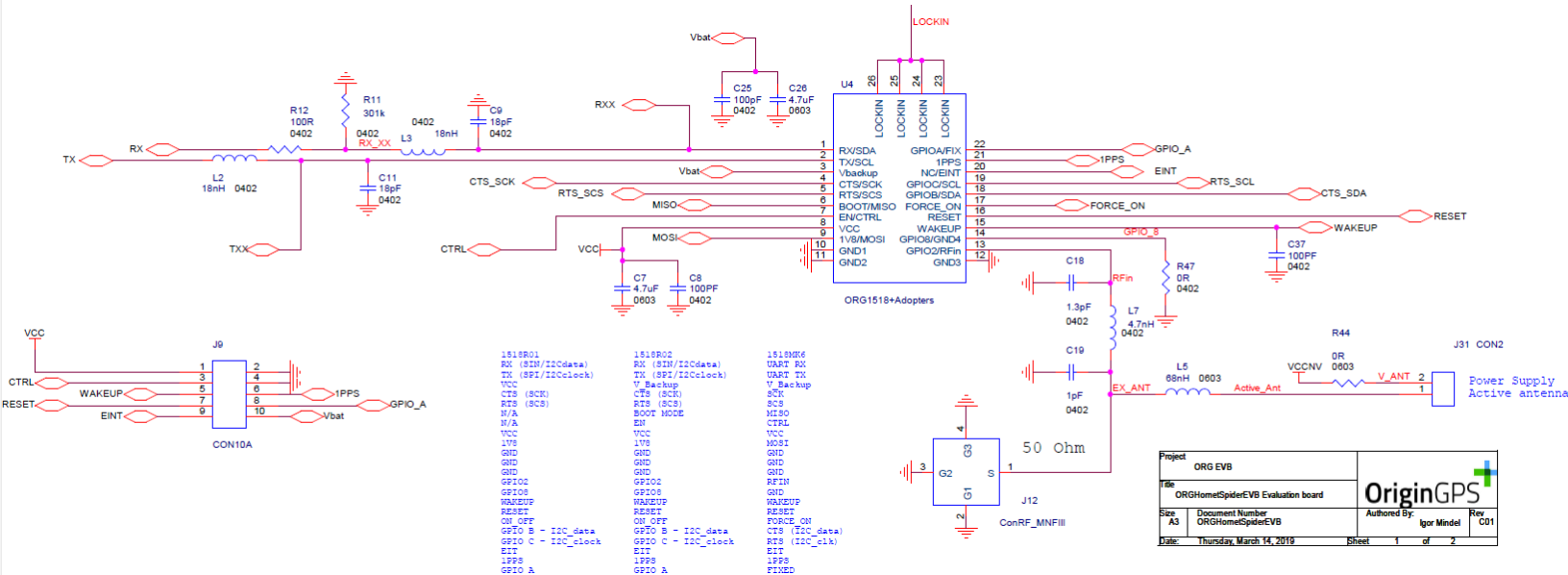
12.4. Interface View

The Block Diagram below describes all the functionality of the board regarding the Interfaces inside the board. The purpose of this view is user-friendly for understanding the board, each connector inside the board and all the options for manual control of the OriginGPS EVK.



13. SCHEMATICS

The Evaluation Kit of the ORG1518-MK06 can be used for all OriginGPS modules, Spider and Hornet. Therefore, schematics will contain all the components but the BOM is necessary for understanding the assembled components for the ORG1518-MK06.



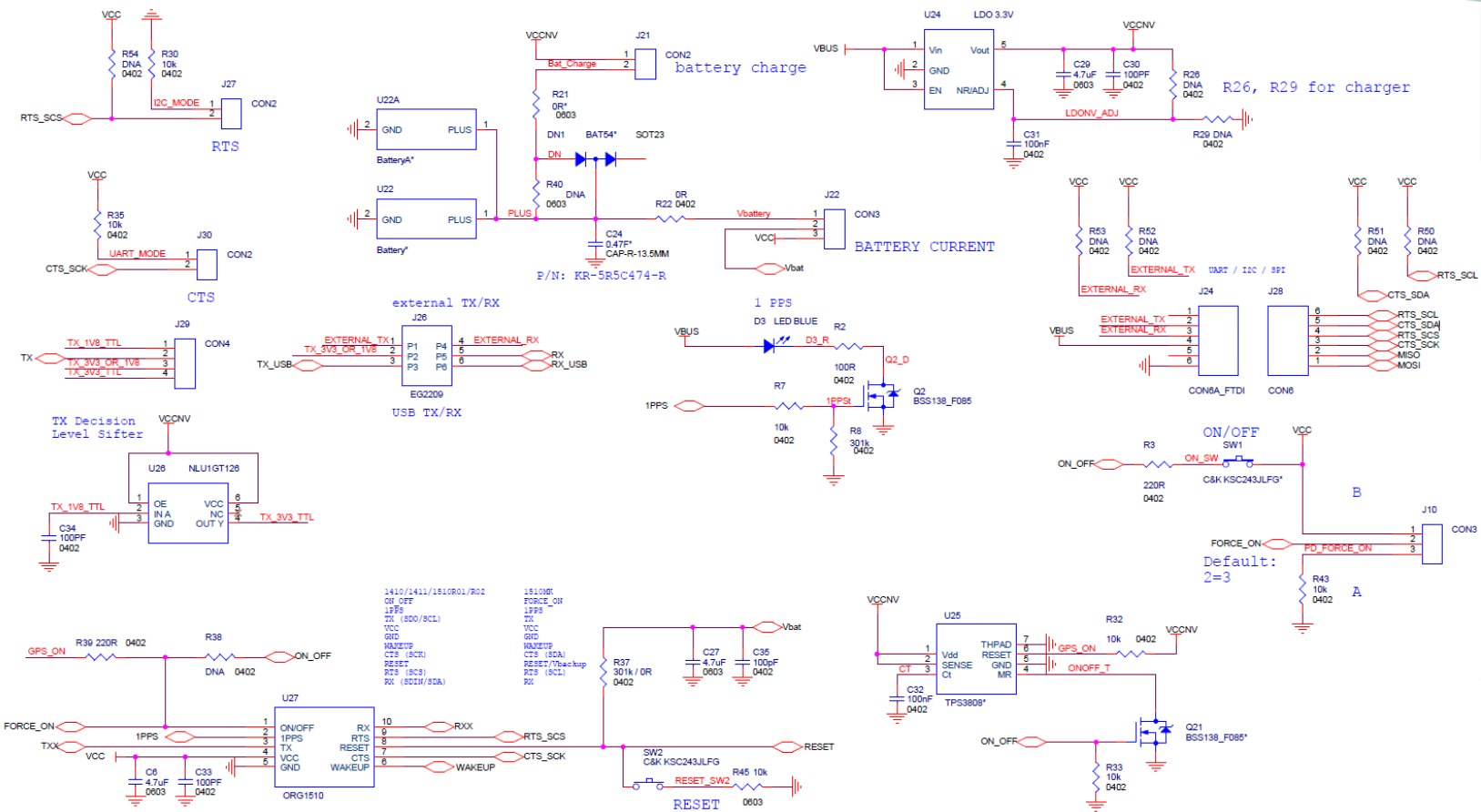


Figure 4 – Schematics Page3

14. BILL OF MATERIALS

15. ASSEMBLY AND LAYOUT

Main Board for the ORG1518-MK06 GNSS Antenna Module is 2 layers 1.6mm thickness FR4 PCB.

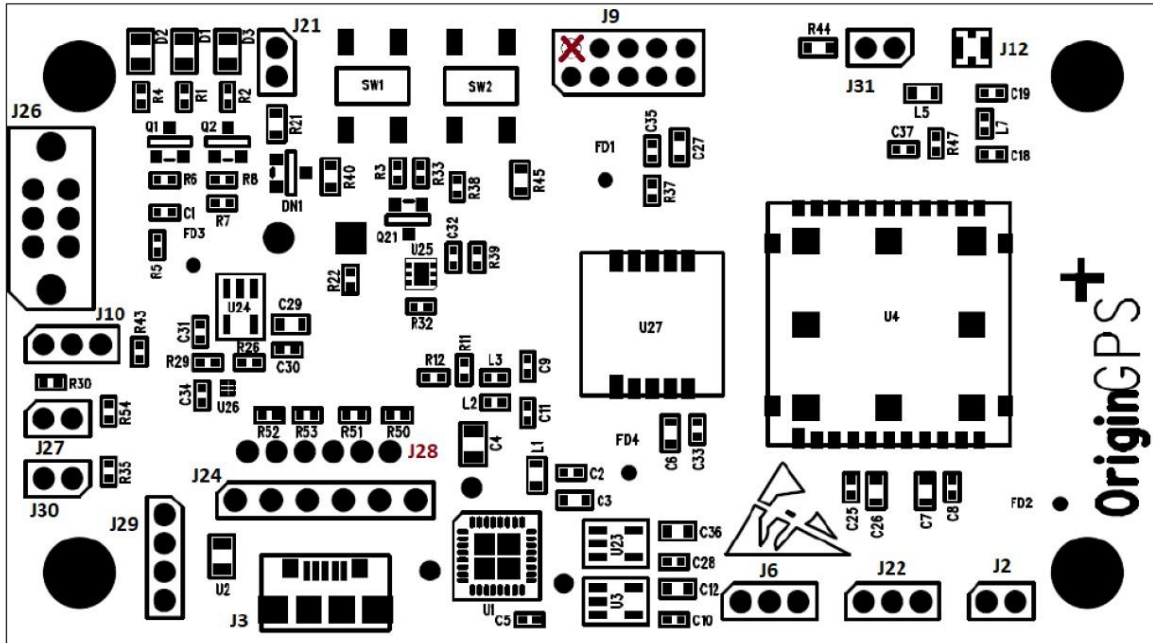


Figure 5 – MAIN BOARD COMPONENTS PLACEMENT (Top Side)

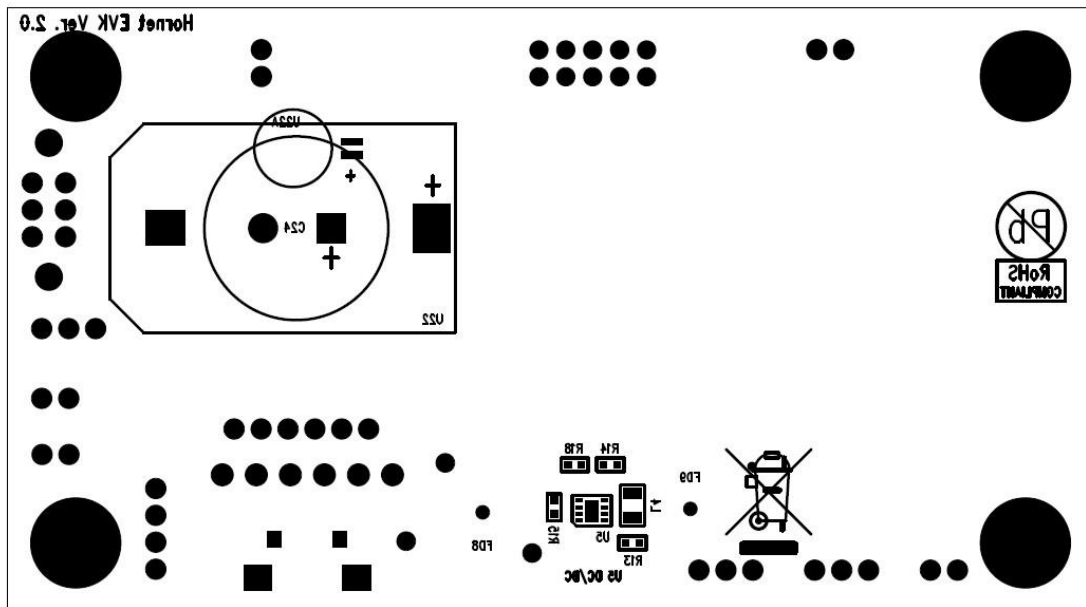


Figure 6 – MAIN BOARD COMPONENTS PLACEMENT (Bottom Side)

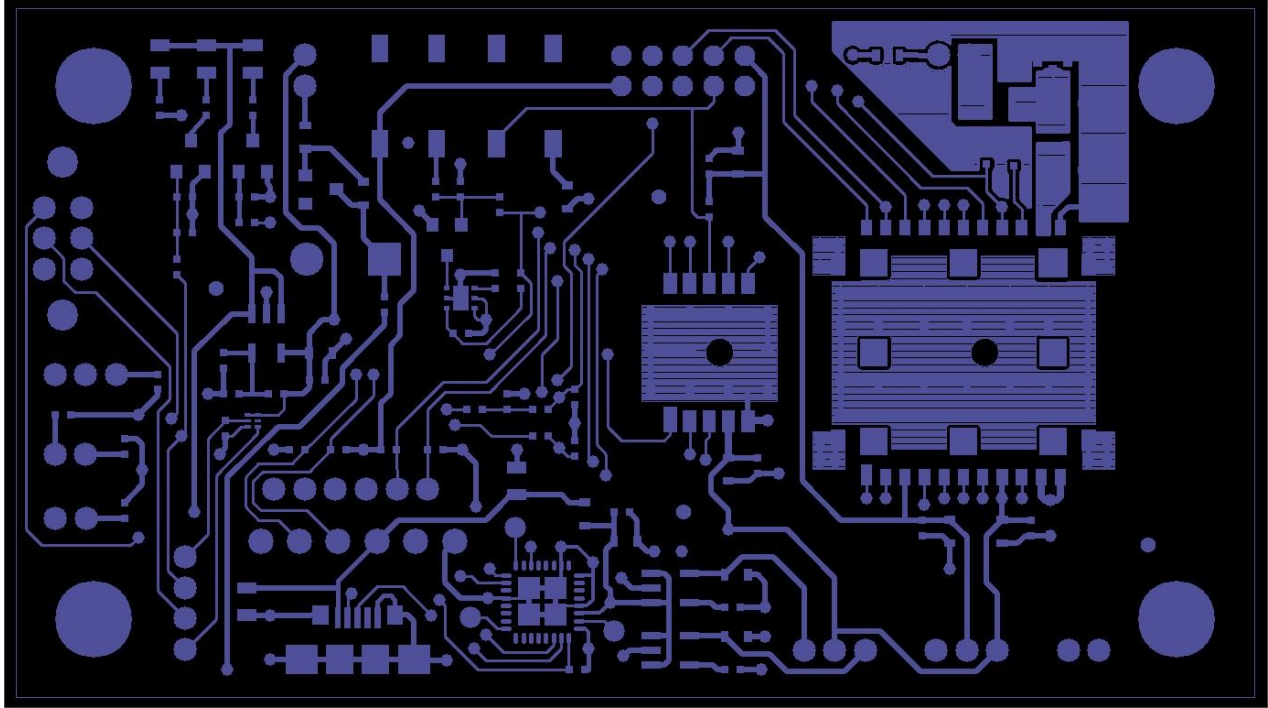


Figure 7 – Gerber Top Side CS Layer

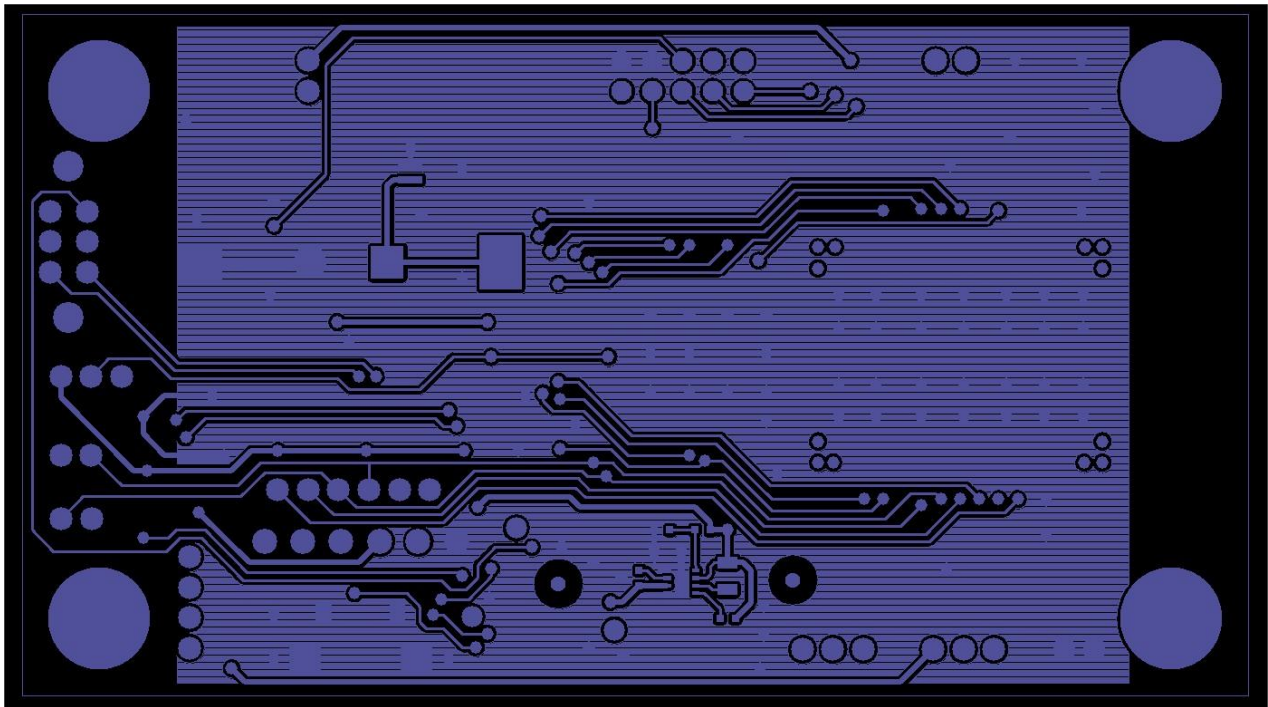


Figure 8 – Gerber Bottom Side PS Layer



16. 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 9 – PIN HEDER 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 2 – USB-SERIAL CONVERTER CABLE HEADER PIN-OUT

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Power Supply Voltage	V_{CC}	Defined by USB V_{BUS}	4.25	5.0	5.25	V
Power Supply Current	I_o		-	-	75	mA
Output Voltage Low State	V_{OL}	$I_{OL} = 8mA$	0.3	0.4	0.6	V
Output Voltage High State	V_{OH}	$I_{OH} = -3mA$	2.2	2.8	3.2	V
Input Voltage State Switching Threshold	V_{IN}	Low \rightarrow High	1.0	1.2	1.5	V
Input Voltage State Switching Hysteresis	V_{HYST}	High \rightarrow Low	20	25	30	mV
Operating Temperature	T_{AMB}		-40	+25	+85	$^{\circ}C$

Table 3 – 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