

# ORG1410 Evaluation Kit

## Datasheet



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## 1. Introduction

### 1.1 About the ORG1410

OriginGPS GPS modules with built-in antenna have been designed to address markets where stand-alone operation, high level of integration, power consumption and flexibility are very important.

The ORG1410 module is a miniature multi-channel receiver that continuously tracks all GPS satellites in view and provides accurate positioning data in industry's standard NMEA format.

The ORG1410 module is further miniaturization of the OriginGPS popular ORG14XX series.

Featuring OriginGPS Noise-Free Zone System™ technology the ORG1410 module offers the ultimate of satellite navigation in smallest size.

The ORG1410 module is a complete SiP (System-in-Package) featuring advanced miniature packaging technology and an ultra-small footprint designed to commit unique integration features for high volume cost sensitive applications.

The ORG1410 module integrates OriginGPS proprietary patch antenna element, LNA, SAW filter, TCXO, RTC crystal, RF shield and Power Management Unit with SiRFStarIV™ GPS processor, thereby optimized for how people really use their location-aware products: often indoors with periods of unobstructed sky view when moving from place to place.

This new 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 ephemeris data while consuming mere microwatts of battery power.

Internal ARM microprocessor and sophisticated firmware keeps positioning payload off the host allowing integration in embedded solutions even with low computing resources.

### 1.2 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 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.

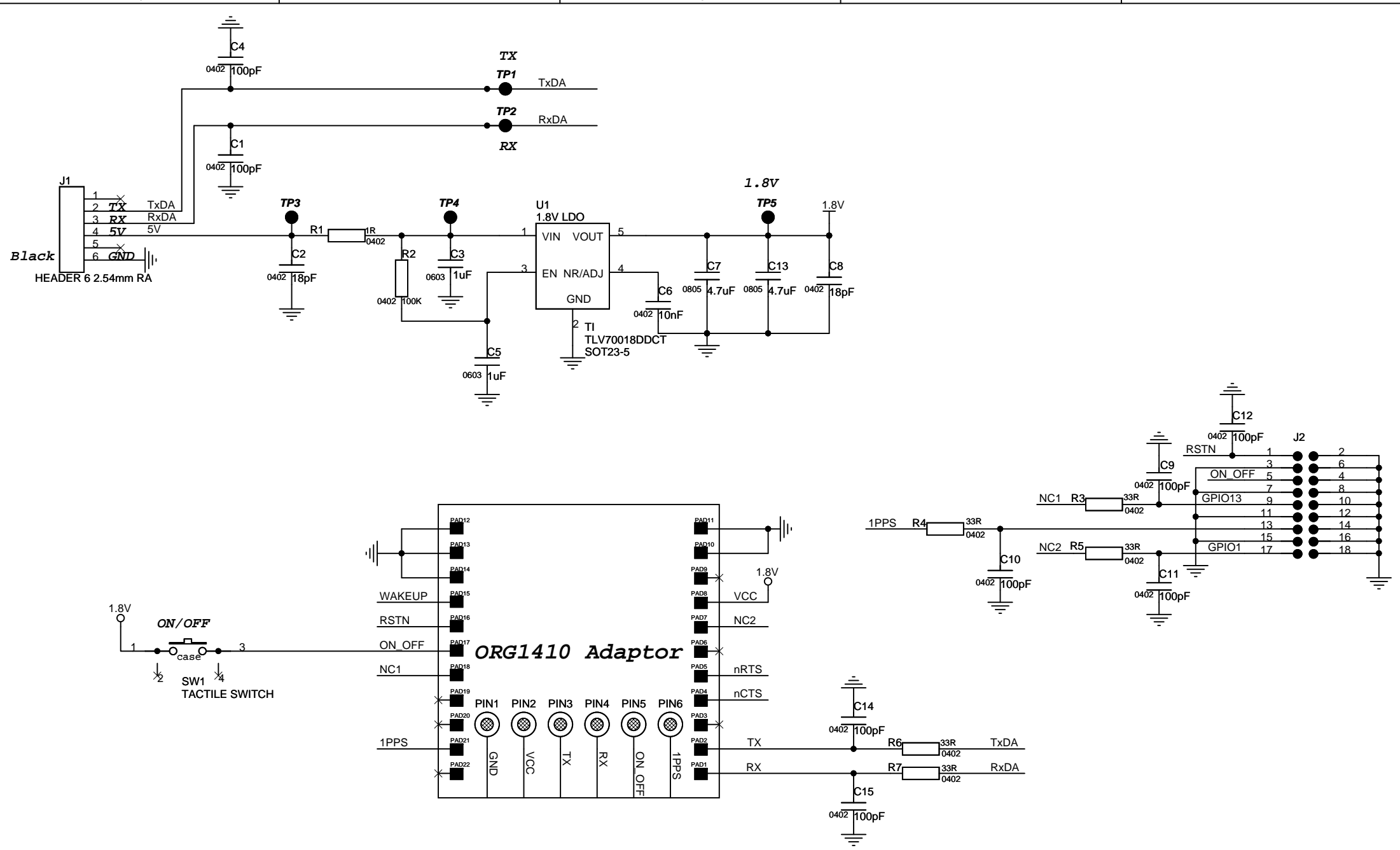
## 2. Description

Evaluation Kit of the ORG1410 GPS Antenna Module comprises the Demo Board, USB to UART cable and CD with GPS simulator software for PC and documentation.

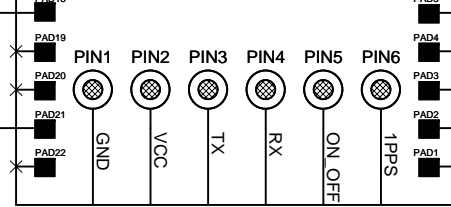
The Demo Board is built of Main Board, incorporating 1.8V LDO regulator, UART connector, push-button tactile switch for Push-To-Fix™ interrupt and various test points.

The ORG1410 GPS Antenna Module is soldered onto the Main Board through the Interface Adaptor.

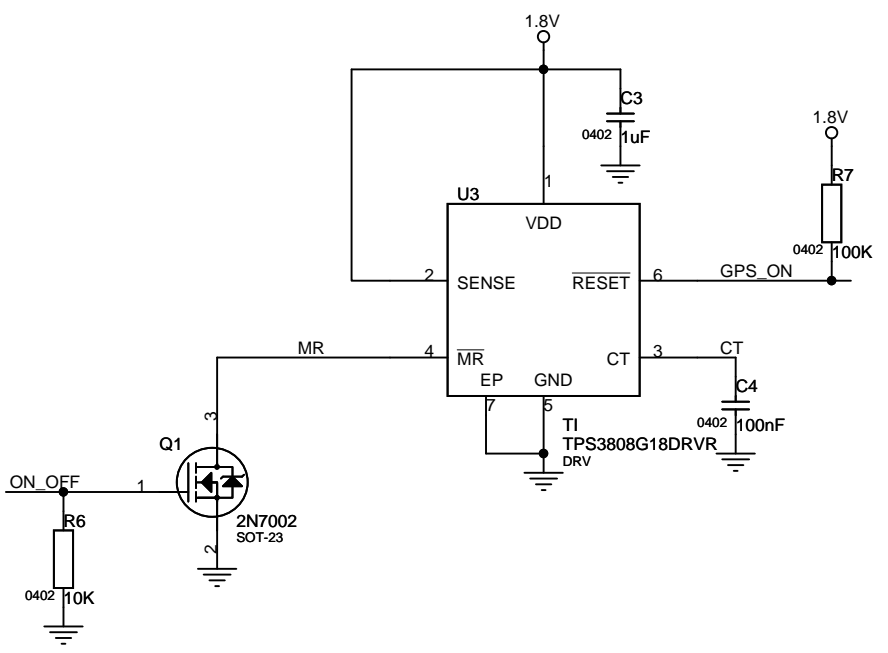
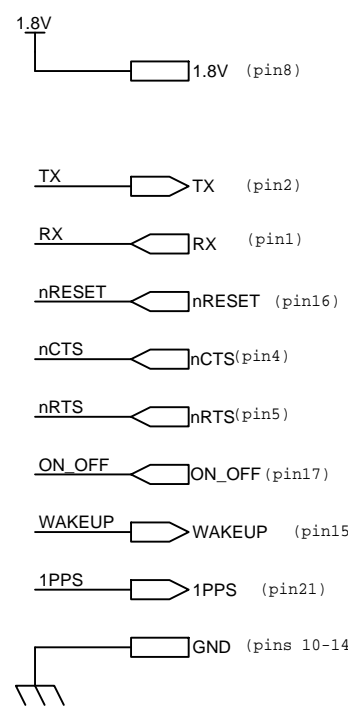
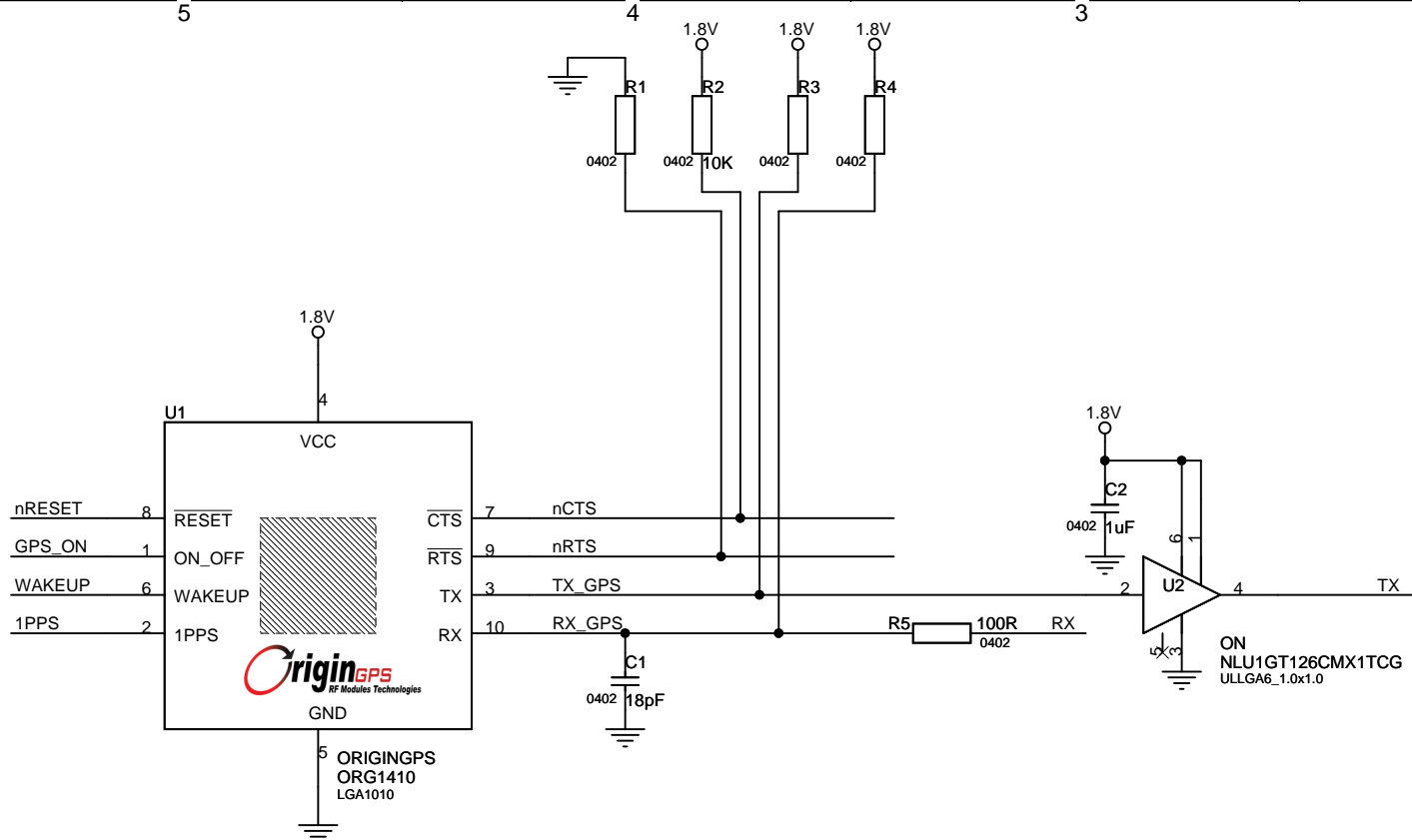
The Interface Adaptor includes a single-bit buffer for voltage level translation of TX line, and a voltage supervisor for autonomous power-on pulse generation.



**ORG1410 Adaptor**



		Project	
		ORG1410 UART Evaluation Board	
Title			
ORG1410 UART Demo Board			
Size	Document Number	Authored By:	Rev
A4	ORG1410-DBUA	I. Divinsky	A00
Date:		Sheet	
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		Project	
		ORG1410-AD1	
Title			
ORG1410 Adaptor			
Size	Document Number	Author By:	Rev
A4	PD-ORG1410-AD1-A00	I. Divinsky	A00
Date:	Monday, April 30, 2012	Sheet	1 of 1

## 4. Bill Of Materials

### 4.1 Main Board Bill Of Materials

Reference	Value	Description	P/N	MFG
C2, C8	18pF	CAP SMT 0402 18pF ±5% 50V COG	GRM1555C1H180JZ01D	MURATA
C1, C4, C9, C10, C11, C12, C14, C15	100pF	CAP SMT 0402 100pF ±5% 50V COG	GRM1555C1H101JA01D	MURATA
C6	10nF	CAP SMT 0402 10nF ±10% 25V X7R	GRM155R71E103KA01D	MURATA
C3, C5	1µF	CAP SMT 0603 1µF ±10% 10V X5R	GRM188R60J105KA01J	MURATA
C7, C13	4.7µF	CAP SMT 0805 4.7µF ±10% 16V X5R	GRM21BR61C475KA88L	MURATA
R1	1Ω	RES SMT 0402 1Ω ±1%	RM04FTN0010	TA-I
R3, R4, R5, R6, R7	33Ω	RES SMT 0402 33Ω ±1%	RM04FTN0330	TA-I
R2	100KΩ	RES SMT 0402 100KΩ ±1%	RM04FTN1003	TA-I
J1	HDR	HEADER 6 POS. "0.1 RIGHT ANGLE	2211S-06G-F1	NELTRON
SW1	TSW	TACT SWITCH SMT	KSC222JLFS	C&K
U1	LDO	LDO REG. SMT SOT23-5 1.8V 200mA	TLV70018DDCT	TI

Table 4-1: Main Board Bill Of Materials

## 4.2 Interface Adaptor Bill Of Materials

Reference	Value	Description	P/N	MFG
C1	18pF	CAP SMT 0402 18pF ±5% 50V COG	GRM1555C1H180JZ01D	MURATA
C4	100nF	CAP SMT 0402 100nF ±10% 16V X7R	GRM155R71C104KA88D	MURATA
C2,C3	1µF	CAP SMT 0402 1µF ±10% 10V X5R	GRM155R61A105KE15D	MURATA
R5	100Ω	RES SMT 0402 100Ω ±1%	RM04FTN1000	TA-I
R2,R6	10KΩ	RES SMT 0402 10KΩ ±1%	RM04FTN1002	TA-I
R7	100KΩ	RES SMT 0402 100KΩ ±1%	RM04FTN1003	TA-I
Q1	2N7002	N-CH MOSFET SOT-23	2N7002KT1G	ON
U1	MODULE	GPS ANTENNA MODULE SMT LGA	ORG1410	ORIGINGPS
U2	NLU1GT126	SINGLE BUFFER 3-STATE	NLU1GT126CMX1TCG	ON
U3	TPS3808	LOW IQ POR SUPERVISOR W. MAN. RST	TPS3808G18DRVR	TI

Table 4-2: Interface Adaptor Bill Of Materials

## 5.Assembly and layout

### 5.1 Main Board PCB

Main Board for the ORG1410 GPS Antenna Module is 2 layers 1.6mm thickness FR4 PCB.

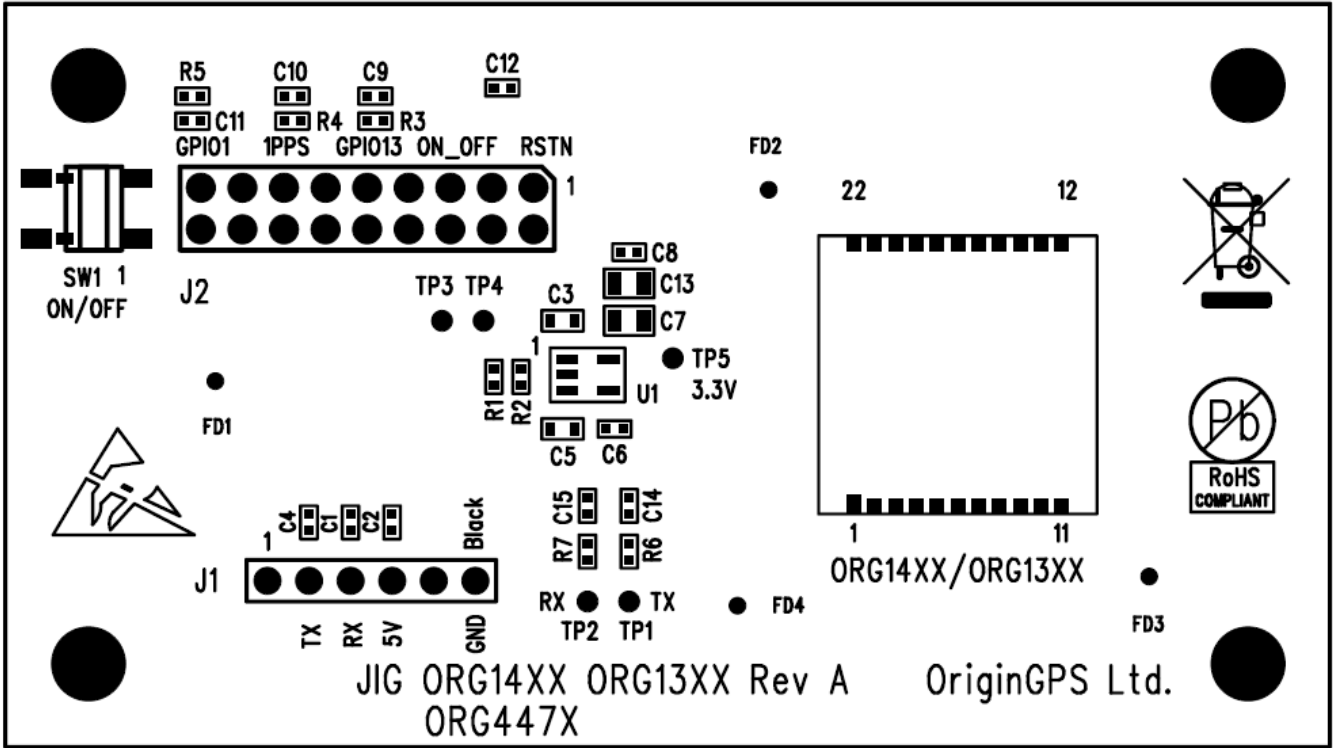


Figure 5-1: Main Board Components Placement

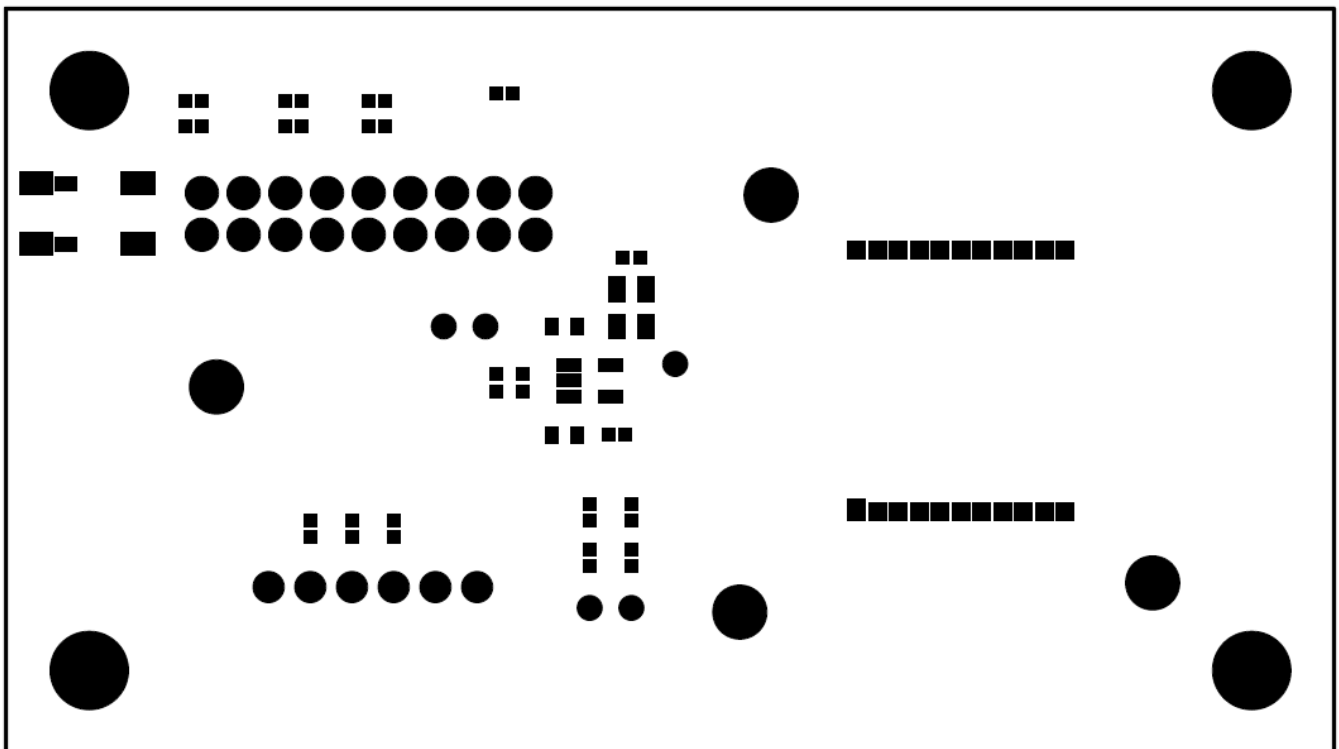


Figure 5-2: Main Board Solder Mask



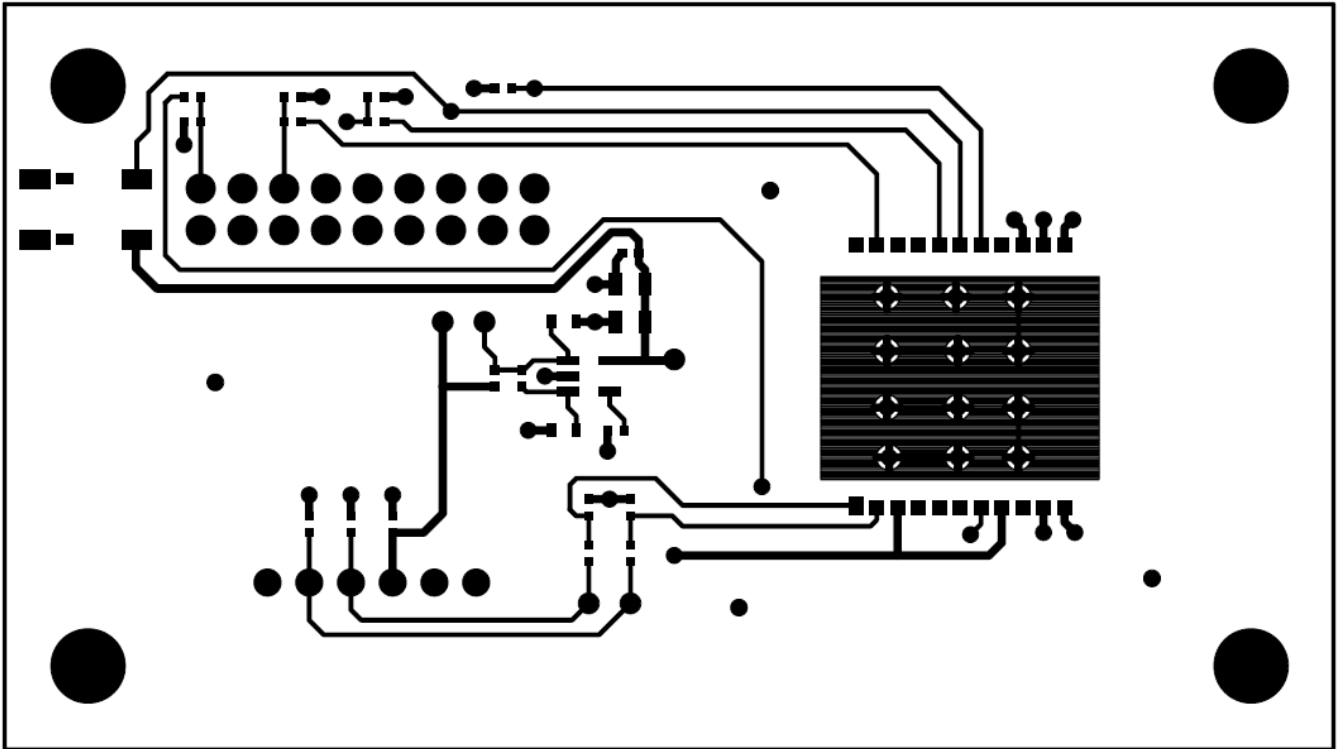


Figure 5-3: Top Layer Routing

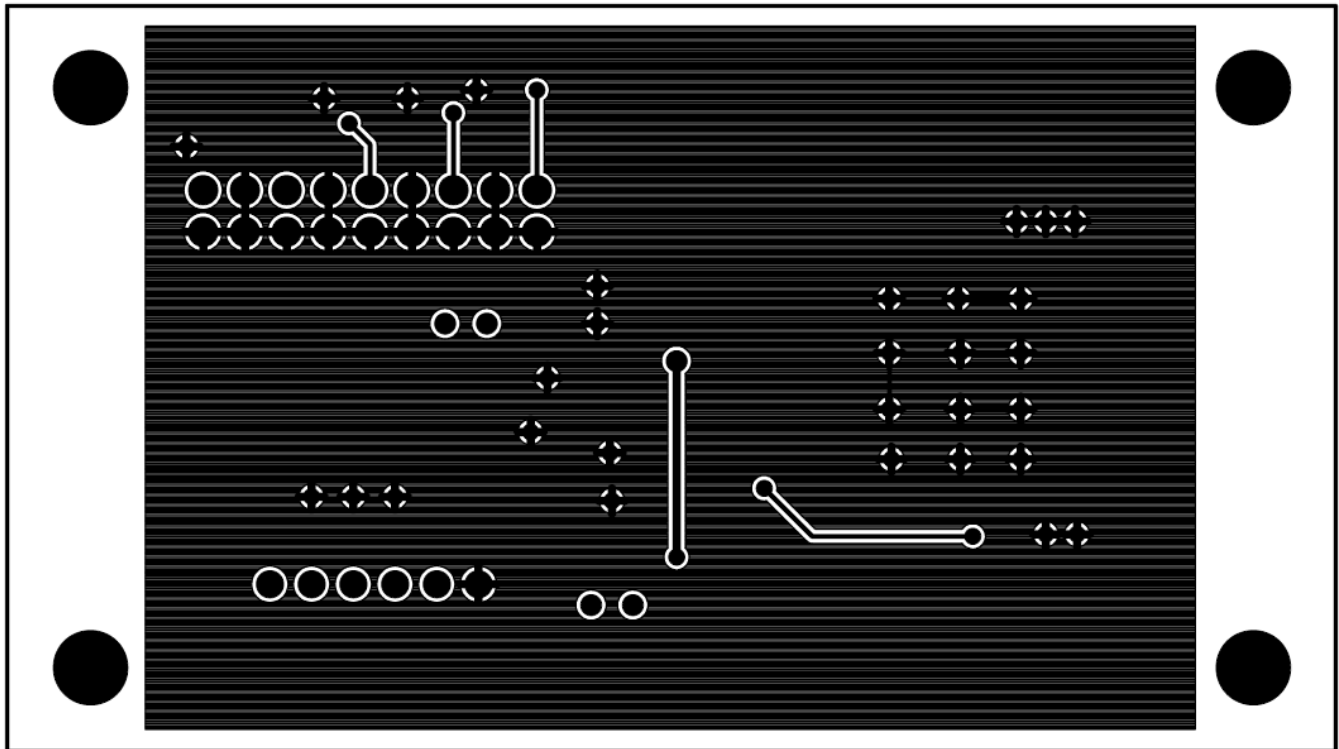


Figure 5-4: Bottom Layer Routing

## 5.2 Interface Adaptor PCB

Interface Adaptor Board for the ORG1410 GPS Antenna Module is 17mm x 17mm 22 pads 4 layers 0.6mm thickness FR4 PCB.

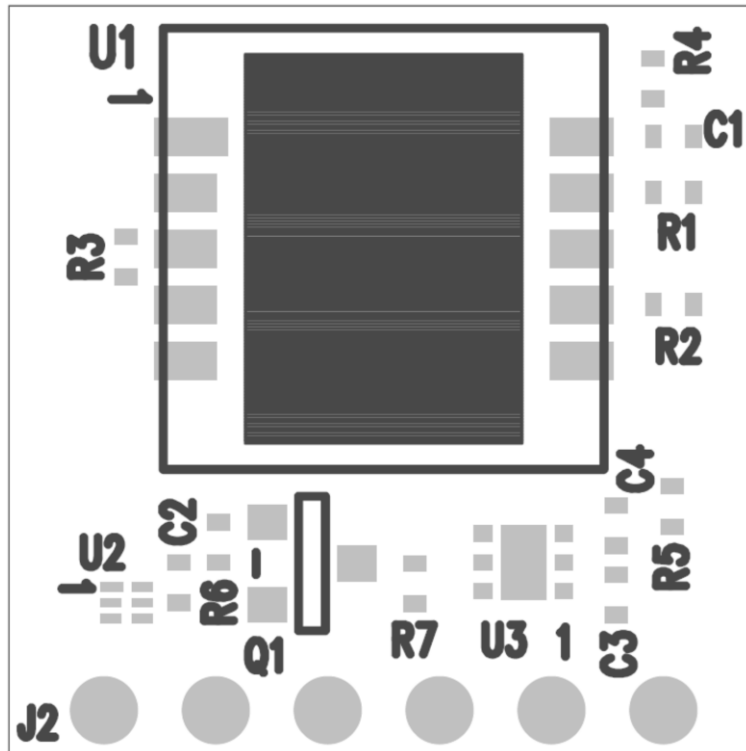


Figure 5-5: Interface Adaptor Board Components Placement

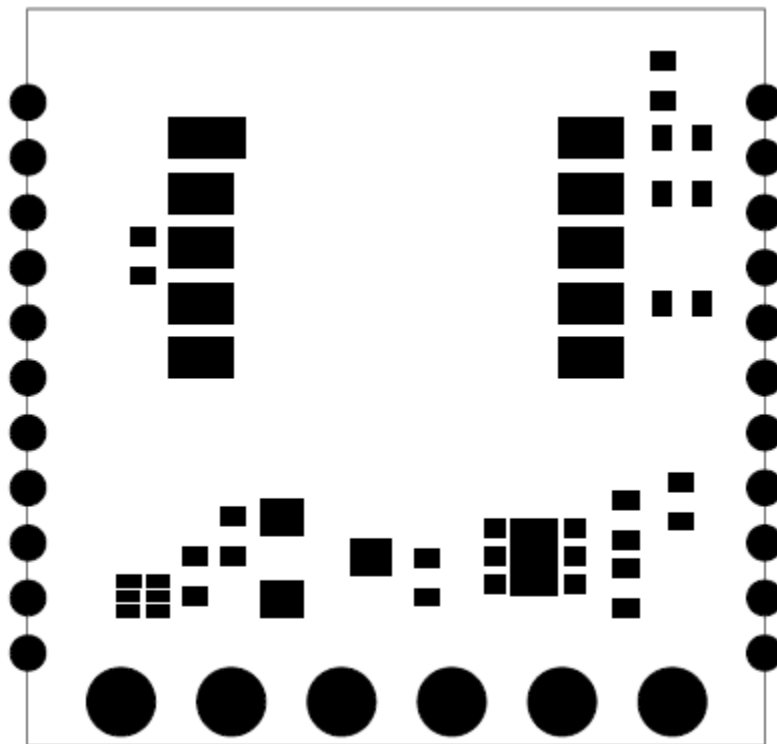


Figure 5-6: Interface Adaptor Board Solder Mask

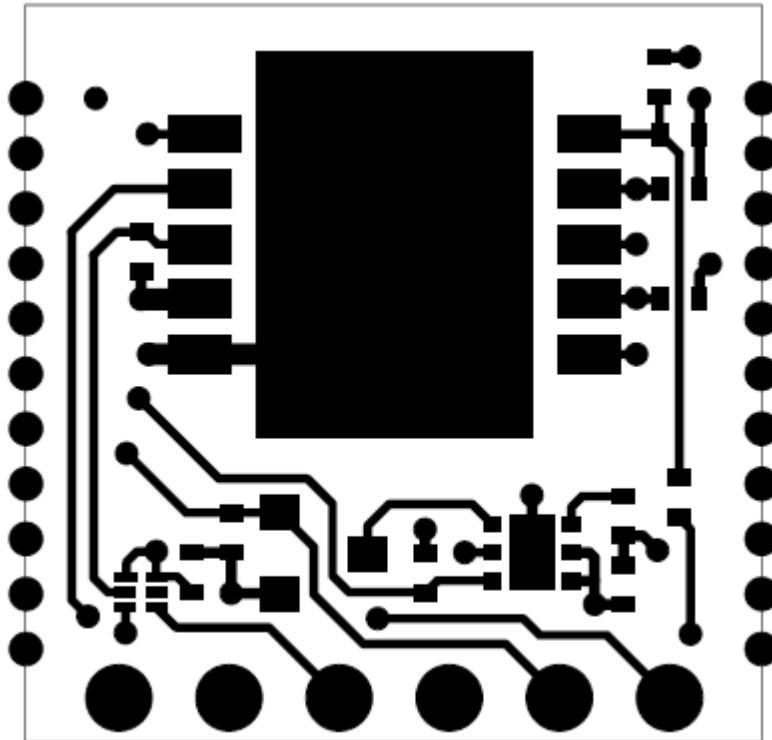


Figure 5-7: Interface Adaptor Board Top Layer Routing

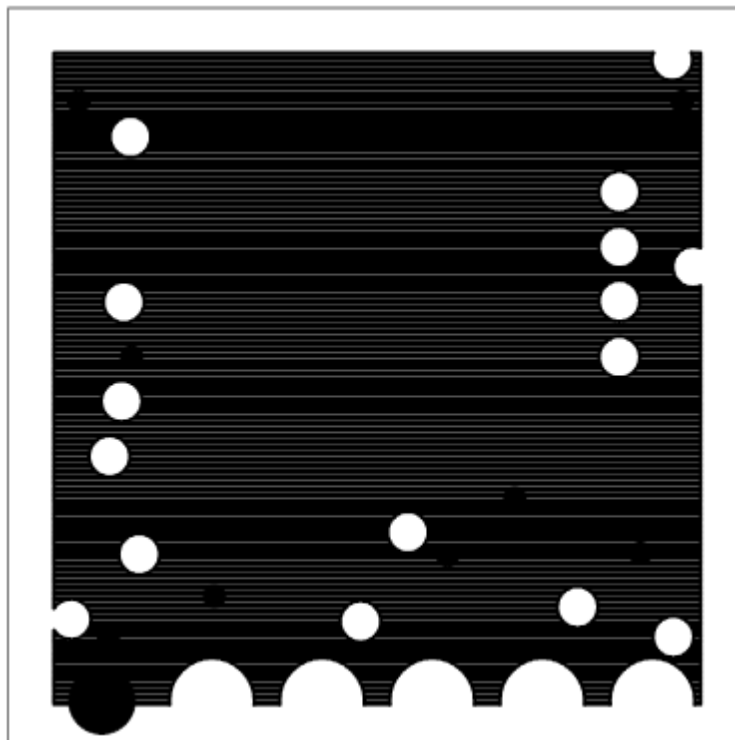


Figure 5-8: Interface Adaptor Inner Layer 1 Routing

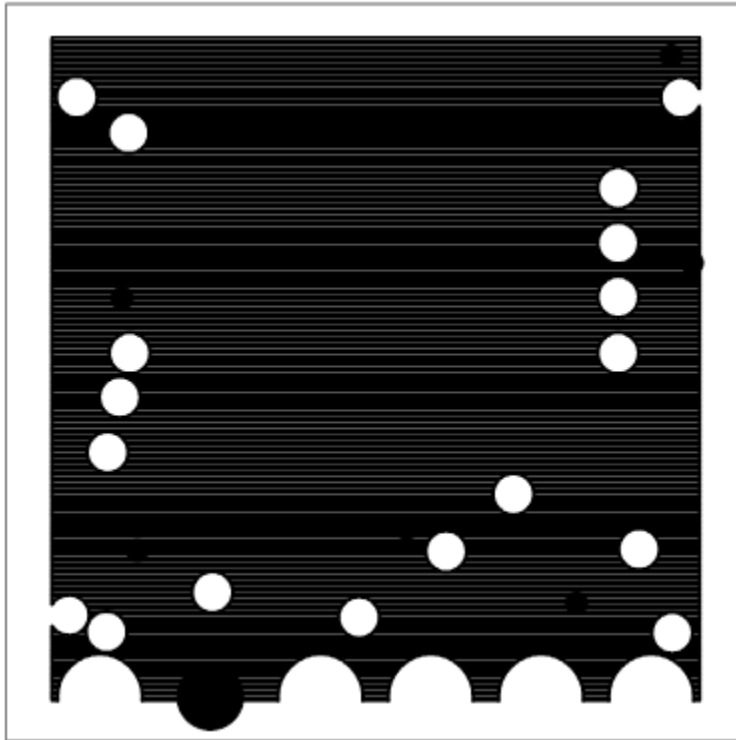


Figure 5-9: Interface Adaptor Inner Layer 2 Routing

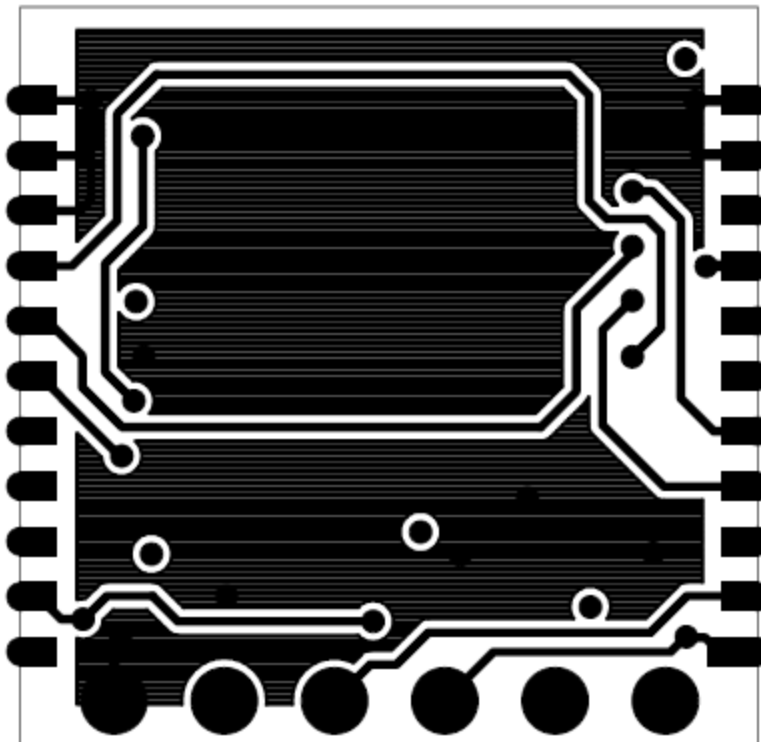


Figure 5-10: Interface Adaptor Bottom Layer Routing

## 6.TTL-232R-3V3 USB-Serial Converter

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.

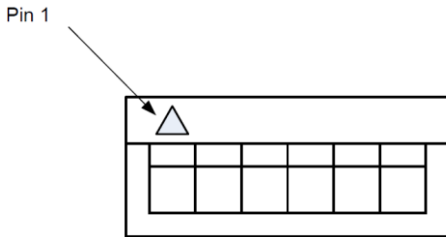


Figure 6-1: Pin Header Socket Bottom view



Pin Number	Name	Type	Colour	Description
1	GND	Power	Black	Ground supply pin
2	$\overline{\text{CS}}\text{T}$	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	$\overline{\text{RT}}\text{S}$	Output	Green	Request To Send output – not in use

Table 6-1: USB-Serial Converter Cable header pin-out

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

Table 6-2: USB-Serial Converter Cable operating parameters