

# GLOBALSAT

## GPS+GOLNASS Engine Board

Hardware Data Sheet

Product No : MT-5110G

Version 1.1



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Issue Date	APPR	CHECK	PREPARE
2013/08/01	Ray		Mason

# Product Description

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## Product Description

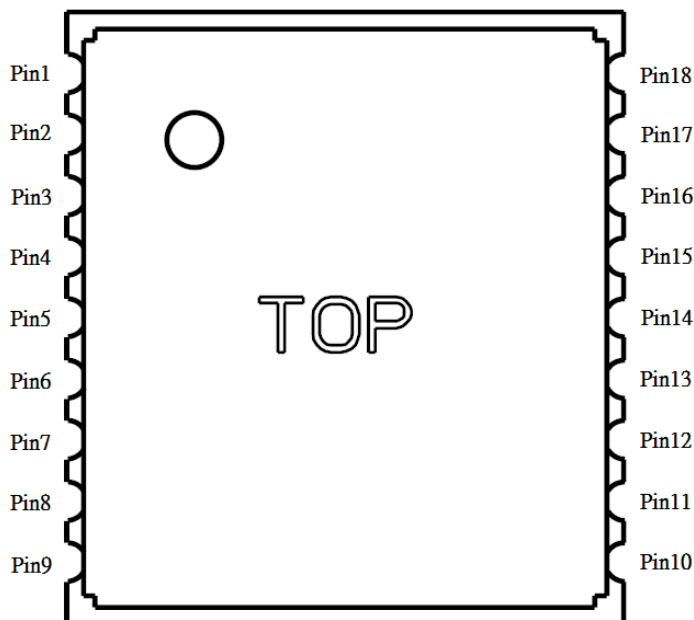
MT-5110G is a compact, high performance, and low power consumption GPS+GLONASS engine board. The chipset is powered by MediaTek, it can provide you with superior sensitivity and performance even in urban canyon and dense foliage environment. The miniature size makes the module easy and the best choice to integrate into portable applications such as DSC, cellular phone, PMP, and gaming devices. MT-5110G is suitable for the following applications:

- Automotive navigation
- Personal positioning
- Fleet management
- Mobile phone navigation
- Marine navigation

## Product Features

- MediaTek high sensitivity solution
- Support 99 search channels and 33 simultaneous tracking channels.
- Very high sensitivity (Tracking Sensitivity: -165dBm )
- Extremely fast TTFF (Time To First Fix) at low signal level
- Support UART(bidirectional transmission) interface
- Support Serial port NMEA output.
- Built-in LNA
- Compact size (10.1mm x 9.7mm x 2.4mm) suitable for space-sensitive application
- One size component, easy to mount on another PCB board
- Support NMEA 0183 V4.0 (GGA, GSA, GSV, RMC, VTG, GLL, ZDA)
- Supports WASS/EGNOS/MSAS/GAGAN (depends on firmware setting)

## Product Pin Description



PIN Number(s)	Name	Type	Description	Note
2	TXD	O	This is the main transmits channel for outputting navigation and measurement data to user's navigation software or user written software. Baud rate based on firmware setting, Output TTL level 2.8V.	
3	RXD	I	This is the main receive channel for receiving software commands to the engine board from MTK software or from user written software. Baud rate based on firmware setting.	
4	TIMEPULSE	O	This pin provides one pulse-per-second output from the board, which is synchronized to GPS time. If do not use it, Just NC.	
6	VBAT	P	This is the power input for the SRAM and RTC. To achieve the faster start-up offered by a hot or warm start, a backup power must be connected. The power voltage should be between 2.5V and 4.3V.	
5,7,13,15,16 ,17,18	RESERVED		MT-5110G reserved pin, just NC.	
8	VCC	P	This is the main power supply to the engine board. (3.3Vdc to 4.3Vdc)	

1,10,12	GND	P	Ground	
9	RESET	I	This pin is input low active. This Module has internal Power on Reset circuit.	
11	RF_IN	I	This pin receives signal of GPS+GLONASS analog via external antenna. It has to be a controlled impedance trace at 50ohm. Do not have RF traces closed the other signal path and routing it on the top layer. Keep the RF traces as short as possible.	
14	VCC_RF	O	This pin can supply external active antenna power 2.8V. If do not use it, just NC.	

## Electrical Specification

### Absolute Maximums Ratings

Parameter	Min.	Typ.	Max.	Conditions	Unit
<b>Power</b>					
Power supply voltage(VCC)	3.3	3.3	4.3		V
Backup battery supply	2.5		4.3		V
VCC_RF output voltage		VCC			
Main power supply Current		37		3.3V	mA
Backup battery supply Current	4.5	5	5.5	3.3V	uA
<b>RF Input</b>					
Input Impedance		50			$\Omega$
Operating Frequency		1.575 1.608			GHz

### DC Electrical characteristics

Parameter	Symbol	Min.	Typ.	Max.	Conditions	Units
I/O Low Level Output Voltage	$V_{OL}$			0.42		V
I/O High Level Output Voltage	$V_{OH}$	2.38				V
I/O Low Level Input Voltage	$V_{IL}$	-0.3		0.7		V
I/O High Level Input Voltage	$V_{IH}$	2.1		3.1		V
TXD Output Voltage	$V_{TO}$	2.52	2.8	3.08		V
RXD Input Voltage	$V_{RI}$			3.6		V
High Level Output Current	$I_{OH}$		2			mA
Low Level Output Current	$I_{OL}$		2			mA
VCC_RF	$V_O$		2.8			V
VCC_RF Output Current	$V_{OC}$		7			mA

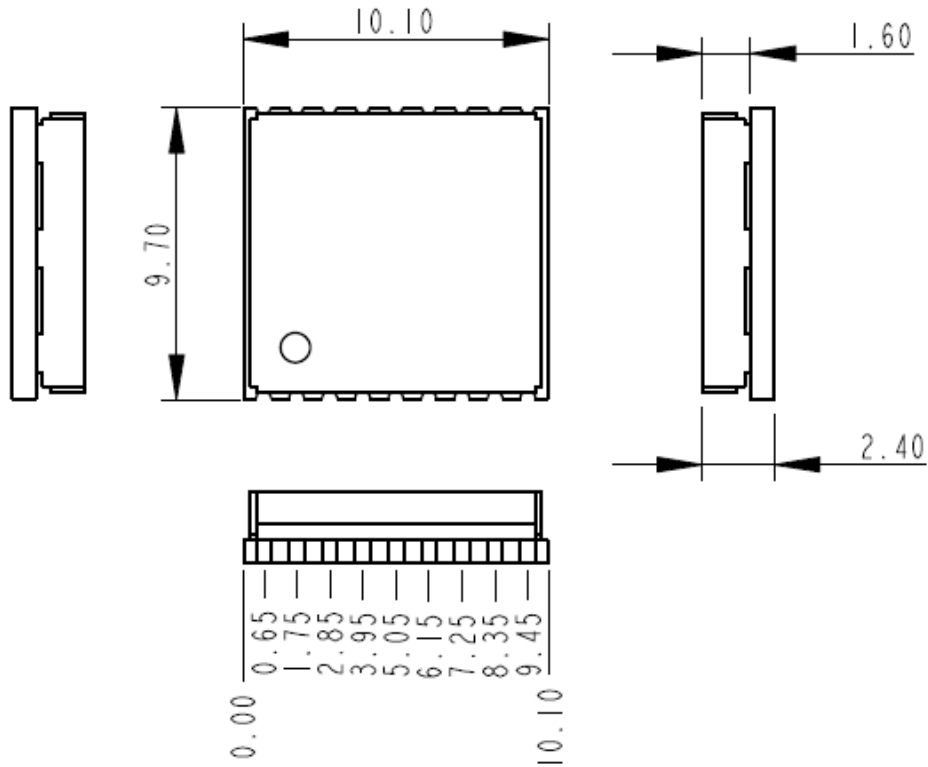
### Environmental Characteristics

Parameter	Min	Typ	Max	Unit
Humidity Range	5		95	% non-condensing
Operation Temperature	-40	25	85	$^{\circ}\text{C}$
Storage Temperature	-40		85	$^{\circ}\text{C}$

## Receiver Performance

Sensitivity	Chipset Tracking :	-165dBm
	Chipset Autonomous acquisition :	-148 dBm
Time-To-First-Fix	Cold Start – Autonomous	< 35s
	Warm Start – Autonomous	< 35s
	Hot Start – Autonomous	< 1s
Horizontal Position Accuracy	Autonomous	< 3m (2D RMS)
	SBAS	<2.0m
Velocity Accuracy	Speed	< 0.01 m/s
	Heading	< 0.01 degrees
Reacquisition	0.1 second, average	
NMEA Update Rate	Output data format based on firmware setting	
Maximum Altitude	< 18,000 meter	
Maximum Velocity	< 515 meter/ second	
Maximum Acceleration	< 4G	

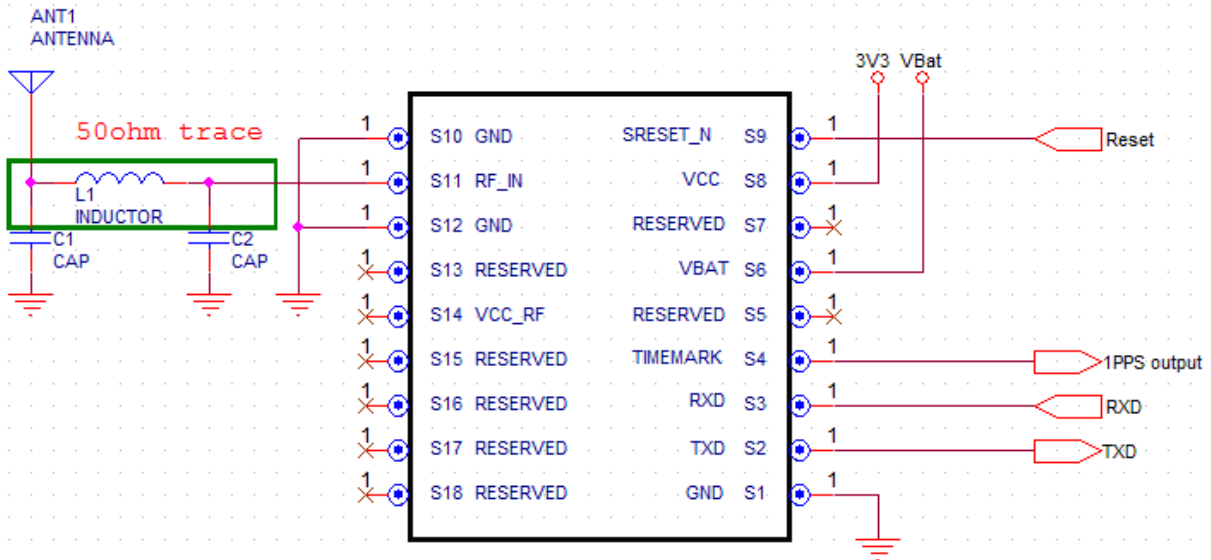
**Package Dimensions**



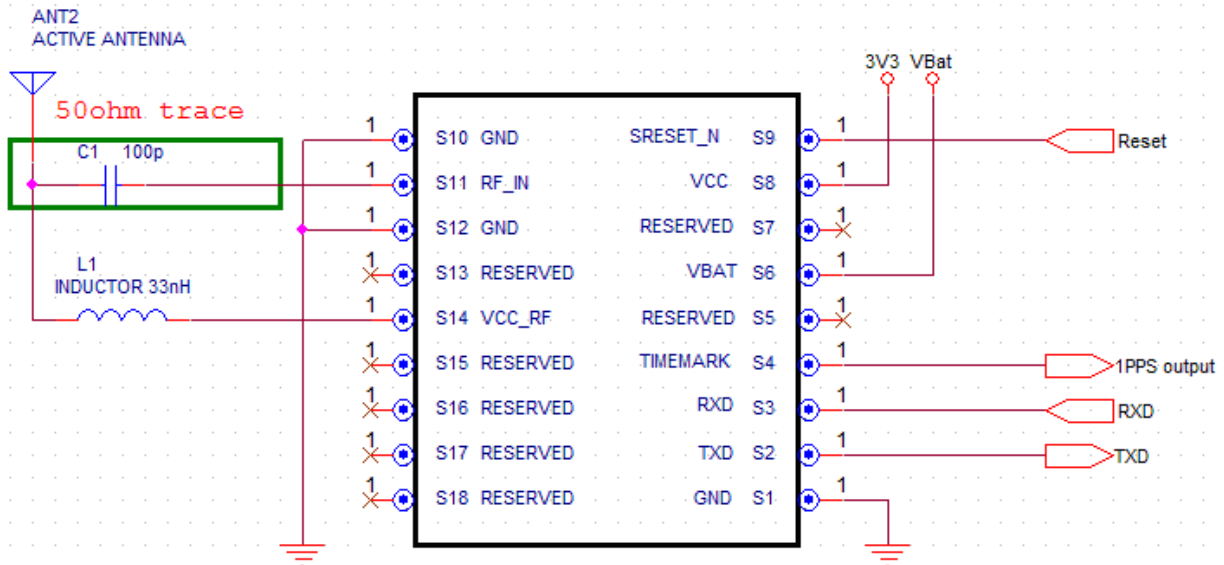
Type	18-pin stamp holes
Dimensions	10.1 mm * 9.7 mm * 2.4 mm ±0.2mm

# Application

## Application circuit with passive antenna



## Application circuit with active antenna





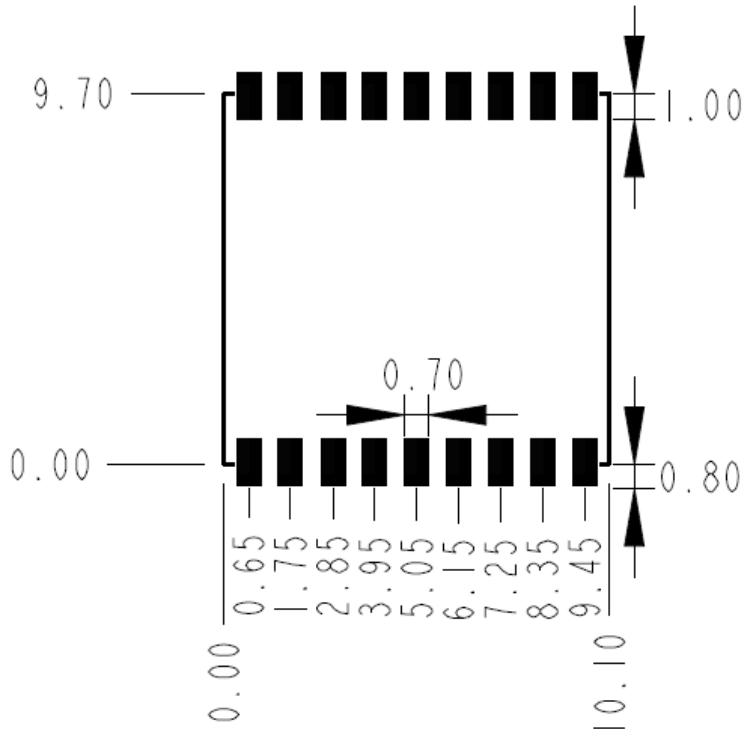
**GPS/GLONASS Active Antenna Specifications (Recommendation)**

Frequency:	1575.42 + 2MHz 1602MHz~1615MHz	Amplifier Gain:	18~22dB Typical
Axial Ratio:	3 dB Typical	Output VSWR:	2.0 Max.
Output Impedance:	50Ω	Noise Figure:	2.0 dB Max
Polarization:	RHCP	Antenna Input Voltage:	2.85V (Typ.)

**NOTE:**

1. VCC\_RF: MT-5110G provides power 2.8V to external active antenna

## Recommended Layout PAD



**Unit: mm**  
**Tolerance: 0.1mm**

## PCB Layout Recommend

Do not routing the other signal or power trace under the engine board.

### RF:

This pin receives signal of GPS+GLONASS analog via external active antenna .It has to be a controlled impedance trace at 50ohm.

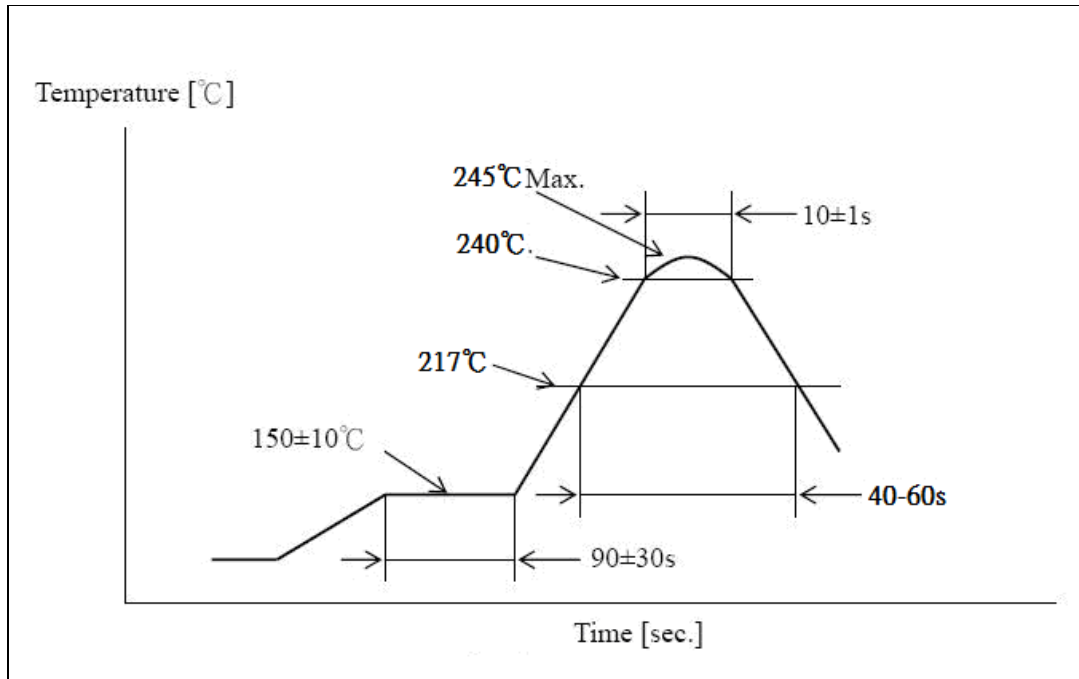
Do not place the RF traces close to the other signal path and not routing it on the top layer.

Keep the RF traces as short as possible.

### Antenna:

Keep the active antenna on the top of your system and confirm the antenna radiation pattern 、 axial ratio 、 power gain 、 noise figure 、 VSWR are correct when you Setup the antenna in your case.

## Recommended Reflow Profile:



Pre heating temperature: 150±10[°C]      Pre heating time: 90±30[sec.]

Heating temperature: 240±5[°C]      Heating time: 10±1[sec.]

Peak temperature must not exceed 245°C and the duration of over 217°C should be 40 - 60 Seconds.

# Appendix

## Label Artwork

A: GLOBALSAT

B: Module Info

XX

SX = SiRF

MX = MTK

XG =GPS+GLONASS

XB =GPS+BDS

XC & XS=GPS

XXXX : IC Type & Date code

C: Bar code

D: Serial Number

E: First pin Mark



## Reversion history

Reversion	Date	Name	Status / Comments
V1.0	2013/8/1	Mason	Initial Version
V1.1	2014/1/14	Mason	Modify Label Artwork