

RYS8839

Ultra-low power, L1 L5 Dual-band multi-constellation +1.8V GNSS module

Datasheet



11mm*8mm*2.2mm



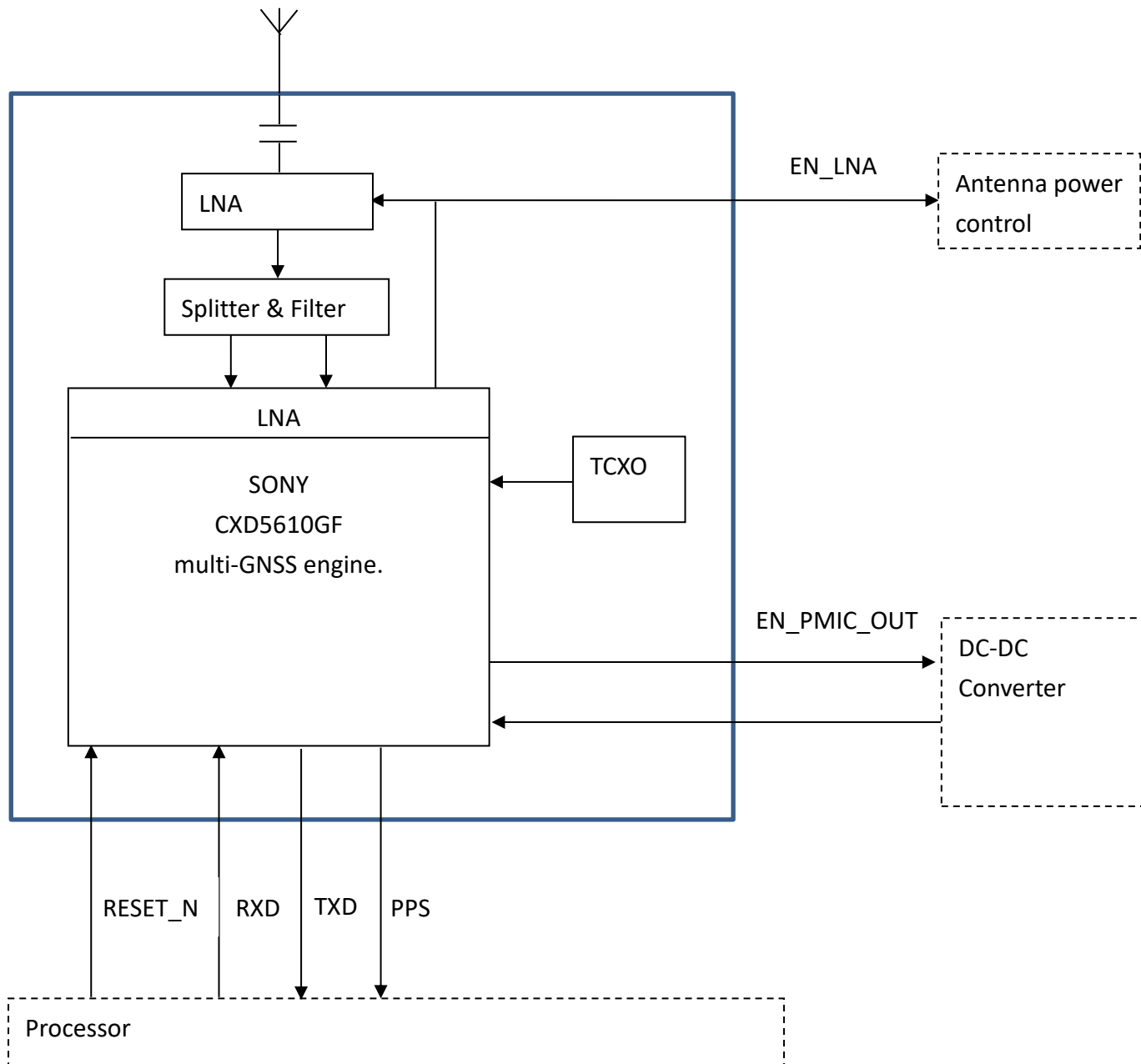
PRODUCT DESCRIPTION

The RYS8839 is an ultra-low power, L1 L5 Dual-band multi-constellation GNSS module. It also has integrated digital noise filters for coexistence with other radio systems.

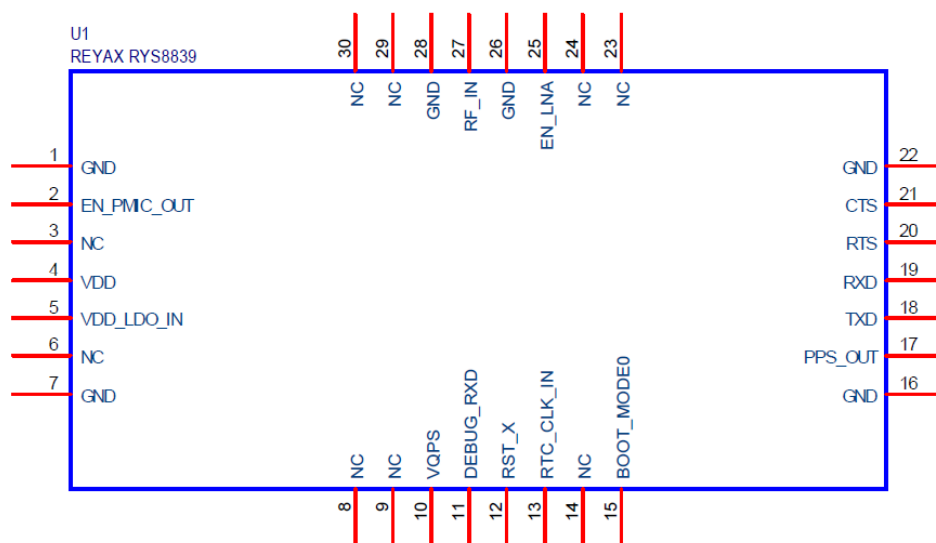
FEATURES

- SONY CXD5610GF Engine.
- A L1 L5 Dual-band GNSS receiver.
- Supports multi-constellation :
 - GPS(L1C/A,L5)
 - GLONASS(L1OF)
 - BeiDou(B1I, B1C, B2a)
 - Galileo(E1, E5a)
 - QZSS(L1C/A, L1S, L1C/B, L5)
 - IRNSS NavIC(L5)
 - SBAS(L1)
- *GNSS performance could depend on the setting.
- Embedded digital noise filters and spectrum analyzer.

BLOCK DIAGRAM

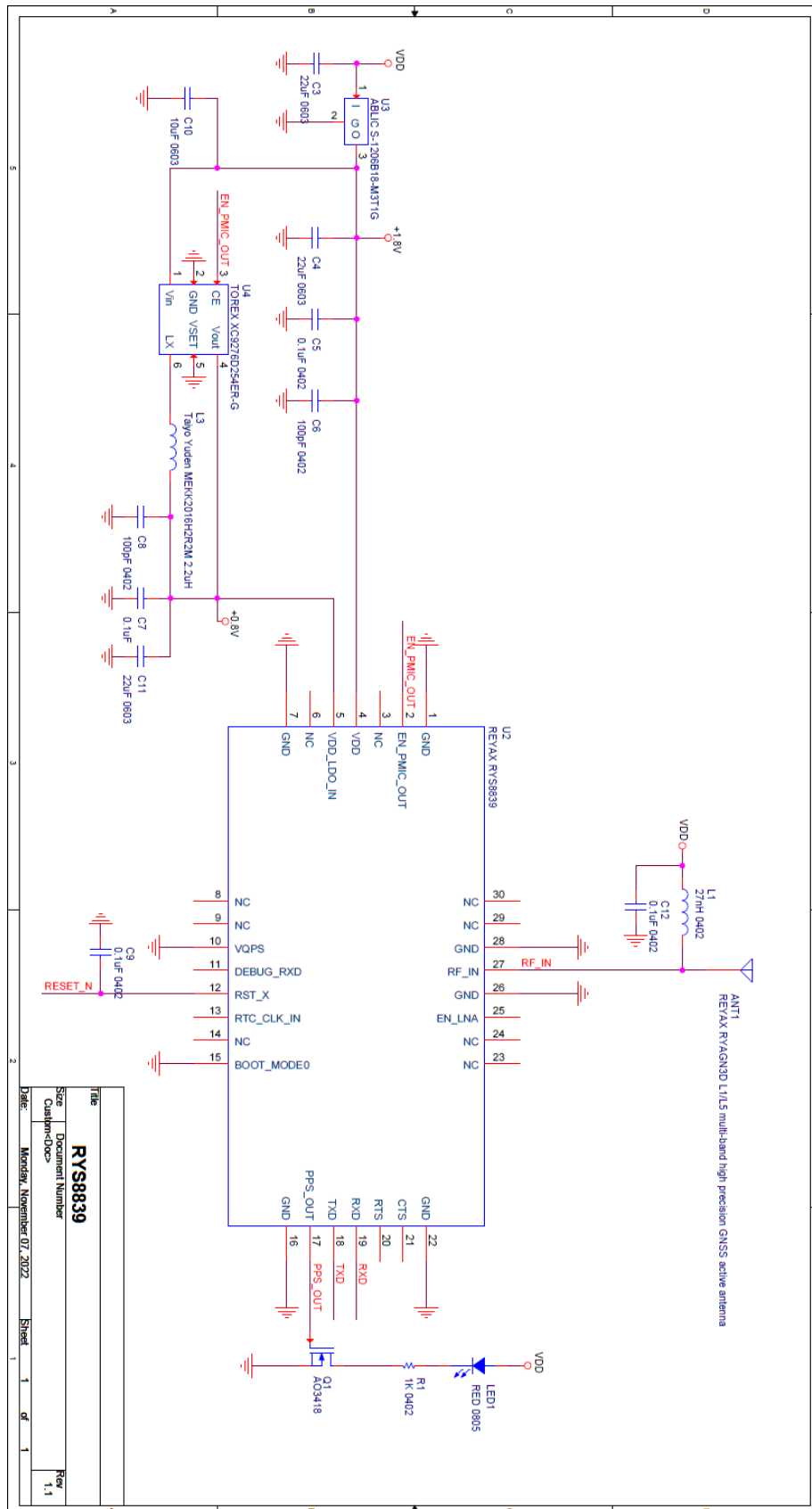


PIN DESCRIPTION



Pin	Name	I/O	Condition
1,7,16,22,26,28	GND	-	Ground
3,6,8,9,14,23,24,29,30	NC	-	Leave Unconnected.
2	EN_PMIC_OUT	O	To enable external PMIC, High active. (Optional)
4	VDD	I	+1.8V Power Supply and I/O Voltage.
5	VDD_LDO_IN	I	+0.8V For the Core block
10	VQPS	I	Reserved, Connect to GND.
11	DEBUG_RXD	I	Reserved, Leave Unconnected.
12	RST_X	I	Reset input, Normal High.
13	RTC_CLK_IN	I	32.768KHz RTC clock input. *If not used, Please Leave Unconnected.
15	BOOT_MODE0	I	GND : UART Interface, VDD : I2C Interface.
17	PPS_OUT	O	Time pulse output.
18	TXD/SCL	O	Serial interface Output / I2C interface
19	RXD/SDA	I/O	Serial interface Input / I2C interface
20	RTS	I	Request to send
21	CTS	O	Clear to Send
25	EN_LNA	O	To enable external active antenna, High active. (Optional)
27	RF_IN	I	GNSS RF Signal input.

APPLICATION SCHEMATIC(Use buck regulator)



Title	RYS8839
Docu. No.	
Rev	1.1
Date	Monday, November 07, 2022
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SPECIFICATION

Item	Min.	Typical	Max.	Unit	Condition
Power Supply Voltage	1.75	1.8	1.85	V	VDD noise level < 30mVpp
	0.72	0.8	0.88	V	VDD_LDO_IN noise level < 30mVpp
GNSS continuous mode					
Satellite acquisition Current		24		mA	L1+L5 Acquisition
Satellite tracking Current		16		mA	L1+L5 Acquisition with 64-SV
Idle Current		2		mA	Waiting for command
Default Baud Rate		115200		bps	8,N,1
Digital input level high	0.7*VDD		VDD+0.3	V	VIH
Digital input level low	-0.3		0.3*VDD	V	VIL
Digital output level high	0.8*VDD		VDD	V	VOH 2mA
Digital output level low	0		0.2*VDD	V	VOL 2mA
GNSS Center Frequency		1176.45 1561.098 1575.42 1602.5625		MHz	GPS L5 BeiDou GPS L1 Glonass
Navigation update rate		1	25	Hz	
Accuracy		1		M	L1 L5 Signal strength is -130dBm
Cold starts		24		Sec.	L1 L5 Signal strength is -130dBm
Hot starts		1		Sec.	L1 L5 Signal strength is -130dBm
Tracking Sensitivity		-167		dBm	
Hot starts Sensitivity		-163		dBm	
Cold starts Sensitivity		-149		dBm	
Velocity		<0.1		m/s	The measured value is based on the condition of measured with simulator, and receiver moved at the constant speed (20km/h)
Operating Temperature	-40	25	+85	°C	
Dimensions					11mm*8mm*2.2mm
Weight		0.37		g	

REFLOW SOLDERING

Consider the "IPC-7530 Guidelines for temperature profiling for mass soldering (reflow and wave) processes, published 2001. **Only single reflow soldering processes are recommended for REYAX modules. Repeated reflow soldering processes and soldering the module upside down are not recommended.**

Preheat phase

Initial heating of component leads and balls. Residual humidity will be dried out. Please note that this preheat phase will not replace prior baking procedures.

- Temperature rise rate: max. 3 °C/s If the temperature rise is too rapid in the preheat phase it may cause excessive slumping.
- Time: 60 - 120 s If the preheat is insufficient, rather large solder balls tend to be generated. Conversely, if performed excessively, fine balls and large balls will be generated in clusters.
- End Temperature: 150 - 200 °C If the temperature is too low, non-melting tends to be caused in areas containing large heat capacity.

Heating/ Reflow phase

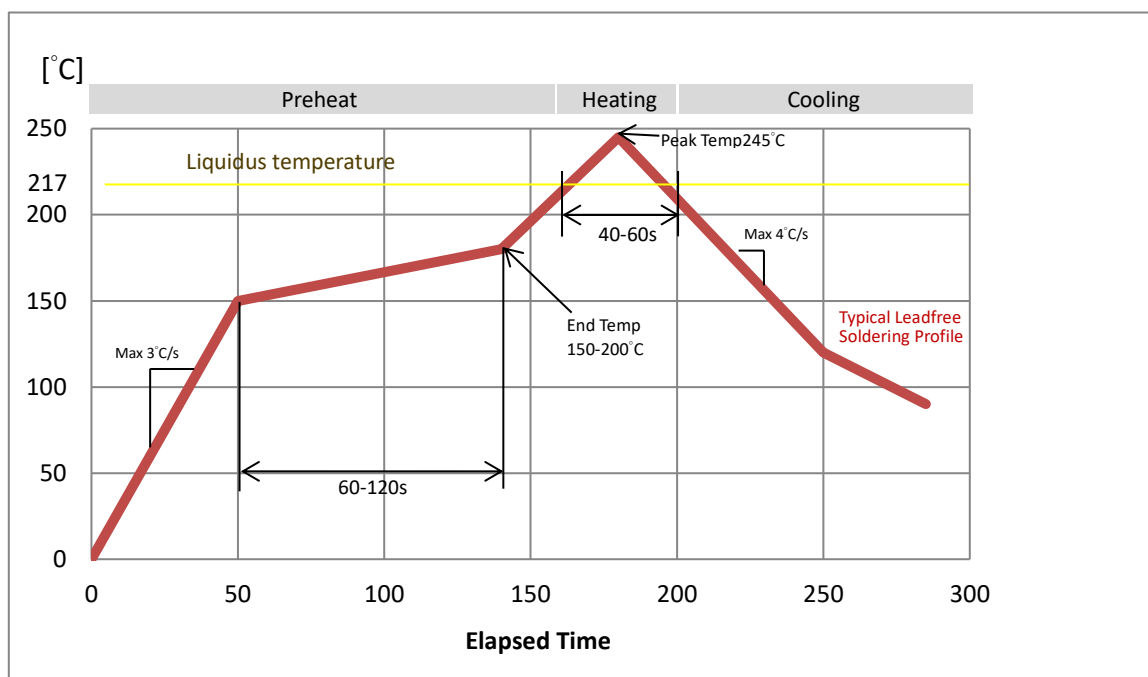
The temperature rises above the liquidus temperature of 217°C. Avoid a sudden rise in temperature as the slump of the paste could become worse.

- Limit time above 217 °C liquidus temperature: 40 - 60 s
- Peak reflow temperature: 245 °C

Cooling phase

A controlled cooling avoids negative metallurgical effects (solder becomes more brittle) of the solder and possible mechanical tensions in the products. Controlled cooling helps to achieve bright solder fillets with a good shape and low contact angle.

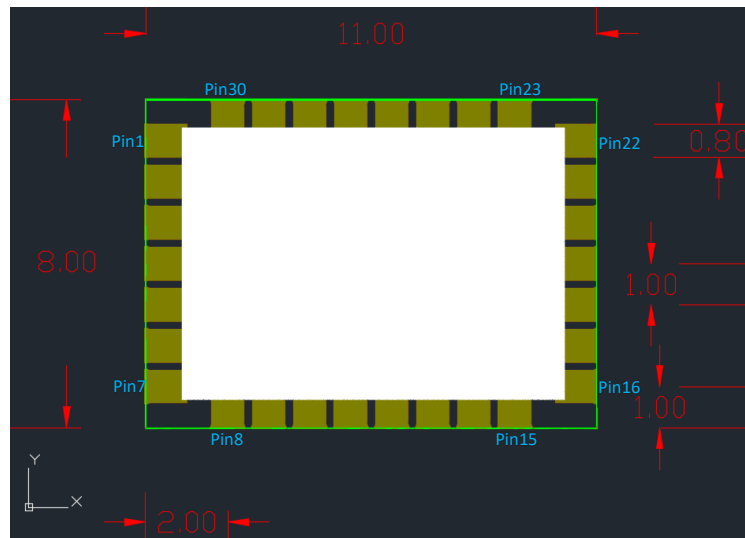
- Temperature fall rate: max 4 °C/s To avoid falling off, the REYAX module should be placed on the topside of the motherboard during soldering.



Recommended soldering profile

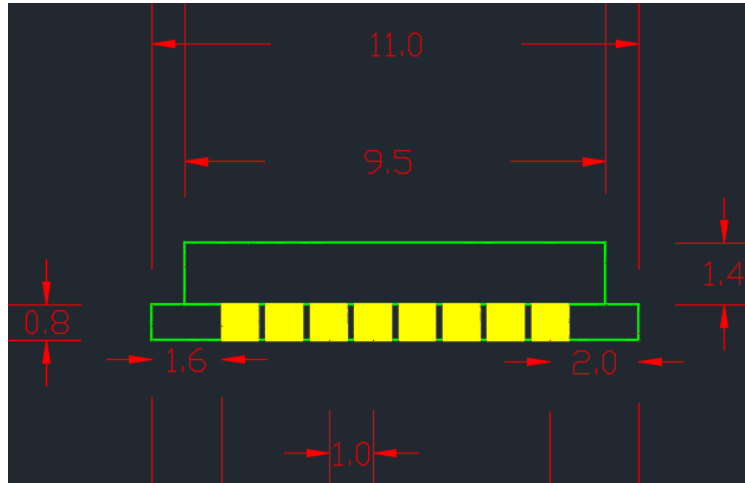
DIMENSIONS

TOP view:



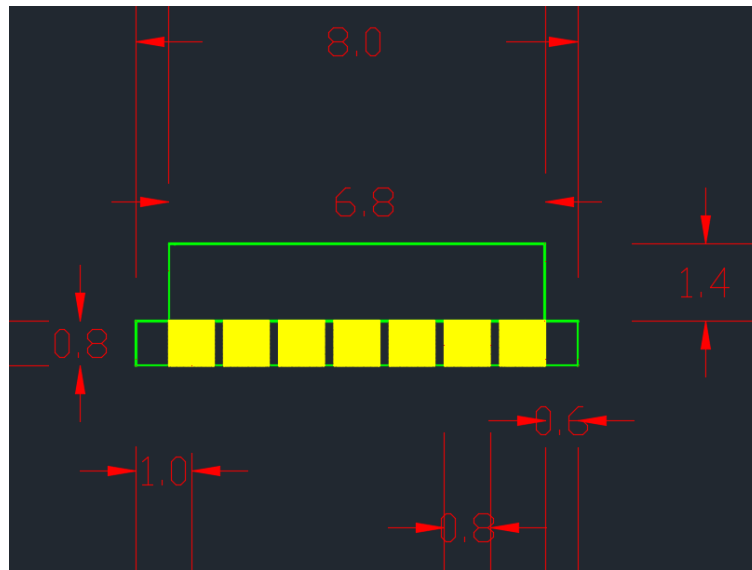
Unit : mm

Upper/Lower view:



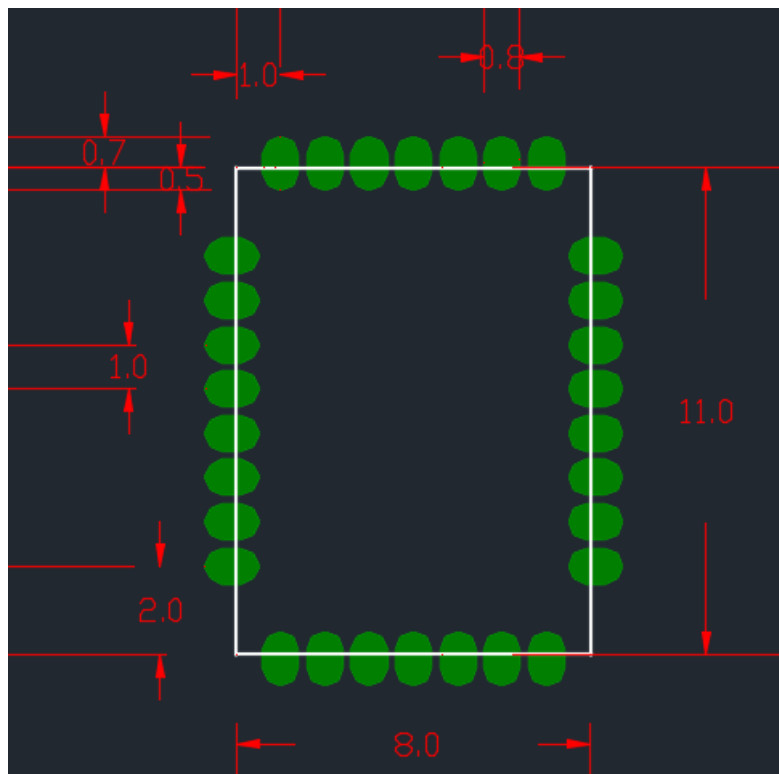
Unit : mm

Side view:



Unit : mm

LAYOUT FOOTPRINT RECOMMENDATIONS



Unit : mm

Quick User Guide

STEP 1. INSTALL THE SOFTWARES

1.) Download the GNSS_Monitor2_ForCustomer_Setup

<https://drive.google.com/file/d/1e6uwdC3NmsTMZIWHbXxcK98UI8Ng-4RC/view?usp=sharing>

STEP 2. CONNECTION SETTING

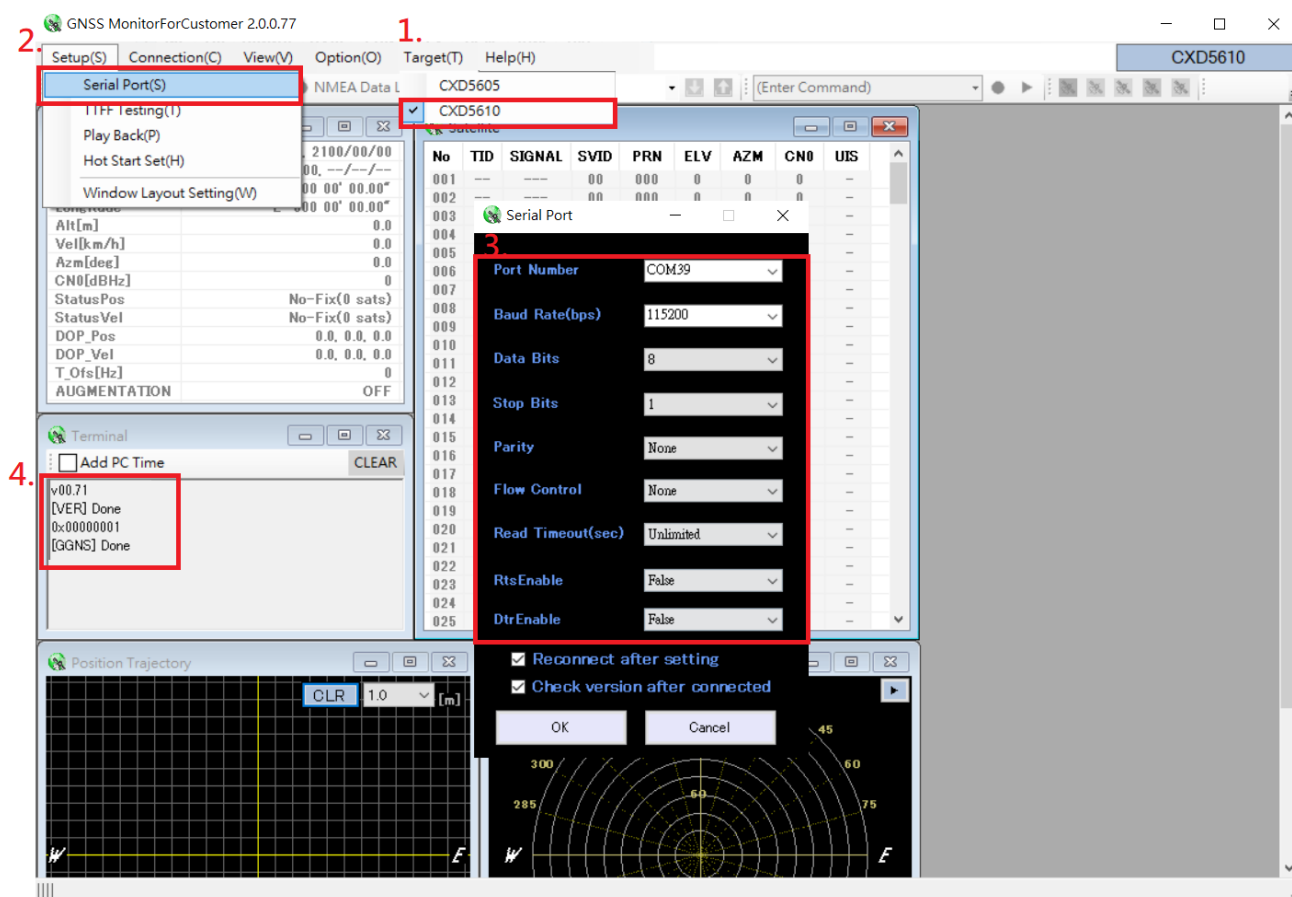
Plug USB to TTL cable to connect the RYS8839_lite and the PC.

1.) Open the software GNSS_Monitor2_ForCustomer Target → CXD5610

2.) Open the Serial Port setting

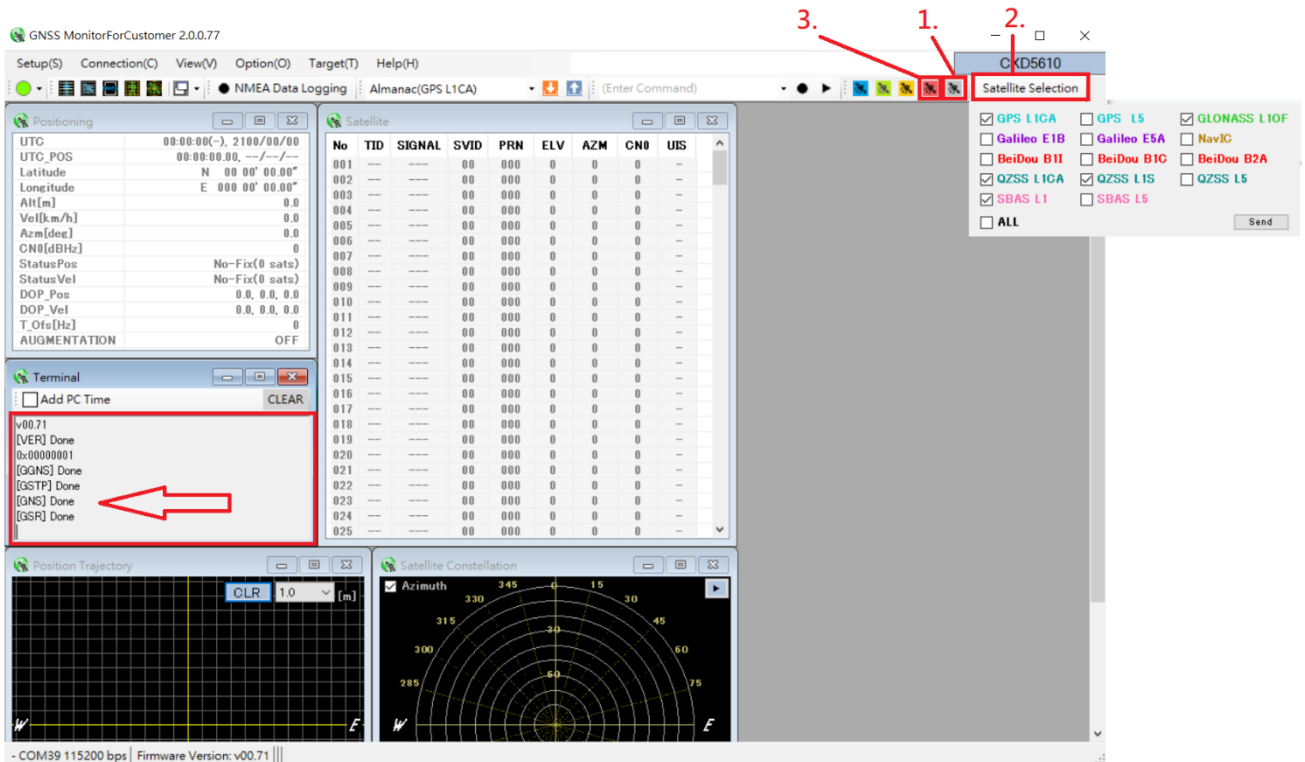
3.) Set the COM port number and the baud rate (Default is 115200bps).

4.) If connection successful, will show FW version message.



STEP 3. Command input setting

- 1.) Click "IDLE" button, Terminal window will show [GSTP]Done.
- 2.) Click "Satellite Selection" button, after select Satellite and click "Send". Terminal window will show [GNS]Done.
- 3.) Click "Hot start" button, Terminal window will show [GSR]Done. Module start output NMEA log.
- 4.) If want to stop tracking, click "IDLE" button.



*For detailed command user guide, please refer to RYS8839_Software_Guide

https://reyax.com/wp-content/uploads/2018/09/RYS8839_Software_Guide.pdf



E-mail : sales@reyax.com

Website : <https://reyax.com>