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RYS8839

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

Datasheet

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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.

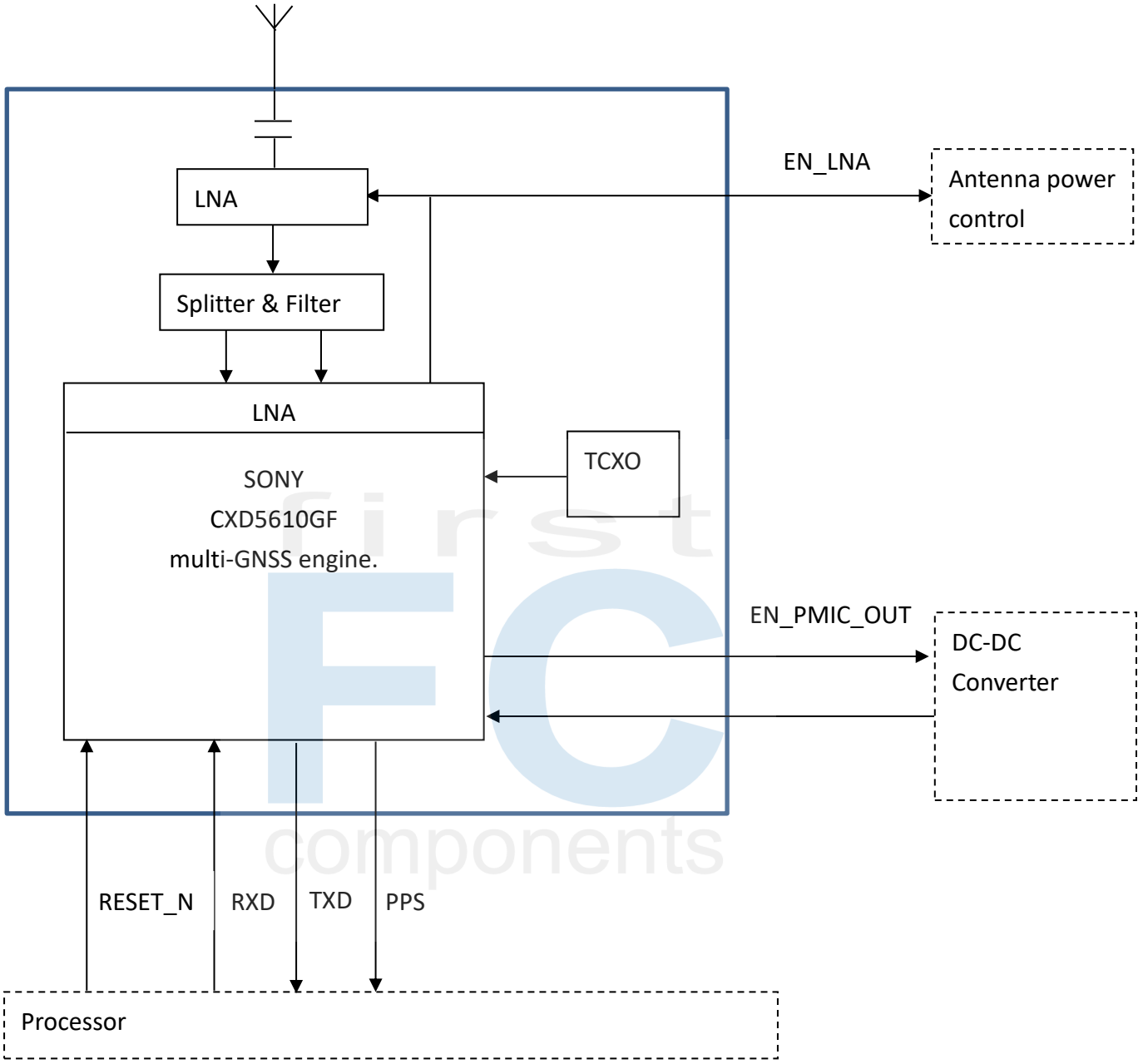
FEATURES

- 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.

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BLOCK DIAGRAM



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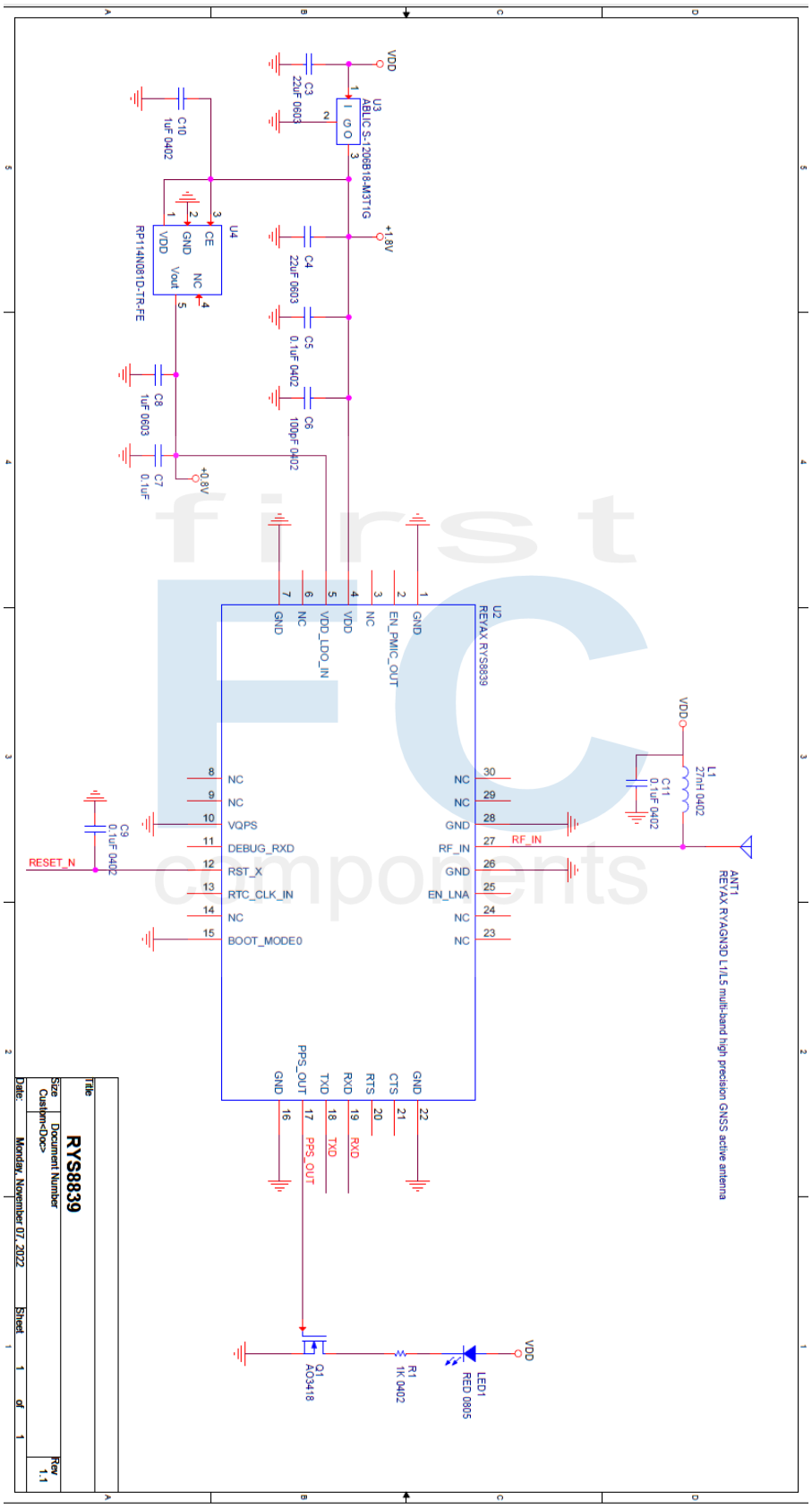
PIN DESCRIPTION



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.

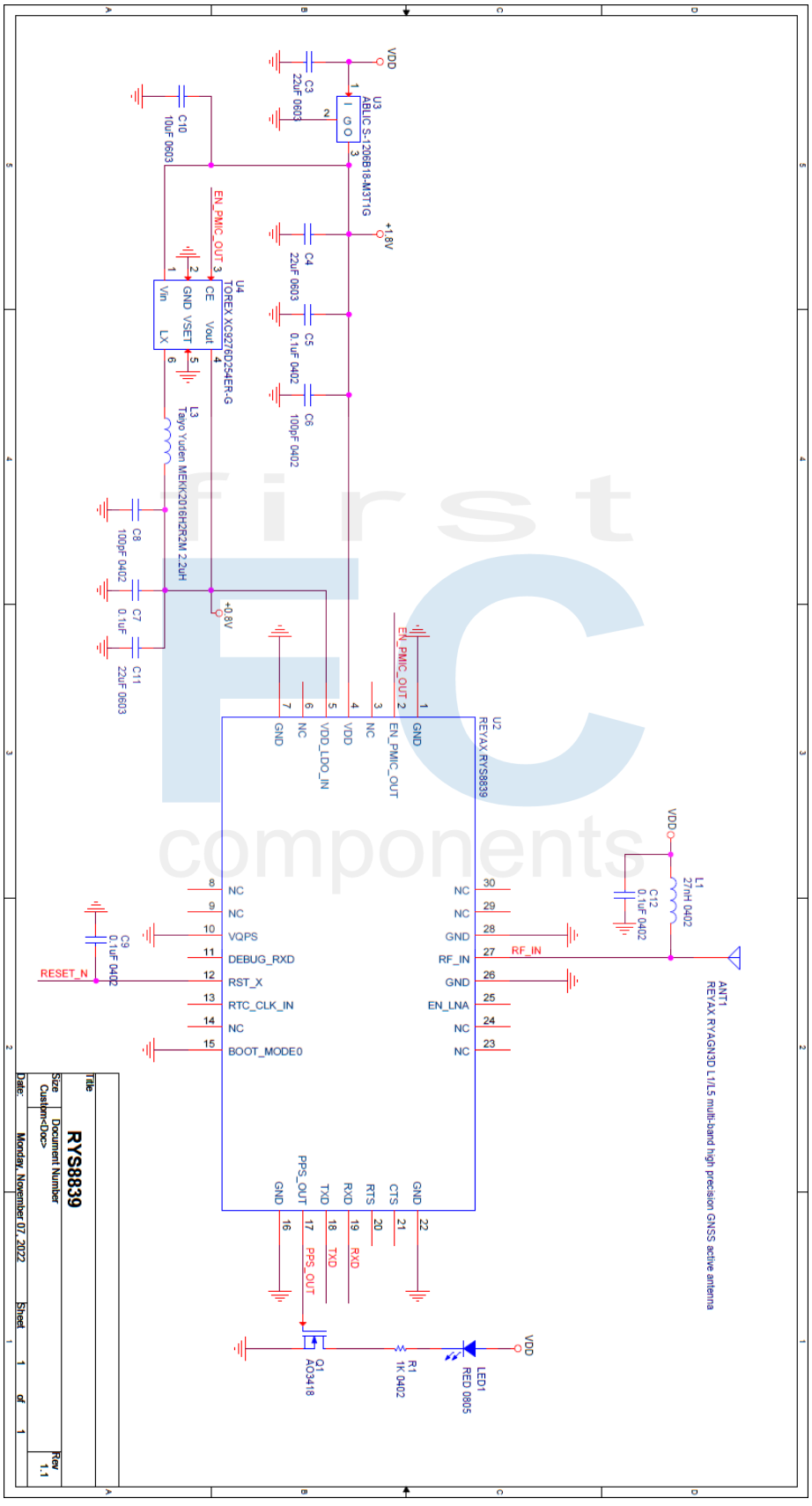
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APPLICATION SCHEMATIC



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APPLICATION SCHEMATIC(Use buck regulator)



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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	

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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

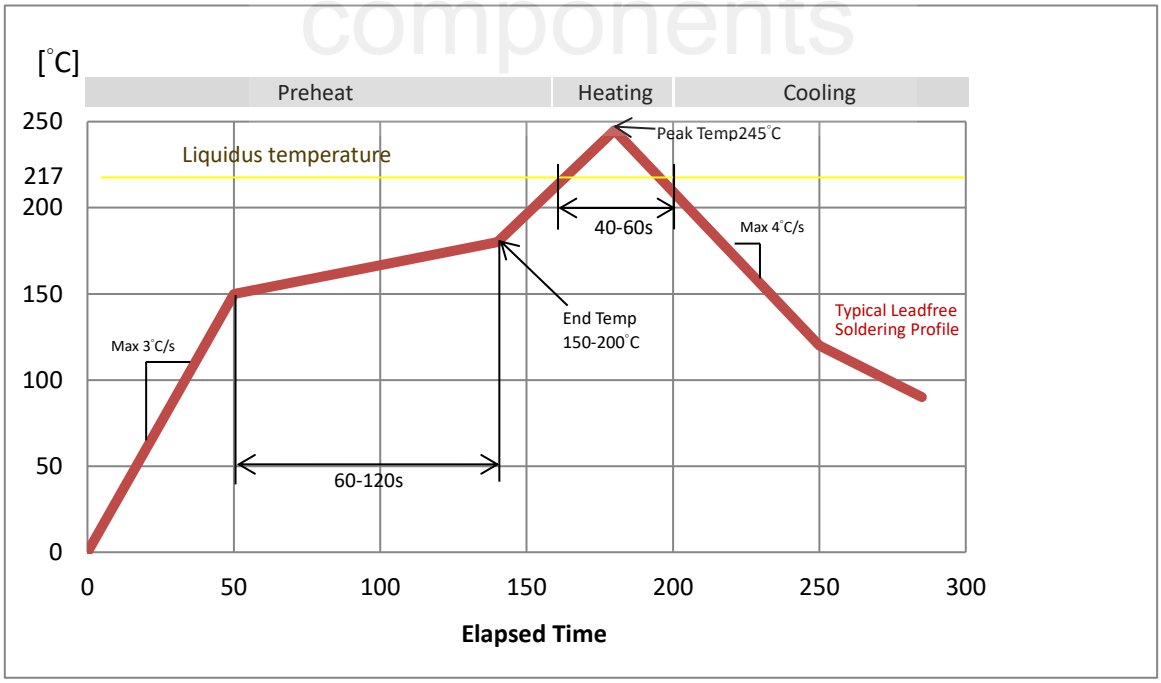
The temperature rises above the liquidus temperature of 217°C. Avoid a sudden rise in temperature as the slump of the paste could become worse.

- 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.

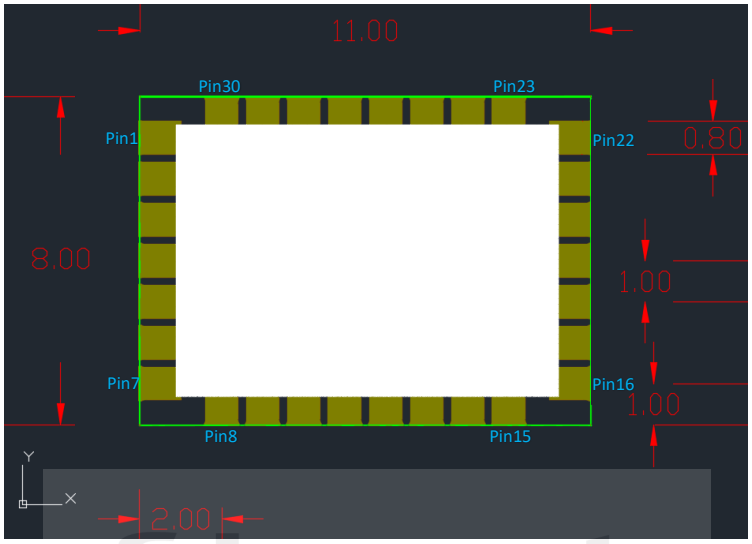


Recommended soldering profile

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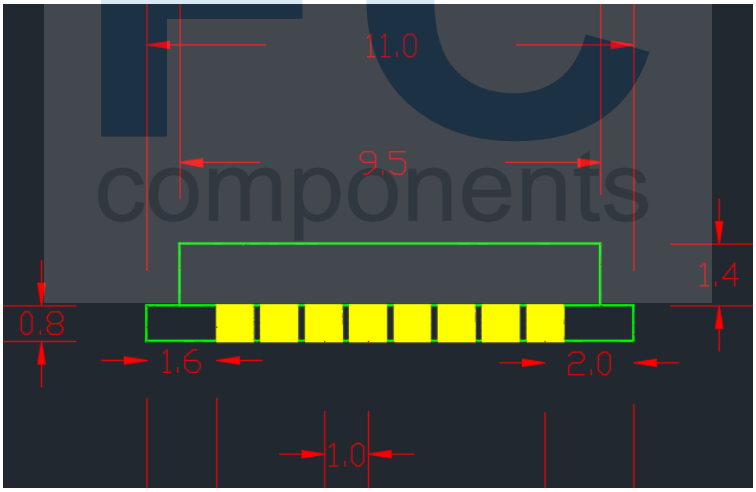
DIMENSIONS

TOP view:



Unit : mm

Upper/Lower view:

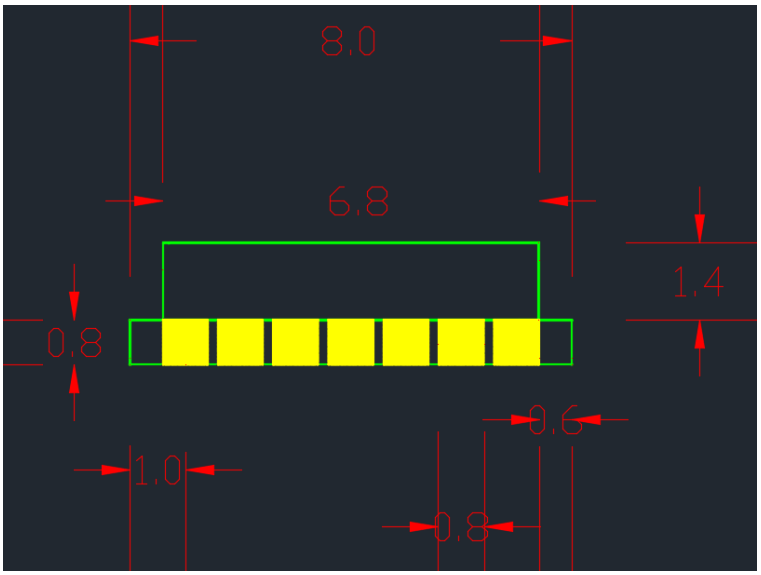


Unit : mm

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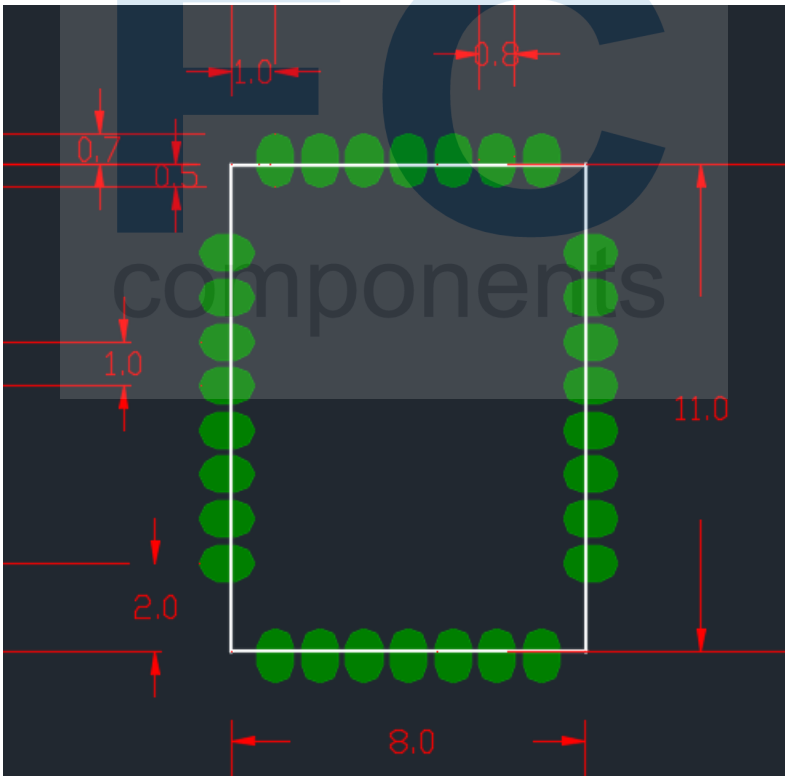
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Side view:



Unit : mm

LAYOUT FOOTPRINT RECOMMENDATIONS



Unit : mm

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Quick User Guide

STEP 1. INSTALL THE SOFTWARES

1.) Download the GNSS_Monitor2_ForCustomer_Setup

https://drive.google.com/file/d/1e6uwdC3NmsTMZIWHbXxcK98Ul8Ng-4RC/view?usp=sharing

STEP 2. CONNECTION SETTING

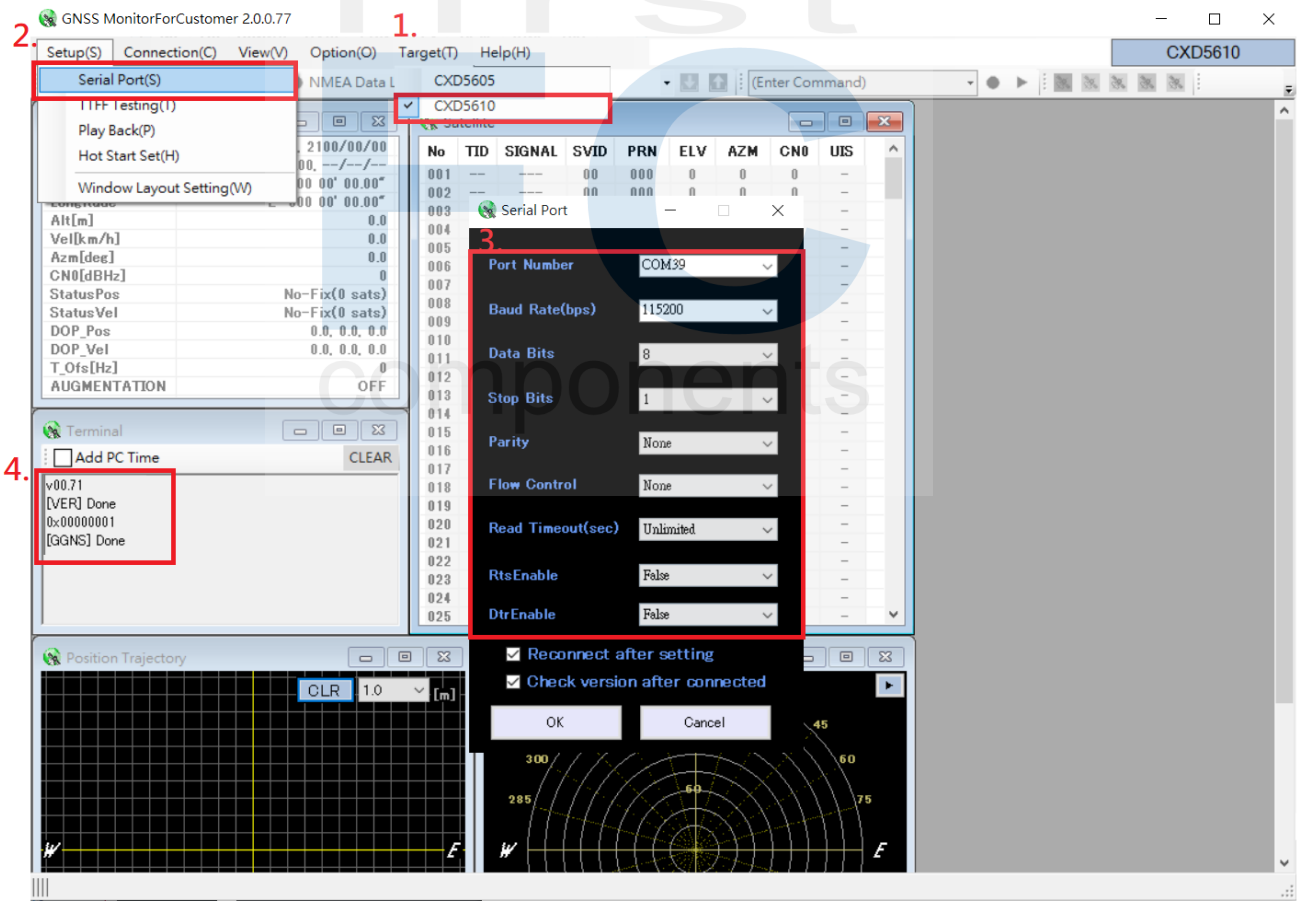
Plug USB to TTL cable to connect the RYS8839_lite and the PC.

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.



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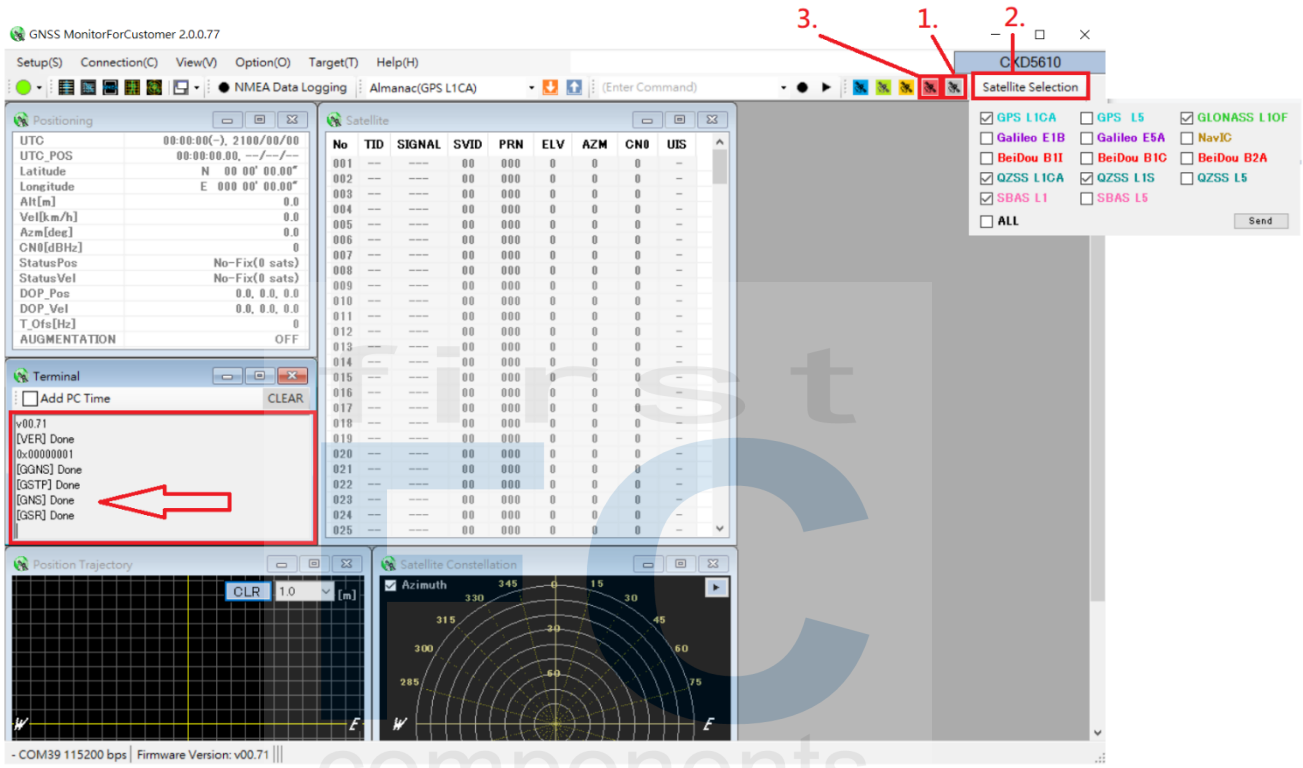
STEP 3. Command input setting

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

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