L70-R EVB User Guide

GPS Module Series

Rev. L70-R_EVB_User_Guide_V1.0

Date: 2014-05-07

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.
Office 501, Building 13, No.99, Tianzhou Road, Shanghai, China, 200233
Tel: +86 21 5108 6236
Mail: info@quectel.com

Or our local office, for more information, please visit:
http://www.quectel.com/support/salesupport.aspx

For technical support, to report documentation errors, please visit:
http://www.quectel.com/support/techsupport.aspx

GENERAL NOTES

QUECTEL OFFERS THIS INFORMATION AS A SERVICE TO ITS CUSTOMERS. THE INFORMATION PROVIDED IS BASED UPON CUSTOMERS' REQUIREMENTS. QUECTEL MAKES EVERY EFFORT TO ENSURE THE QUALITY OF THE INFORMATION IT MAKES AVAILABLE. QUECTEL DOES NOT MAKE ANY WARRANTY AS TO THE INFORMATION CONTAINED HEREIN, AND DOES NOT ACCEPT ANY LIABILITY FOR ANY INJURY, LOSS OR DAMAGE OF ANY KIND INCURRED BY USE OF OR RELIANCE UPON THE INFORMATION. ALL INFORMATION SUPPLIED HEREIN IS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

COPYRIGHT

About the Document

History

Revision	Date	Author	Description
1.0	2014-05-07	Ada LI	Initial

Contents

Table Index

Figure Index

1 Introduction

This document defines and specifies the usage of L70-R EVB (Evaluation Board). You can get useful information about L70-R EVB and GPS demo tool from this document.

2 Introduction to EVB Kit

2.1. EVB Top and Bottom View

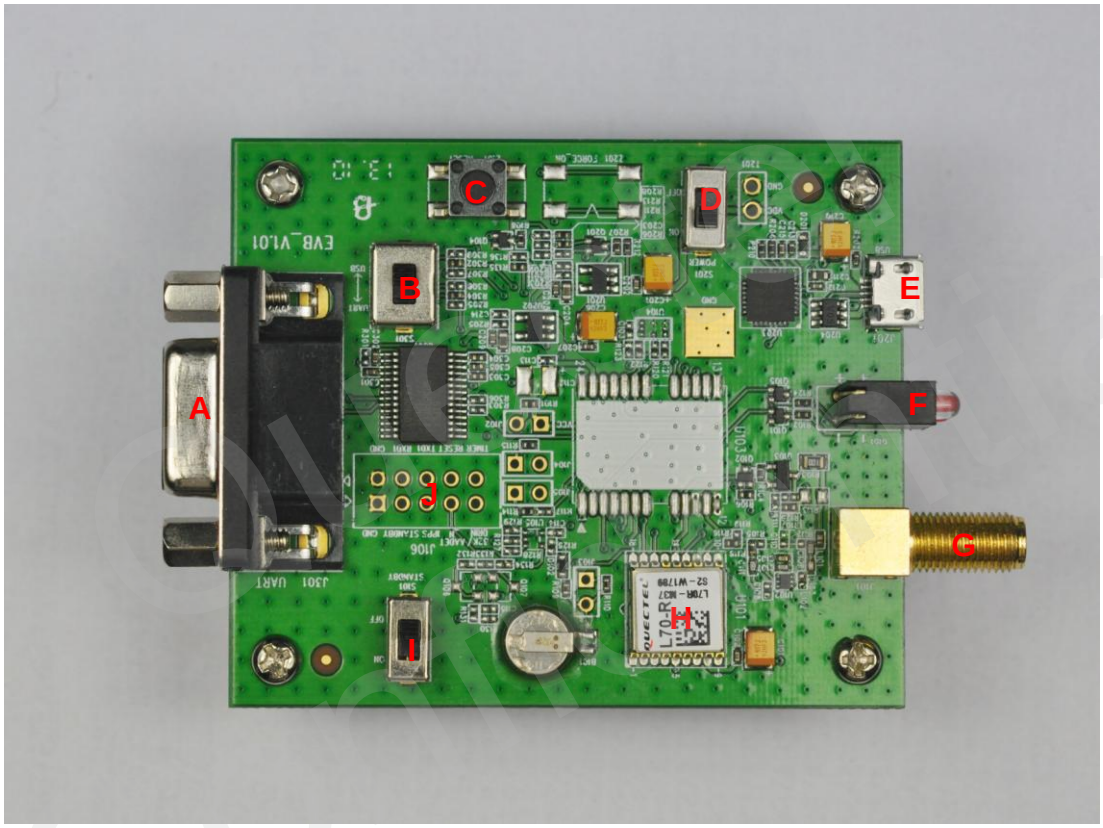


Figure 1: EVB Top View

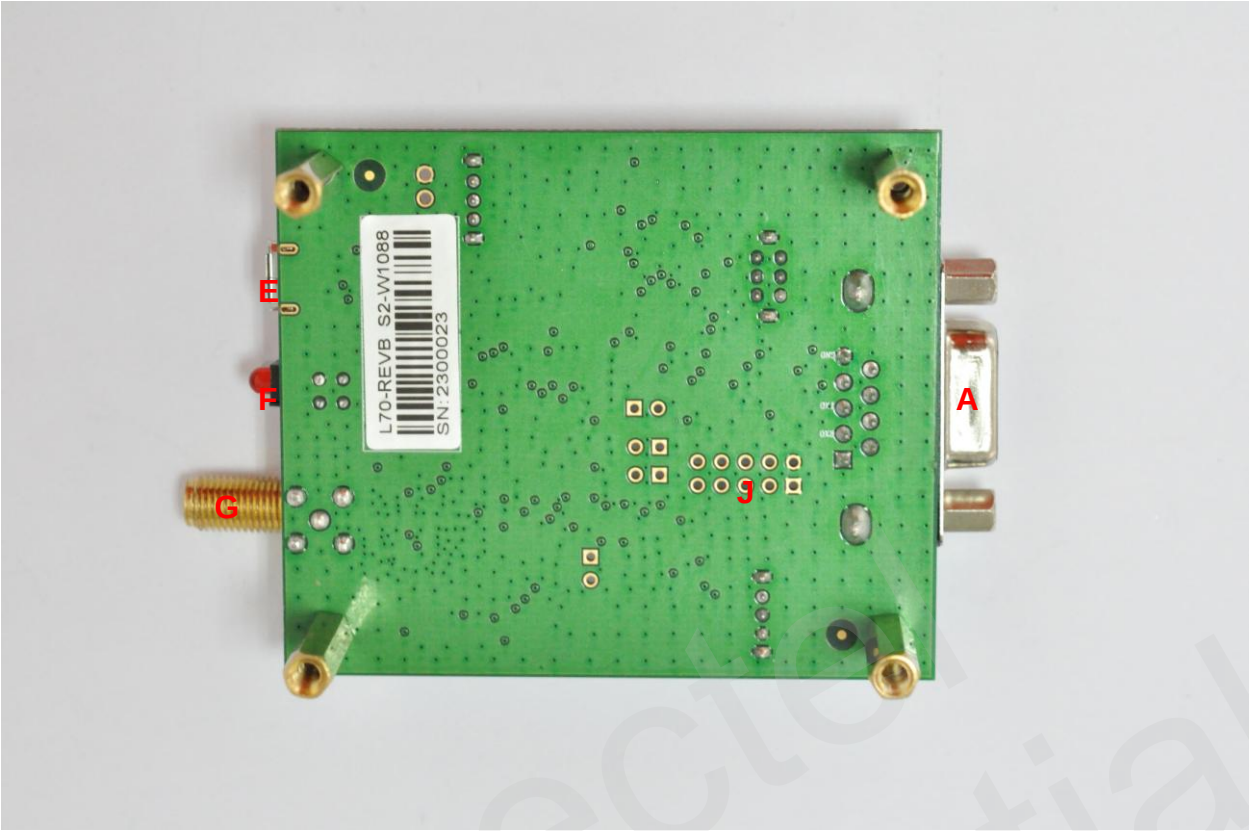


Figure 2: EVB Bottom View

A: UART port
B: Serial port alternation switch
C: RESET button
D: POWER switch
E: Micro-USB port
F: Indication LEDs
G: Antenna interface
H: L70-R Module
I: STANDBY switch
J: Test points

2.2. EVB Accessories

Figure 3: EVB Accessories

A: USB cable
B: GPS active antenna (3.3V)

3 Interface Application

3.1. USB Interface

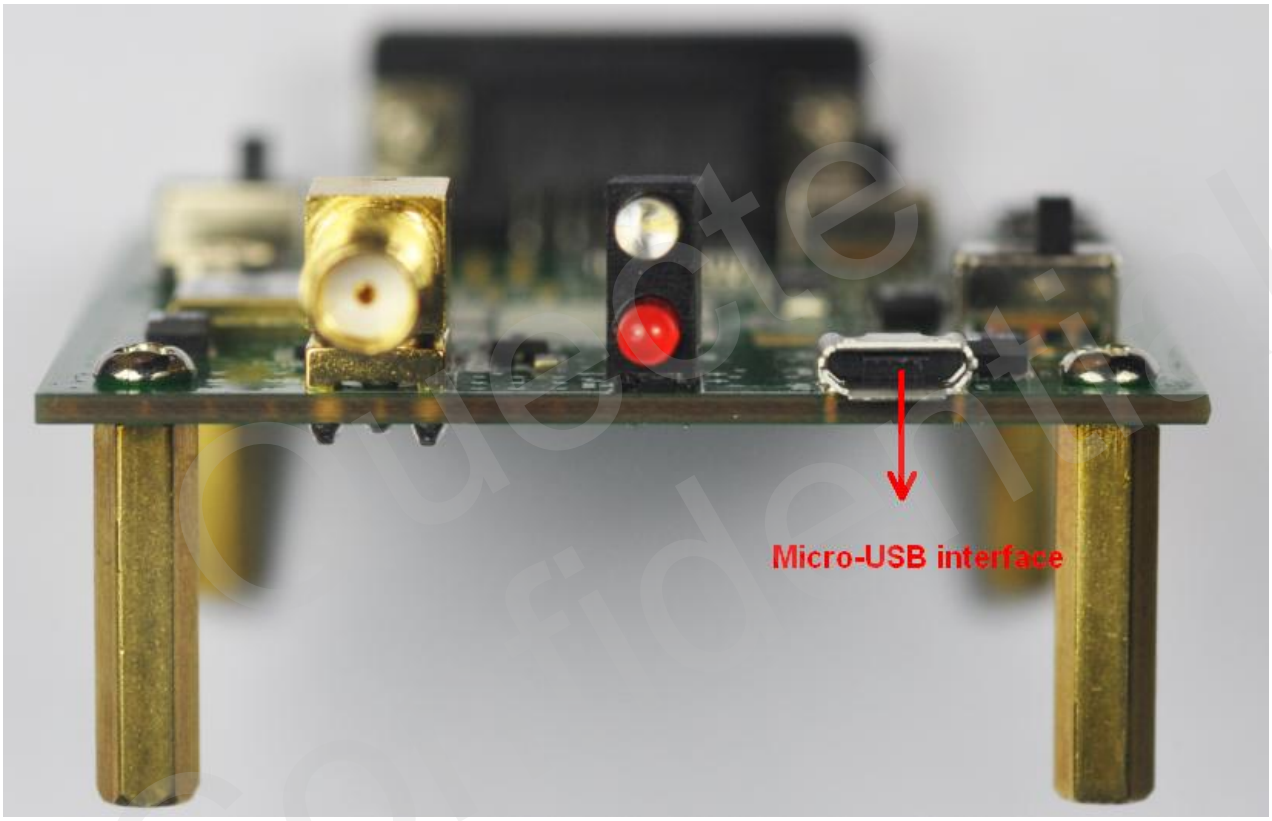


Figure 4: Micro-USB Interface

The main power is supplied via Micro-USB interface. Quectel provides two ways for data communication: Micro-USB and UART interface which are controlled by serial port alternation switch (S2). Both of RS232 and Micro-USB cable are necessary, if you want to use UART in order to output NEMA. So the easy way is touse Micro-USB cable which both provides the power and output NEMA. You can make alternation between UART port and Micro-USB interface via switch (S2).

NOTE

If you want to use PowerGPS Tool, UART interface is recommended for data communication.

3.2. UART Interface

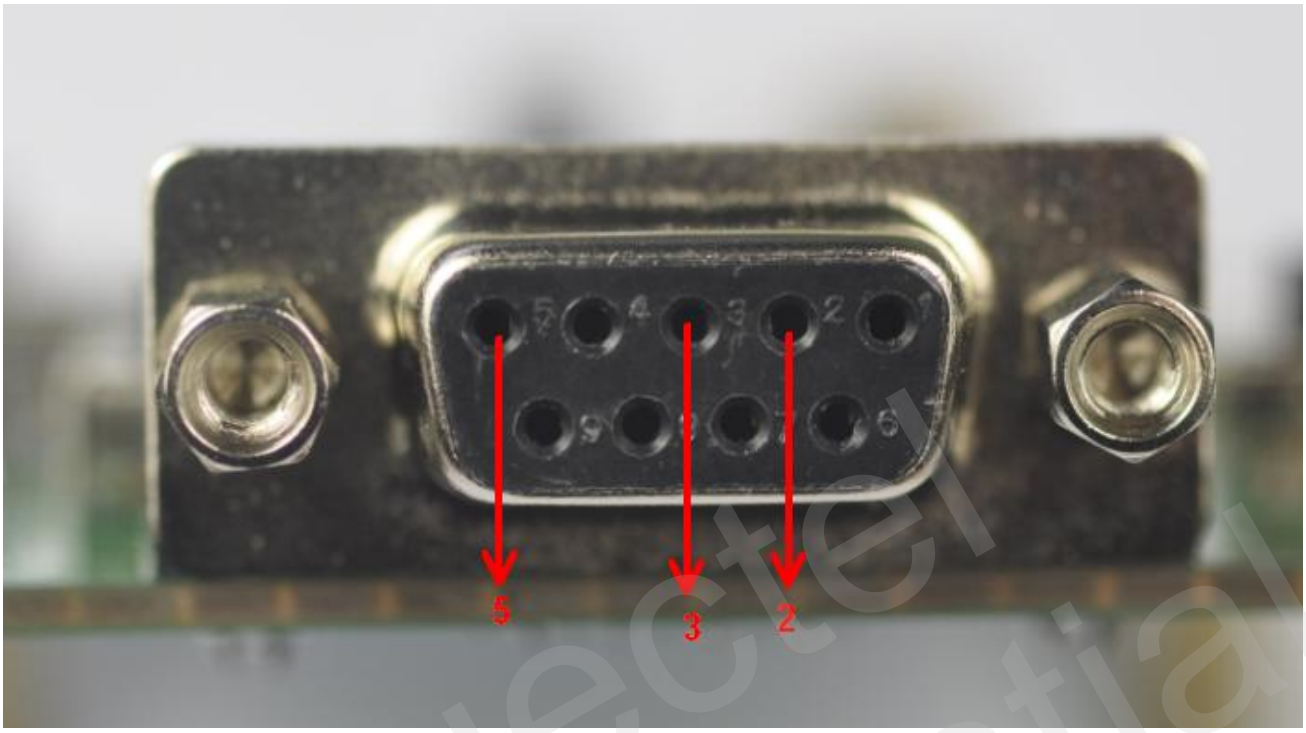


Figure 5: UART Interface

Table 1: Pins of UART Port

Pin	Signal	I/O	Description
2	RXD	I	Receive data
3	TXD	O	Transmit data
5	GND		GND

3.3. Antenna Interface

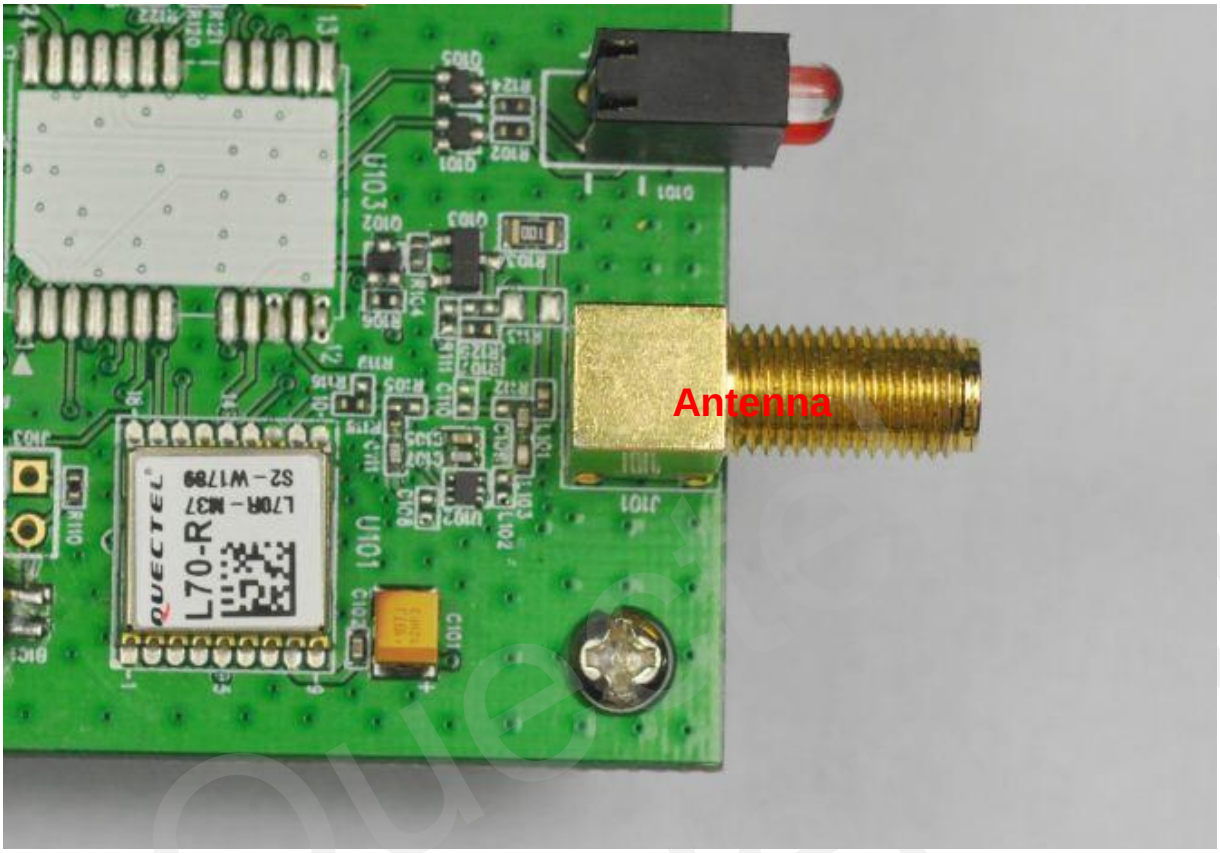


Figure 6: Antenna Interface

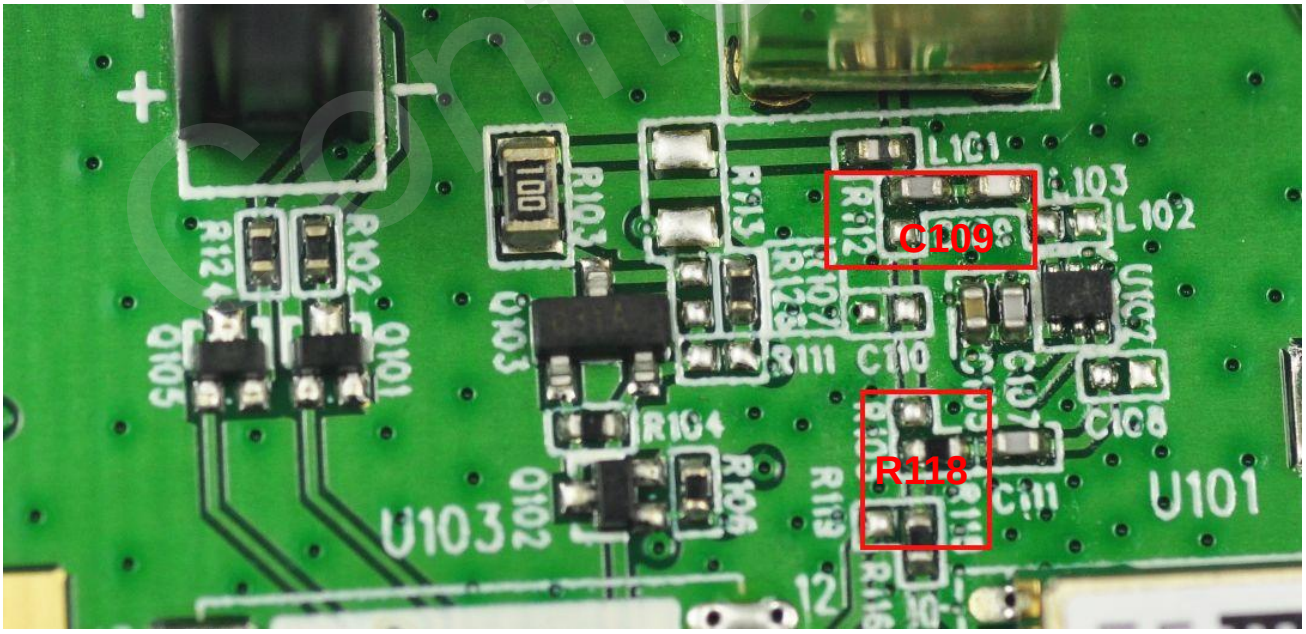


Figure 7: LNA Layout

For choice of external antenna, both of active antenna and passive antenna can be selected. Please note the LNA is installed in the EVB by default, so you have to move C109 to R112 and R118 to R105, when you want to remove the LNA for test.

3.4. Switches and Buttons

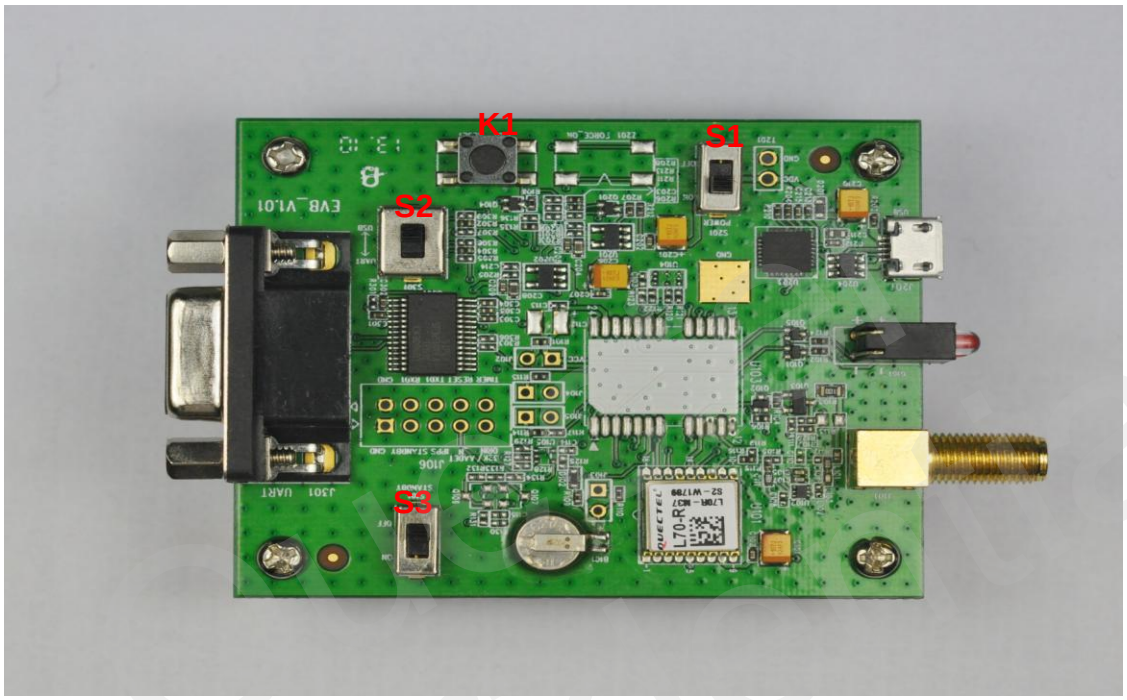


Figure 8: Switches and Buttons

Table 2: Switches and Buttons

Part	Name	I/O	Description
S1	POWER	I	Control power supply via Micro-USB.
S2	Serial port alternation switch	I	QUECTEL EVB supplies two communicative ways: Micro-USB and UART which are controlled by switch.
S3	STANDBY	I	The module will enter into standby mode when switching from OFF to ON, and exit from standby mode in the opposite operation.
K1	RESET	I	Press and release this button, then the module will reset.

3.5. Operating Status LEDs

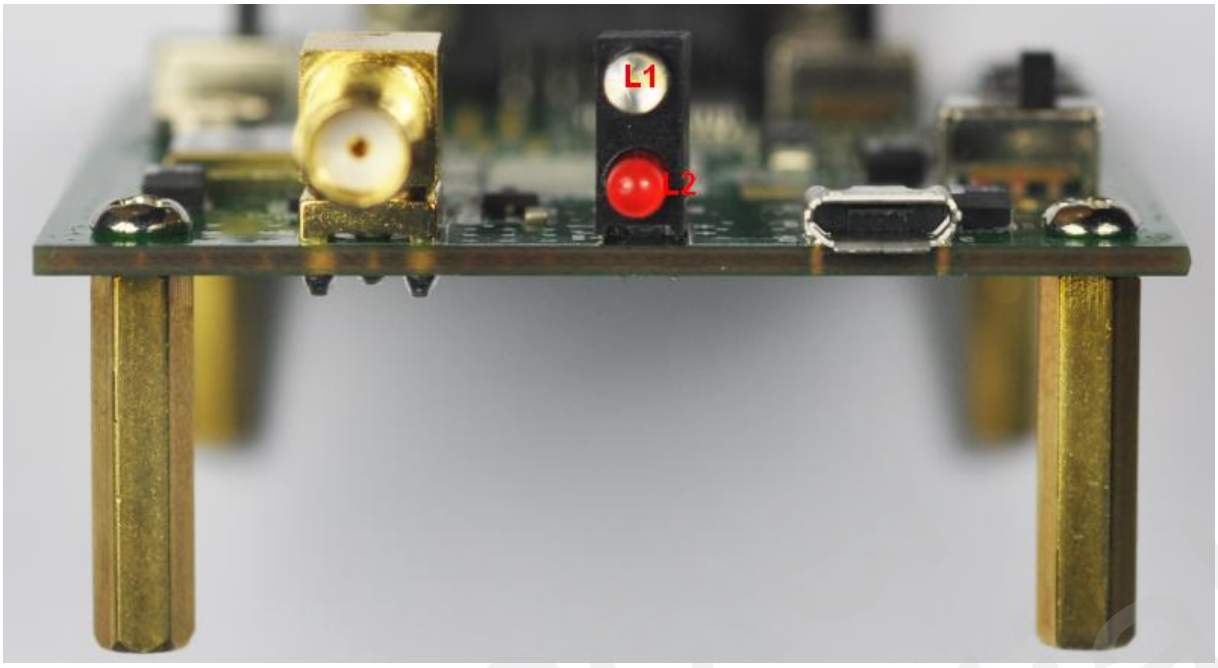


Figure 9: Operating Status LEDs

Table 3: Operating Status LEDs

Part	Name	I/O	Description
L1	TXD1	O	Flash: turn on successfully. Micro-USB or UART1 port can output messages. Extinct: fail to turn on the module.
L2	1PPS	O	Flash: fix successfully. The frequency is 1Hz. Extinct: no fix.

3.6. Test Points

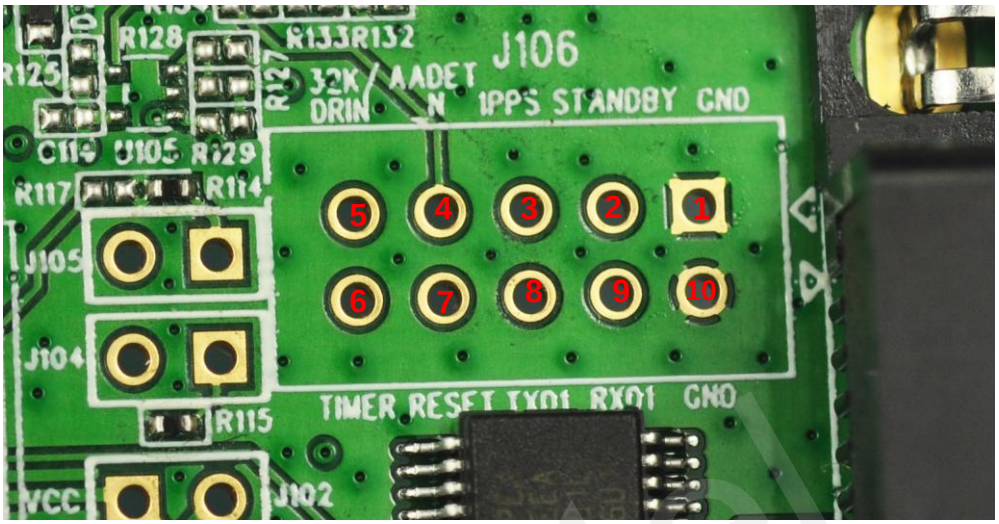


Figure 10: Test Points J106

Table 4: Pins of J106

Pin	Signal	I/O	Description
1/10	GND		Ground
2	STANDBY	I	Enter or exit standby mode
3	1PPS	O	1 pulse per second
4	AADET_N	I	Reserved
5	32K/DRIN		Reserved
6	TIMER(FORCE_ON)		Reserved
7	RESET	I	System reset
8	TXD1	O	Transmit data
9	RXD1	I	Receive data

4 EVB and Accessories

The EVB and its accessories are equipped as shown in Figure 11.

Figure 11: EVB and Accessory Equipments

5 Install Device Driver

Please note that you need to install the driver of Micro-USB when use Micro-USB for data communication. The driver has been stored in our FTP server. The driver of CP210x also can be downloaded from internet. The download path of our FTP server is as below:

Overseas customer: /d:/FTP/OC/Overseas_Technical/Overseas_Module Official Documents/GNSS Module/Common/04 Tool Kit/ GNSS_EVB_Micro-USB_Driver_CP210x.

Domestic customer: /d:/FTP/CC/Domestic_Technical/Domestic_Module Official Documents/GNSS Module/Common/04 Tool Kit/ GNSS_EVB_Micro-USB_Driver_CP210x.

6 Starting PowerGPS

The PowerGPS version is V2.2.0. The PowerGPS tool can help you to view the status of GPS&GLONASS receiver conveniently. When the tool is opened, the following window will be displayed:

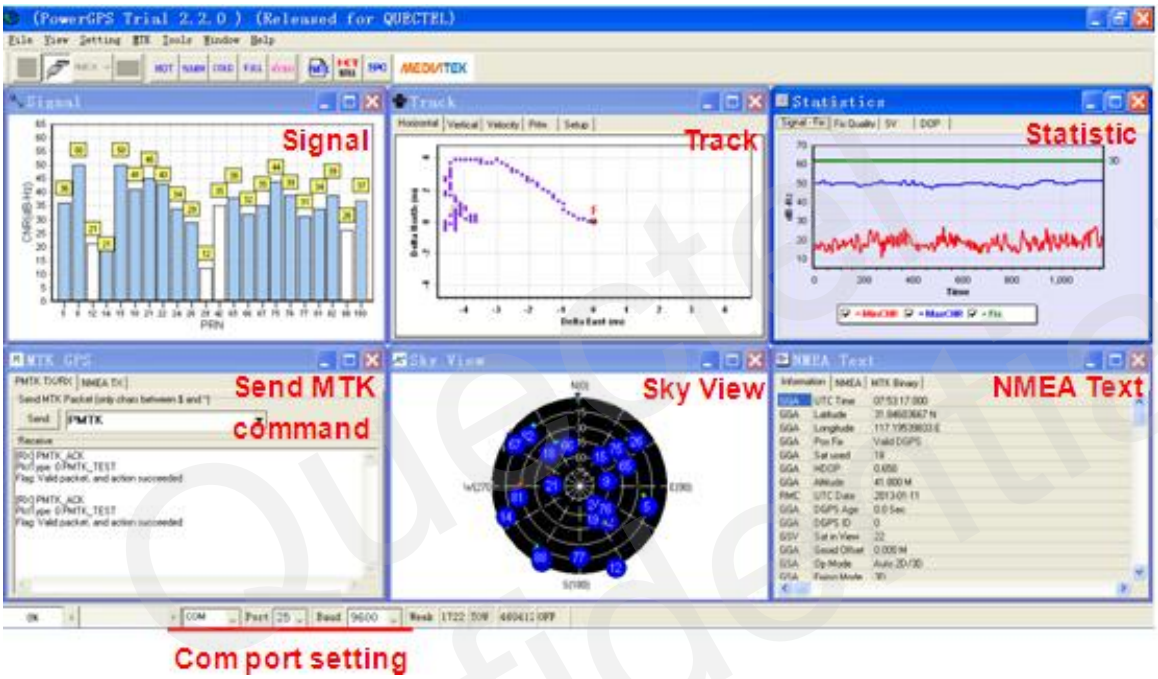
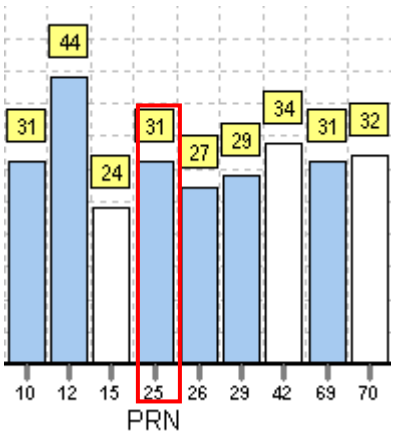
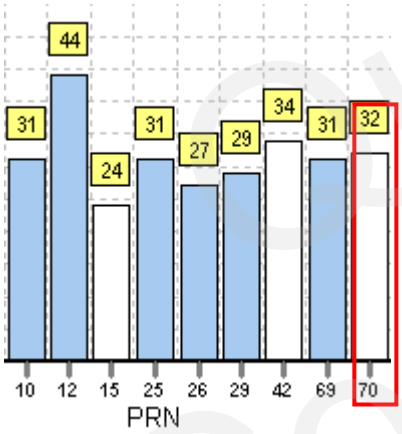
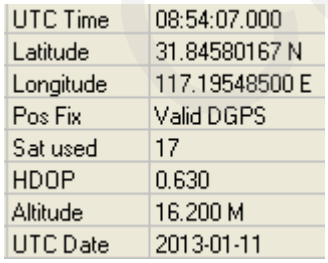
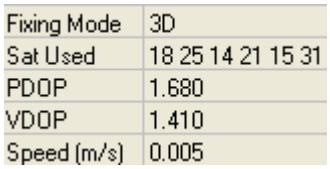


Figure 12: PowerGPS Tool

After EVB accessories are assembled, turn on the module and start up the PowerGPS. Select a correct COM port and baud rate (L70-R module supports 9600bps by default), then click the button “Create Connection”.

From the PowerGPS window, you can view CNR message, time, position, speed, precision and so on. Explanations are listed in Table 5.

Table 5: Explanations of PowerGPS Window

Icon	Explanation
	SV with PRN 65. If the position of SV is near to the centre of the Sky View, the elevation angle of SV is close to 90°. Dark blue means this satellite is in tracking.
	Light blue means this satellite is not in tracking.
	The CNR of PRN 25 is 31dB/Hz. Light blue column means the navigation data of this satellite is in use.
	The CNR of PRN 70 is 32dB/Hz. White column means the navigation data of this satellite is not in use. The range of GLONASS SVID is 65-96.
	UTC time Latitude degree longitude degree Positing fix Using the number of satellites Horizontal Dilution of Precision Altitude based on WGS84 Datum UTC date
	Fix type: No-Fix, 3D or 2D SPS Using satellite Position Dilution of Precision Vertical Dilution of Precision Speed of receiver

- **PMTK Command**

You can send PMTK command by PowerGPS. The format of PMTK command is included only characters between '$' and '*', for example: PMTK869,0.

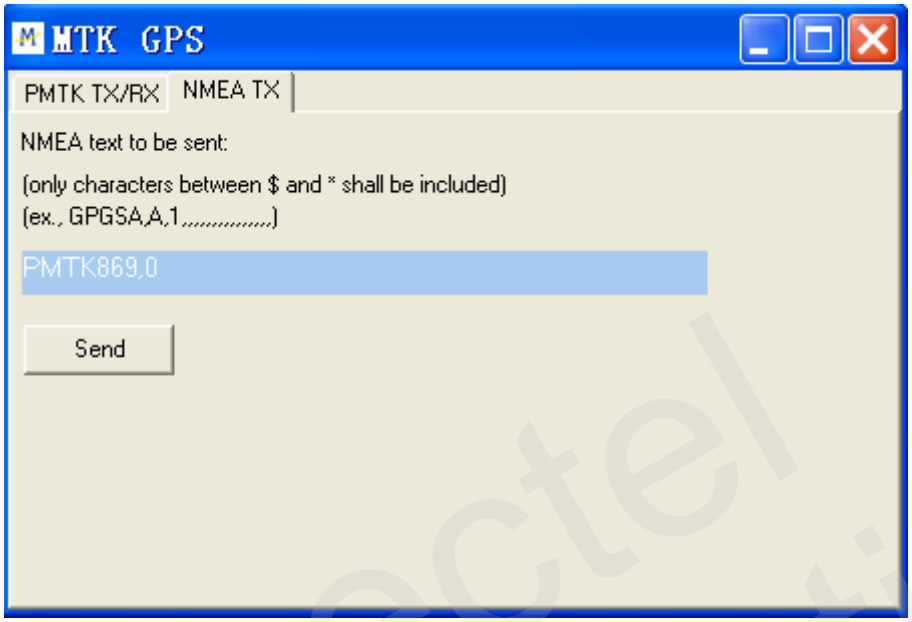


Figure 13: MTK Command

- **Automatic TTFF Testing**

This tool allows you to measure the TTFF (Time to First Fix) under different testing conditions. You can choose to test the TTFF from full start, cold start, warm start and hot start and the number of tests can be chosen from 1, 10, 20, 100, 1000 and 10000. Click on the Run button to start the test and it can be stopped by clicking on the Stop button. The configuration is as below:

Start "MTK" menu, and click "Static TTFF Testing", then "Static TTFF Testing" as shown below:

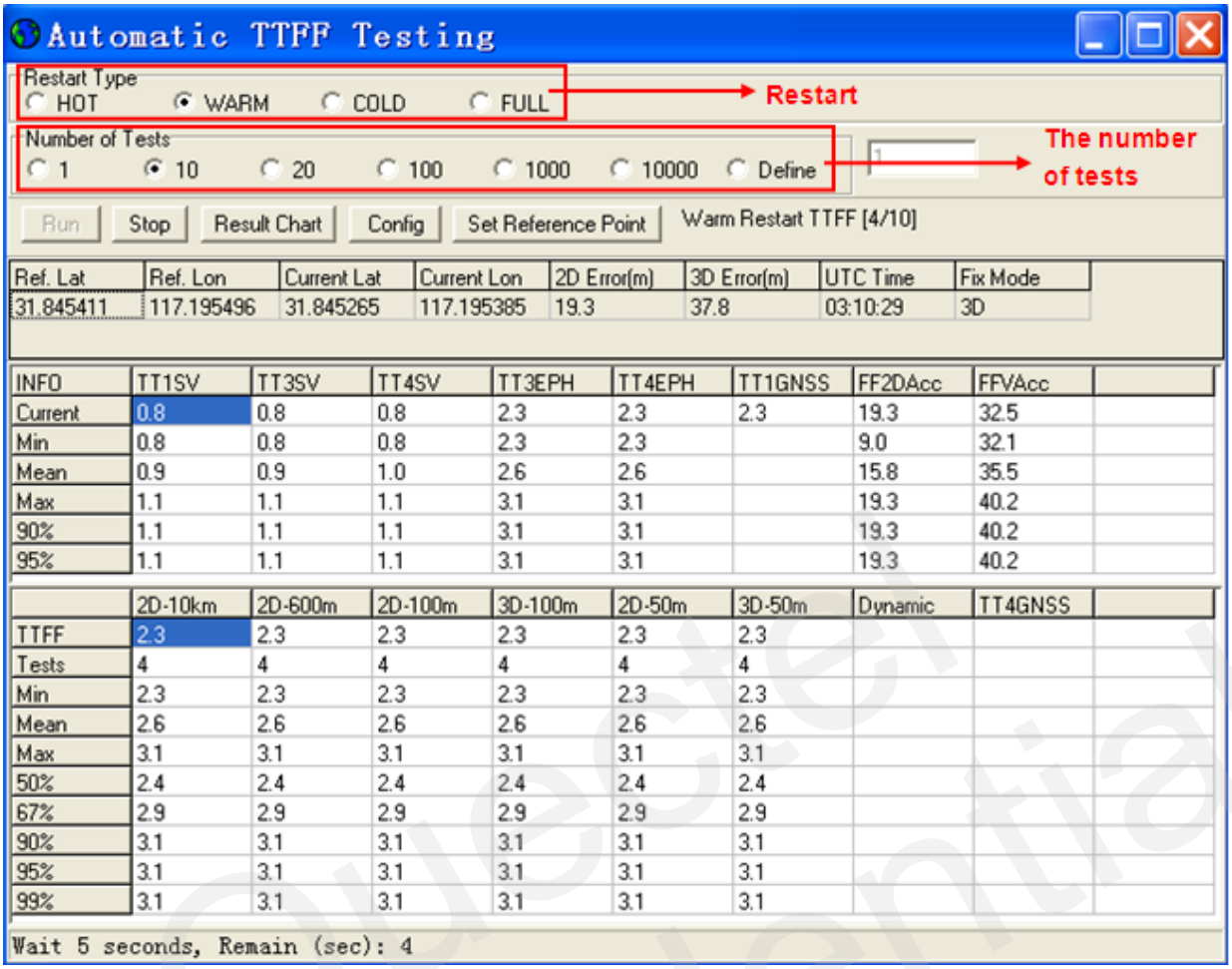


Figure 14: Static TTFF Testing

Click “Set reference point”, choose “Reference location”. After start positioning, click “Use Mean Position”, then click “OK”. As shown in the screenshots below:

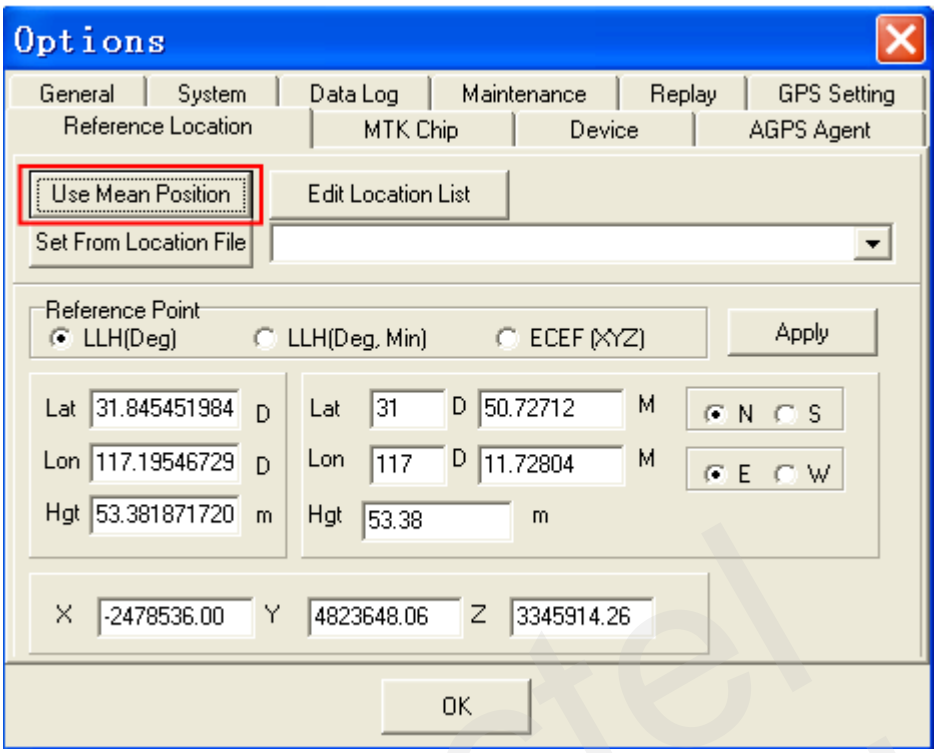


Figure 15: Static TTFF Testing Configuration Options

Click “Config”, set “TTFF Time- out (sec)”, then click “OK”, shown as below:

In general, if you choose hot start, set “TTFF Time-out (sec)” as10s. If you choose warm start, set the “TTFF Time-out (sec)” as 50s. If you choose cold start, set the “TTFF Time-out (sec)” as 100s. “TTFF Time–out (sec)” can help you to judge TTFF and save time.

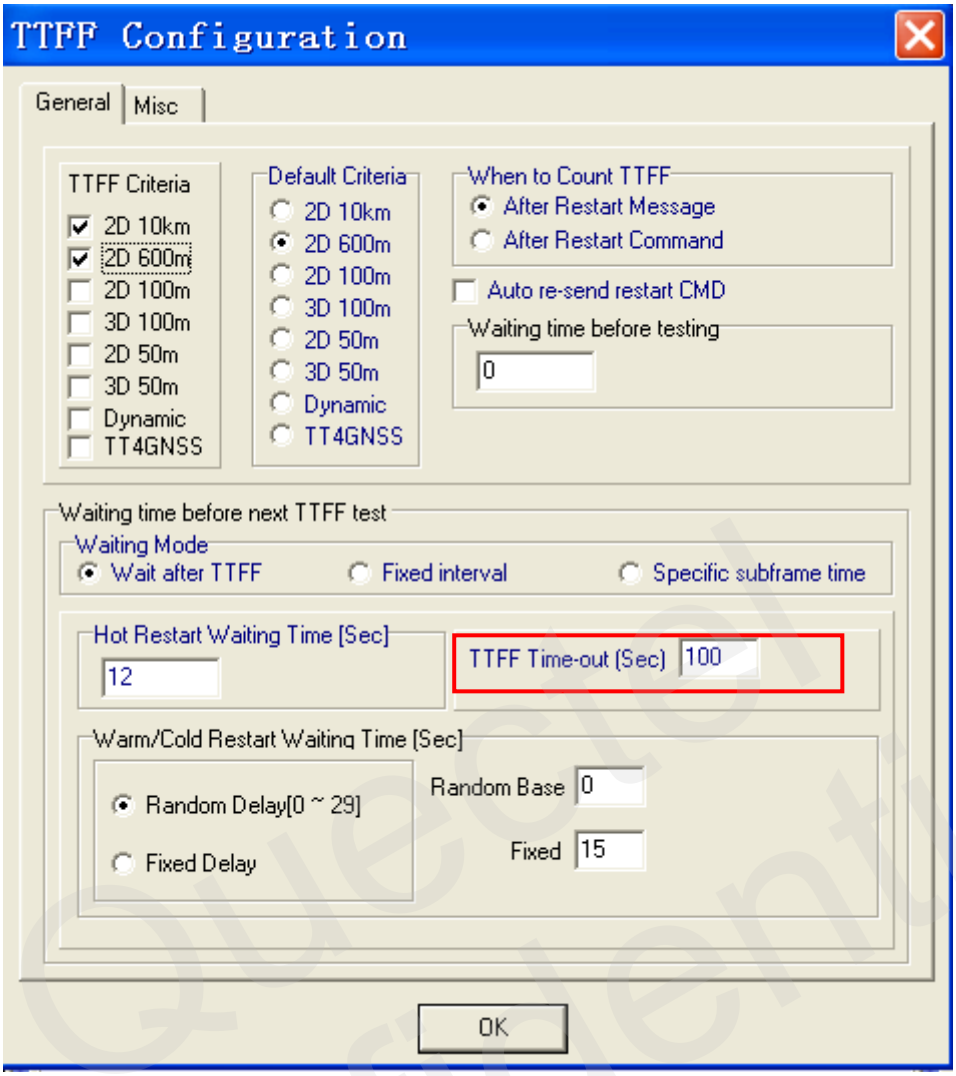


Figure 16: Static TTFF Testing Configuration

The above operation is completed. Click on the Run button to start the test and it can be stopped by clicking Stop button.

After finishing the testing, you can see the testing result charts. Of course, the result also will be stored in the tool installation path, and you can view the corresponding log.

7 Appendix A Reference

Table 6: Reference

SN	Document Name	Remark
[1]	Quectel_L70-R_Hardware_Design	L70-R Hardware Design
[2]	Quectel_L70-R_Protocol_Specification	L70-R Protocol Specification
[3]	Quectel_L70-R_Reference Design	L70-R Reference Design

Table 7: Abbreviations

Abbreviation	Description
CNR	Carrier-to-Noise Ratio
GPS	Global Positioning System
LED	Light Emitting Diode
PPS	Pulse Per Second
PRN	Pseudorandom Noise
SPS	Standard Positioning Service
SV	Satellite Vehicle
UART	Universal Asynchronous Receiver & Transmitter
UTC	Universal Time Coordinated
WGS84	World Geodetic System 1984