L76 Series
EVB User Guide

GNSS Module Series

Rev. L76_Series_EVB_User_Guide_V2.0

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About the document

History

Revision	Date	Author	Description
1.0	2013-02-25	Dishon ZHOU	Initial
1.1	2013-03-26	Dishon ZHOU	Optimized the contents of Chapter 3.
2.0	2016-04-26	Ziv LIAO	1. Changed the document name from Quectel_L76_EVB_User_Guide to Quectel_L76_Series_EVB_User_Guide 2. Incorporated the related information of L76-L module

Contents

Table Index

Figure Index

1 Introduction

This document defines and specifies the usage of L76 series EVB (Evaluation Board). You can get useful information about L76 series EVB and GNSS demo tool from this document.

L76-L module, which comes with a built-in LNA, provides better performance than L76 in weak signal areas.

2 Introduction to L76 Series EVB Kit

2.1. Top and Bottom View

L76 series EVB includes L76 and L76-L versions. The following illustrates the top and bottom view of the EVB, by taking L76 as the example.

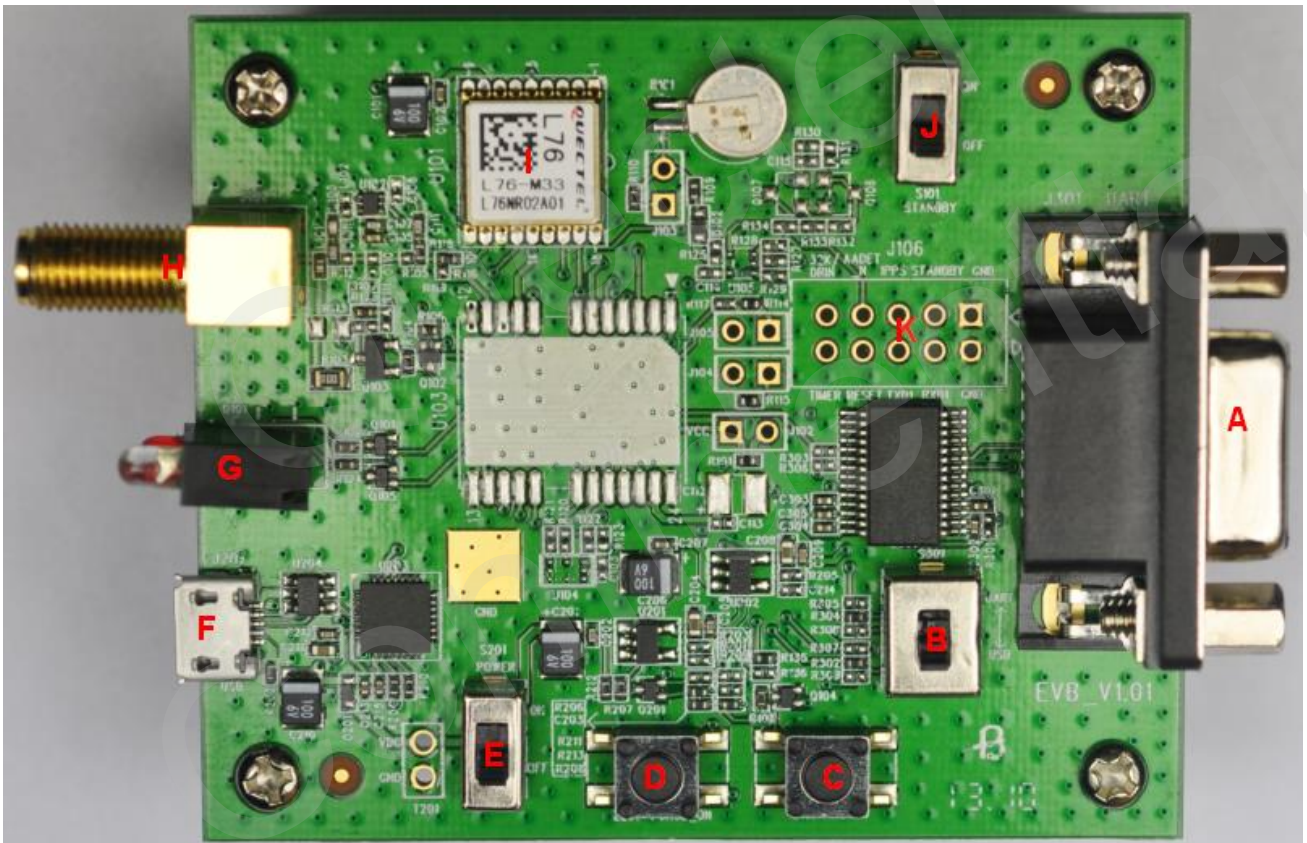**Figure 1: Top View of L76 EVB**

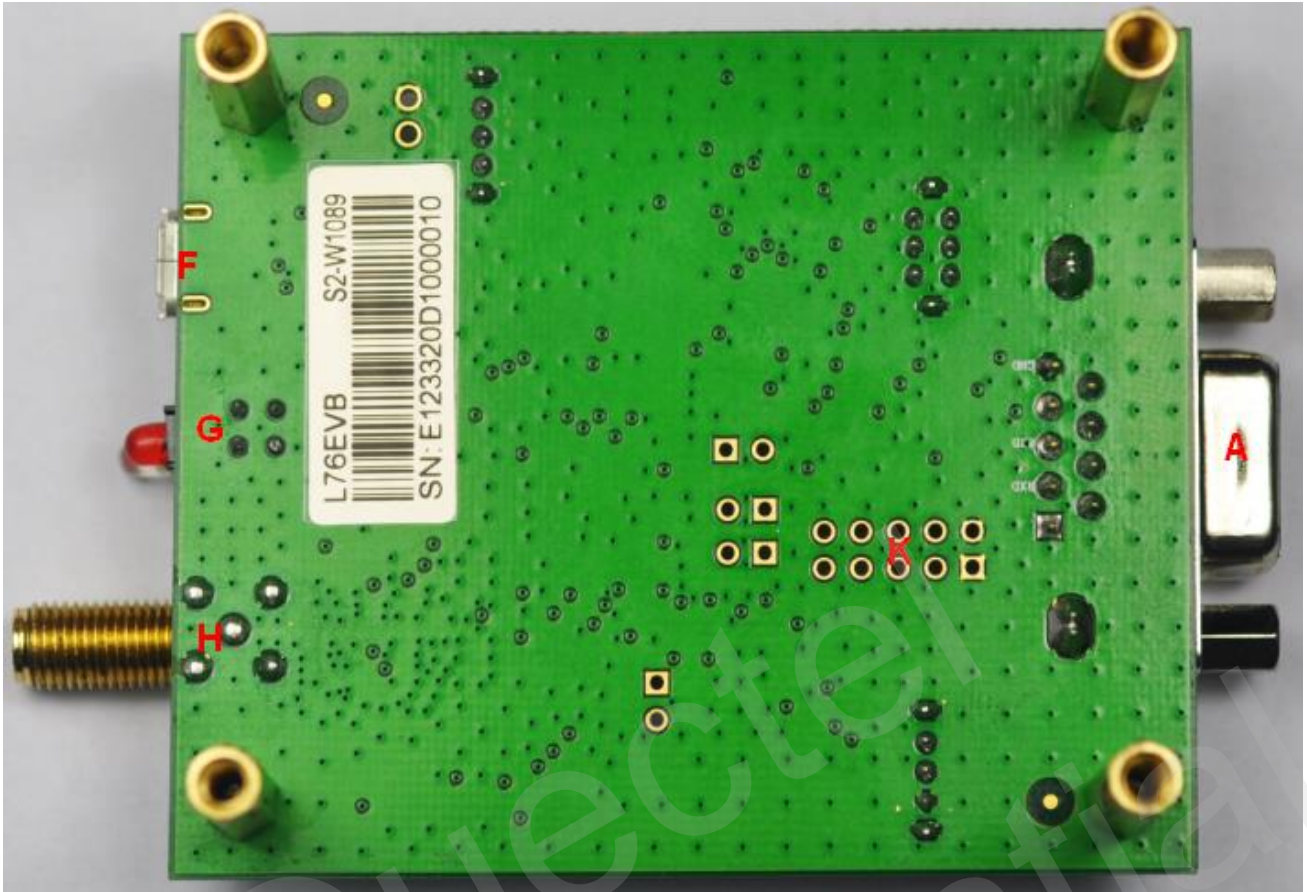**Figure 2: Bottom View of L76 EVB**

A: UART port

B: Serial port alternation switch

C: RESET button

D: FORCE_ON button

E: POWER switch

F: Micro-USB port

G: Indication LEDs

H: Antenna interface

I: L76 module

J: STANDBY switch

K: Test points

2.2. EVB Accessories

Figure 3: EVB Accessories

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

3 Interface Applications

3.1. USB Interface
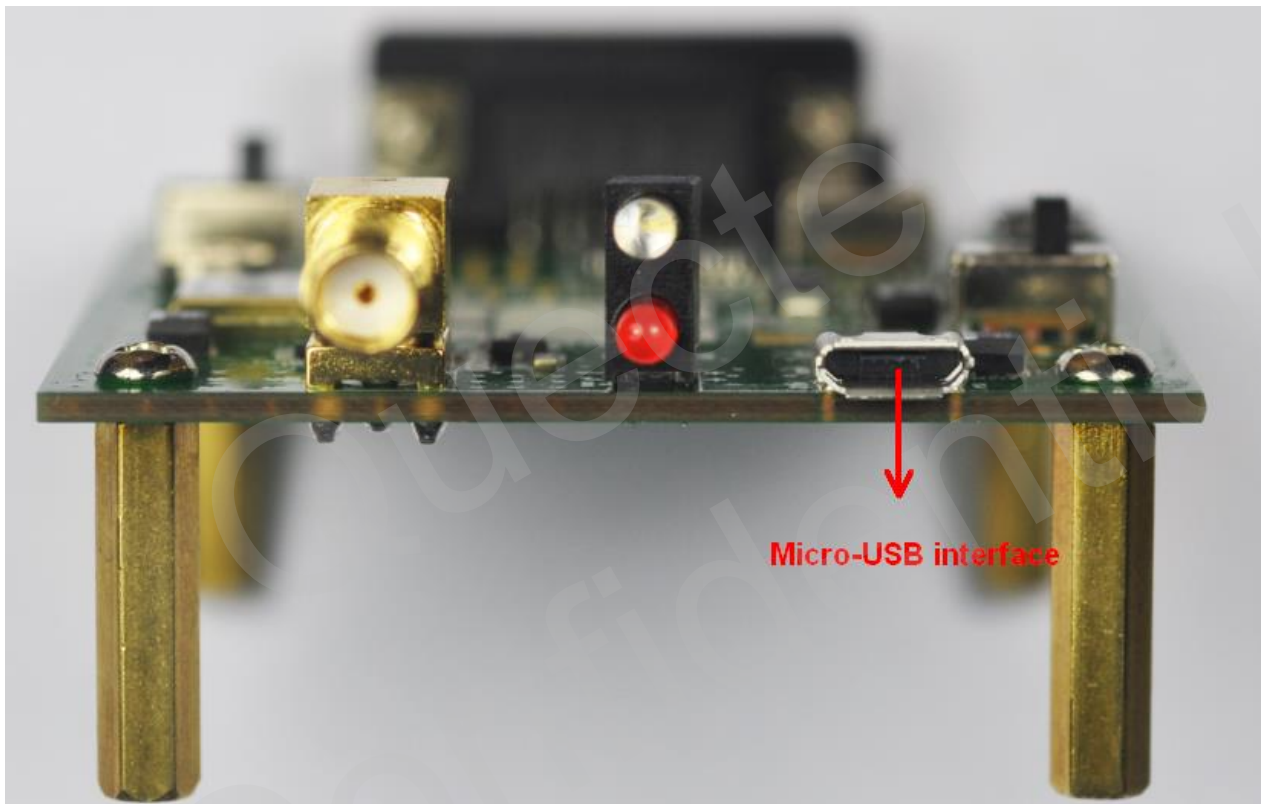
Figure 4: Micro-USB Interface

The main power is supplied via micro-USB interface. We provide two ways for data communication: micro-USB and UART interface which are controlled by alternation switch (S2). Both RS232 and micro-USB cables are necessary, if you want to use UART to output NEMA. So the easiest way is to use the micro-USB cable which is able to supply 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
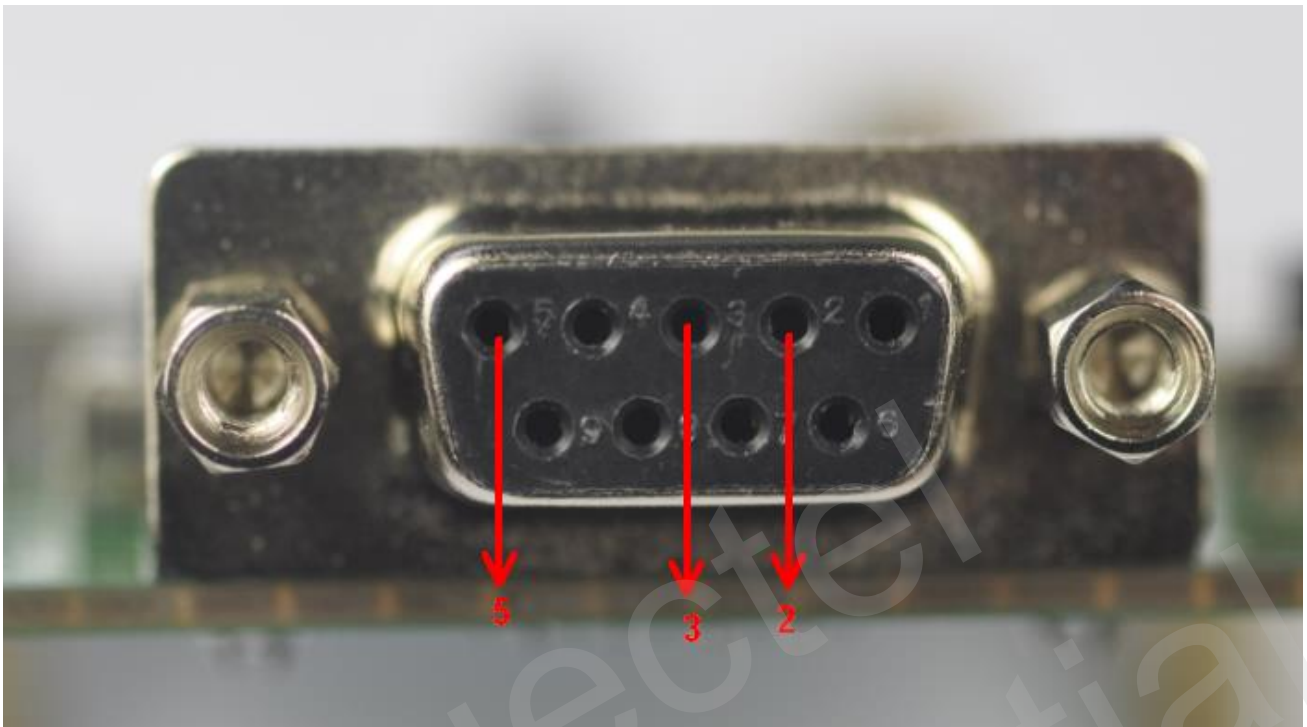
Figure 5: **UART Interface**

Table 1: Pins of UART port

Pin No.	Signal	I/O	Description
2	RXD	I	Receive data
3	TXD	O	Transmit data
5	GND		GND

3.3. Antenna Interface

L76 series EVB includes L76 and L76-L versions. The following illustrates the antenna interface and LNA layout of the EVB, by taking L76 as the example.

Figure 6: L76 EVB Antenna Interface
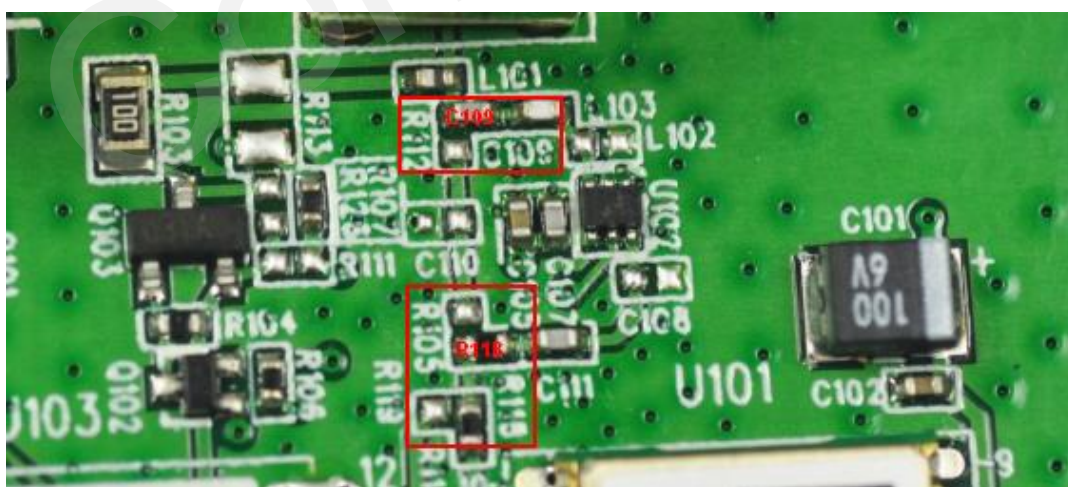
Figure 7: L76 EVB LNA Layout

Both active antenna and passive antenna can be selected as the external antenna. Please note that the LNA is installed in the EVB by default, and thus you have to move C109 to R112 and R118 to R105, when you want to remove the LNA for test.

NOTE

There is a built-in LNA in L76-L module, so LNA is not designed into the L76-L EVB.

3.4. Switches and Buttons

L76 series EVB includes L76 and L76-L versions. The following illustrates the switches and buttons of the EVB, by taking L76 as the example.
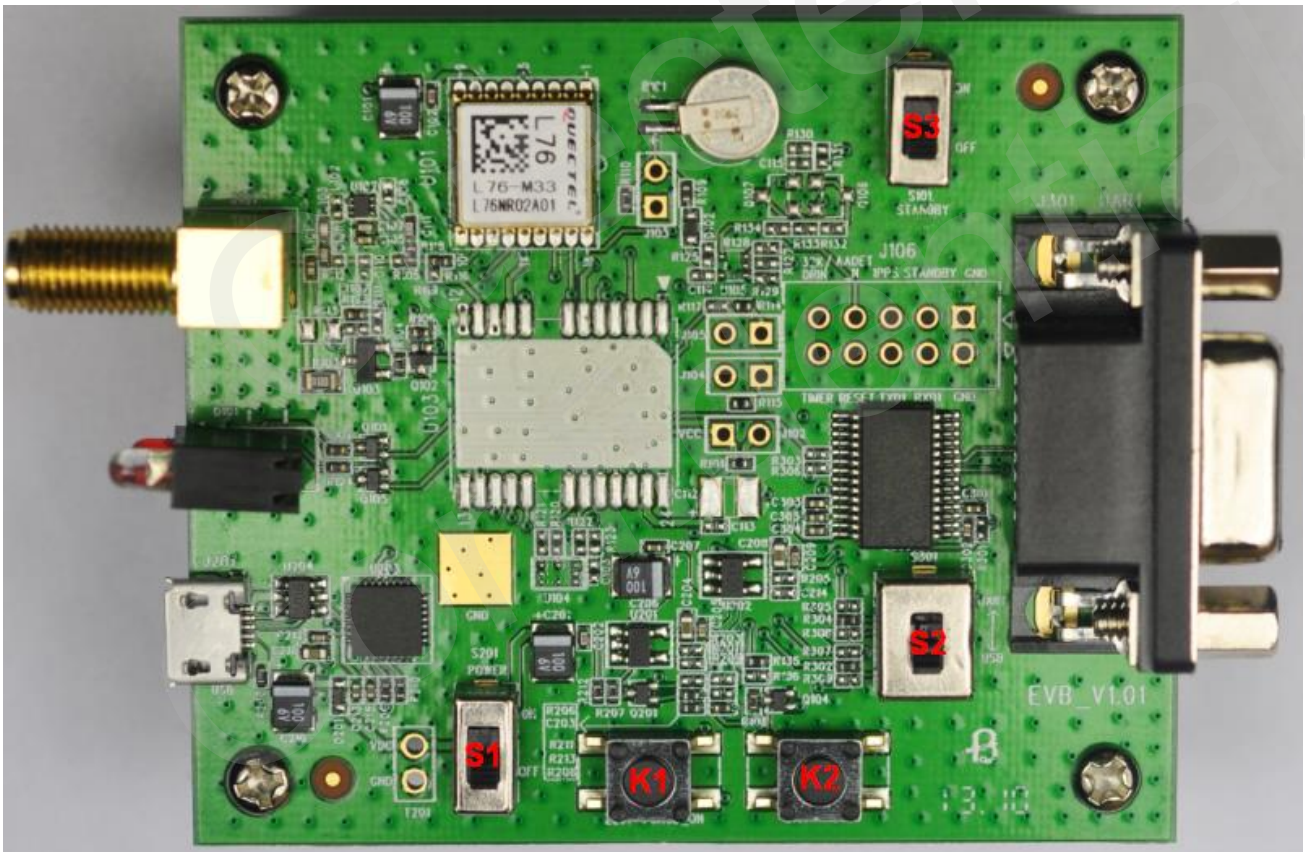

Figure 8: L76 Switches and Buttons

Table 2: L76 Switches and Buttons

Part No.	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	FORCE_ON	I	Press and release the button, the module will be woken up from backup mode.
K2	RESET	I	Press and release the button, the module will be 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: turned on successfully, micro-USB or UART1 port can output messages. Extinct: fail to turn on the module.
L2	1PPS	O	Flash: successful fix, the frequency is 1Hz. Extinct: no fix.

3.6. Test Points

L76 series EVB includes L76 and L76-L versions. The following illustrates the test points of the EVB, by taking L76 as the example.
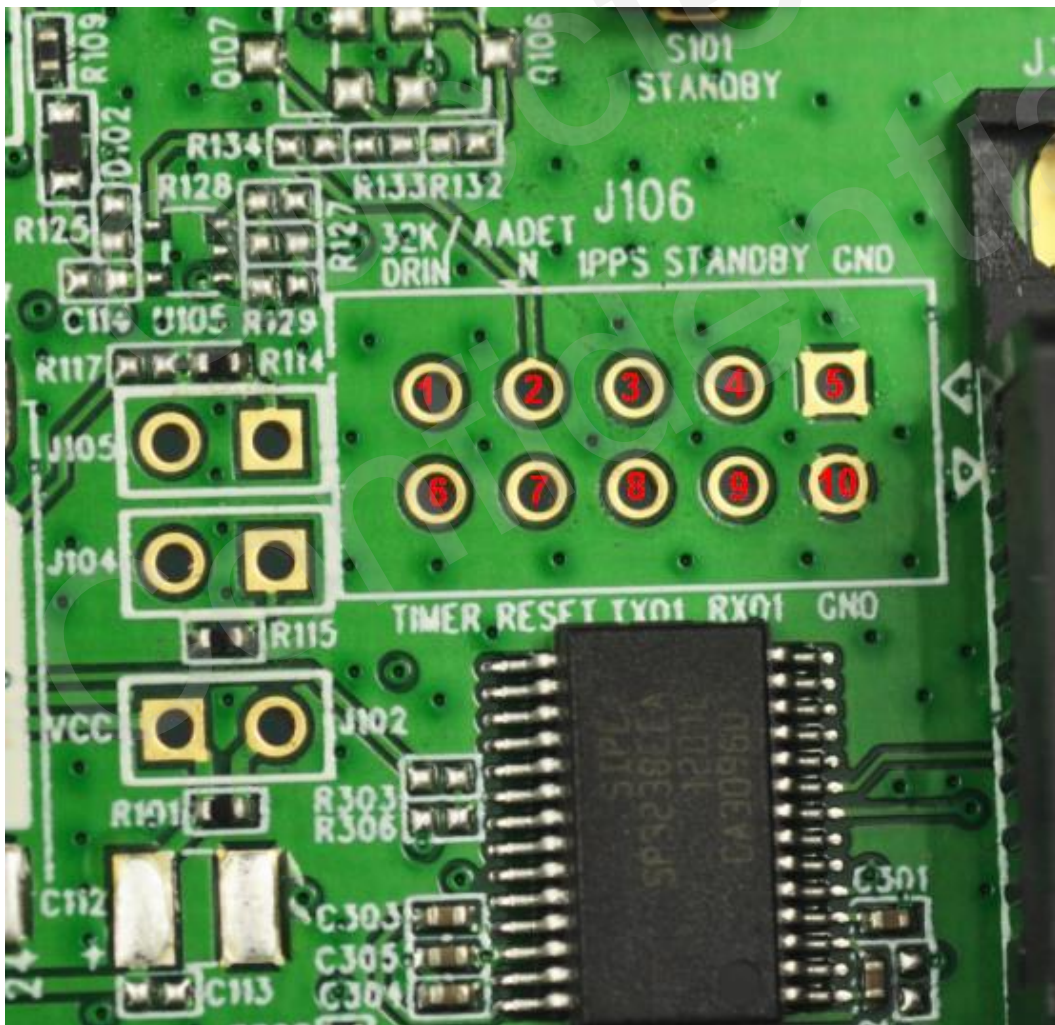

Figure 10: L76 Test Points - J106

Table 4: Pin Description of J106

Pin No.	Signal	I/O	Description
1	32K/DRIN		Reserved
2	AADET_N	I	Active antenna open circuit detection
3	1PPS	O	1 pulse per second
4	STANDBY	I	Enter or exit standby mode
5/10	GND		Ground
6	FORCE_ON		Logic high will force module to be woken up from backup mode. Keep this pin open or pulled low before entering into backup mode. If unused, keep this pin open.
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 shown in Figure 11.

Figure 11: EVB and Accessories

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 the internet. The download path in our FTP server is as below:

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

Domestic customers:
/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 user to view the status of GPS&GLONASS receiver conveniently. When the tool is opened, the following window will be displayed:
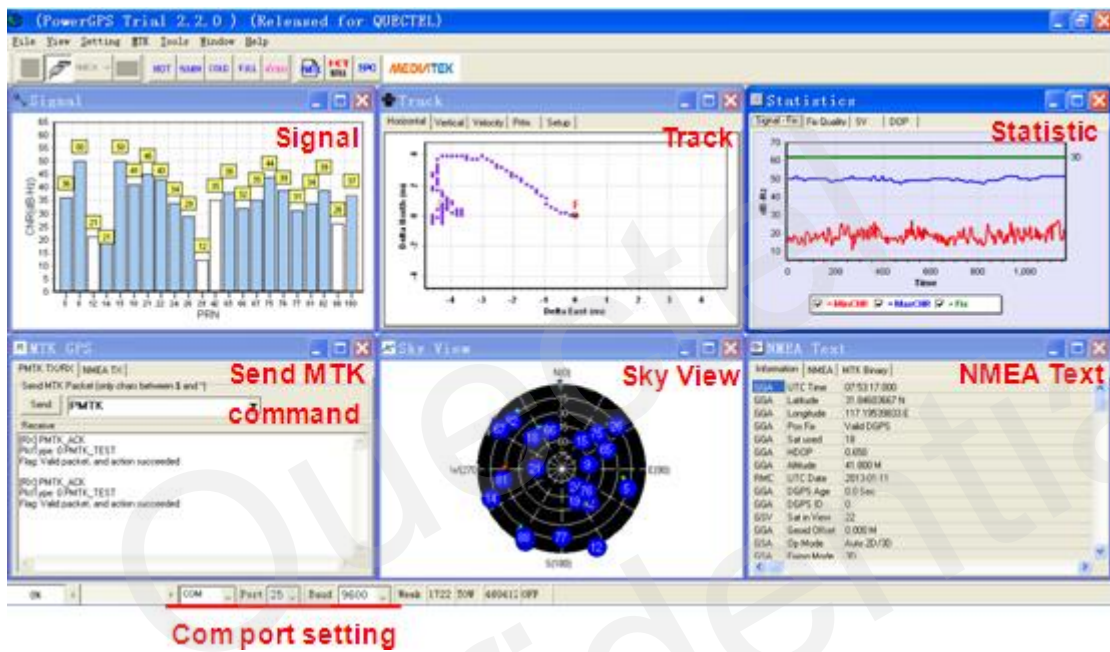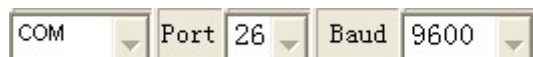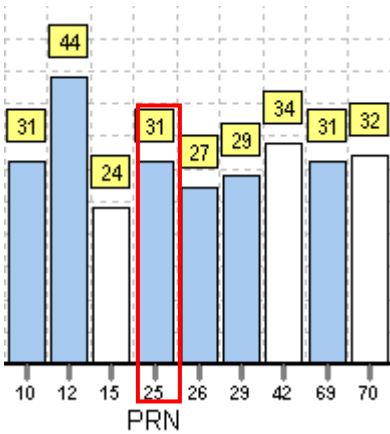

Figure 12: PowerGPS Tool

After EVB accessories are assembled, turn on the module and start up the PowerGPS. Select a correct COM port and baud rate (L76 series module supports 9600bps by default), then click the button "Create Connection".
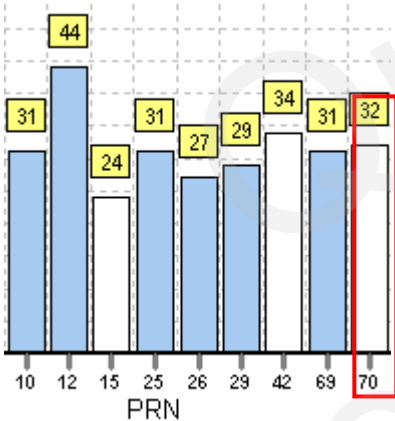

From the PowerGPS window, user can view CNR message, time, position, speed, precision, and so on. Explanations are listed in Table 5.

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 Position fix The number of satellites being used Horizontal Dilution of Precision Altitude based on WGS84 datum UTC date
	Fixing mode: No-fix, 3D or 2D SPS Satellite being used 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 includes only characters between '$' and '*', for example: PMTK869,0.
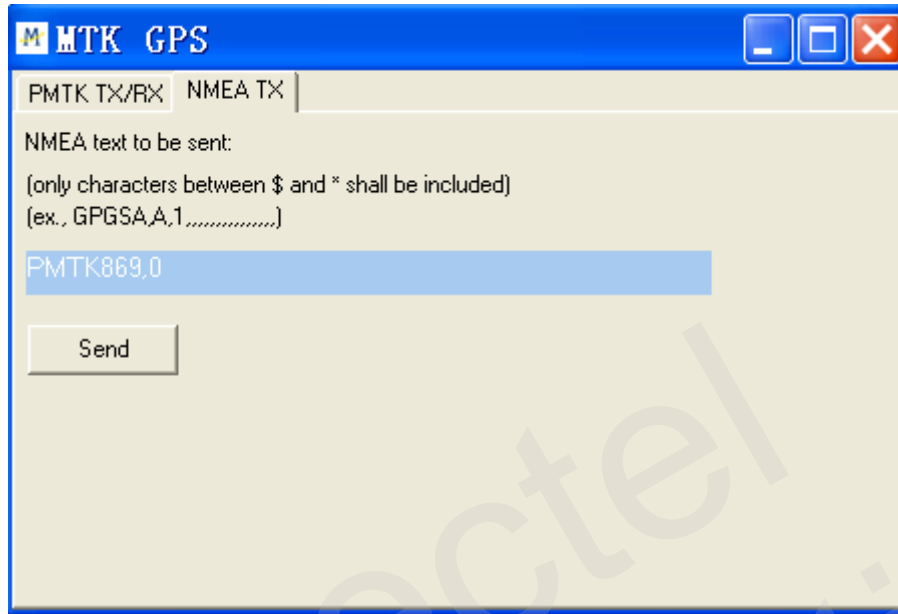

Figure 13: MTK Command

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 in 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 following are the detailed configuration steps during TTFF testing:

1. Start "**MTK**" menu, and then click "**Static TTFF Testing**" to enter Automatic TTFF Testing as shown below:
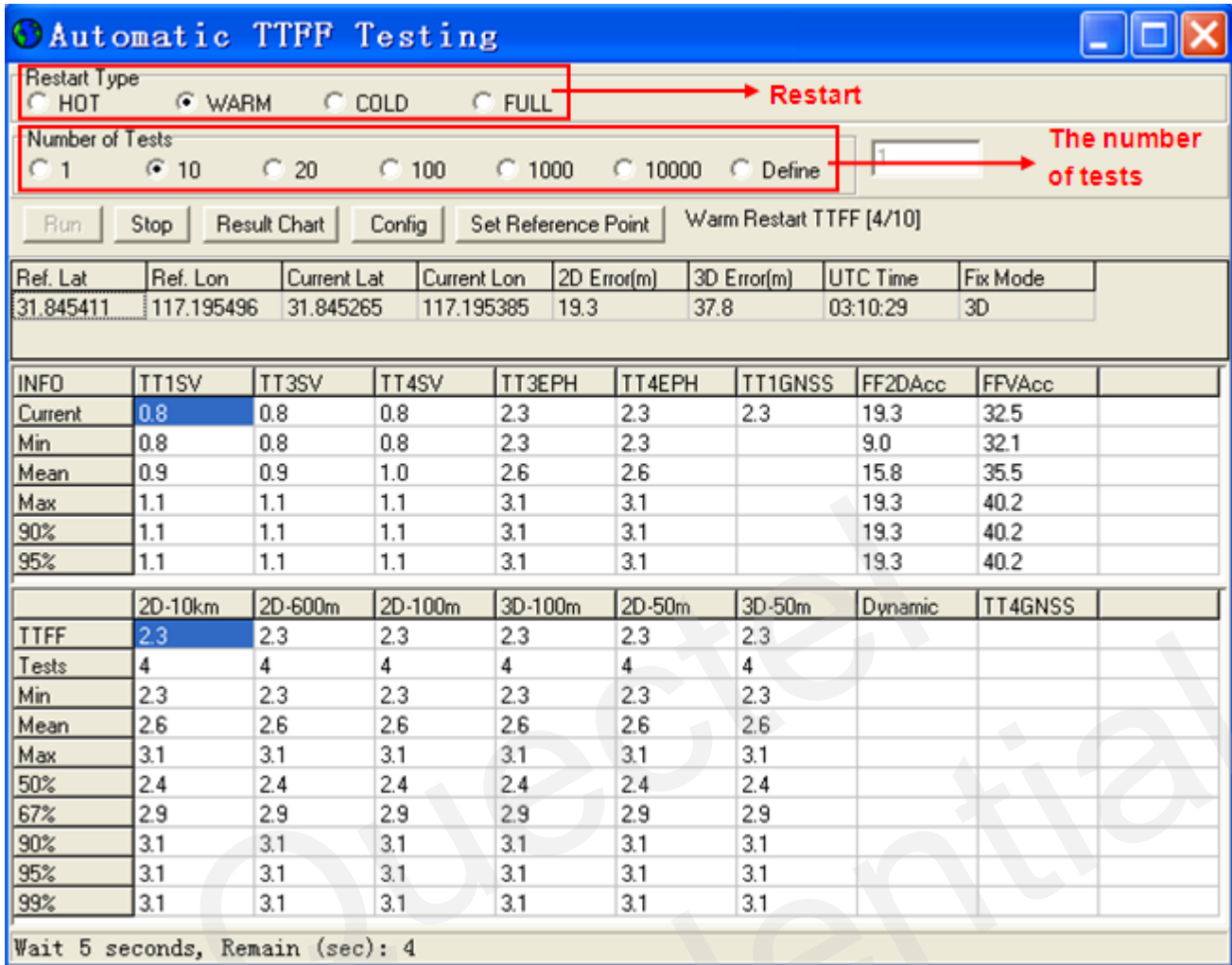
Figure 14: Static TTFF Testing

2. Click "**Set reference point**", and choose "**Reference location**". After start positioning, click "**Use Mean Position**", then click "**OK**". As shown in the screenshots below:
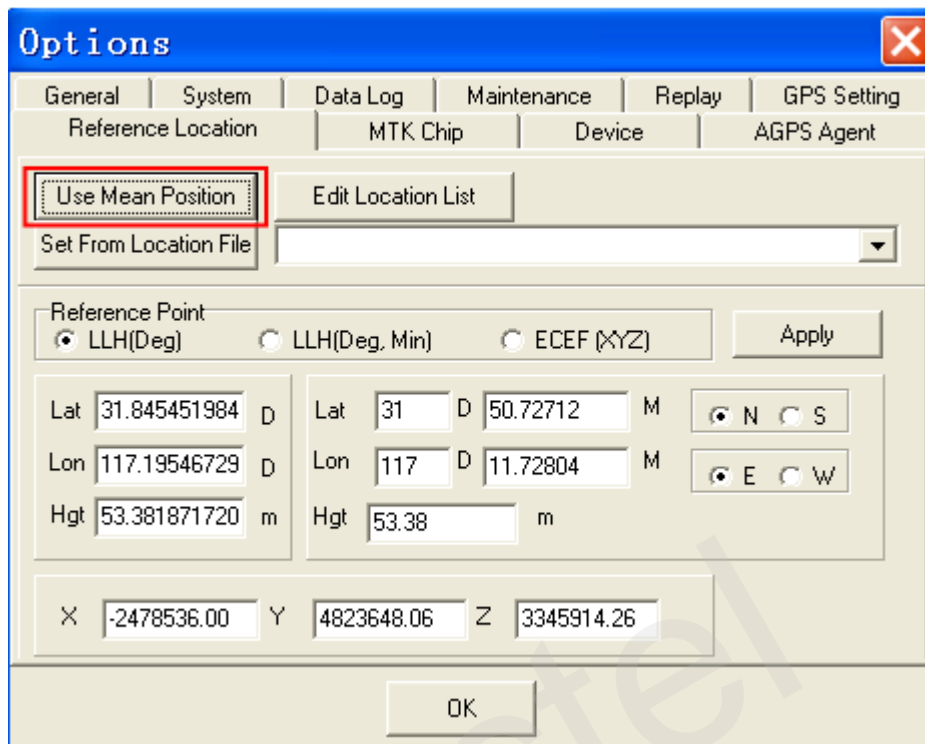
Figure 15: Static TTFF Testing Configuration Options

3. Click "**Config**", set "**TTFF Time- out (sec)**", then click "**OK**", shown as below:

In generally, if you choose hot start, "TTFF Time-out (sec)" is recommended to be set as 10s. If you choose warm start, the "TTFF Time-out (sec)" can be set as 50s. If you choose cold start, the "TTFF Time-out (sec)" can be set as 100s. "TTFF Time–out (sec)" can help you judge TTFF and save time.
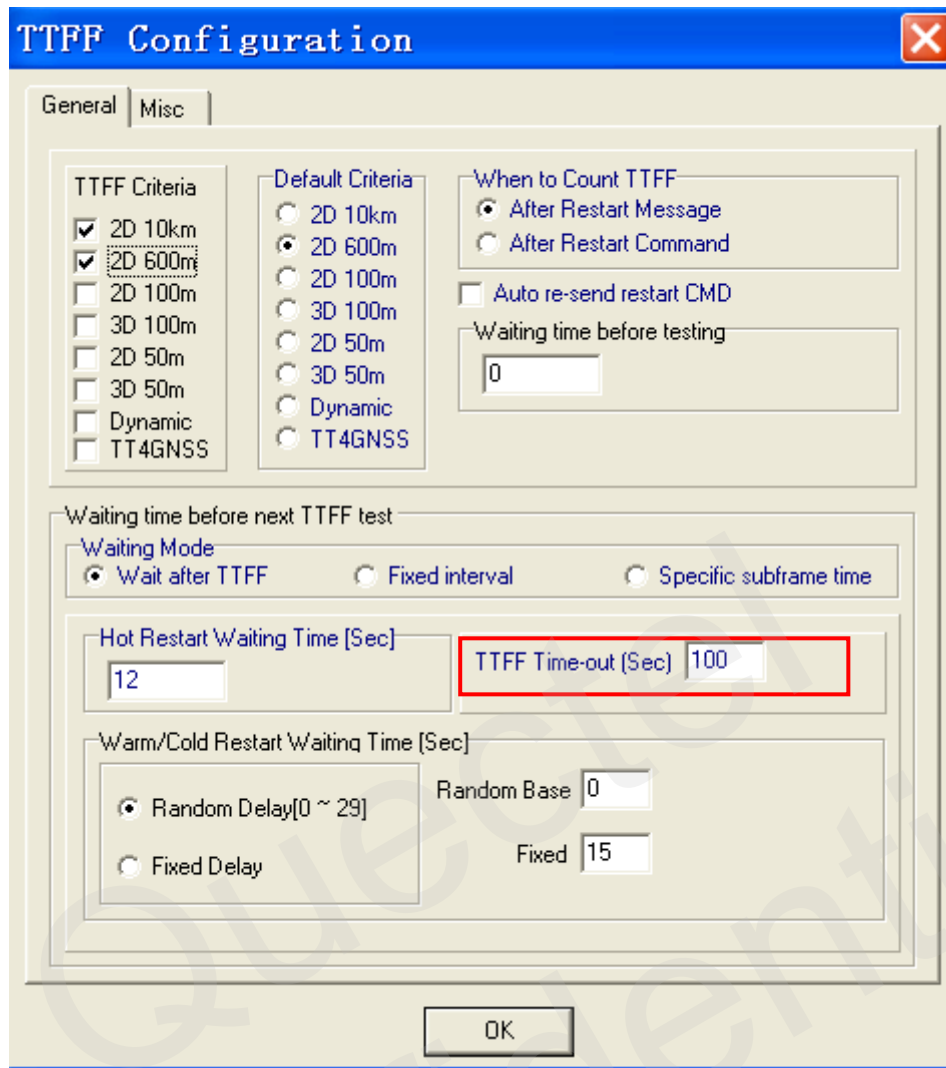
Figure 16: Static TTFF Testing Configuration

4. After the above operations have been completed, click on the **Run** button to start the test and it can be stopped by clicking **Stop** button.

5. 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 References

Table 6: References

SN	Document name	Remark
[1]	L76_Series_Hardware_Design	L76 Series Hardware Design
[2]	L76_Series_Protocol_Specification	L76 Series Protocol Specification
[3]	L76_Series_Reference Design	L76 Series Reference Design

Table 7: Abbreviations

Abbreviation	Description
CNR	Carrier-to-Noise Ratio
GPS	Global Positioning System
GLONASS	Global Navigation Satellite System (The Russian GNSS)
GNSS	Global Navigation Satellite 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