

L76 EVB User Guide

GNSS Module Series

Rev. L76_EVB_User Guide_V1.0

Date: 2013-02-27



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About the document

History

Revision	Date	Author	Description
1.0	2013-02-21	Dishon ZHOU	Initial

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1 Introduction

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

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2 Introduction to EVB Kit

2.1. EVB Top and Bottom View

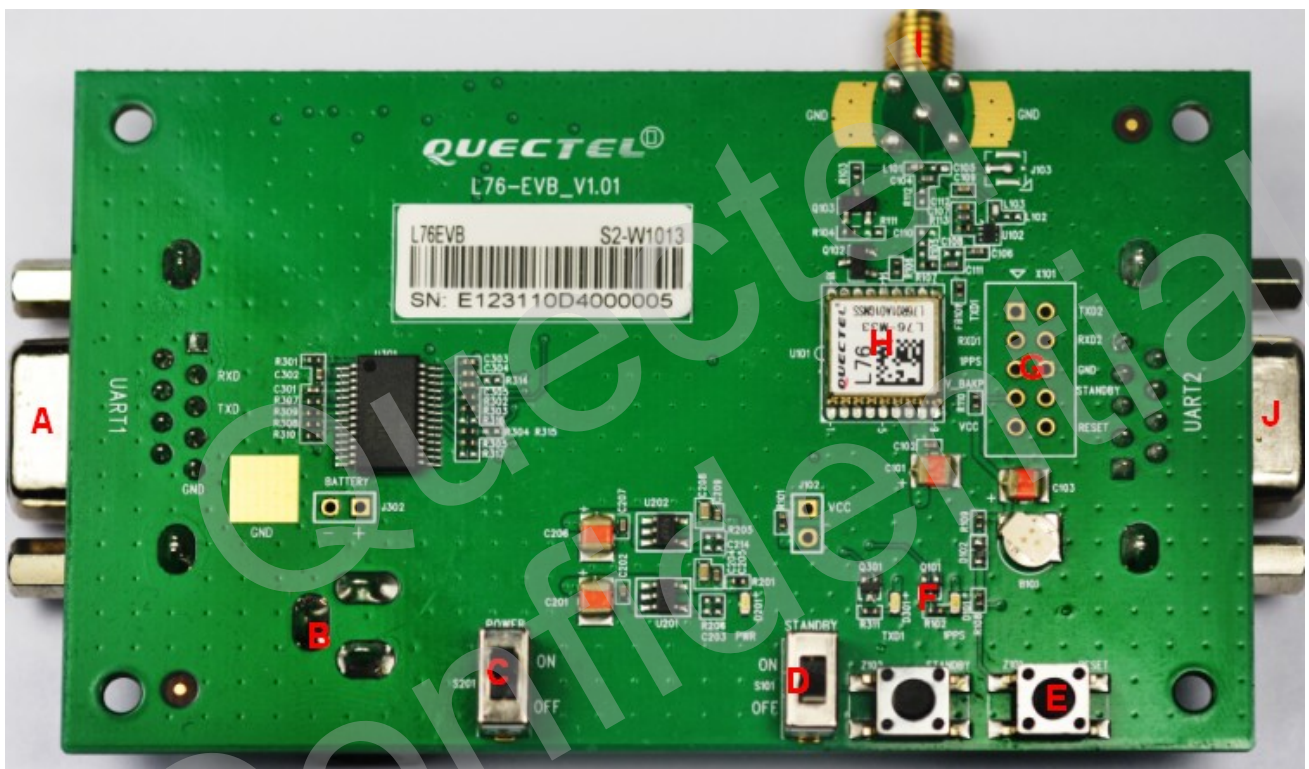


Figure 1: EVB Top View

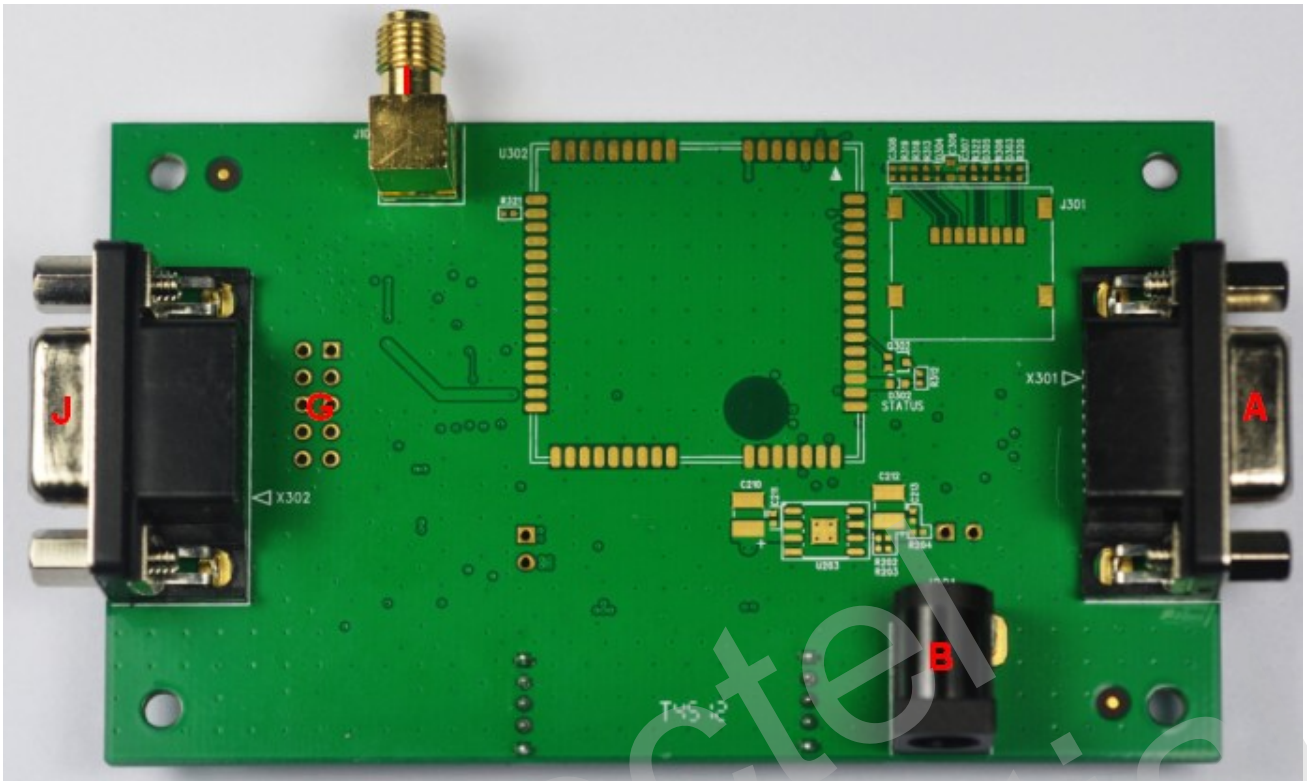


Figure 2: EVB Bottom View

- A: UART 1 port
- B: Adapter interface
- C: POWER switch
- D: STANDBY switch
- E: RESET button
- F: Indication LEDs
- G: Test points
- H: L76 Module
- I: Antenna interface
- J: UART 2 port (invalid)

2.2. EVB Accessories



Figure 3: EVB Accessories

- A: GNSS active antenna (3.3V)
- B: DC5V/2A power adapter
- C: USB to RS232 converter cable

3 Interface Application

3.1. Power Interface

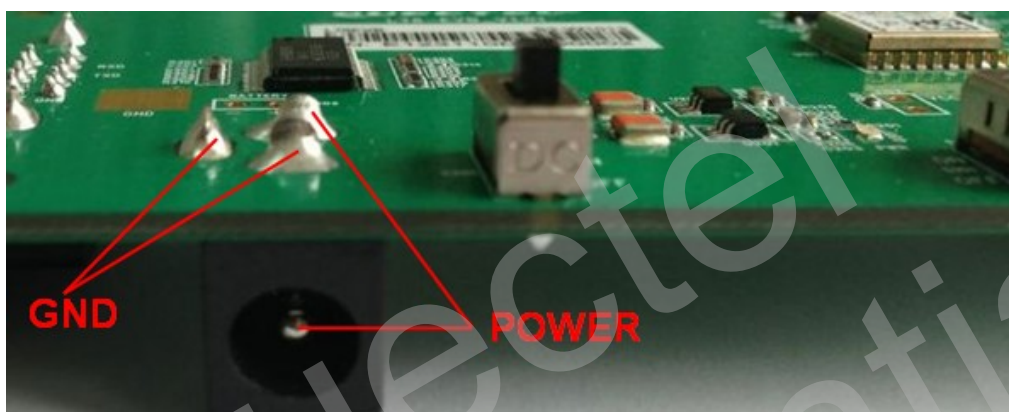


Figure 4: Power Interface

3.2. UART Interface

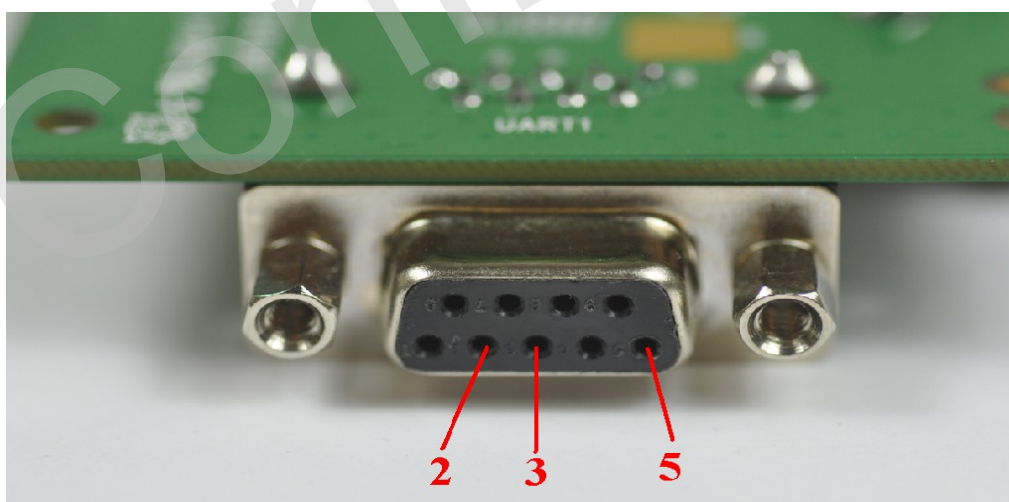


Figure 5: UART Interface

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

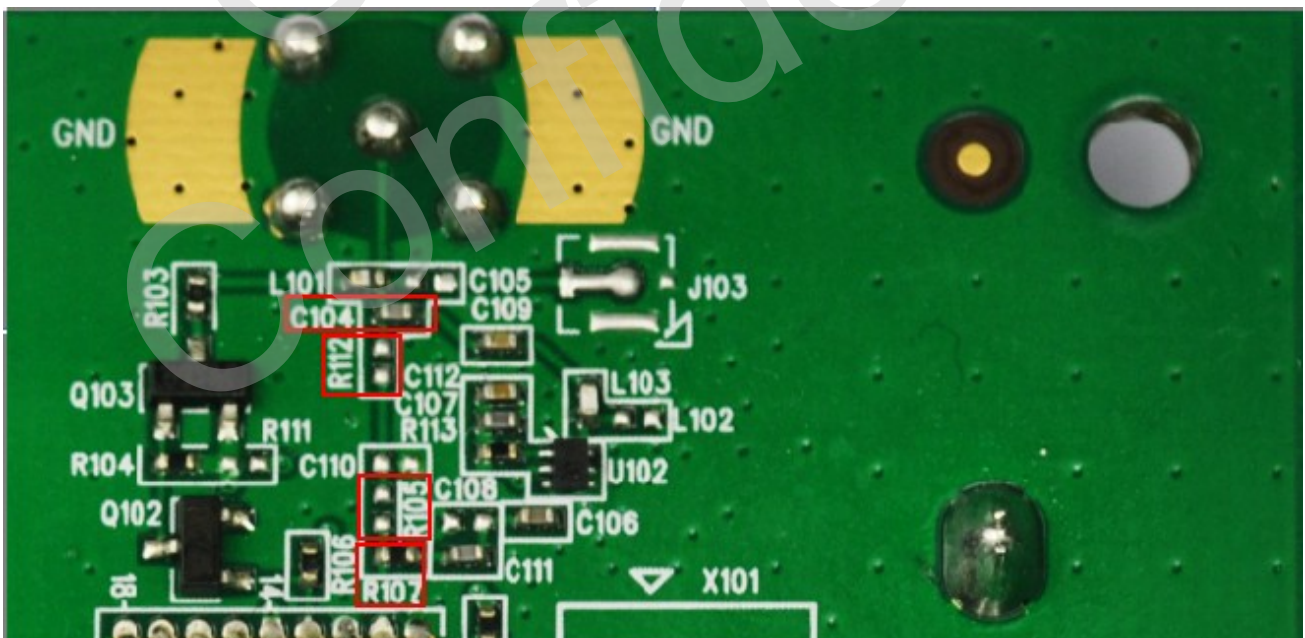


Figure 7: LNA Layout

EVB has LNA by default. If EVB has LNA, you can choose passive antenna. In the EVB, if C104 moves to R112, and R107 moves to R105, then the EVB has no LNA. You should choose active antenna.

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 from adapter.
S2	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

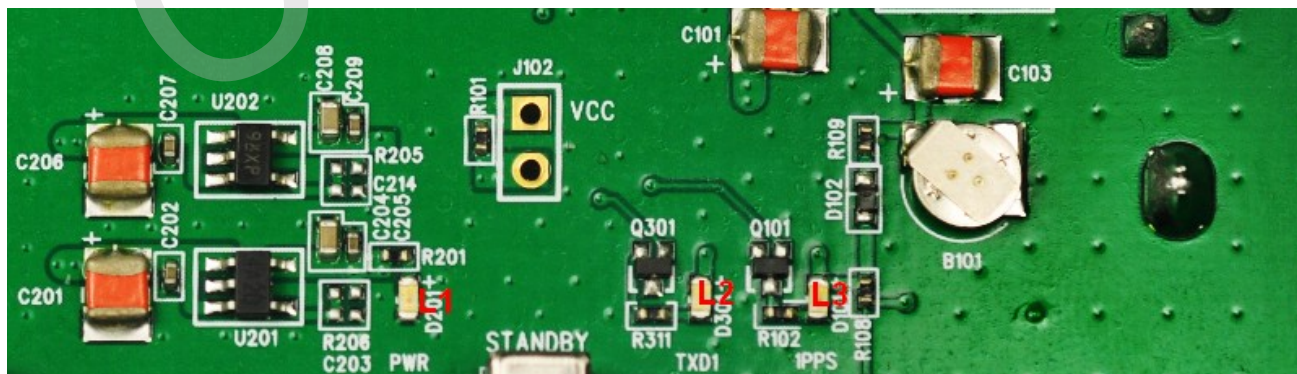


Figure 9: Operating Status LEDs

Table 3: Operating status LEDs

Part	Name	I/O	Description
L1	PWR	O	Bright: Power on Extinct: Power off
L2	TXD1	O	Flash: Turn on successfully. UART1 port can output messages. Extinct: Fail to turn on the module.
L3	1PPS	O	Flash: Fix successfully, the frequency is 1Hz. Extinct: No fix

3.6. Test Points

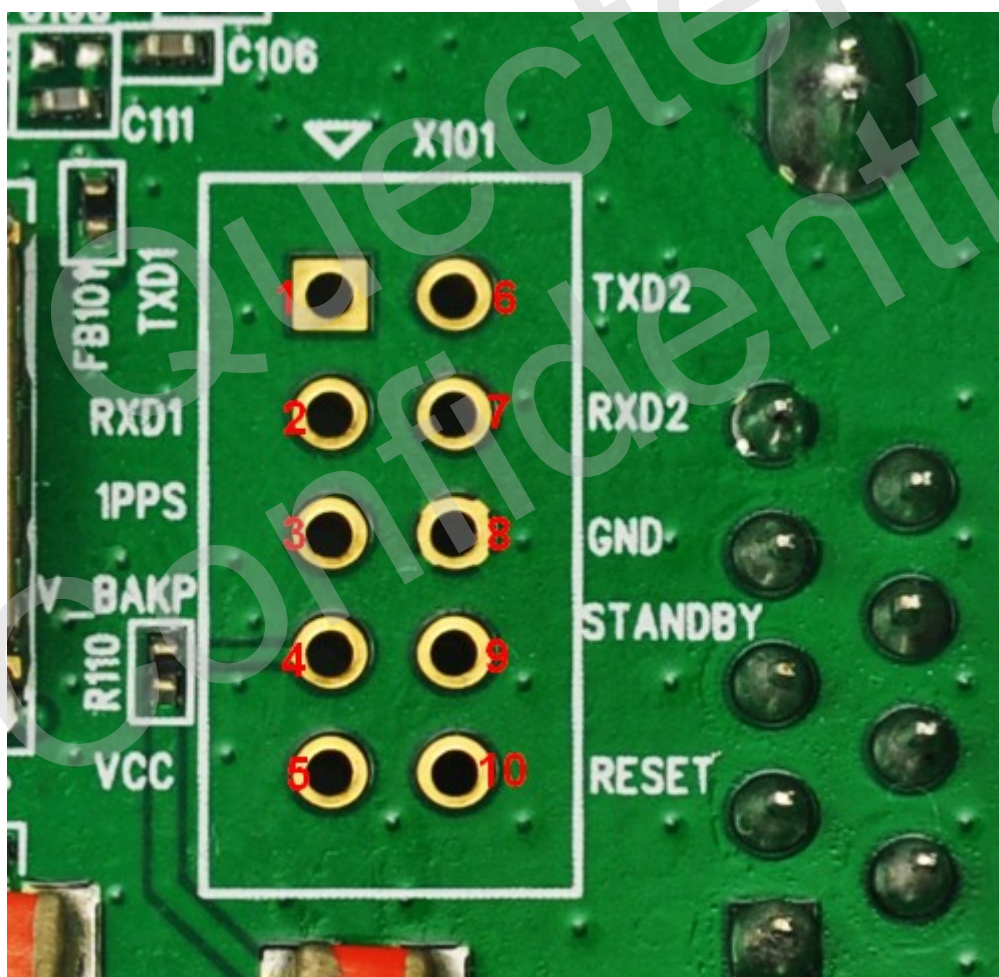


Figure 10: Test Points X101

Table 4: Pins of X101

Pin	Signal	I/O	Description
1	TXD1	O	Transmit data
2	RXD1	I	Receive data
3	1PPS	O	1 pulse per second
4	V_BAKP	I	Backup voltage supply
5	VCC	I	Voltage supply for L76 module
6	TXD2(Force_on)	O	Transmit data. Logic high will force module to be waked up from backup mode. Keep this pin open or pulled low before entering into backup mode. If unused, keep this pin open.
7	RXD2	I	Receive data
8	GND		Ground
9	STANDBY	I	Enter or exit standby mode
10	RESET	I	System reset

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

Before using UART1 port, please install the driver of USB 2.0 to RS232 converter cable from the attached CD.



Figure 12: USB Driver CD

6 Starting PowerGPS

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:

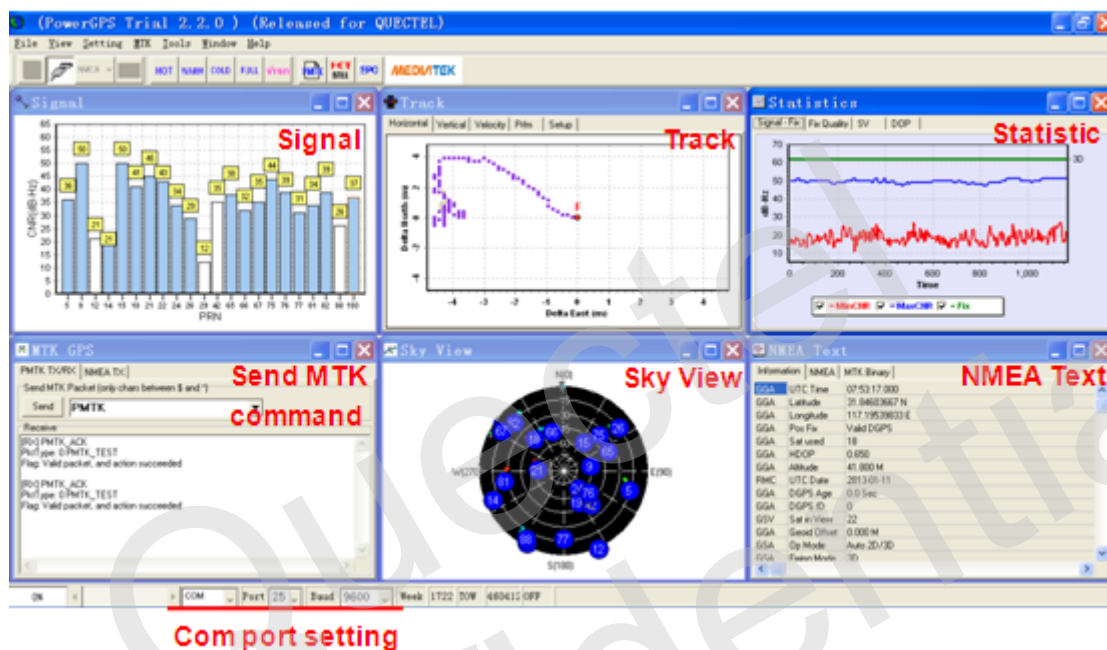


Figure 13: PowerGPS Tool

After EVB accessories are assembled, turn on the module and start up the PowerGPS. Select a correct COM port and baud rate (L76 module supports 9600bps by default), 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 7.

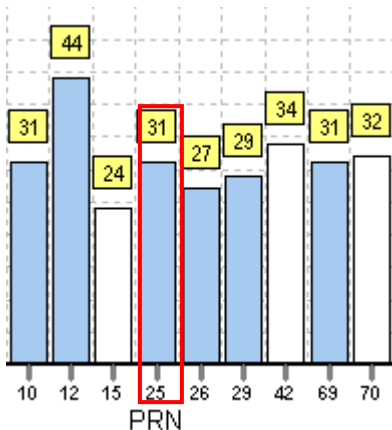
Table 5: Explanations of PowerGPS Window

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

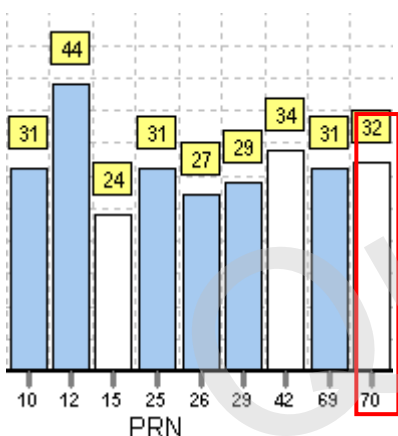
means this satellite is in tracking, i.e., the CNR of the satellite is greater than 0.



Light blue means this satellite is not in tracking, i.e., its CNR is less than 0.



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	08:54:07.000
Latitude	31.84580167 N
Longitude	117.19548500 E
Pos Fix	Valid DGPS
Sat used	17
HDOP	0.630
Altitude	16.200 M
UTC Date	2013-01-11

UTC time
Latitude degree
longitude degree
Positing fix
Using the number of satellites
Horizontal Dilution of Precision
Altitude based on WGS84 Datum
UTC date

Fixing Mode	3D
Sat Used	18 25 14 21 15 31
PDOP	1.680
VDOP	1.410
Speed (m/s)	0.005

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.

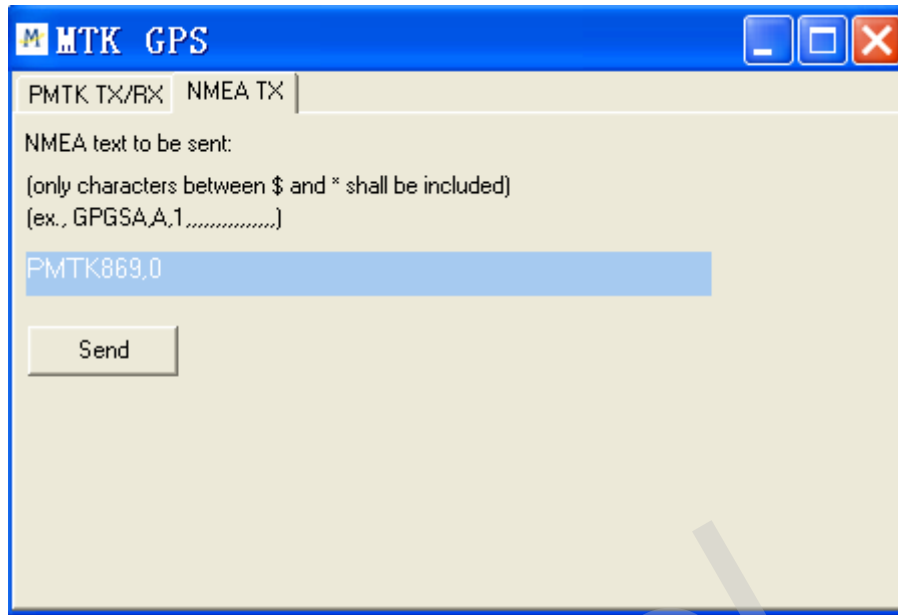


Figure 14: MTK Command

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 Run button to start the test and it can be stopped by clicking on Stop button. The configuration is as below:

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

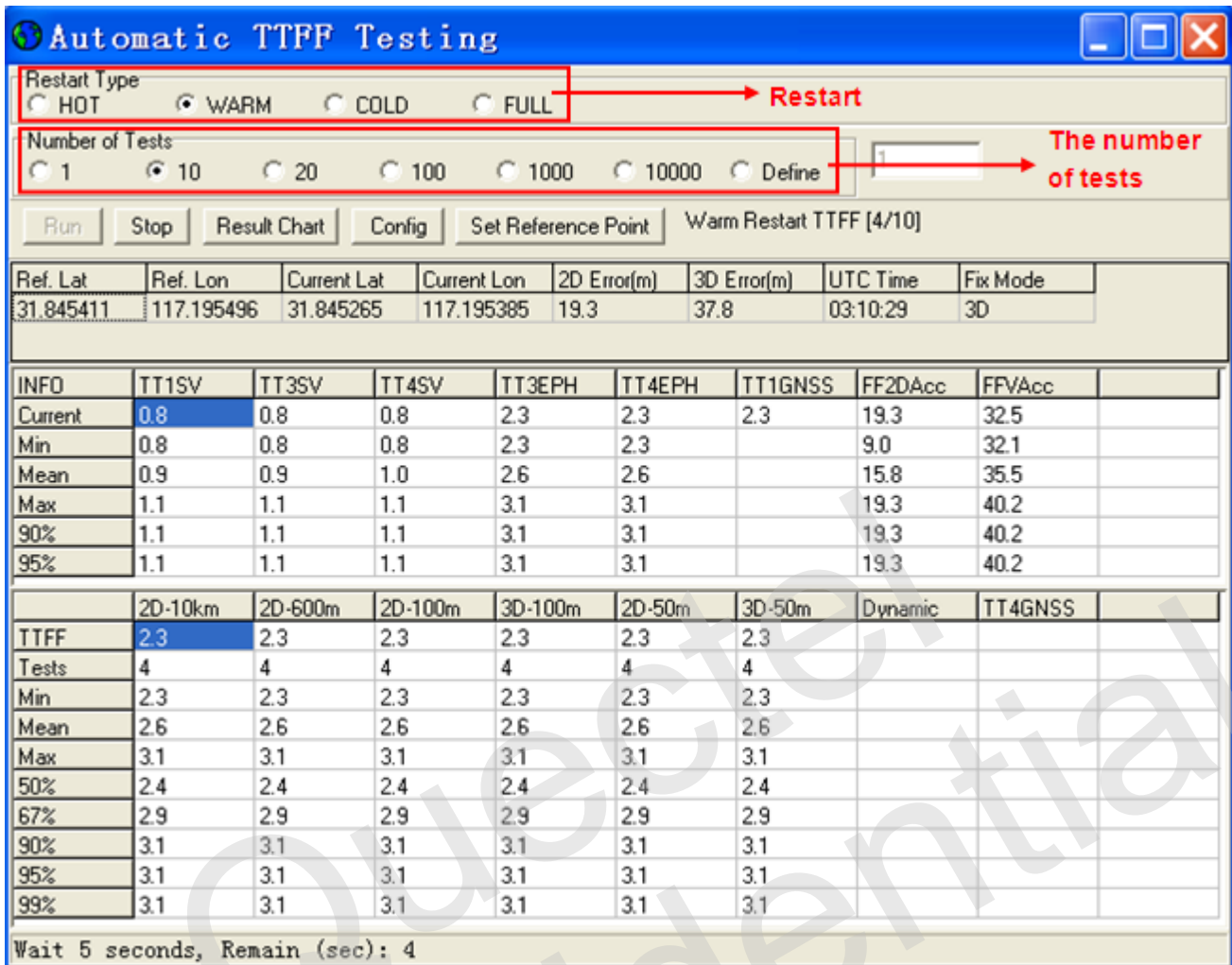


Figure 15: Static TTFB Testing

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

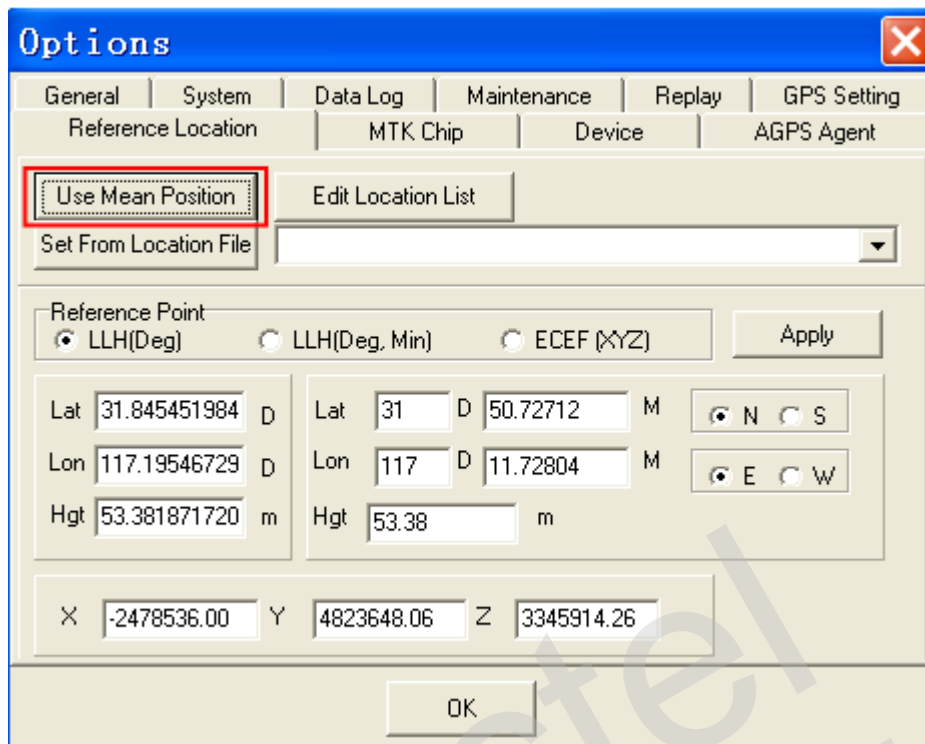


Figure 16: Static TTFF Testing Configuration Options

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

In generally, if you choose hot start, "TTFF Time-out (sec)" sets 10s. If you choose warm start, the "TTFF Time-out (sec)" sets 50s. If you choose cold start, the "TTFF Time-out (sec)" sets 100s. "TTFF Time-out (sec)" can help you judge TTFF and save time.

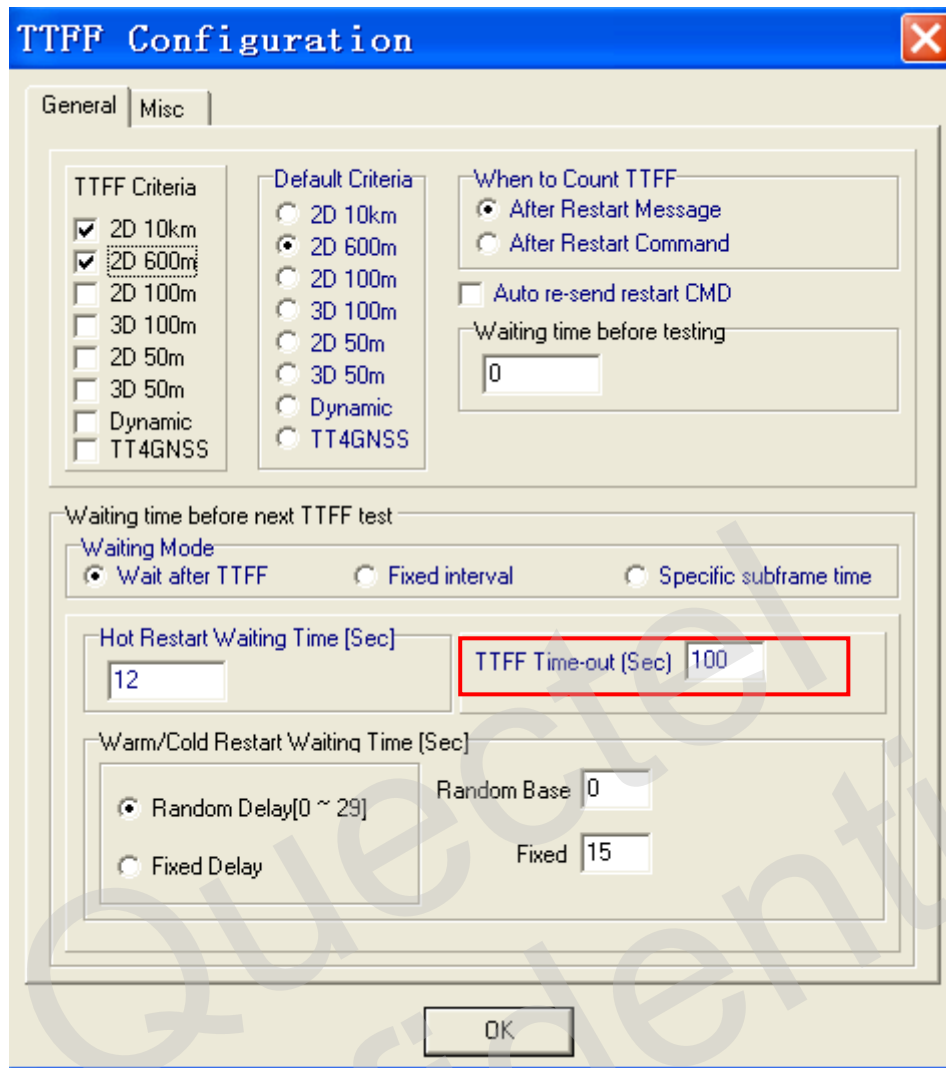


Figure 17: Static TTF Testing Configuration

The above operation is completed. Click on Run button to start the test and it can be stopped by clicking on 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]	L76_Hardware_Design	L76 Hardware Design
[2]	L76_Protocol_Specification	L76 Protocol Specification
[3]	L76_Reference Design	L76 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