



# L10

## Quectel GPS Engine

### EVB User Guide

L10\_EVB\_UGD\_V1.00



|                            |                    |
|----------------------------|--------------------|
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## 0. Revision history

| Revision | Date      | Author      | Description of change |
|----------|-----------|-------------|-----------------------|
| 1.00     | 2009-7-20 | Tracy ZHANG | Initial               |

## 1. Introduction

This document defines and specifies the usage of L10 EVB (Evaluation Board). Customer can get useful information about L10 EVB and GPS demo tool from this document.

### 1.1. Reference

**Table 1: Reference**

| SN  | Document name | Remark          |
|-----|---------------|-----------------|
| [1] | L10_HD        | Hardware Design |

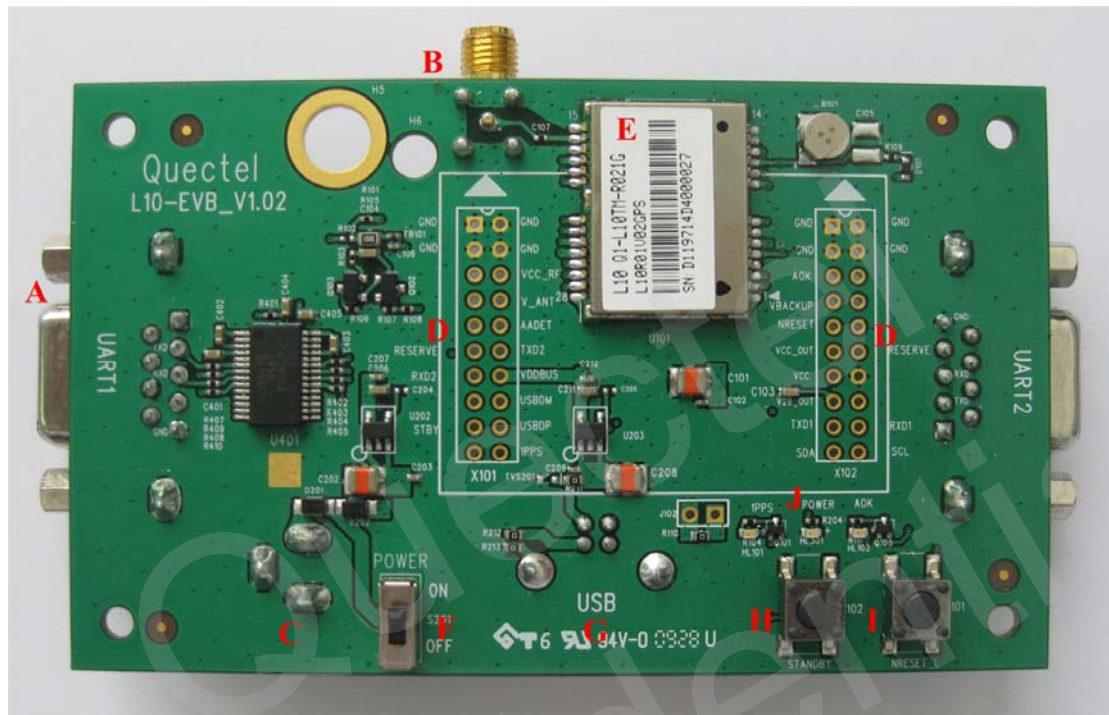
### 1.2. Abbreviations

**Table 2: Abbreviations**

| Abbreviation | Description                                   |
|--------------|-----------------------------------------------|
| CNR          | Carrier-to-Noise Ratio                        |
| GPS          | Global Positioning System                     |
| PRN          | Pseudorandom Noise                            |
| SPS          | Standard Positioning Service                  |
| SV           | Satellite Vehicle                             |
| UART         | Universal Asynchronous Receiver & Transmitter |
| USB          | Universal Serial Bus                          |
| UTC          | Universal Time Coordinated                    |
| WGS84        | World Geodetic System 1984                    |

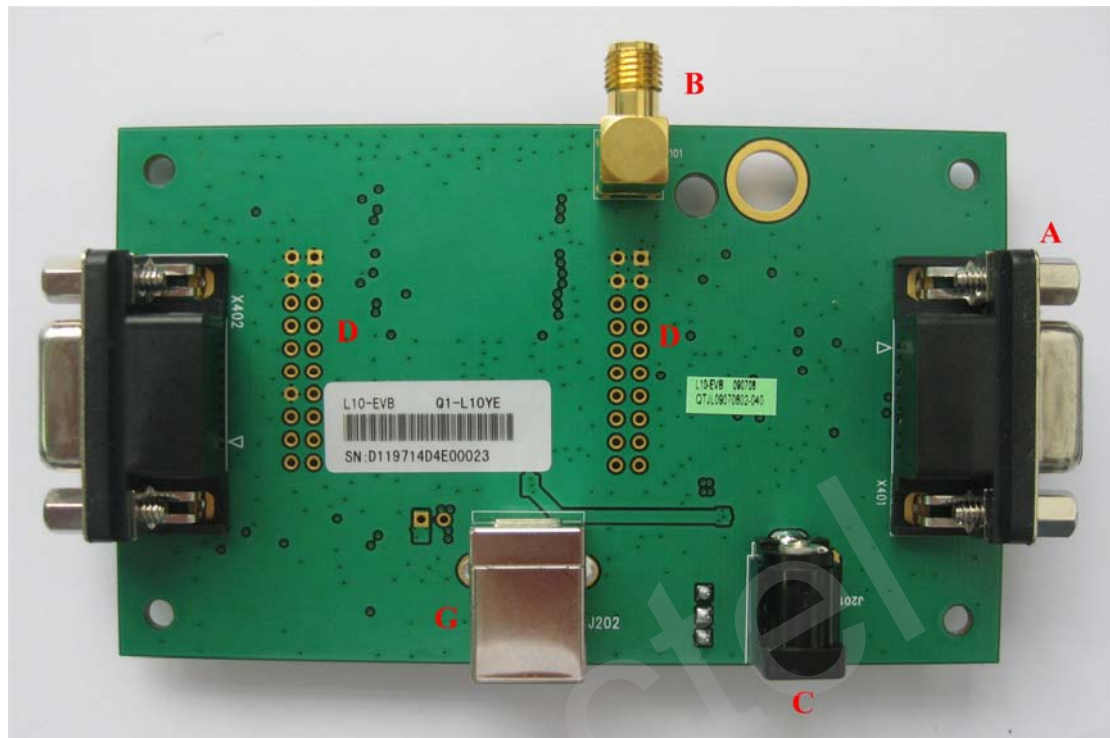
## 2. EVB Kit Introduction

## 2.1. EVB Top and Bottom View



**Figure 1: EVB top view**





**Figure 2: EVB bottom view**

- A: UART port
- B: Antenna interface
- C: Adapter interface
- D: Test points
- E: L10 Module
- F: POWER switch
- G: USB interface
- H: STANDBY button
- I: RESET button
- J: Indication LEDs

## 2.2. EVB Accessories



**Figure 3: EVB accessories**

A: GPS active antenna (3.3V)

B: DC5V/2A power adapter

C: Serial port cable (USB 2.0)

D: USB cable

### 3. Interface Application

#### 3.1. Power Interface

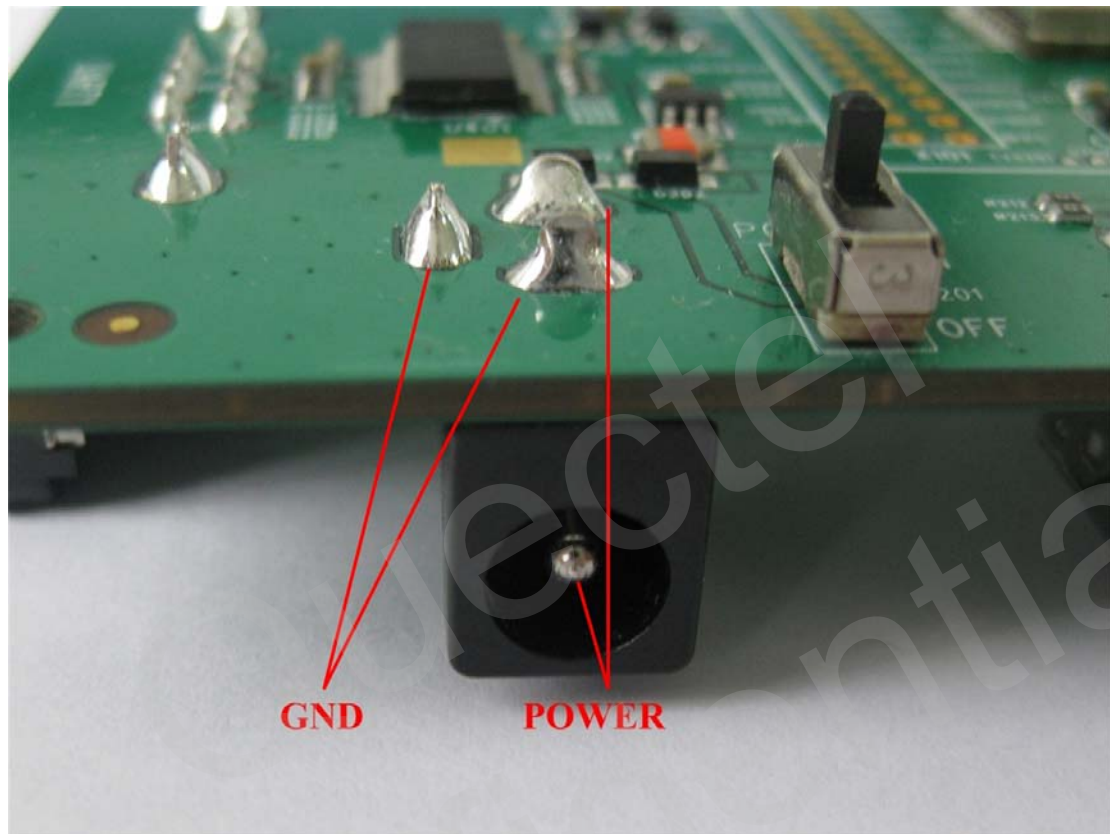


Figure 4: Power interface

### 3.2. UART Interface

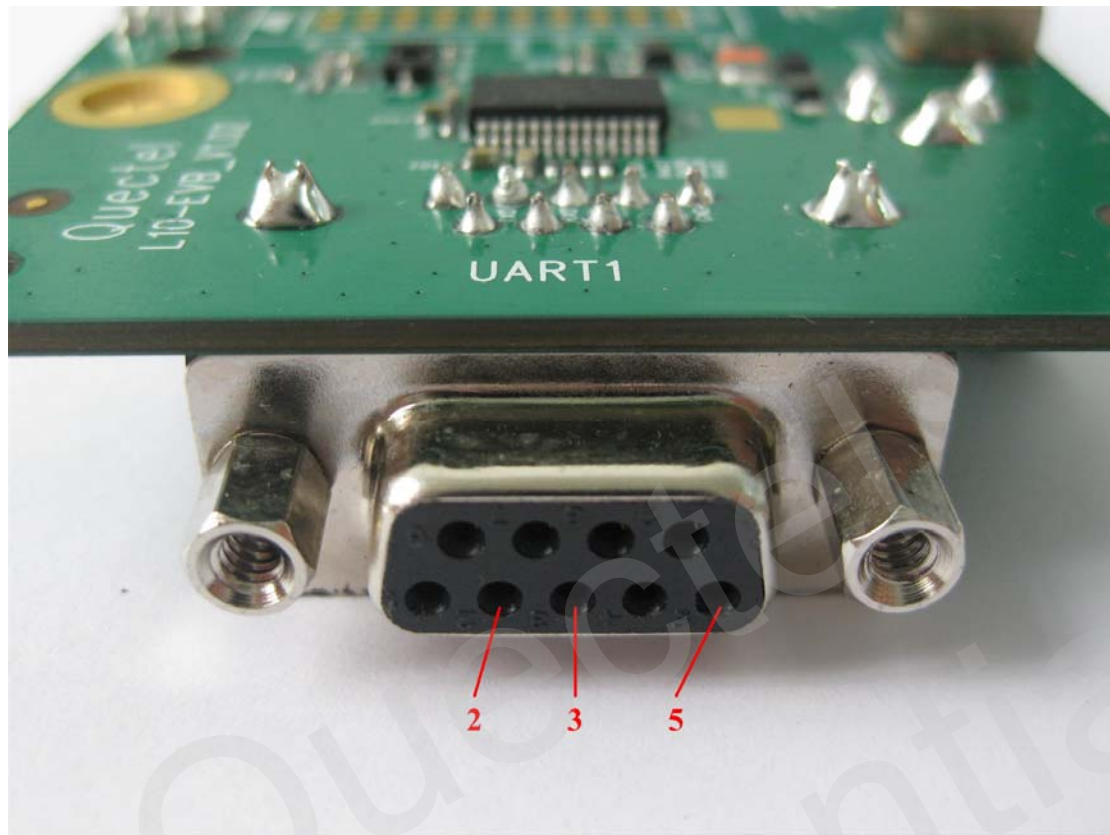


Figure 5: UART interface

Table 3: Pins of UART port

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

### 3.3. USB Interface



Figure 6: USB interface

Table 4: Pins of USB port

| Pin | Signal | I/O | Description           |
|-----|--------|-----|-----------------------|
| 1   | USB_5V | I   | Power supply from USB |
| 2   | GND    |     | GND                   |
| 3   | USB_DP | I/O | USB data positive     |
| 4   | USB_DM | I/O | USB data negative     |



### 3.4. Antenna Interface

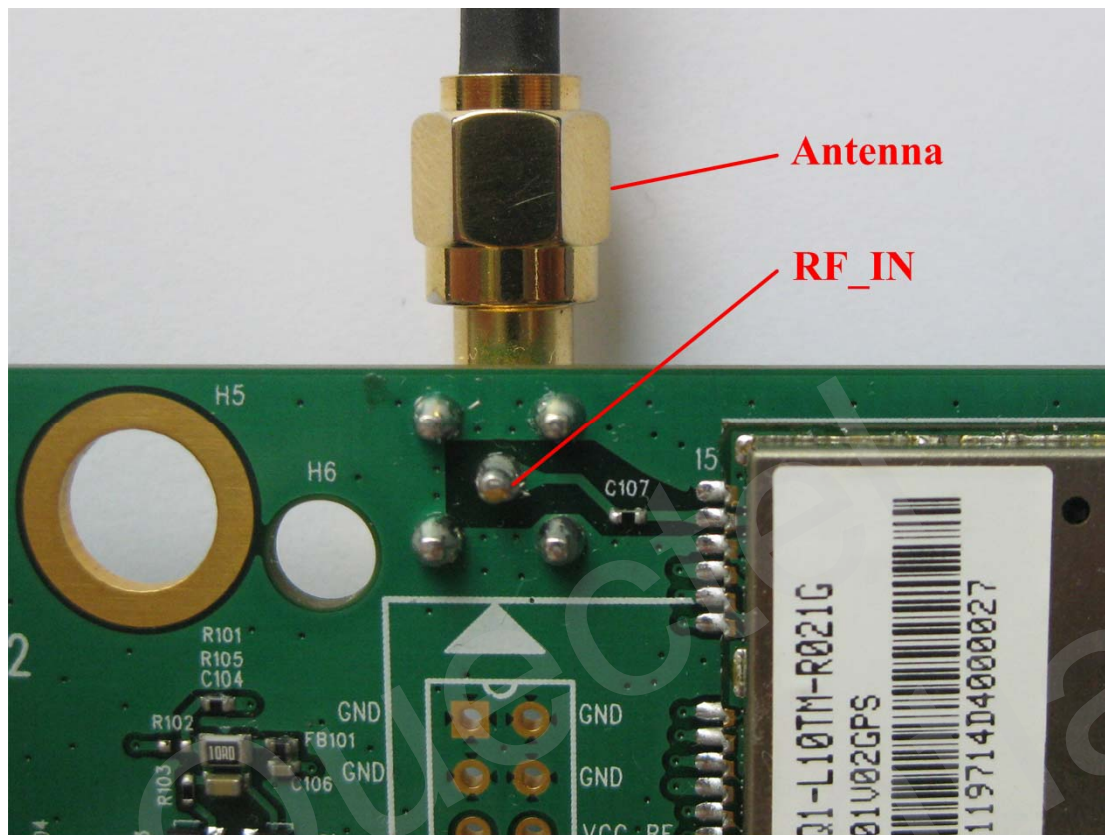


Figure 7: Antenna interface

### 3.5. Switches and Buttons



Figure 8: Switches and buttons

Table 5: Switches and buttons

| Part | Name    | I/O | Description                                                                                                          |
|------|---------|-----|----------------------------------------------------------------------------------------------------------------------|
| S1   | POWER   | I   | Control power supply from adapter                                                                                    |
| K1   | STANDBY | I   | The module will enter into standby mode when pressing this button, and exit standby mode when releasing this button. |
| K2   | RESET_N | I   | Press and release this button. Then the module will reset.                                                           |

### 3.6. Operating Status LEDs

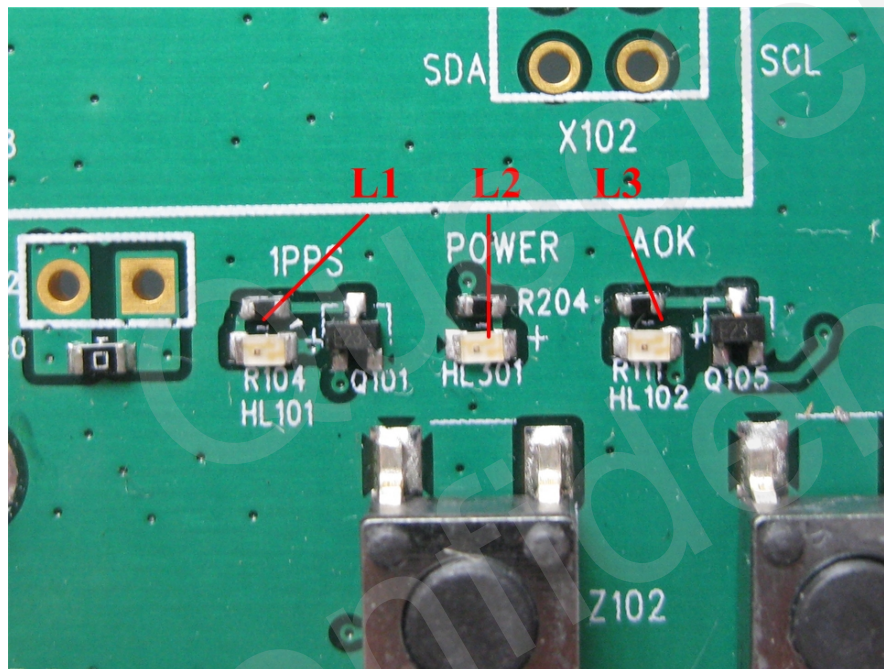


Figure 9: Operating status LEDs

Table 6: Operating status LEDs

| Part | Name  | I/O | Description                                                                                           |
|------|-------|-----|-------------------------------------------------------------------------------------------------------|
| L1   | 1PPS  | O   | Flash: fix successfully, the frequency is 1Hz<br>Extinct: no fix                                      |
| L2   | POWER | O   | Bright: Power on<br>Extinct: Power off                                                                |
| L3   | AOK   | O   | Bright: Active antenna is short-circuit or not assembled<br>Extinct: Active antenna operates normally |

### 3.7. Test Points

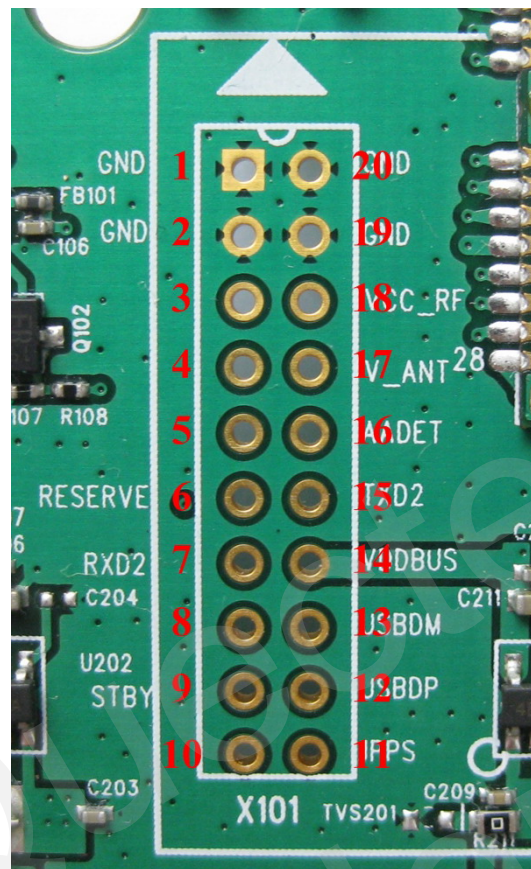


Figure 10: Test points X101

Table 7: Pins of X101

| Pin | Signal    | I/O | Description                 |
|-----|-----------|-----|-----------------------------|
| 1   | GND       |     | Ground                      |
| 2   | GND       |     |                             |
| 3   | NC        |     | Not connected               |
| 4   | NC        |     |                             |
| 5   | NC        |     |                             |
| 6   | RESERVE   |     |                             |
| 7   | RESERVE   |     |                             |
| 8   | NC        |     |                             |
| 9   | EXTINT0   | I   | Enter or exit standby mode  |
| 10  | NC        |     |                             |
| 11  | TIMEPULSE | O   | Time pulse                  |
| 12  | USB_DP    | I/O | USB data positive           |
| 13  | USB_DM    | I/O | USB data negative           |
| 14  | VDDUSB    | I   | Voltage supply for USB port |



|    |         |   |                                       |
|----|---------|---|---------------------------------------|
| 15 | RESERVE |   |                                       |
| 16 | AADET_N | I | Active antenna open-circuit detection |
| 17 | V_ANT   | I | Antenna bias voltage                  |
| 18 | VCC_RF  | O | Output voltage for RF section         |
| 19 | GND     |   |                                       |
| 20 | GND     |   |                                       |

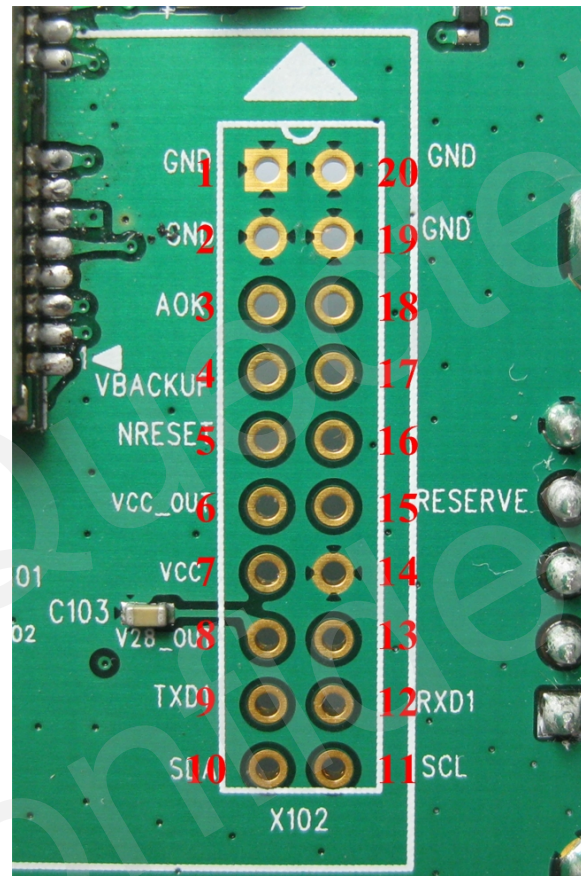


Figure 11: Test points X102

Table 8: Pins of X102

| Pin | Signal  | I/O | Description                                                         |
|-----|---------|-----|---------------------------------------------------------------------|
| 1   | GND     |     | Ground                                                              |
| 2   | GND     |     |                                                                     |
| 3   | AOK     | O   | Antenna status report                                               |
| 4   | V_BCKP  | I   | Backup voltage supply                                               |
| 5   | RESET_N | I   | System reset, low level active.                                     |
| 6   | VCC_OUT | O   | Output voltage. VCC_OUT pin is directly connected to VCC pin within |

|    |         |     |                |
|----|---------|-----|----------------|
|    |         |     | the module.    |
| 7  | VCC     | I   | Supply voltage |
| 8  | RESERVE |     |                |
| 9  | TXD1    | O   | Transmit data  |
| 10 | SDA2    | I/O | I2C interface  |
| 11 | SCL2    | I/O | I2C interface  |
| 12 | RXD1    | I   | Receive data   |
| 13 | NC      |     | Not connected  |
| 14 | GND     |     |                |
| 15 | RESERVE |     |                |
| 16 | NC      |     |                |
| 17 | NC      |     |                |
| 18 | NC      |     |                |
| 19 | GND     |     |                |
| 20 | GND     |     |                |

## 4. EVB and Accessories

When USB to RS232 cable is used, the EVB and its accessories are equipped as shown in Figure 12.



**Figure 12: EVB and accessory equipments with serial cable**

When USB cable is used, the EVB and its accessories are equipped as shown in Figure 13.



**Figure 13: EVB and accessory equipments with USB cable**

## 5. Installing Device Driver

Customer can get NMEA message through UART port or USB port.

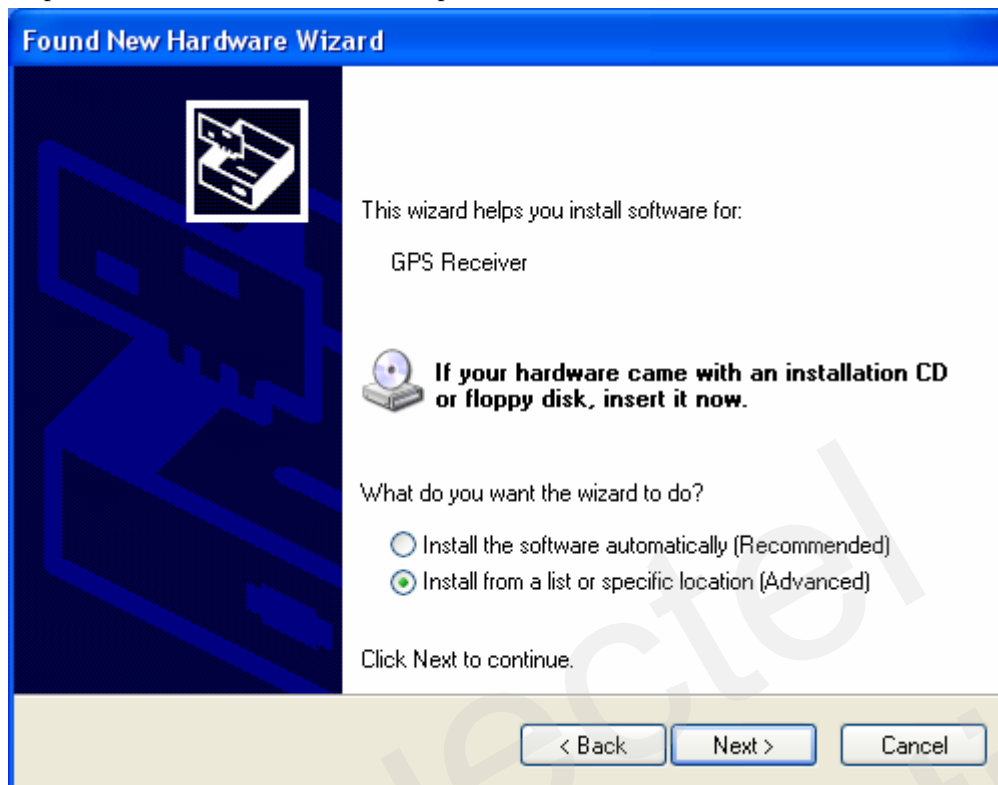
Before using UART port, please install the driver of USB 2.0 to RS232 cable from the attached CD.

Before using USB port, please install the USB driver included in Quectel L10 CD. Installation steps are as follows:

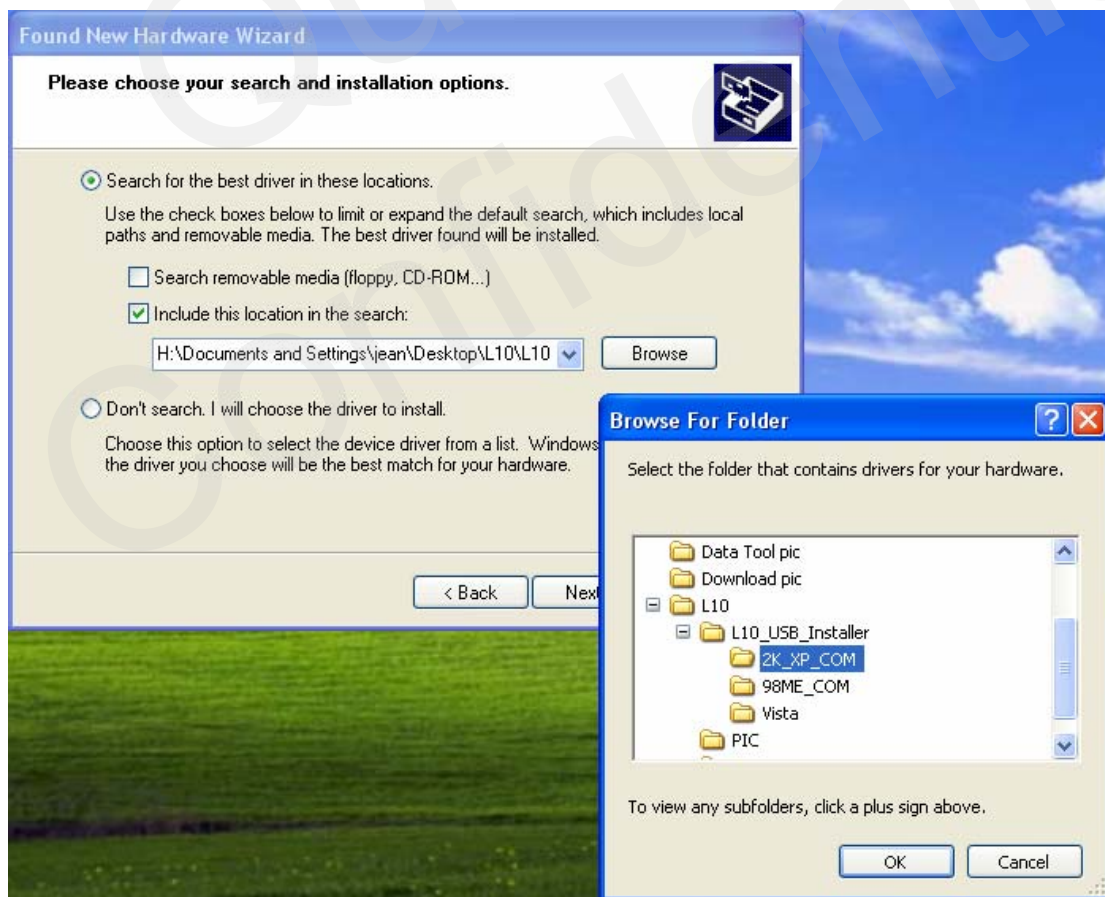
Step 1: Connect L10-EVB to PC with USB cable. Then PC will request installing the virtual COM port driver.



Step 2: Choose “Install from a list or specific location”.

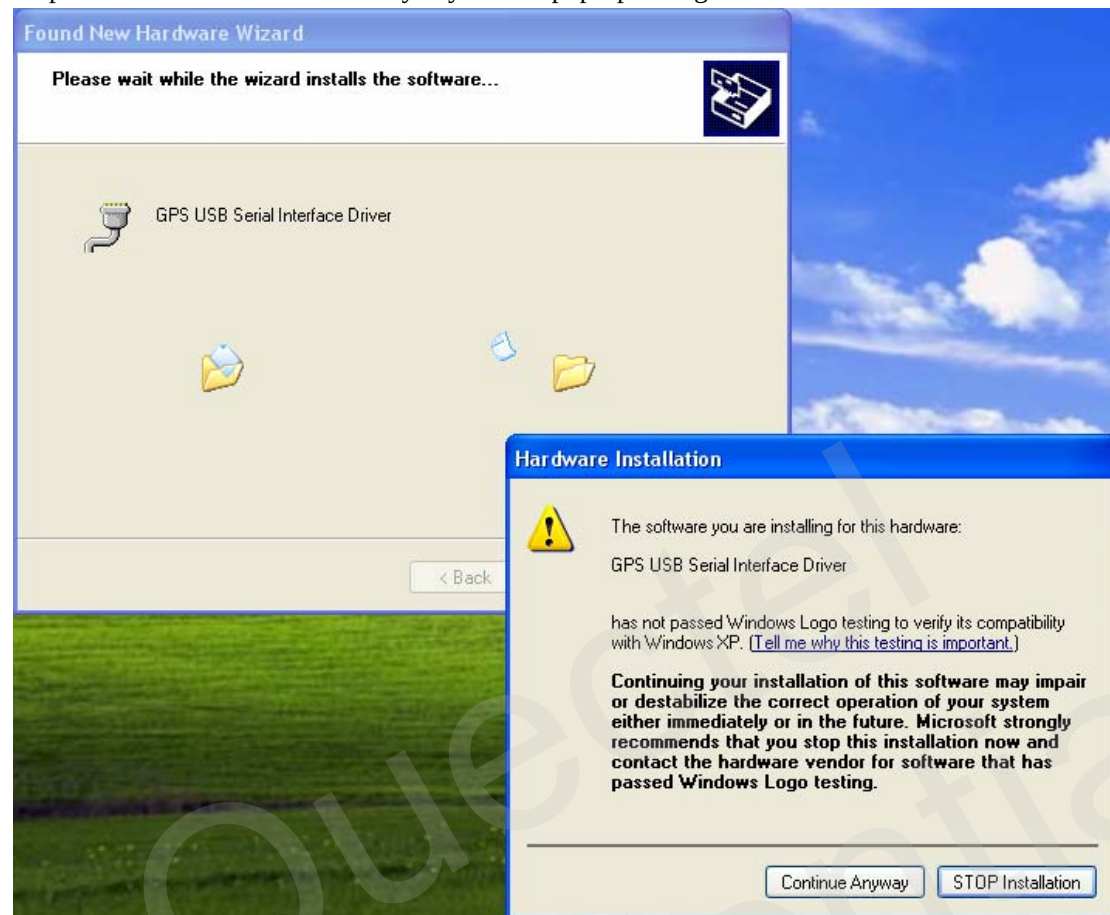


Step 3: Choose the right folder according to PC's OS.





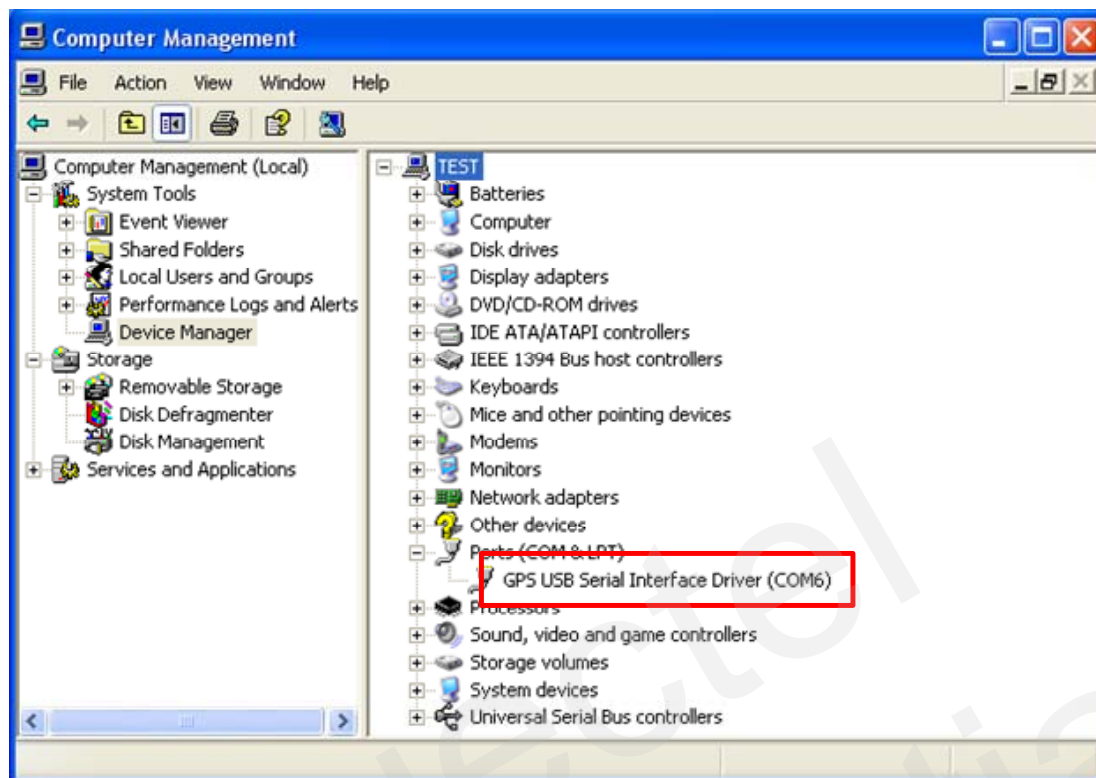
Step 4: Click button “Continue Anyway” in the pop-up dialog box.



Step 5: GPS USB driver installation finishes.

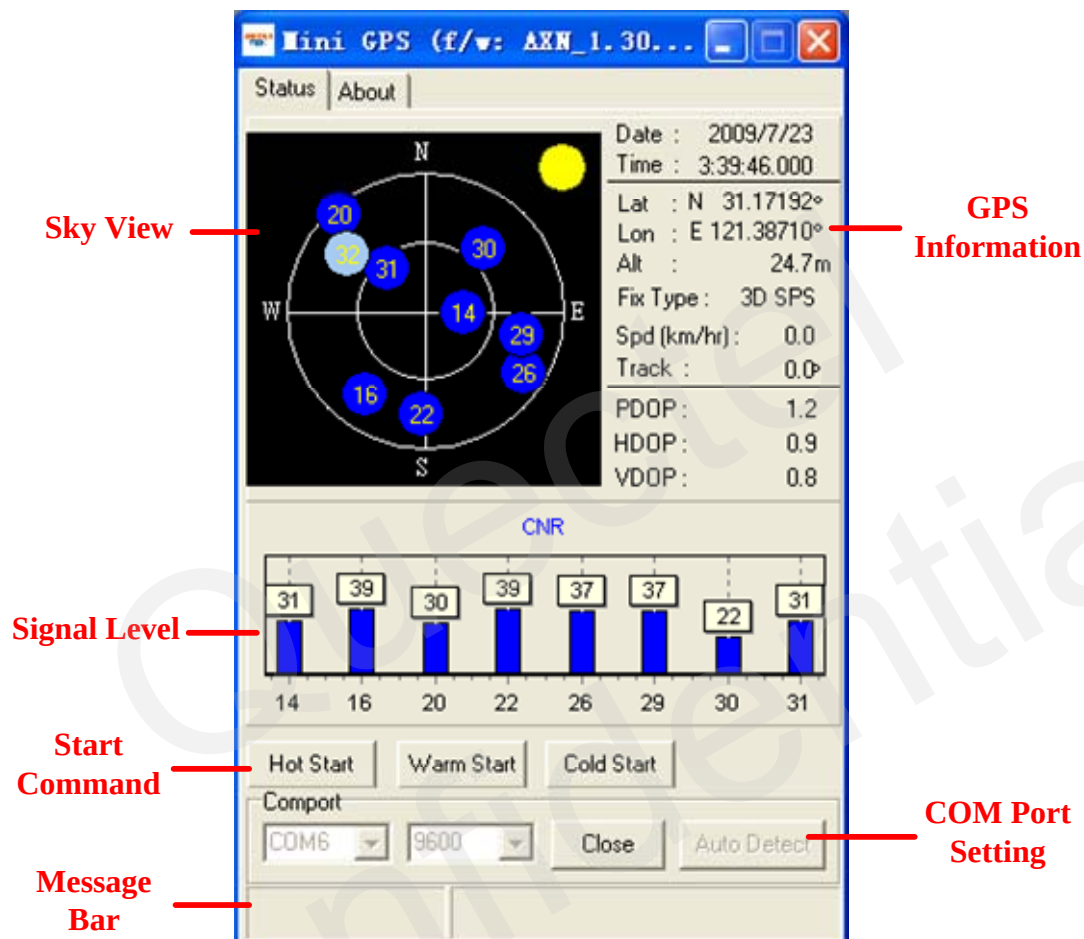


User will find a new virtual COM port in the Device Manager of PC as shown below:



## 6. Starting MiniGPS

The MiniGPS tool can help user to view the status of GPS receiver conveniently. The operation window is shown below:



When USB to RS232 cable is used, power must be supplied through DC adapter, and the default baud rate is 9600bps. When USB cable is used, external DC adapter is unnecessary. In this case, power can be supplied through USB port from PC. The baud rate of the USB port is auto-adaptive. After assembling EVB accessories, start up the MiniGPS. Select a correct COM port and baud rate, click the button "Open".

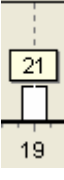


When PC gets any message from the COM port, a yellow dot will be flashing at the upper right corner of the Sky Chart.

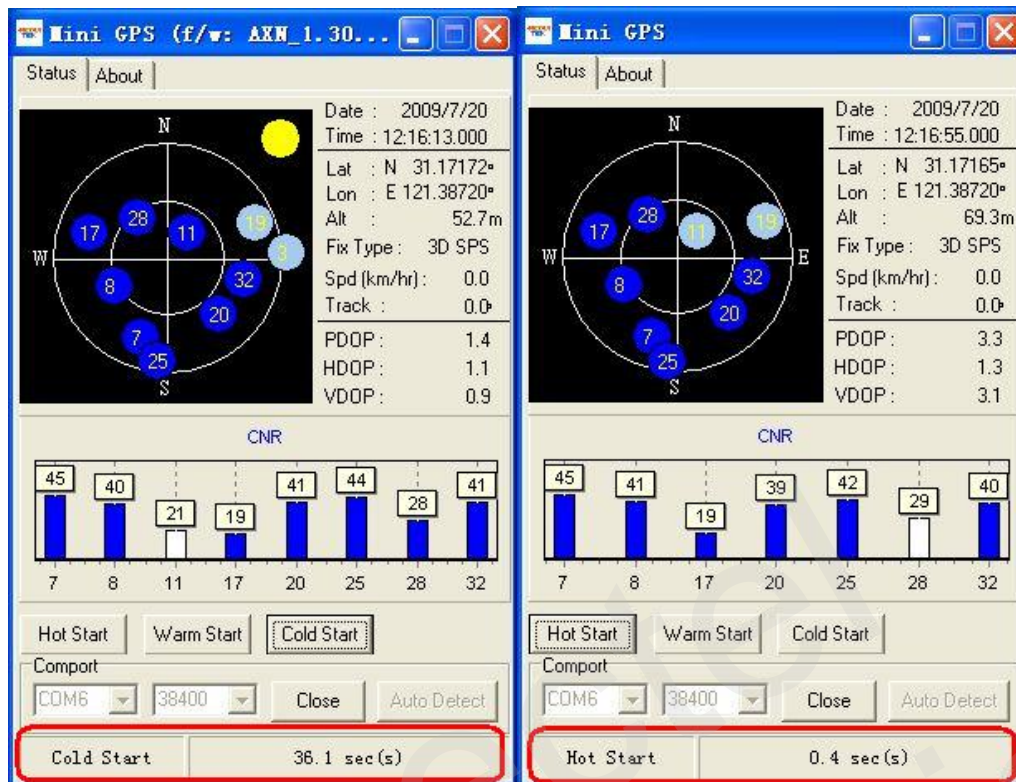


From the MiniGPS window, user can view CNR message, time, position, speed, precision and so on. Explanations are listed in Table 8.

**Table 9: Explanations of MiniGPS window**

| Icon                                                                                                             | Explanation                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | SV with PRN 30. 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.                                                                                                                                        |
| Date : 2009/7/23<br>Time : 3:39:46.000                                                                           | UTC time                                                                                                                                                                                                                 |
| Lat : N 31.17192°<br>Lon : E 121.38710°<br>Alt : 24.7m<br>Fix Type : 3D SPS<br>Spd (km/hr) : 0.0<br>Track : 0.0° | Latitude and longitude degree<br>Altitude based on WGS84 Datum<br>Fix type: NoFix, 3D or 2D SPS<br>Speed of receiver<br>Track degree of receiver                                                                         |
| PDOP : 1.2<br>HDOP : 0.9<br>VDOP : 0.8                                                                           | Position Dilution of Precision<br>Horizontal Dilution of Precision<br>Vertical Dilution of Precision                                                                                                                     |
|                                | The CNR of PRN 26 is 37dB/Hz. Blue column means the navigation data of this satellite is in use.                                                                                                                         |
|                               | The CNR of PRN 19 is 21dB/Hz. White column means the navigation data of this satellite is not in use.                                                                                                                    |

User can drive L10 to implement Hot Start, Warm Start or Cold Start via Start Command buttons. Fix time will be indicated in the Message Bar as shown in the 2 screenshots below:





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