

# **L86** EVB User Guide

**GNSS Module Series**

Rev. L86\_EVB\_User\_Guide\_V1.0

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# About the Document

## History

| Revision | Date       | Author   | Description |
|----------|------------|----------|-------------|
| 1.0      | 2014-08-18 | Bond SUN | Initial     |

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## Contents

|  |           |
|--|-----------|
| About the Document .....               | 2         |
| Contents .....                         | 3         |
| Table Index .....                      | 4         |
| Figure Index .....                     | 5         |
| <b>1 Introduction .....</b>            | <b>6</b>  |
| <b>2 Introduction to EVB Kit .....</b> | <b>7</b>  |
| 2.1. EVB Top and Bottom View .....     | 7         |
| 2.2. EVB Accessories .....             | 9         |
| <b>3 Interface Application .....</b>   | <b>10</b> |
| 3.1. USB Interface .....               | 10        |
| 3.2. UART Interface .....              | 11        |
| 3.3. Antenna Interface .....           | 12        |
| 3.4. Switches and Buttons .....        | 13        |
| 3.5. Test Point .....                  | 14        |
| <b>4 EVB and Accessories .....</b>     | <b>15</b> |
| <b>5 Install Device Driver .....</b>   | <b>16</b> |
| <b>6 Start PowerGPS .....</b>          | <b>17</b> |
| <b>7 Appendix A Reference .....</b>    | <b>20</b> |

## Table Index

|   |    |
|---|----|
| TABLE 1: EVB BOTTOM VIEW .....                | 8  |
| TABLE 2: EVB ACCESSORIES .....                | 9  |
| TABLE 3: PINS OF UART PORT .....              | 11 |
| TABLE 4: SWITCHES AND BUTTONS .....           | 13 |
| TABLE 5: THE DESCRIPTION OF TEST POINTS ..... | 14 |
| TABLE 6: DESCRIPTION OF POWERGPS WINDOW ..... | 18 |
| TABLE 7: REFERENCE .....                      | 20 |
| TABLE 8: ABBREVIATIONS .....                  | 20 |

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## Figure Index

|  |    |
|--|----|
| FIGURE 1: EVB TOP VIEW .....               | 7  |
| FIGURE 2: EVB BOTTOM VIEW .....            | 8  |
| FIGURE 3: EVB ACCESSORIES .....            | 9  |
| FIGURE 4: MICRO-USB INTERFACE .....        | 10 |
| FIGURE 5: UART INTERFACE .....             | 11 |
| FIGURE 6: ANTENNA INTERFACE .....          | 12 |
| FIGURE 7: SWITCHES AND BUTTONS .....       | 13 |
| FIGURE 8: TEST POINTS.....                 | 14 |
| FIGURE 9: EVB AND ACCESSORY EQUIPMENT..... | 15 |
| FIGURE 10: POWERGPS TOOL .....             | 17 |
| FIGURE 11: COM PORT AND BAUD.....          | 17 |

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# 1 Introduction

This document defines and specifies the usage of L86 EVB (Evaluation Board). You can get useful information about L86 EVB and GPS demo tool from this document.

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# 2 Introduction to EVB Kit

## 2.1. EVB Top and Bottom View

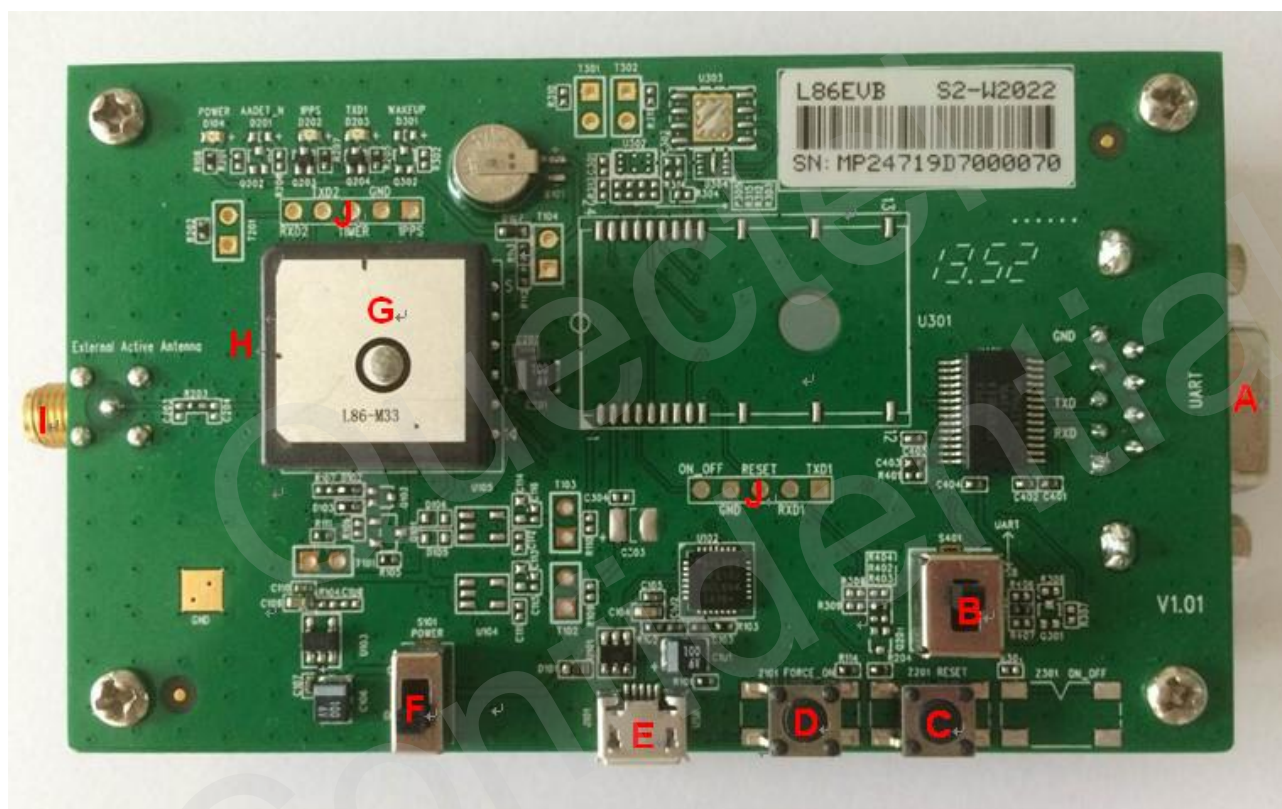


Figure 1: EVB Top View





Figure 2: EVB Bottom View

Table 1: EVB Bottom View

| Index | Description                    |
|-------|--------------------------------|
| A     | UART port                      |
| B     | Serial port alternation switch |
| C     | RESET button                   |
| D     | FORCE_ON                       |
| E     | Micro-USB port                 |
| F     | POWER switch                   |
| G     | PATCH antenna                  |
| H     | L86 module                     |
| I     | Active antenna interface       |
| J     | Test points                    |

## 2.2. EVB Accessories



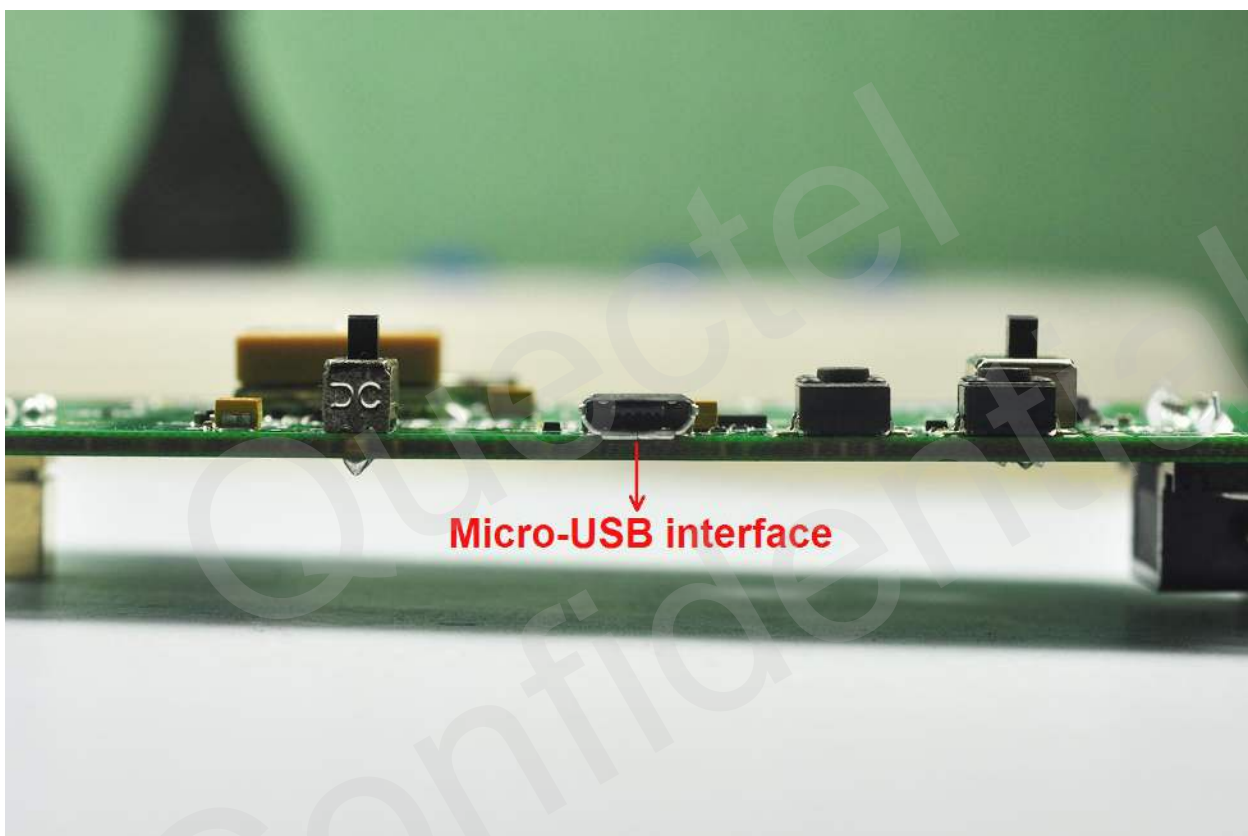
Figure 3: EVB Accessories

Table 2: EVB Accessories

| Index | Description |
|-------|-------------|
| A     | USB cable   |

# 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 (S401). If you want to use UART in order to output NEMA, both RS232 and Micro-USB cable are necessary. So the easier way is to use Micro-USB cable which provides both the power and output NEMA. You can make alternation between UART port and Micro-USB interface via switch (S401).

### 3.2. UART Interface

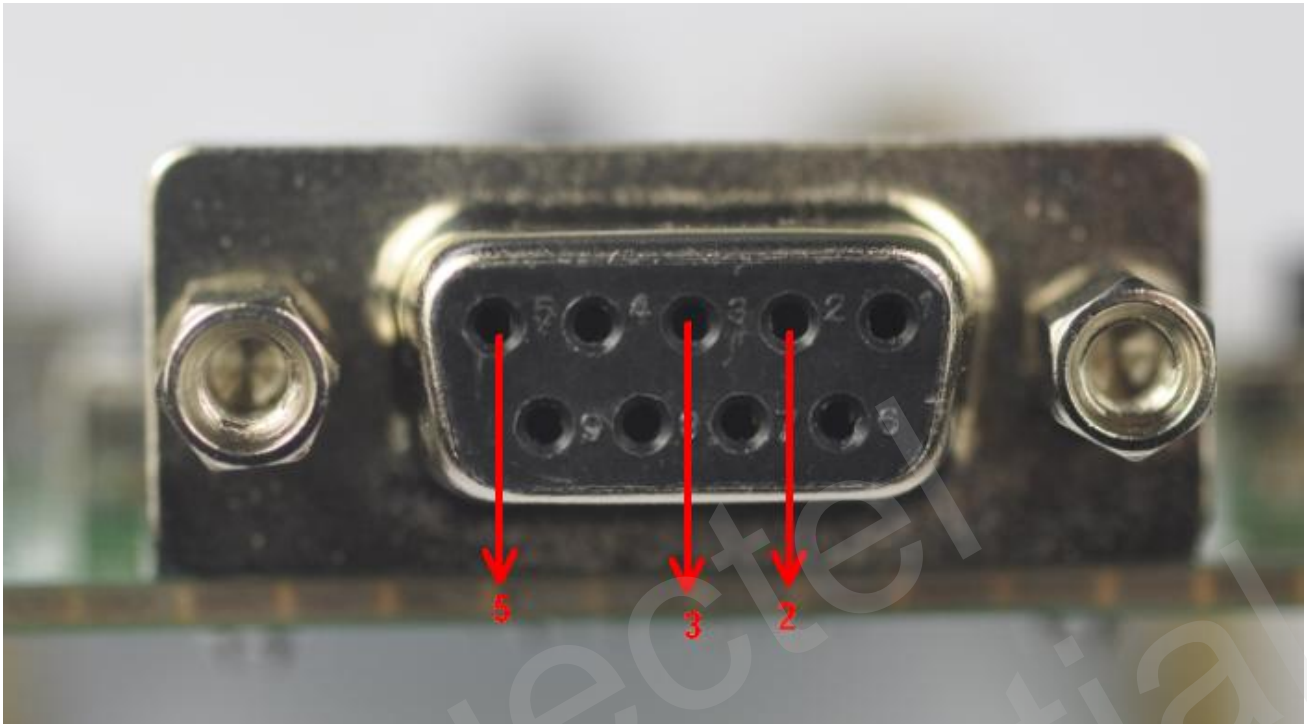


Figure 5: UART Interface

Table 3: 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

### 3.4. Switches and Buttons

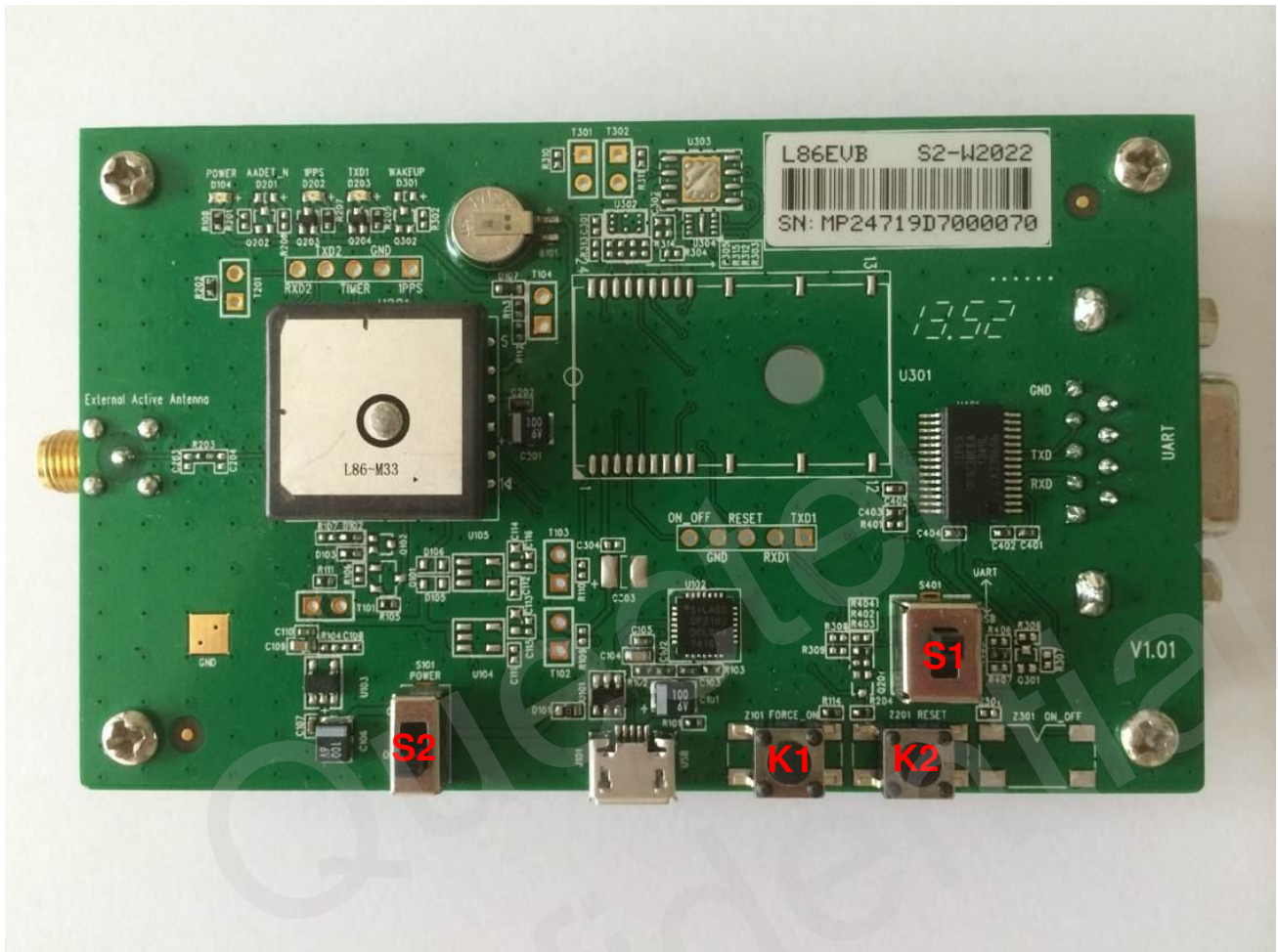


Figure 7: Switches and Buttons

Table 4: Switches and Buttons

| Part | Name                           | I/O | Description   |
|------|--------------------------------|-----|---|
| S1   | Serial port alternation switch | I   | Quectel EVB supplies two communicative ways: Micro-USB and UART which are controlled by switch. |
| S2   | POWER                          | I   | Control power supply via Micro-USB.   |
| K1   | FORCE_ON                       | I   | Logic high will force module to wake up from backup mode.                                       |
| K2   | RESET                          | I   | Press and release this button, then the module will reset.                                      |

### 3.5. Test Point

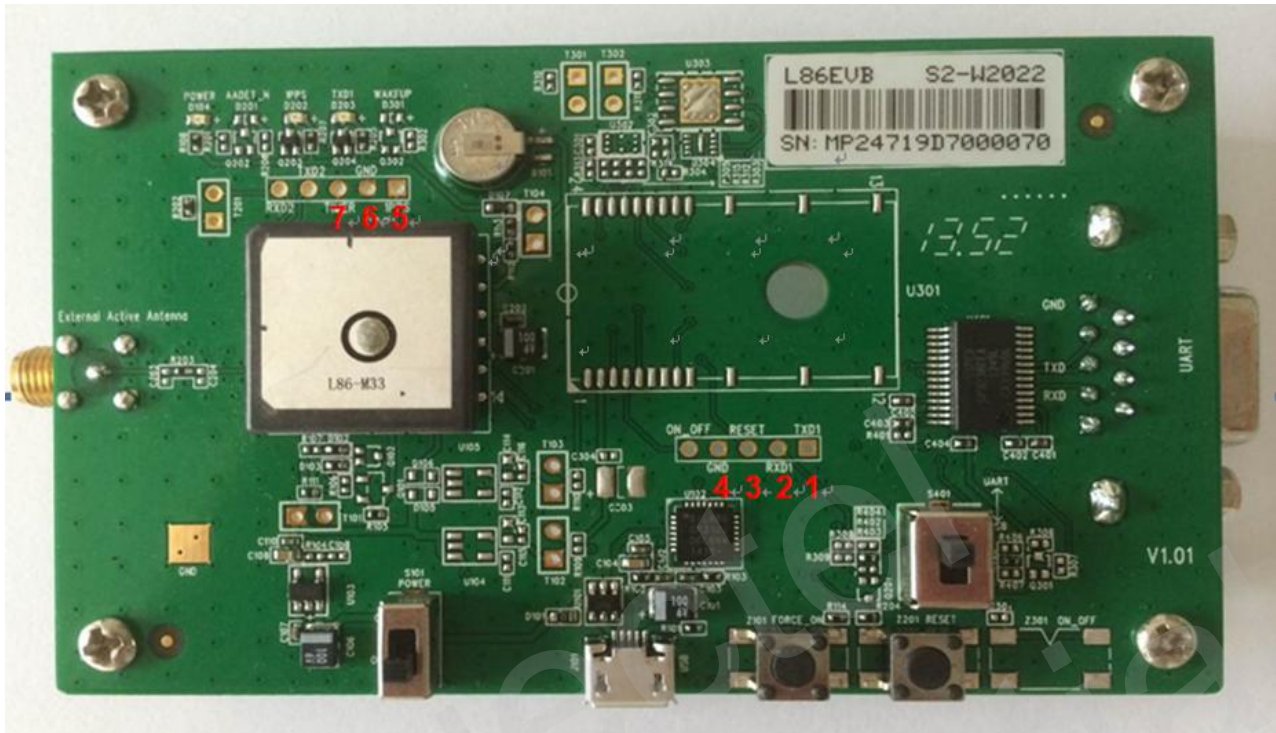


Figure 8: Test Points

Table 5: The Description of Test Points

| Pin | Signal | I/O | Description   |
|-----|--------|-----|---|
| 1   | TXD1   | O   | Transmit data   |
| 2   | RXD1   | I   | Receive data  |
| 3   | RESET  | I   | System reset  |
| 4/6 | GND    |     | Ground  |
| 5   | 1PPS   | O   | 1 pulse per second  |
| 7   | TIMER  | O   | Logic high will force module to wake up from backup mode. Keep this pin open or pulled low before entering into backup mode. If unused, keep this pin open. |

## 4 EVB and Accessories

The EVB and its accessories are equipped as shown in Figure 9.



Figure 9: EVB and Accessory Equipment

**NOTE**

The GNSS active antenna is not included in L86EVB-KIT. If you need it for your application, you can purchase separately from Quectel Sales Support.



## 5 Install Device Driver

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

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# 6 Start PowerGPS

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



Figure 10: PowerGPS Tool


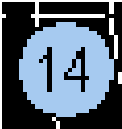
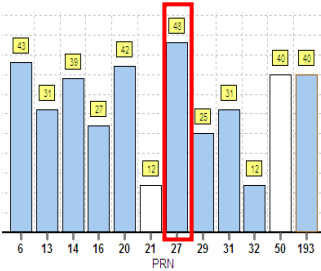
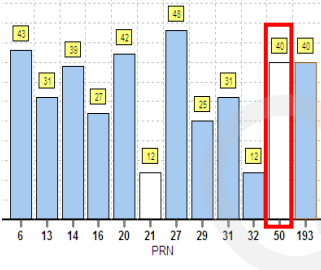
After EVB accessories are assembled, turn on the module and start up the PowerGPS. Select a correct COM port and baud rate (L86 module supports 9600bps by default), then click the button “Create Connection”.



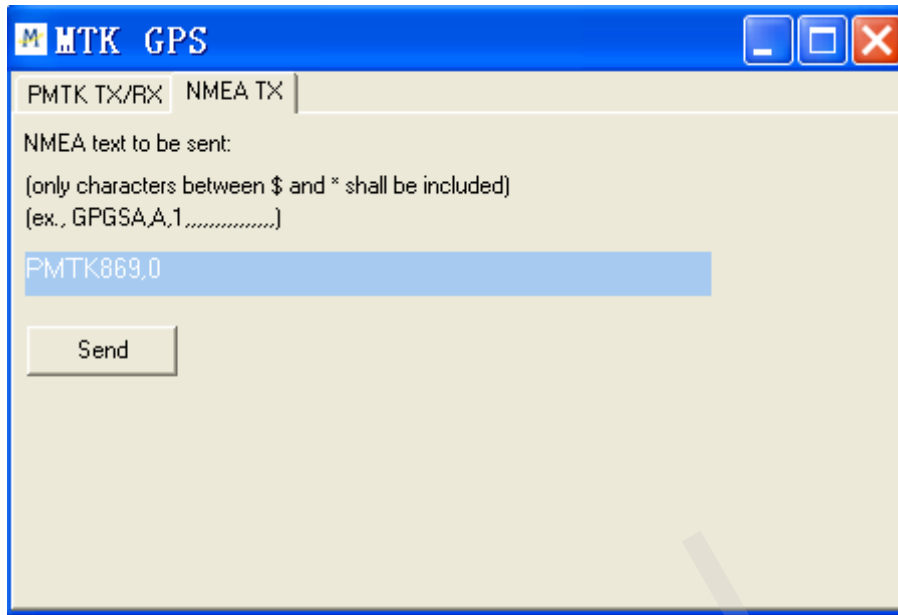
Figure 11: COM Port and Baud

From the PowerGPS window, user can view CNR message, time, position, speed, precision and so on. Descriptions are listed in Table 6.

**Table 6: Description of PowerGPS Window**

| Icon  | Description  |                                  |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
|---|--|----------------------------------|--------------------------------|----------|-------------------|-----------------|-----------|----------------|--------------------------------|---------|------------|--------------------------------|-------------|-------|-------------------------------|------|-------|----------------------------------|----------|----------|-------------------------------|----------|------------|----------|--|
|    | SV with PRN 20. 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 27 is 48dB/Hz. Light blue column means the navigation data of this satellite is in use.   |                                  |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
|   | The CNR of PRN 50 is 40dB/Hz. White column means the navigation data of this satellite is not in use.  |                                  |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| <table border="1"> <tbody> <tr><td>UTC Time</td><td>08:54:07.000</td><td>UTC time</td></tr> <tr><td>Latitude</td><td>31.84580167 N</td><td>Latitude degree</td></tr> <tr><td>Longitude</td><td>117.19548500 E</td><td>longitude degree</td></tr> <tr><td>Pos Fix</td><td>Valid DGPS</td><td>Positing fix</td></tr> <tr><td>Sat used</td><td>17</td><td>The number of used satellites</td></tr> <tr><td>HDOP</td><td>0.630</td><td>Horizontal Dilution of Precision</td></tr> <tr><td>Altitude</td><td>16.200 M</td><td>Altitude based on WGS84 Datum</td></tr> <tr><td>UTC Date</td><td>2013-01-11</td><td>UTC date</td></tr> </tbody> </table> | UTC Time   | 08:54:07.000                     | UTC time                       | Latitude | 31.84580167 N     | Latitude degree | Longitude | 117.19548500 E | longitude degree               | Pos Fix | Valid DGPS | Positing fix                   | Sat used    | 17    | The number of used satellites | HDOP | 0.630 | Horizontal Dilution of Precision | Altitude | 16.200 M | Altitude based on WGS84 Datum | UTC Date | 2013-01-11 | UTC date |  |
| UTC Time  | 08:54:07.000   | UTC time                         |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| Latitude  | 31.84580167 N  | Latitude degree                  |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| Longitude   | 117.19548500 E   | longitude degree                 |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| Pos Fix   | Valid DGPS   | Positing fix                     |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| Sat used  | 17   | The number of used satellites    |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| HDOP  | 0.630  | Horizontal Dilution of Precision |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| Altitude  | 16.200 M   | Altitude based on WGS84 Datum    |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| UTC Date  | 2013-01-11   | UTC date                         |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| <table border="1"> <tbody> <tr><td>Fixing Mode</td><td>3D</td><td>Fix type: No-Fix, 3D or 2D SPS</td></tr> <tr><td>Sat Used</td><td>18 25 14 21 15 31</td><td>Used satellite</td></tr> <tr><td>PDOP</td><td>1.680</td><td>Position Dilution of Precision</td></tr> <tr><td>VDOP</td><td>1.410</td><td>Vertical Dilution of Precision</td></tr> <tr><td>Speed (m/s)</td><td>0.005</td><td>Speed of receiver</td></tr> </tbody> </table>  | Fixing Mode  | 3D                               | Fix type: No-Fix, 3D or 2D SPS | Sat Used | 18 25 14 21 15 31 | Used satellite  | PDOP      | 1.680          | Position Dilution of Precision | VDOP    | 1.410      | Vertical Dilution of Precision | Speed (m/s) | 0.005 | Speed of receiver             |      |       |                                  |          |          |                               |          |            |          |  |
| Fixing Mode   | 3D   | Fix type: No-Fix, 3D or 2D SPS   |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| Sat Used  | 18 25 14 21 15 31  | Used satellite                   |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| PDOP  | 1.680  | Position Dilution of Precision   |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| VDOP  | 1.410  | Vertical Dilution of Precision   |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |
| Speed (m/s)   | 0.005  | Speed of receiver                |                                |          |                   |                 |           |                |                                |         |            |                                |             |       |                               |      |       |                                  |          |          |                               |          |            |          |  |

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



**Figure 12: MTK Command**

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# 7 Appendix A Reference

**Table 7: Reference**

| SN  | Document Name                      | Remark                     |
|-----|------------------------------------|----------------------------|
| [1] | Quectel_L86_Hardware_Design        | L86 Hardware Design        |
| [2] | Quectel_L86_Protocol_Specification | L86 Protocol Specification |
| [3] | Quectel_L86_Reference Design       | L86 Reference Design       |

**Table 8: Abbreviations**

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