



# AirPrime XA1110 and XM1110

## Development Kit User Guide



**SIERRA**  
WIRELESS®

41111056  
Rev 2.4

## Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless modem are used in a normal manner with a well-constructed network, the Sierra Wireless modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless modem, or for failure of the Sierra Wireless modem to transmit or receive such data.

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*Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless modems may be used at this time.*

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## Revision History

Revision number	Release date	Changes
1	June 23, 2017	Initial revision in SWI Template
2.0	April 2018	Changed instances of EVK to Development Kit
2.1	May 04, 2018	Updated <a href="#">System Requirements</a> on page 19
2.2	May 09, 2018	Updated <a href="#">USB Driver and GNSS Tool</a> on page 19
2.3	May 16, 2018	Updated <a href="#">Software Usage</a> on page 19
2.4	May 28, 2018	Updated <a href="#">USB Driver and GNSS Tool</a> on page 19

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# >> 1: Introduction

The main purpose of the Development Kit is to simplify the evaluation process for GNSS modules and to help testers operate our products with convenience and ease.

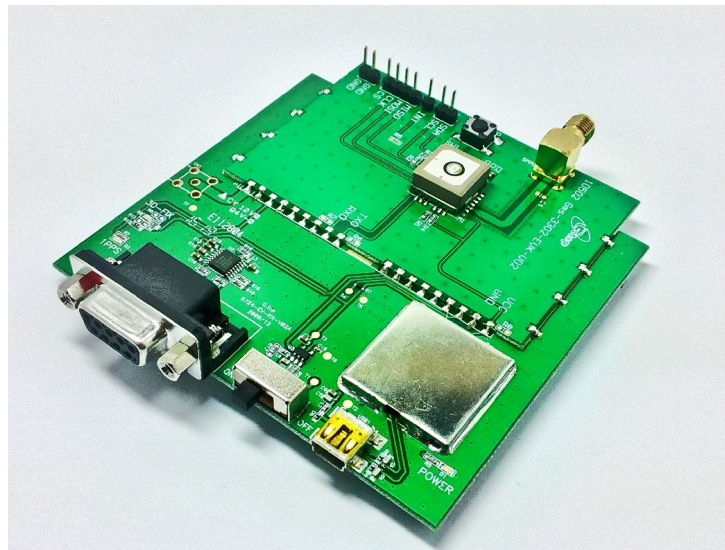


Figure 1-1: XA1110 and XM1110 Development Kit

This device can communicate with computer devices via USB cable, and it must be used in conjunction with the software “GNSS Tool”, for users to record all GNSS module data such as satellites’ status, time-to-first-fix (TTFF), date and time.

If evaluation of RTCM function is desired, the tester can refer to the GNSS Tool and see how to connect the GNSS simulator with the Development Kit via RS232 (DB-9 Connector).

The Development Kit has five series based on the various modules in the list below:

**With External Active Antenna (Series 1):**

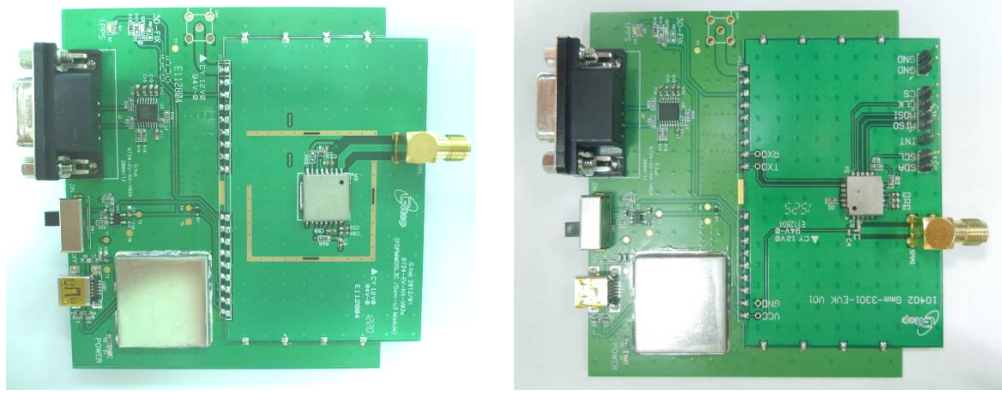


Figure 1-2: Left: Gmm-g3; Right: XM1110

**Built-in Patch Antenna (Series 2):**

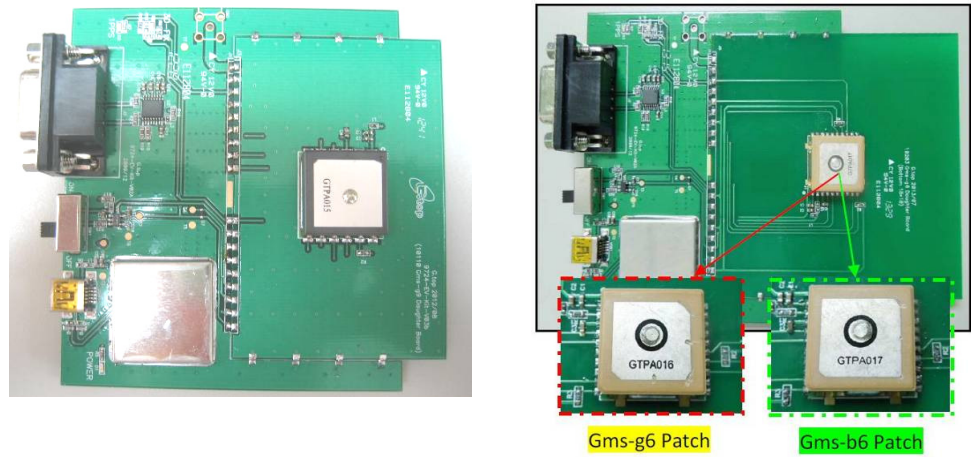


Figure 1-3: Left: Gms-g9; Right: Gms-g6 / Gms-b6 (Common Board)

**Built-in chip antenna (Series 3):**



Figure 1-4: Gms-g6a

**Built-in Switch Antenna input (Series 4):**

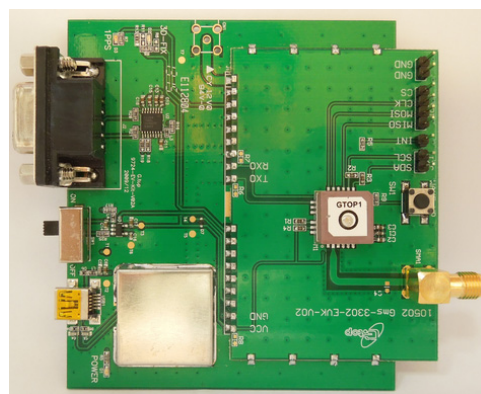


Figure 1-5: XA1110

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## Caution

- Global navigation satellite system (GNSS) includes GPS+GLONASS and BeiDou GPS+ BeiDou-2(COMPASS).
  - GPS was established by the US Ministry of National Defense.
  - GLONASS was established by Russian Aerospace Defense Forces and is used in Russia.
  - BeiDou-2 system, also known as “Compass”, has been commercially operational since the end of 2012. It is currently a constellation of 16 satellites ultimately 35 providing worldwide positioning, navigation and timing services to the Asia-Pacific region.

Each country is responsible for the preciseness and maintenance of the system. Any changes they have implemented to the system in the future may enhance or deteriorate the effectiveness and performance of the received GNSS data.

- GNSS signal may be cut off or become seriously weakened if you operate Development Kit inside any infrastructures such as buildings, tunnels, or nearby any huge objects and/or obstruction. That signal being cut off does not mean the Development Kit is malfunctioned; it will operate properly again once it receives clear GNSS signals (works best under open sky).

## Packing Contents

- User Manual / Software Application Program
- CP210X USB Bridge VCP driver
- GNSS Tool with user manual
- Development Kit user manual

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*Note: These items will be delivered by E-mail. Please contact your dealer for the items for more information.*

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- USB Cable
- Development Kit with Main Board: GNSS Module Board
- External Active Antenna (module: Gmm-g3, XM1110)

# >> 2: Hardware Overview

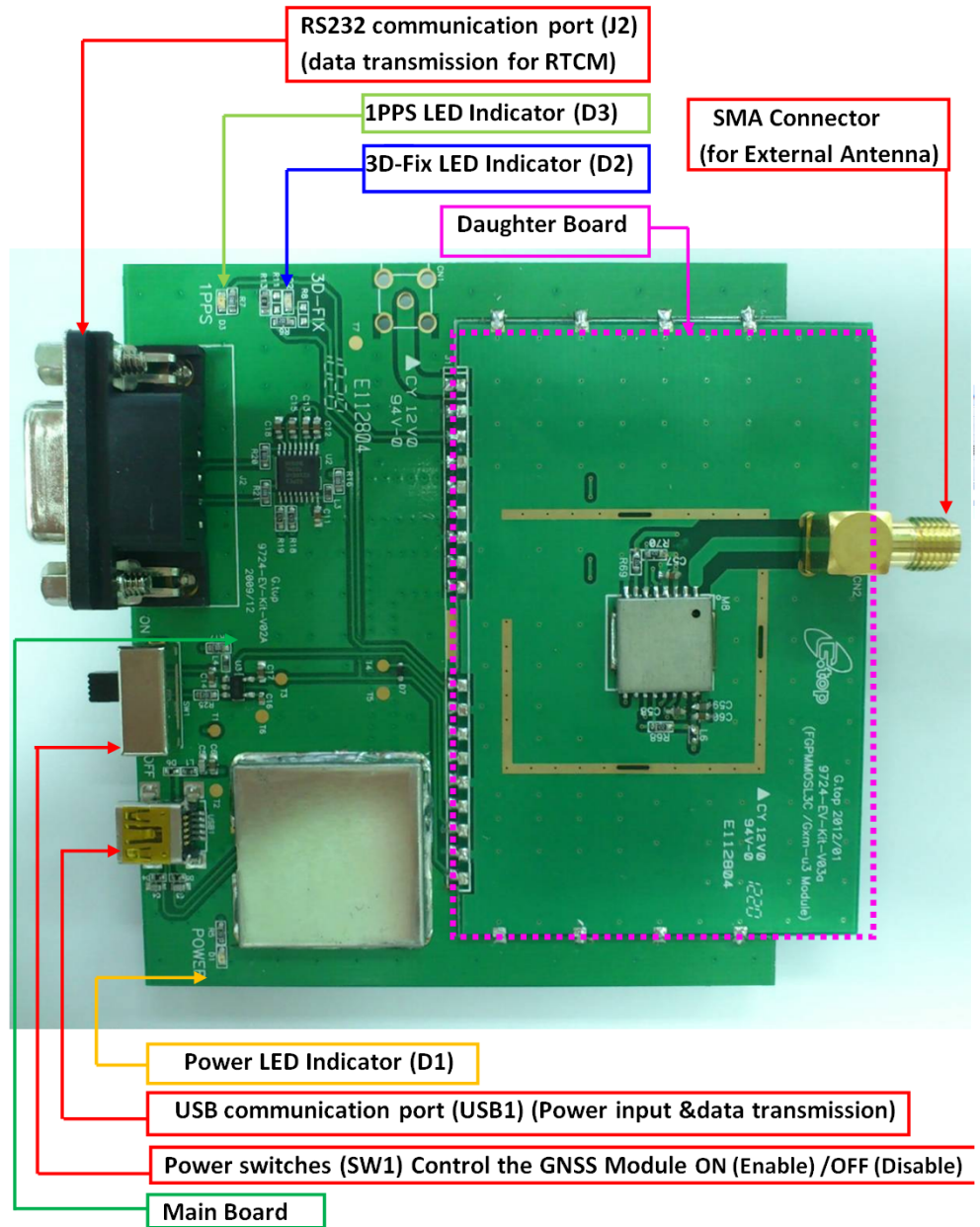


Figure 2-1: Compatible Models: (Series 1) Gmm-g3

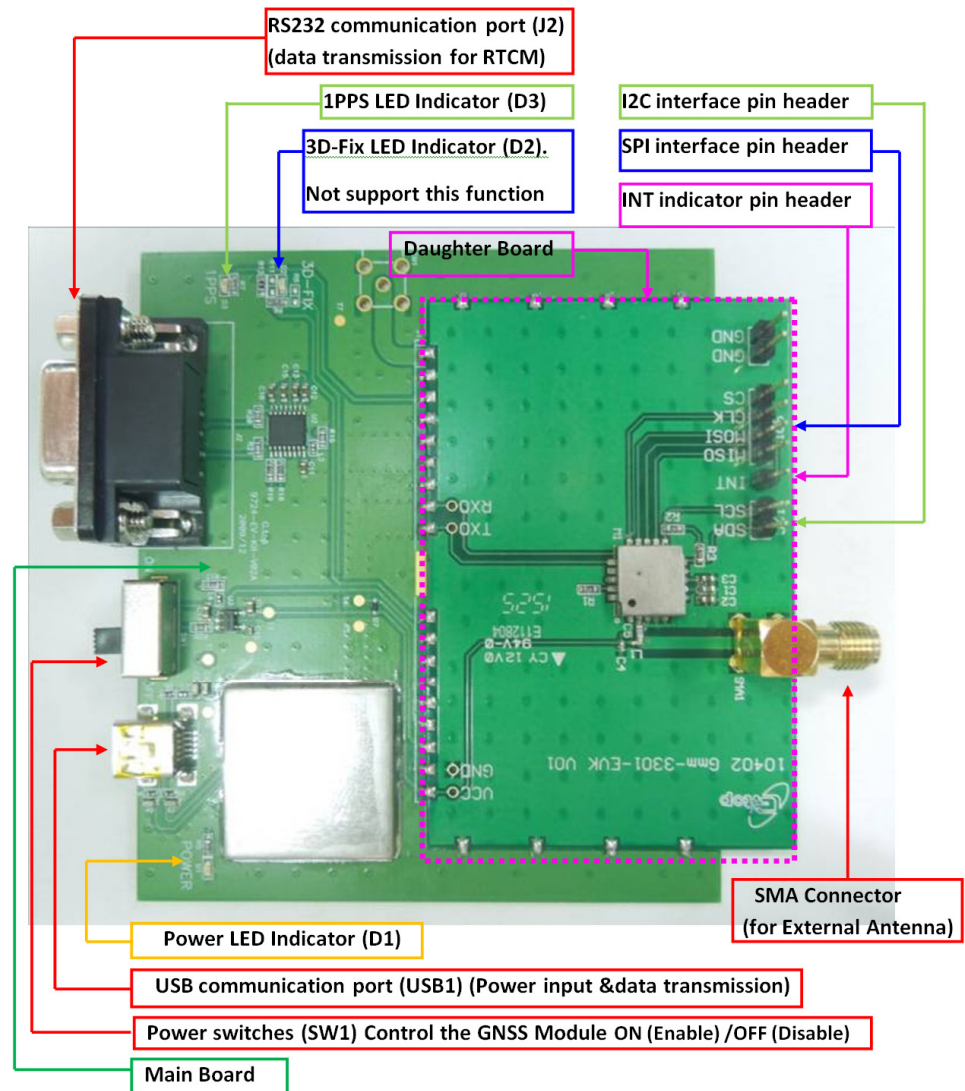


Figure 2-2: Compatible Models: (Series 1) XM1110

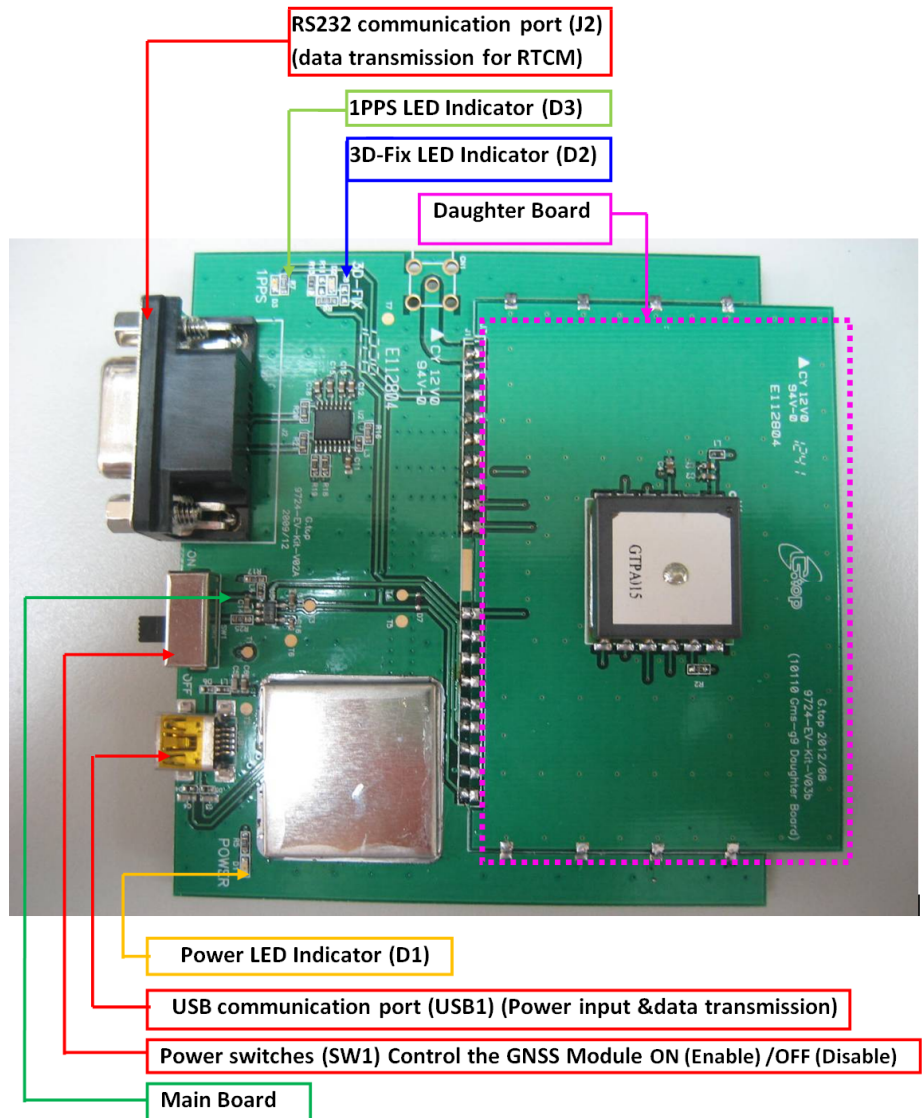


Figure 2-3: Compatible Model: (Series 2) Gms-g9

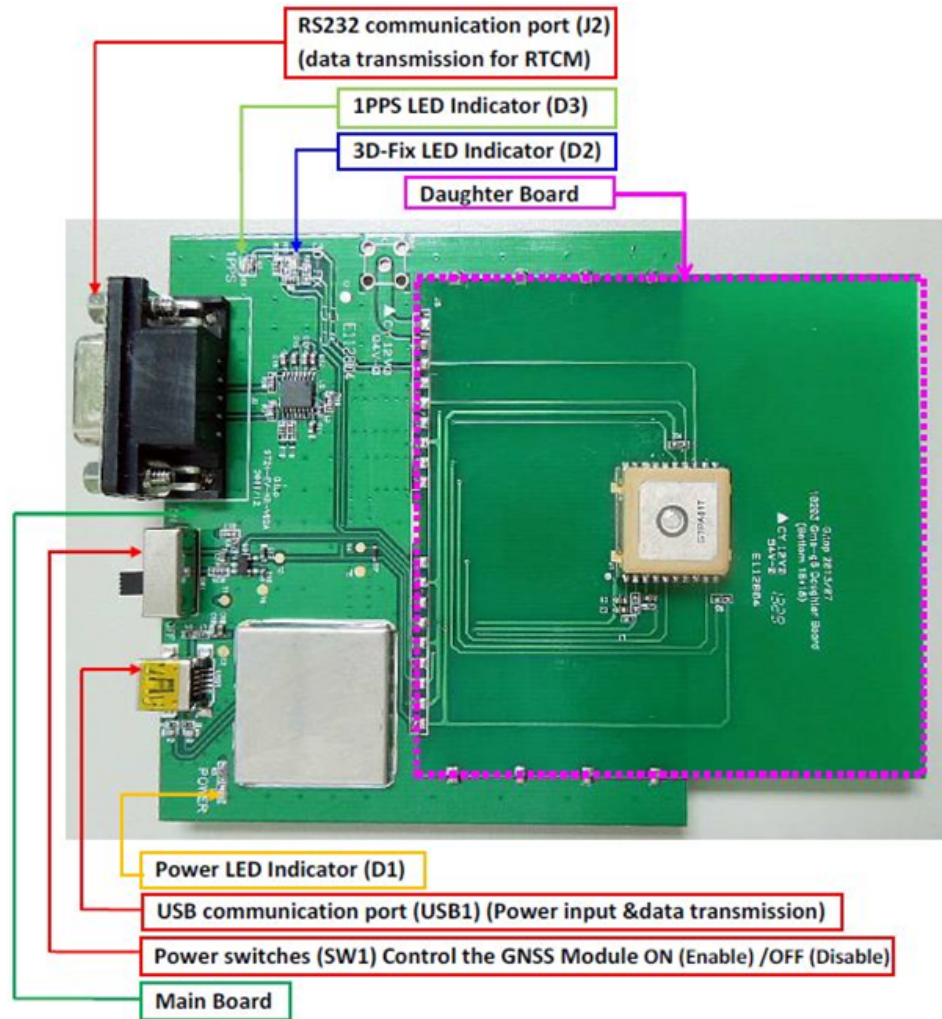


Figure 2-4: Compatible Model: (Series 2) Gms-g6 / Gms-b6 (Common board)

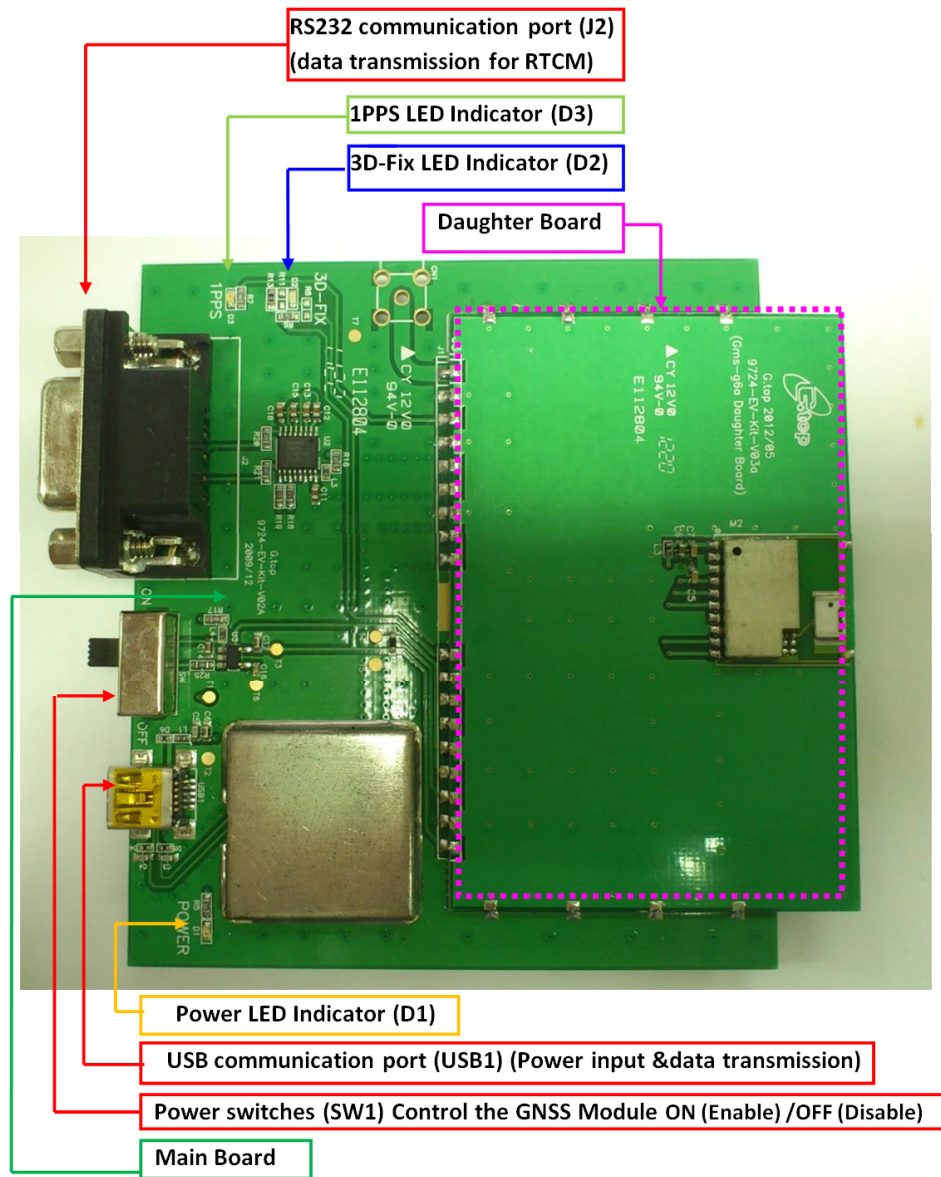


Figure 2-5: Compatible Model: (Series 3) Gms-g6a

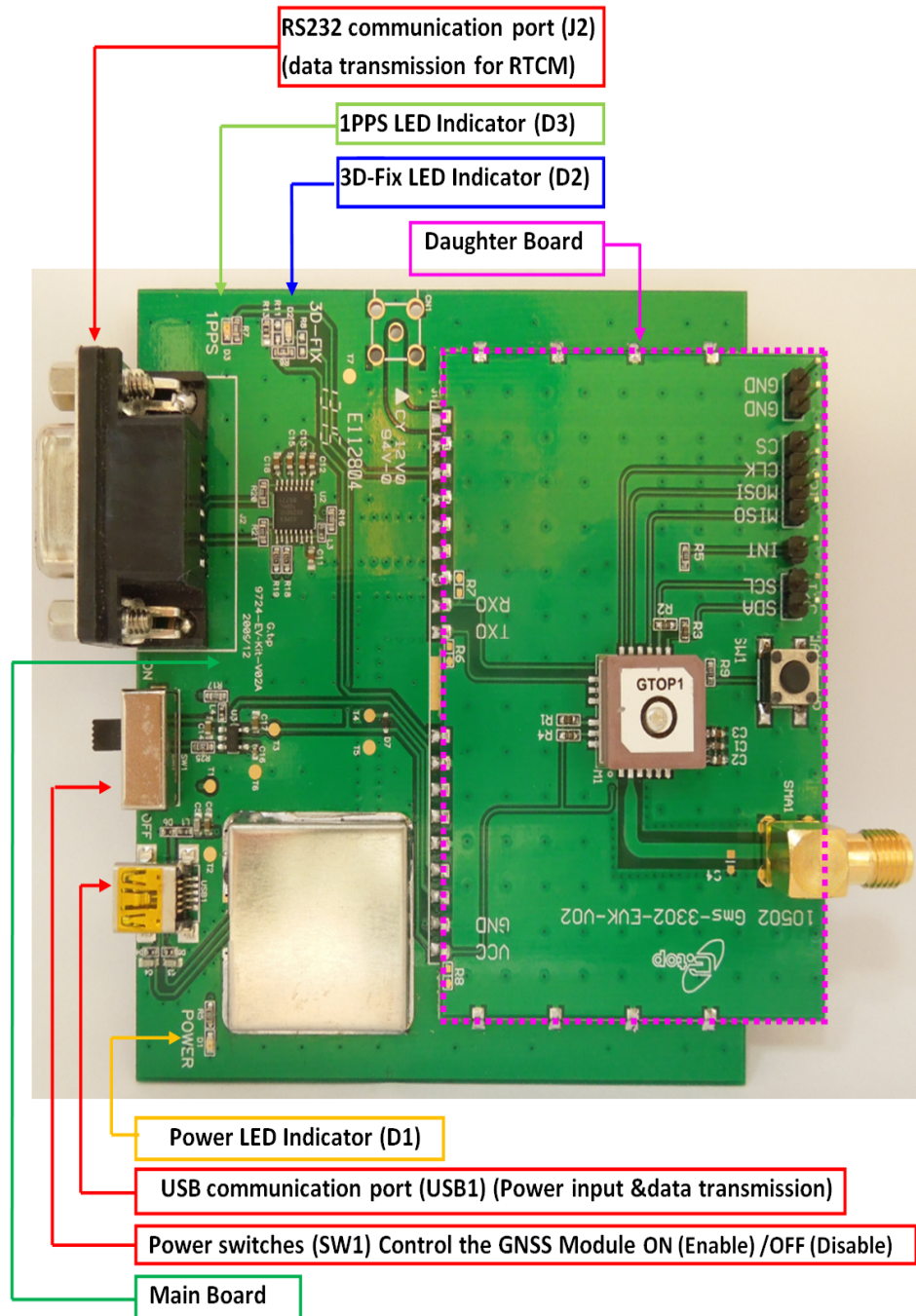


Figure 2-6: Compatible Model: (Series 4) XA1110

## 3: Function Testing

### Preparation for Power and Data Communication

Compatible Model: All series

1. Connect USB cable to the Development Kit and to the PC.
  - The USB cable supplies power for the Development Kit, and transmits data between Development Kit and PC.
  - Make sure the Power LED Indicator (D1) is lighted on.
2. Toggle the switch (SW1) from right to left for power on GNSS module:
 

Toggle the switch to the left for the power supplying on GNSS Module. Please refer to the figure below.

  - a. Once the Power LED Indicator (D1) is on and switch (SW1) is on, the initial state will be the following:
    - 3D Fix LED Indicator (D2) blinks (blue light)
    - 1PPS LED Indicator (D3) is off (green light)
  - b. Once the module is in the status of FIX:
    - 3D Fix LED Indicator (D2) is off
    - 1PPS LED Indicator (D3) blinks

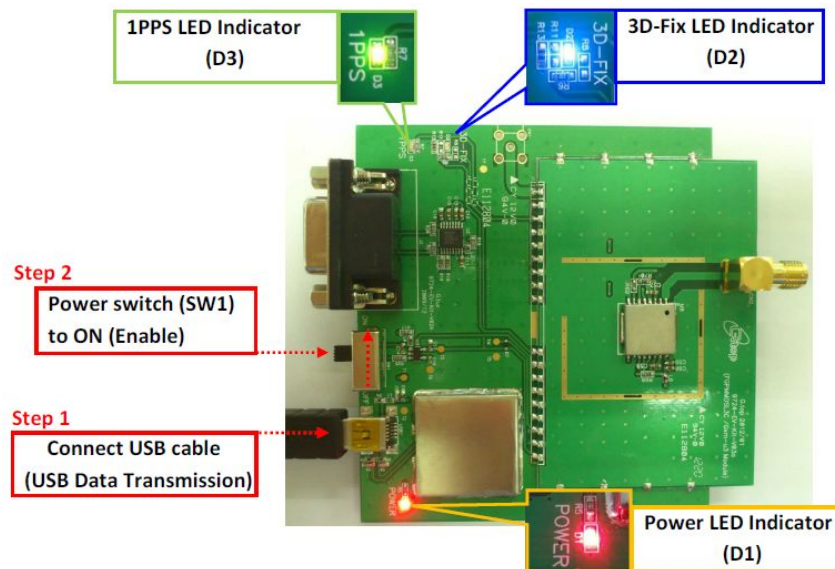


Figure 3-1: Device Features

## Application for RF Reception

1. Attaching external active antenna with GNSS modules on the Development Kit. Compatible Models: (series1) Gmm-g3 / XM1110:

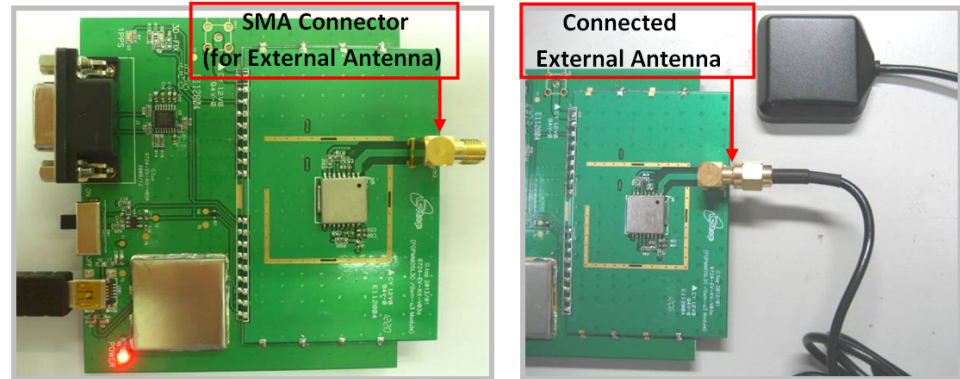


Figure 3-2: External Active Antenna Attachments

2. Patch Antenna Module Compatible Model: (Series 2) Gms-g9, Gms-g6 and Gms-b6(Common board):

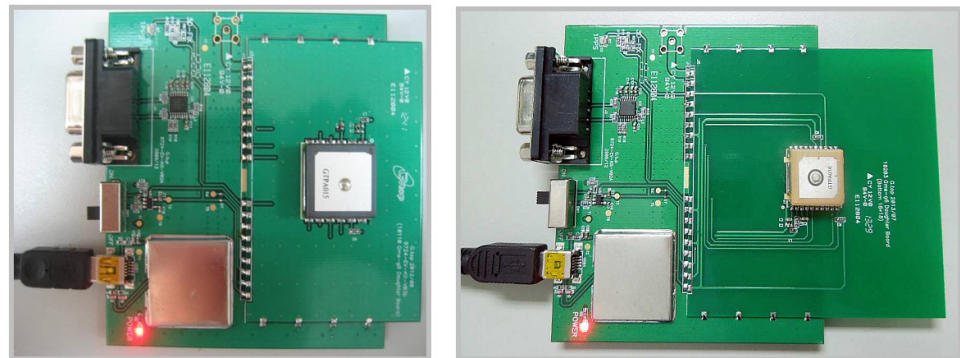


Figure 3-3: Left: Gms-g9; Right: Gms-b6.

3. Chip Antenna module. Compatible Model: (Series 3) Gms-g6a:



Figure 3-4: Gms-g6a

4. Patch Antenna Module. Compatible Models: (Series 4)\_ XA1110:

When connecting the module to an external active antenna, the internal RF will switch the RF signal from the embedded antenna to the external active antenna. If the external active antenna is removed, the RF signal will then switch back to the embedded patch antenna.

The external active antenna will be detected and connected by the module when it consumes >4mA current.

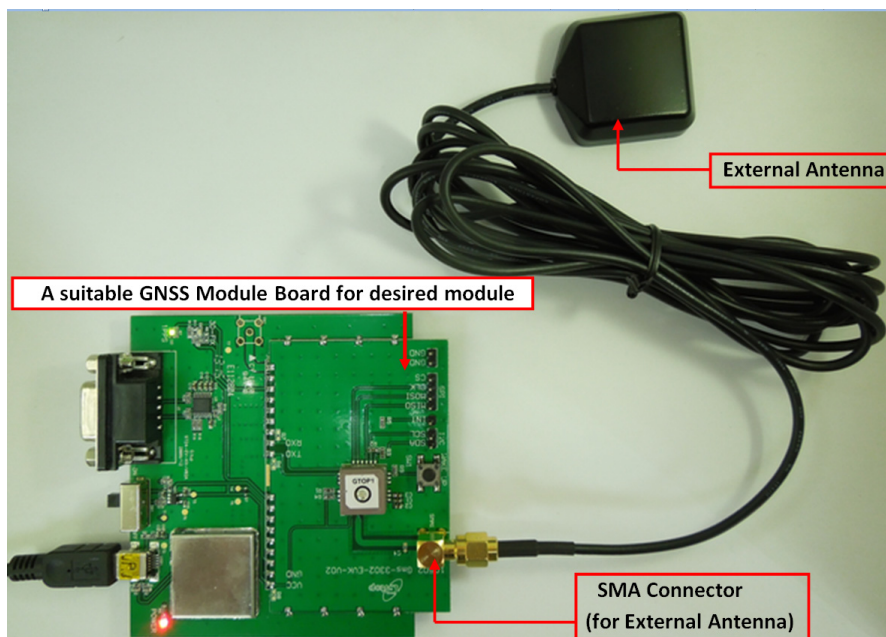


Figure 3-5: XA1110 External Active Antenna

## 4: Software Usage

### System Requirements

- Operating System: Microsoft Windows 7, 8, and 10
- USB Driver: CP210x VCPInstaller.zip  
For Windows 7, Windows 8 or Windows 8.1, please use CP210xVCP driver v6.7 or the latest version (v6.7.5).  
For Windows 10, please use CP210xVCP driver v6.7.5; v10.1.1
- GUI Tool: GNSS Tool
- Microsoft .NET Framework 4.5
- Microsoft Visual C++ 2015 Redistributable Package (x86)

### USB Driver and GNSS Tool

Before setting up the connection between the module and the PC, you will need the Development Kit USB Driver (CP210x VCP) and GNSS Tool.exe to operate the Development Kit.

Please download and install the USB Driver (CP210x VCP) from <https://source.sierrawireless.com/resources/airprime/software/cp210x-windows-drivers>.

Please download the GNSS tool from [https://source.sierrawireless.com/resources/airprime/software/gnss\\_tool/](https://source.sierrawireless.com/resources/airprime/software/gnss_tool/).

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**Important:** Please check whether you have the correct USB driver before you proceed to the next step. Without the correct driver, the Development Kit will not function.

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### Installing the USB Driver

1. Double click **CP210x\_VCP\_Win.exe** to begin driver installation:

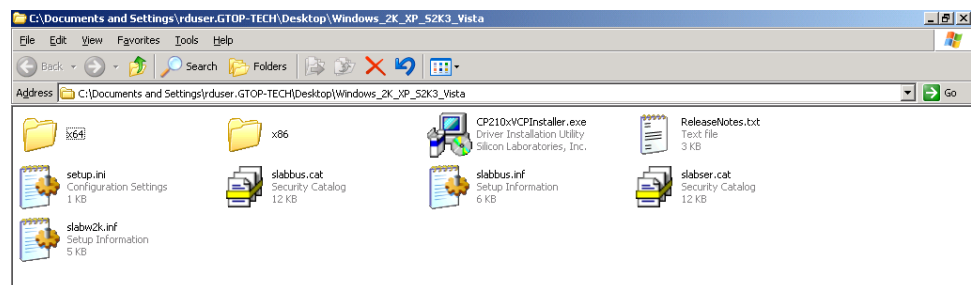


Figure 4-1: Driver Installation Folder

2. Click **Install**:

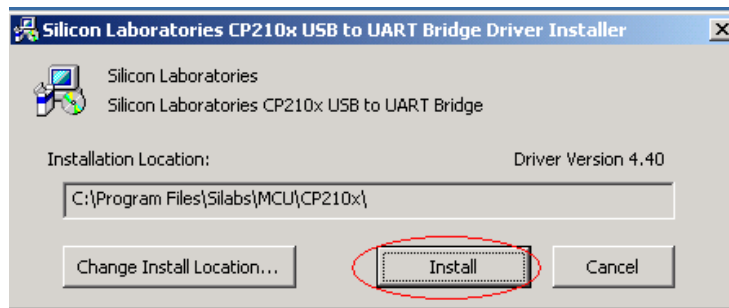


Figure 4-2: Starting the Installation Process

3. After the installation is complete, you may need to restart your computer. Please follow the instructions on screen to restart your computer.
4. After the computer restarted, right click on **My Computer** and select **Manage**:

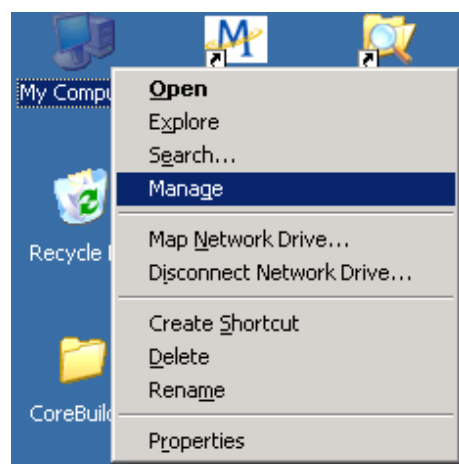


Figure 4-3: Selecting Manage

5. Left click **Device Manager** and select **Ports (COM & LPT)**. Check to see if a device named **Silicon Labs CP210x USB to UART Bridge (COM#)** is present. If so, the Development Kit is set up and ready for use.

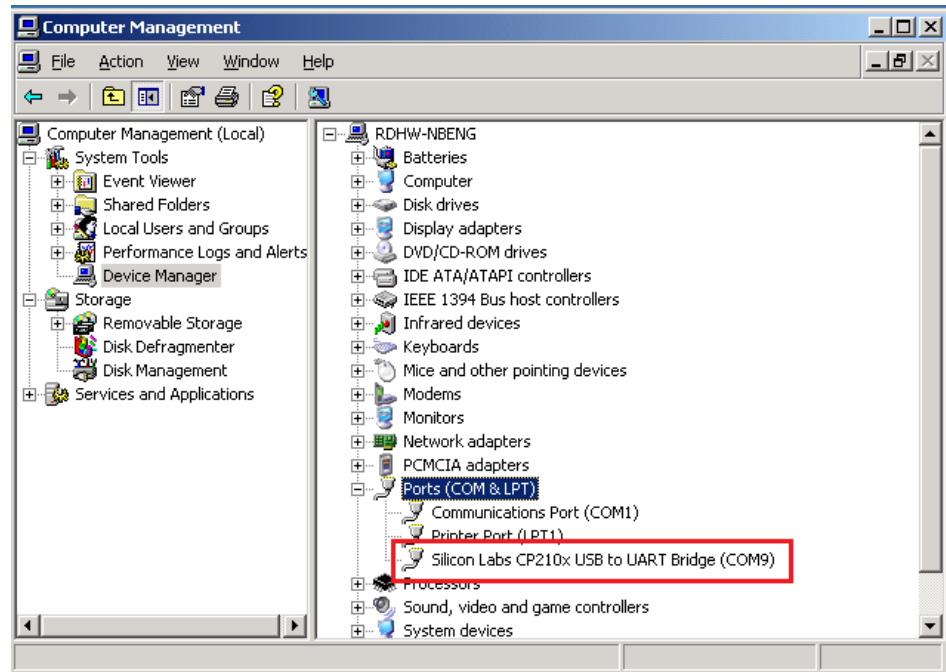


Figure 4-4: Accessing the Port Properties

“COM9” represents the virtual COM port number generated for the USB connection to the Development Kit. This generated COM port value must match the COM port value in the program setting for the application to establish proper communication with the Development Kit.

After completing the installation, please proceed to [Using GNSS Tool](#).

## Using GNSS Tool

Microsoft Framework 4.5 or higher is required before you launch the GNSS Tool software on your PC.

Double click **GNSSTool.exe** to start the application, the main screen of the program is shown here:

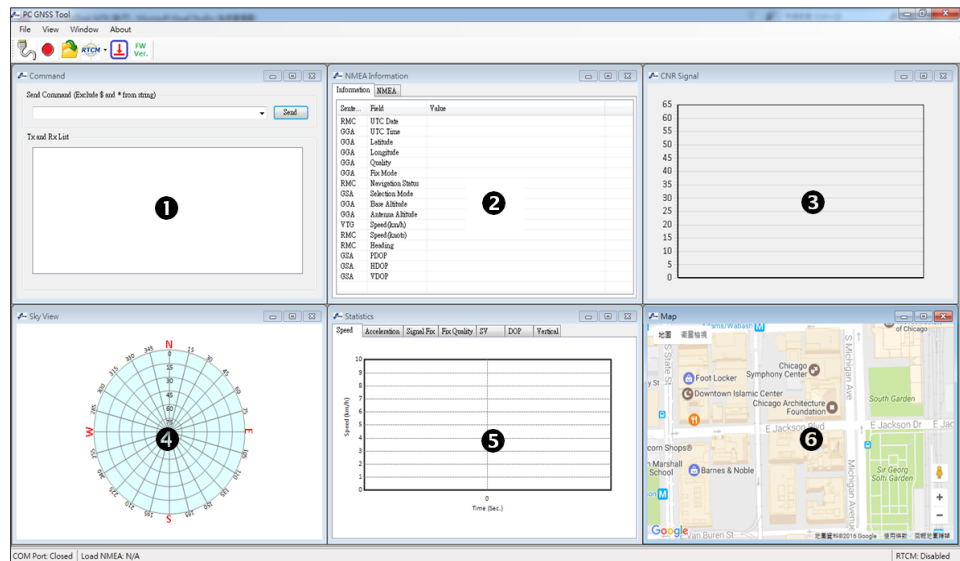


Figure 4-5: GNSS Tool Main Screen

- 1. Command Tx and Rx List:** clicking on this menu item will display the Command window.
- 2. NMEA List:** clicking on this menu item will display a window with NMEA information.
- 3. CNR Signal:** clicking on this menu item will display the CNR signal window.
- 4. Sky View:** clicking on this menu item will display a window with a sky view of satellites.
- 5. Statistics Plot:** clicking on this menu item will display the statistics plot window.
- 6. Map:** clicking on this menu item will display the map window.

After the Development Kit is connected with the PC, please choose the correct **<COM Port>** and **< Baud Rate >** then click the **OK** button and select the appropriate value.

When users click the *Open Communication* menu item or toolbar button, a set up dialog will pop up as shown here:

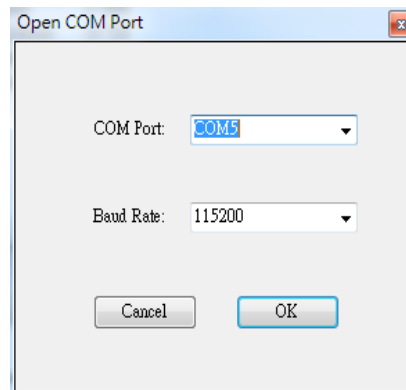


Figure 4-6: COM Port Dialog

If you want more information about the GNSS Tool software, refer to the Sierra Wireless GNSS Tool User Guide.

## >> 5: Troubleshooting

### Setup Troubleshooting

**Table 5-1: Troubleshooting Causes and Solutions**

Problem	Possible Cause	Solution
<b>Cannot find GNSS device</b>	USB was not set up properly	Check to see if the Development Kit was set up properly, and make sure that the device is receiving enough power through the USB cable (Red LED should light up continuously).
<b>No NMEA data or GNSS signals</b>	<ol style="list-style-type: none"> <li>1. USB was not set up properly.</li> <li>2. COM Port or Baud rate value is incorrect.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check to see if the USB connector to the PC or Development Kit is connected properly.</li> <li>2. Double check to see if the proper COM Port and Baud rate value are selected.</li> </ol>
<b>Poor GNSS Signal Reception</b>	<ol style="list-style-type: none"> <li>1. If it is used inside a vehicle, the anti-sunscreen film on the windshield may interfere and weaken the GNSS signal.</li> <li>2. The vehicle might be under some area with a dense overhead canopy such as a forest, buildings, tunnels, etc.</li> </ol>	For both problems, the user may apply the external active antenna with the Development Kit, and then place the antenna on top of the car's roof to improve signal reception.

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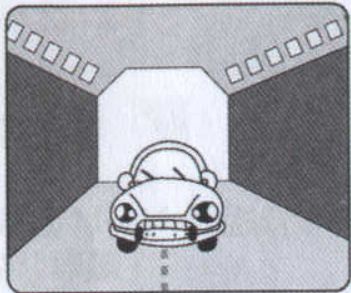
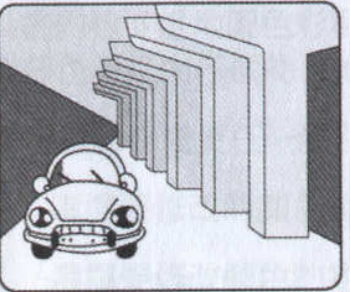
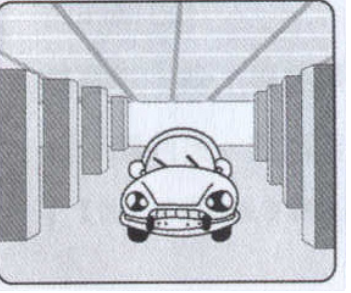
*Note: if these troubleshooting steps do not solve the problem, please contact us or send it back to us for inspection.*

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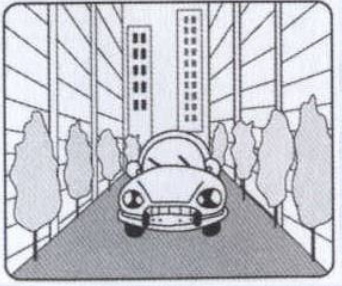
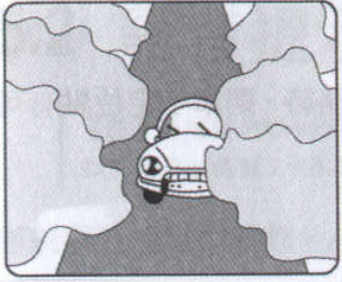
## Causes of Poor GPS Signals

It is possible to have weak GNSS signal in the following situations:

**Table 5-2: Examples where Poor GPS Signals may Occur**

	<p>Inside a tunnel, where the GNSS signal is blocked.</p>
	<p>Underneath infrastructure (e.g. a bridge), where the GNSS signal is blocked.</p>
	<p>Inside a building, where the GNSS signal is blocked.</p>

**Table 5-2: Examples where Poor GPS Signals may Occur (Continued)**

	<p>Next to tall buildings, where the GNSS signal is weakened.</p>
	<p>Underneath forests or any other kinds of canopy where the GNSS signal is weakened.</p>

- If the Development Kit is used inside a car which has anti-sunlight films on the windshield and windows, the GPS signal will be weakened severely, and may result in no GPS reception.
- GNSS satellites are property of United States Army. Sometimes they will tune-down the accuracy for unknown reasons. In such cases, the GNSS position may not be accurate.