AirPrime XA12xx and XM1210

Development Kit User Guide

SIERRA WIRELESS®

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Rev 1.2

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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Revision History

Revision number	Release date	Changes
1.0	October 22, 2018	Creation
1.1	October 29, 2018	Updated screenshots in Software Usage
1.2	November 05, 2018	Updated Packing Contents on page 9

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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.

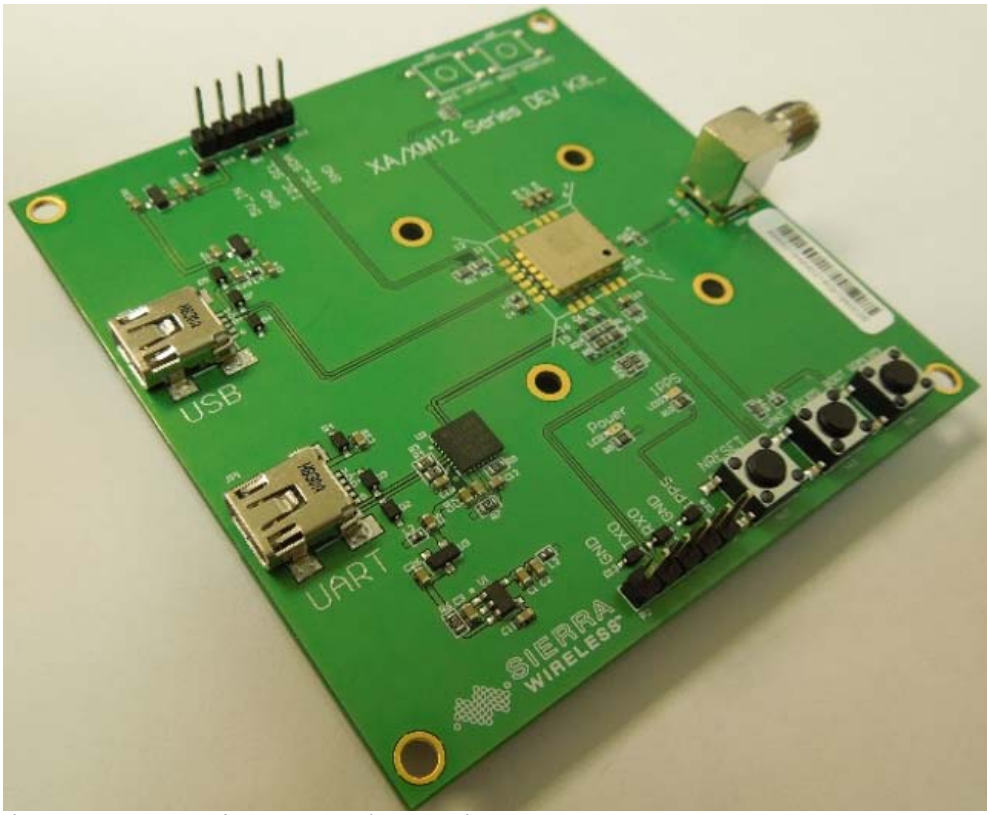


Figure 1-1: XA12xx and XM1210 Development Kit

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.

There are two types of development kit:

1. Series 1 is for stand-alone modules such as the XM1210
2. Series 2 is for patch antenna modules such as the XA1210 (which supports GPS + GLONASS) and the XA1220 (which supports GPS + Beidou)

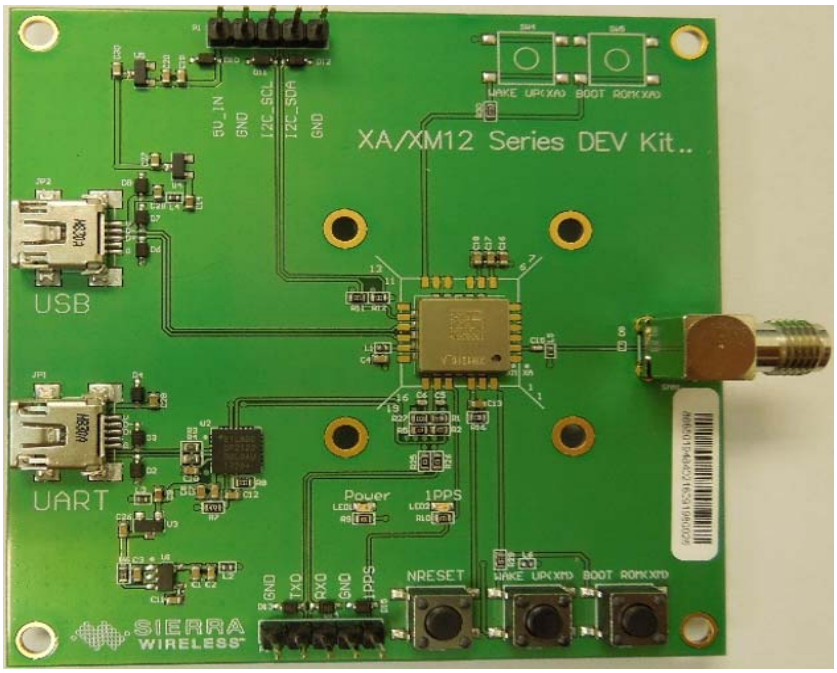


Figure 1-2: Series 1 Development Kit Board

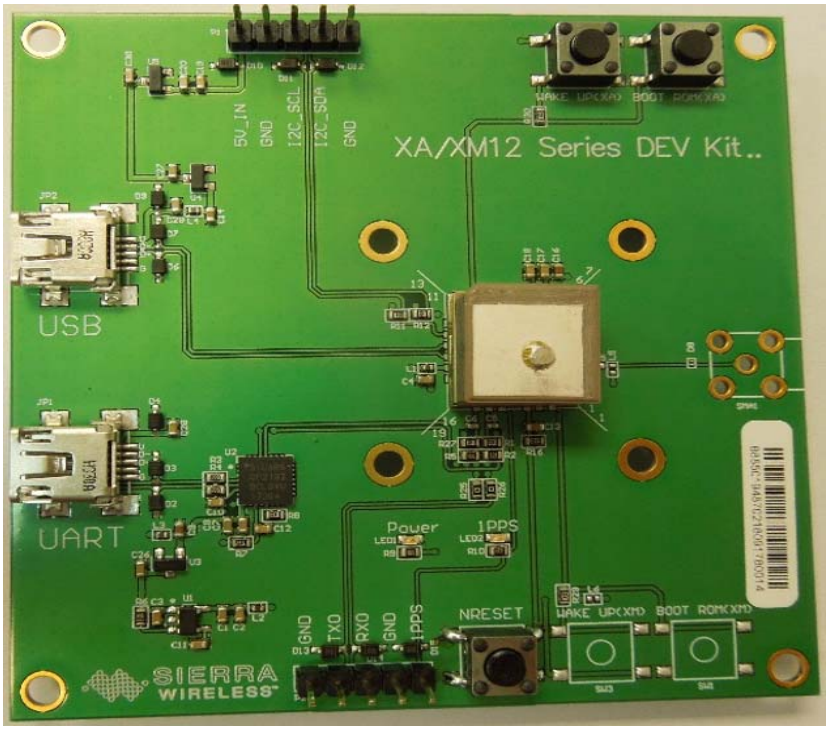


Figure 1-3: Series 2 Development Kit Board

Caution

- GNSS signal may be cut off or become seriously weakened if you operate the Development Kit inside any infrastructure such as buildings, tunnels, or near any huge objects and/or obstruction. Signal being cut off does not mean the Development Kit has malfunctioned; it will operate properly again once it receives clear GNSS signals (works normally under the open sky).
- Select a suitable external active antenna based on the satellite system that you use.

Packing Contents

The development kit is delivered with:

- USB cable
- External active antenna

You will also need the following documents and software which are available on the Source:

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

2: Hardware Overview

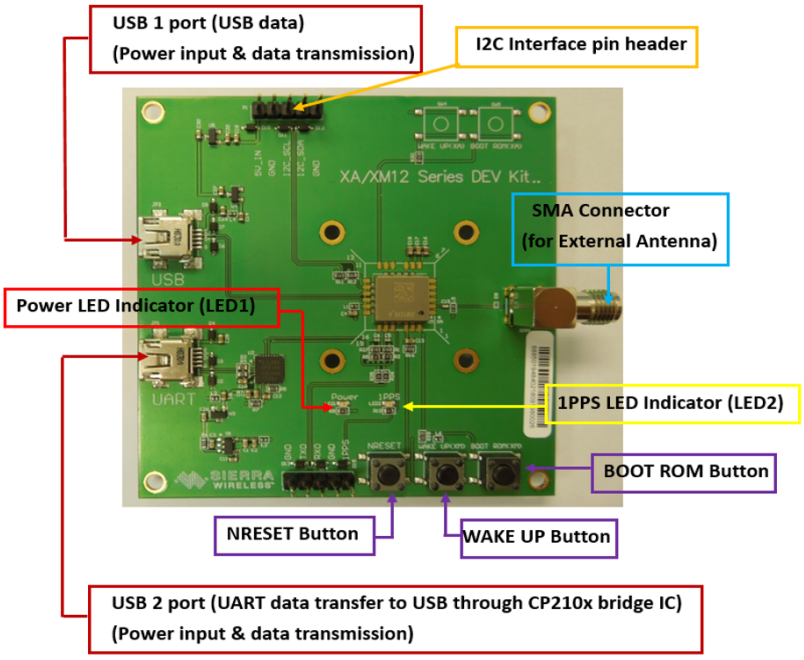


Figure 2-1: Series 1 (for XM1210) Parts and Features

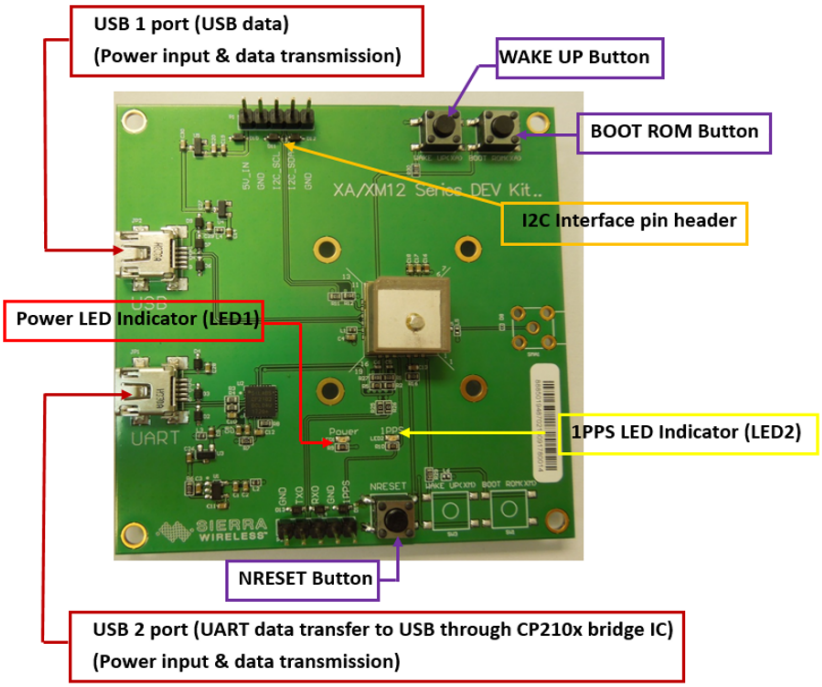


Figure 2-2: Series 2 (for XA1210 and XA1220) Parts and Features

3: Function Testing

Preparation for Power and Data Communication

1. Connect USB cable between the PC and UART port of USB port of the Development Kit.
   - The PC supplies power for the development kit and transmits data.
   - Make sure the Power LED Indicator (LED1) is lit.
2. The 1PPS LED Indicator (LED2) indicates fix status:
   - 1PPS LED Indicator is off: no fix status
   - 1PPS LED Indicator is blinking (with a green light): 3D fix status

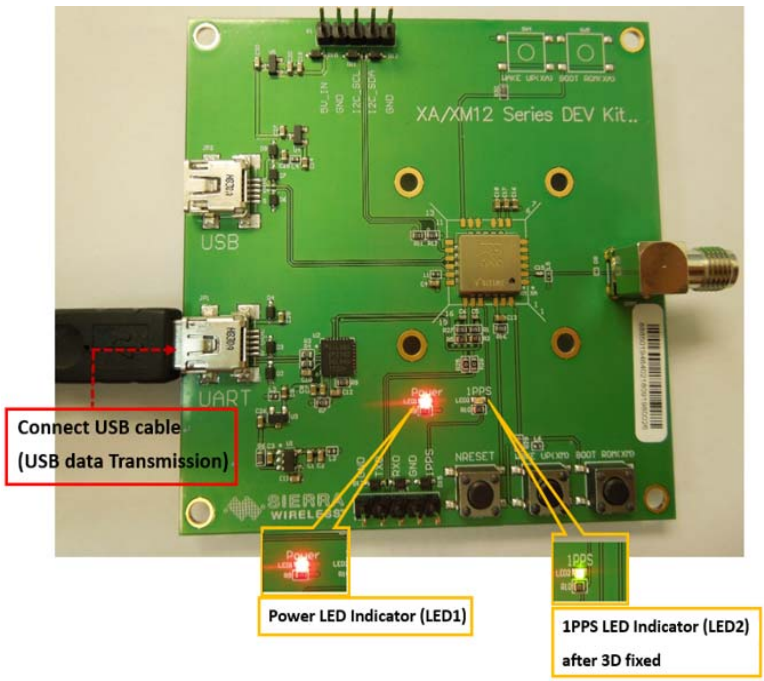


Figure 3-1: Power is On and Module is Ready for Data Connection

3. Push button SW2 to power reset the development kit.
4. Push button SW3/SW4 to wake the module up from sleep mode.
5. Use the Boot ROM to upgrade firmware on the GNSS module. Refer to the following steps:
   - **a.** Push SW1/SW5 until the module is powered on.
   - **b.** Connect the USB cable to the UART port. (The USB cable supplies power and transmits data. Make sure that the Power LED Indicator, LED1, is on.)
   - **c.** Release SW1/SW5.
   - **d.** Use the GNSS Tool to upgrade the firmware.

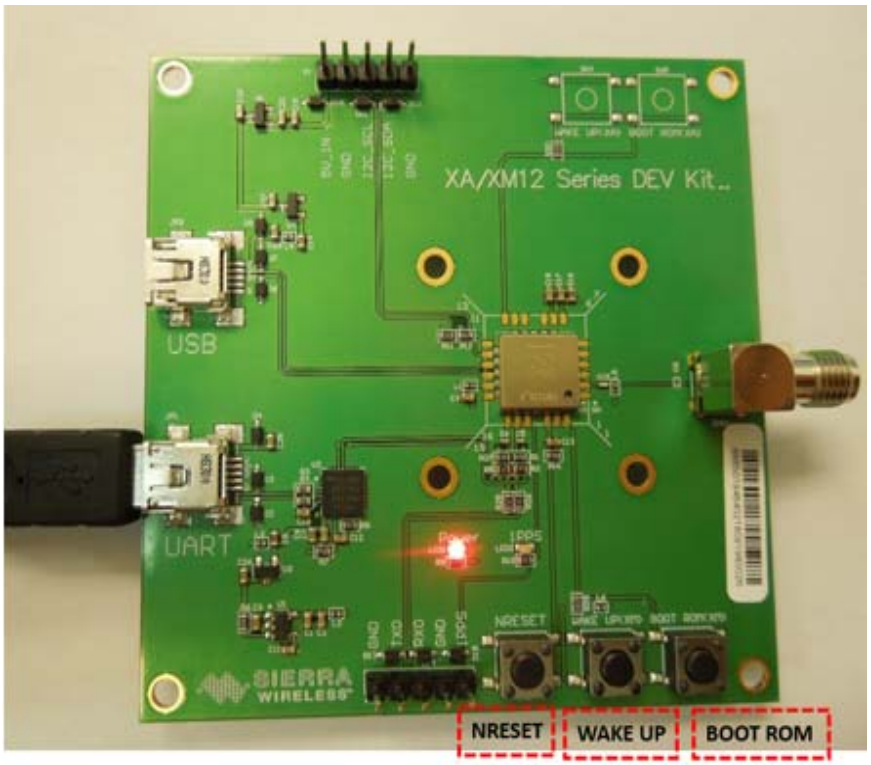


Figure 3-2: Button Position on Series 1 (for the XM1210) Development Kit

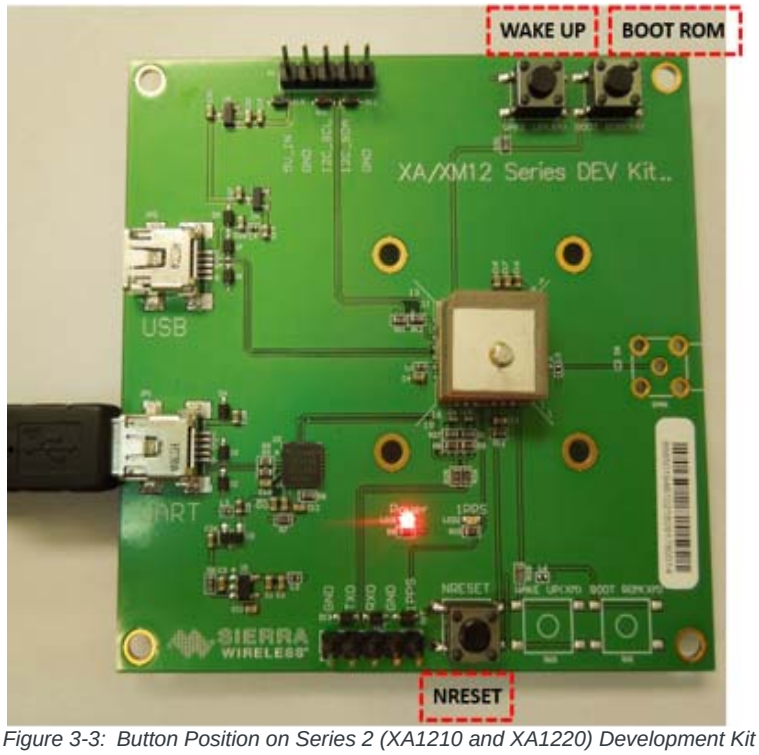


Figure 3-3: Button Position on Series 2 (XA1210 and XA1220) Development Kit

Application for RF Reception

1. External active antenna with a GNSS module on the Series 1 (for XM1210) Development Kit.

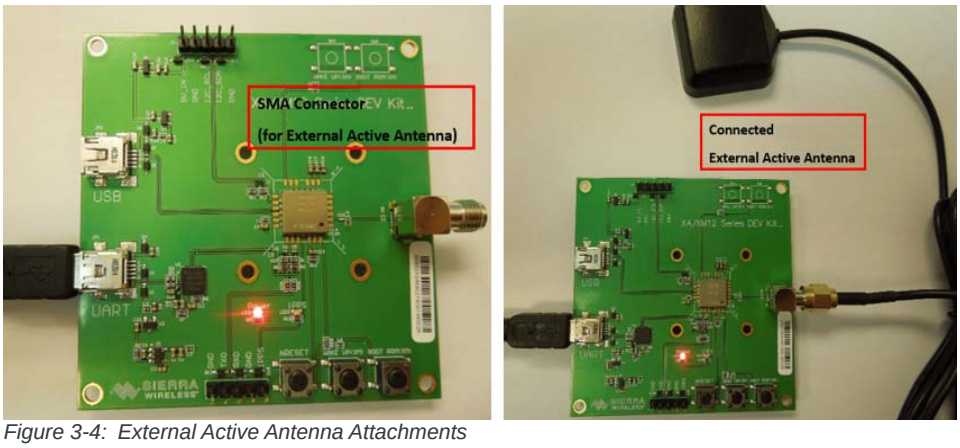


Figure 3-4: External Active Antenna Attachments

2. Built-in patch antenna module on the Series 2 (for XA1210 and XA1220) Development Kit.

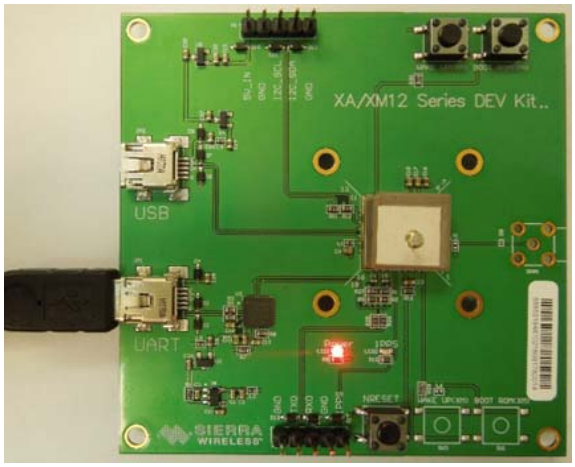


Figure 3-5: Patch Antenna Module

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
- Allystar USB Driver: Allystar -USB driver.zip
- Sensor Device Driver: Allystar-Sensor Device driver.zip
- 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's UART port 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/.

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

Installing the USB Driver

1. Double click **CP210x_VCP_Win.exe** to begin driver installation:

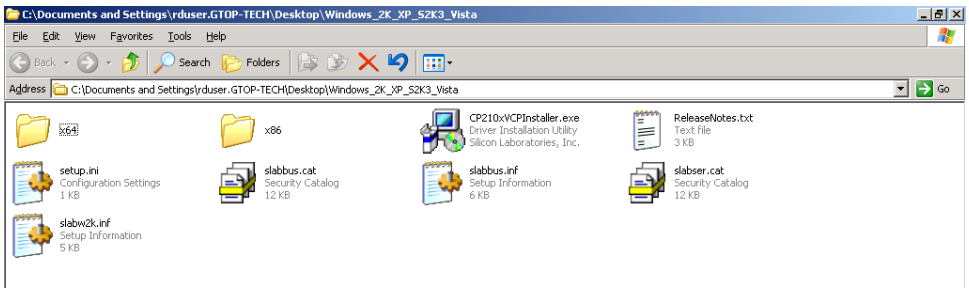


Figure 4-1: Driver Installation Folder

2. Click **Install**:

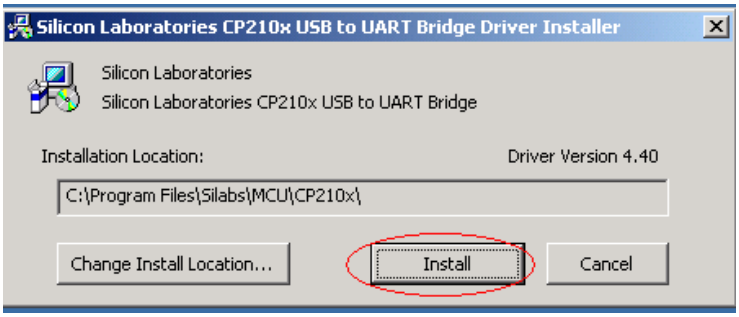


Figure 4-2: Starting the Installation Process

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**:

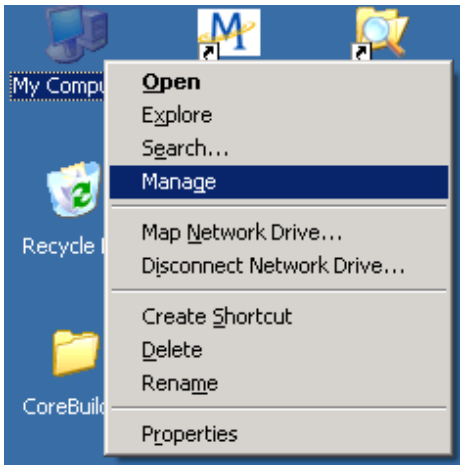


Figure 4-3: Selecting Manage

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.

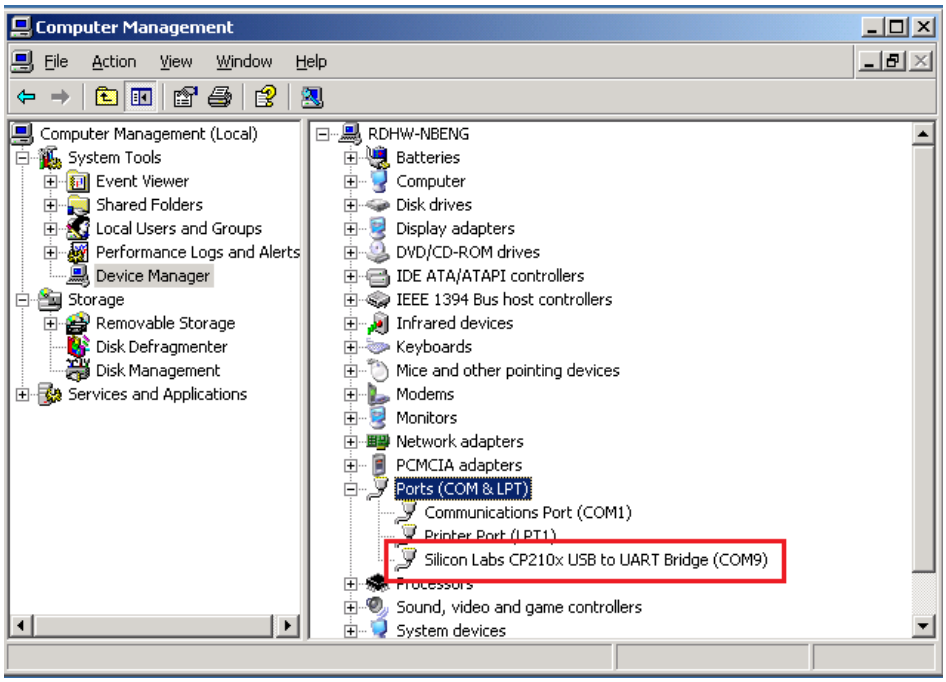


Figure 4-4: Accessing the Port Properties

“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 below:

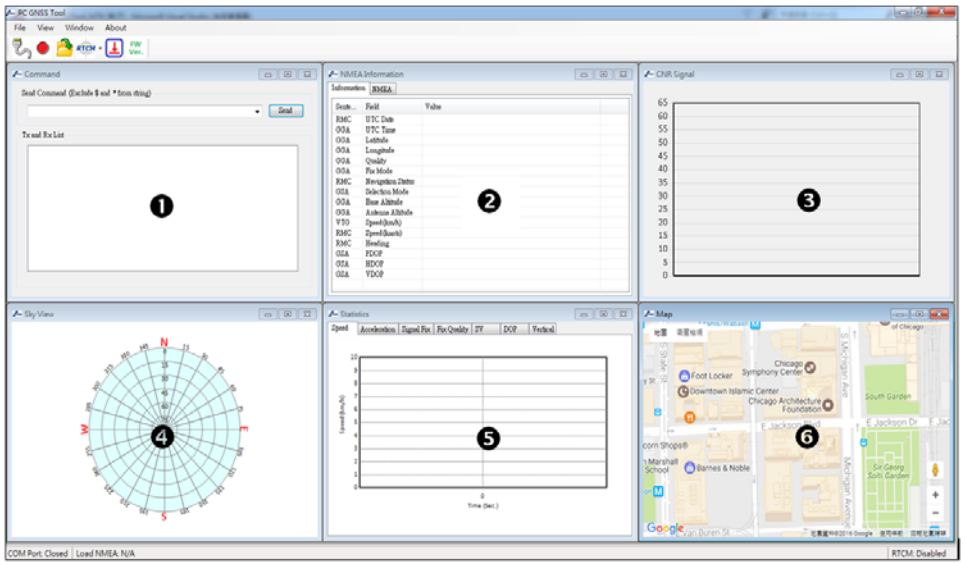


Figure 4-5: Main Program Screen

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.

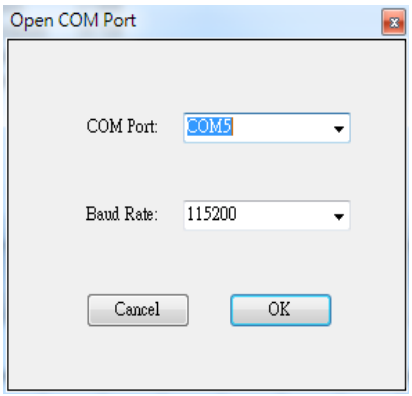


Figure 4-6: COM Port Dialog

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

Allystar USB Driver

Before setting up the connection between the module's USB port and the PC, you will need the DEV USB Driver (Allystar GNSS USB) and GNSS Tool.exe to operate the Development Kit.

Please download and install the USB Driver (Allystar GNSS USB) from the Source.

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

To install:

1. Go to the driver installation folder and double-click **ALLYSTAR_GNSS_USB_Driver.exe** to begin driver installation.

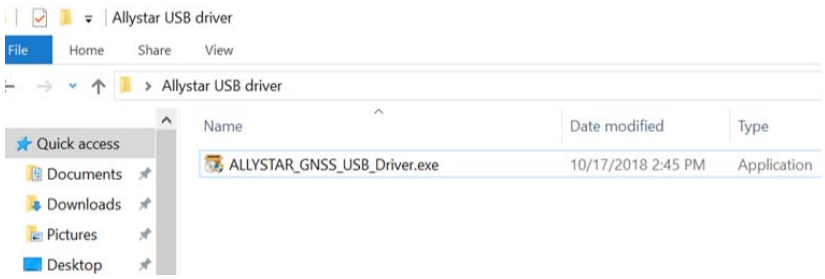


Figure 4-7: Allystar USB Driver Installation Folder

2. Click **Next** from the Installation Wizard.

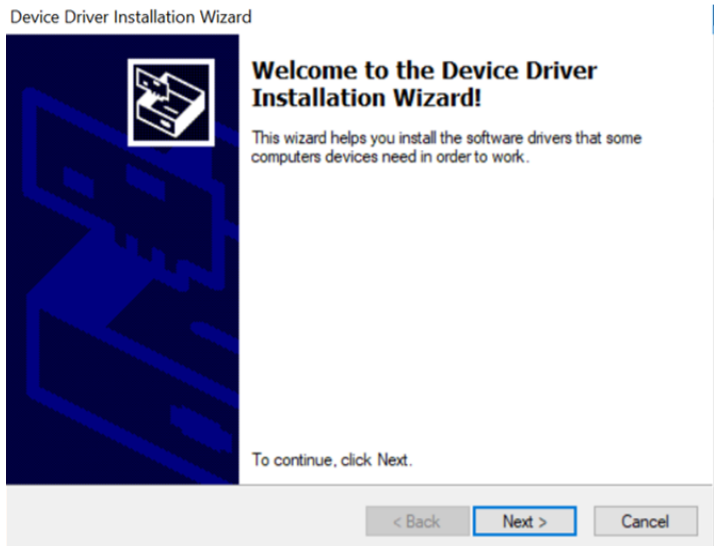


Figure 4-8: Start the Allystar USB Installation Wizard

3. You may need to restart your computer after installation. Please follow the instructions on your screen to restart your computer.
4. After your computer has been restarted, right-click on **My Computer** and select **Manage**.

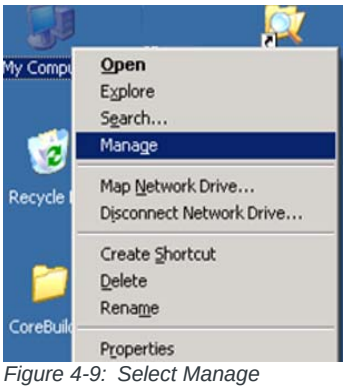


Figure 4-9: Select Manage

5. Left-click **Device Manager** and select **Universal Serial Bus controllers**. Check to see if a device named *ALLYSTAR-GNSS* is present. If so, the Development Kit is set up and ready for use.

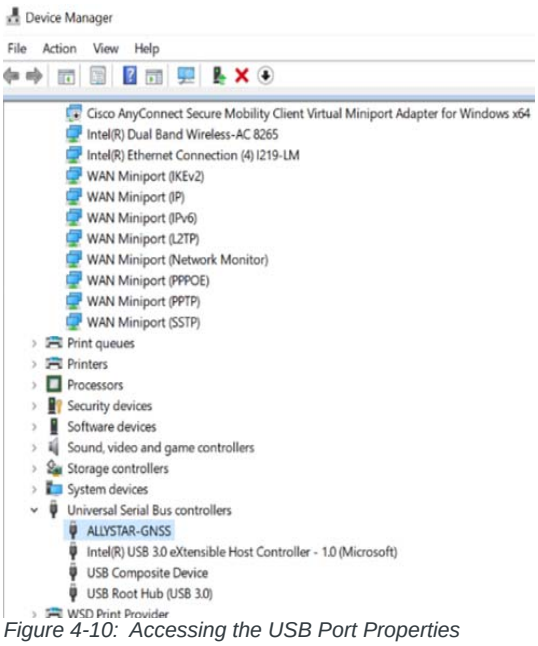


Figure 4-10: Accessing the USB Port Properties

Sensor Device Driver

Microsoft Windows 7 introduced a built-in platform for the support of sensor devices including location sensors, as GNSS sensor is part of the Location category.

The Allystar Sensor Device Driver connects GNSS receivers to the sensor and location API structure for Windows 7 onwards.

Before setting up the connection between the module's USB port and the PC, you will need the Allystar Sensor Location Driver to operate the Development Kit.

Please download and install the GNSS Sensor device driver from the Source.

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

To install:

1. Go to the driver installation folder and right-click **usbgps.inf** to begin driver installation.

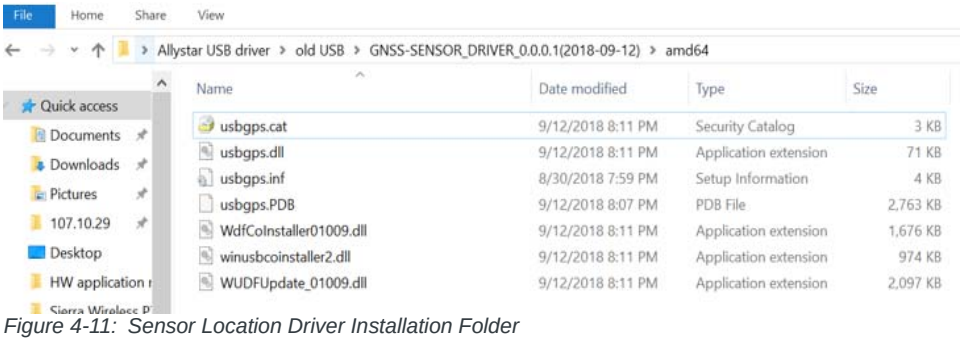


Figure 4-11: Sensor Location Driver Installation Folder

2. Click **Next** from the Installation Wizard.

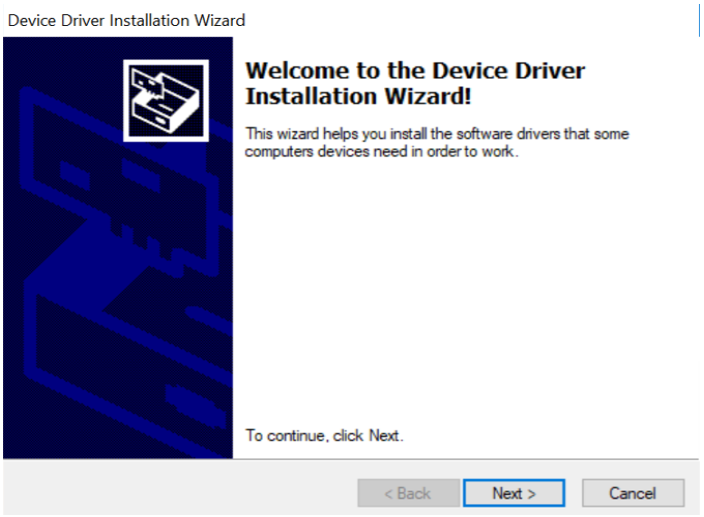


Figure 4-12: Start the Location Driver Installation Wizard

3. You may need to restart your computer after installation. Please follow the instructions on your screen to restart your computer.
4. After your computer has been restarted, right-click on **My Computer** and select **Manage**.

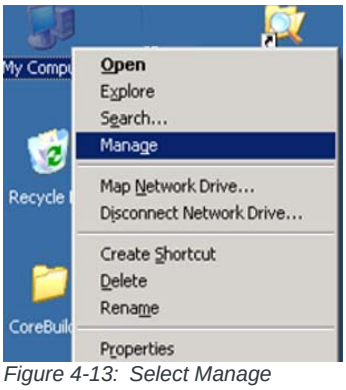


Figure 4-13: Select Manage

5. Left-click **Device Manager** and select **Sensors**. Check to see if a device named *DriverCoding Location Sensor Device (DEMO)* is present. If so, the Development Kit is set up and ready for use.

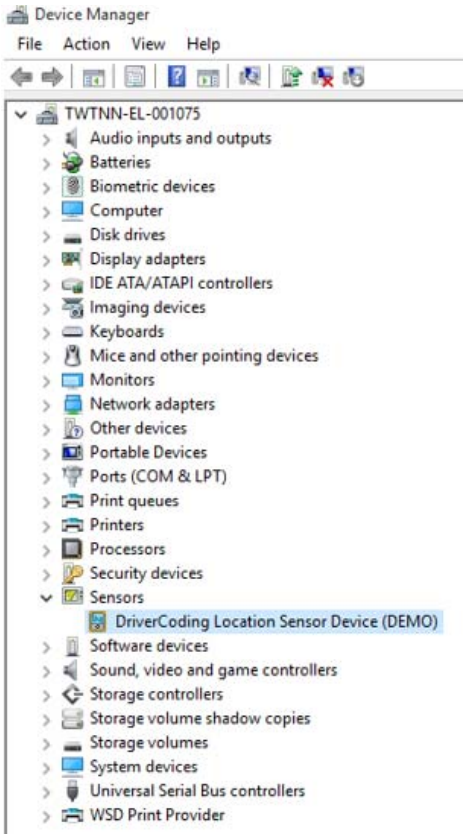


Figure 4-14: Sensor Device Driver is Installed

5: Troubleshooting

Setup Troubleshooting

Table 5-1: Troubleshooting Causes and Solutions

Problem	Possible Cause	Solution
Cannot find GNSS device	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 (green LED should light up continuously).
No NMEA data or GNSS signals	1. USB was not set up properly. 2. COM Port or Baud rate value is incorrect.	1. Check to see if the USB connector to the PC or Development Kit is connected properly. 2. Double check to see if the proper COM Port and Baud rate value are selected.
Poor GNSS Signal Reception	1. If it is used inside a vehicle, the anti-sunscreen film on the windshield may interfere and weaken the GNSS signal. 2. The vehicle might be under some area with a dense overhead canopy such as a forest, buildings, tunnels, etc.	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.

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

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

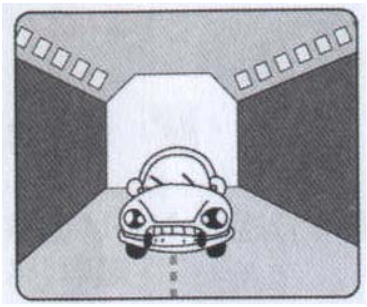
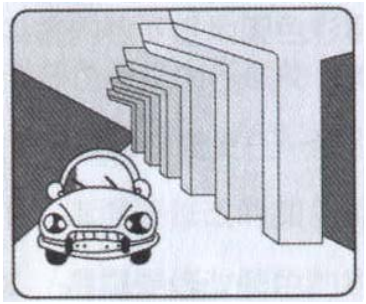
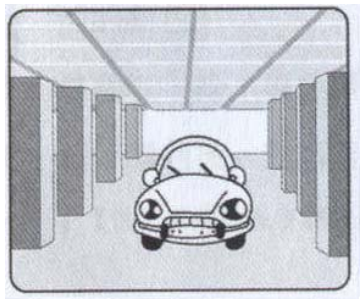
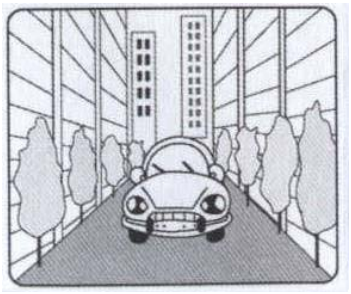
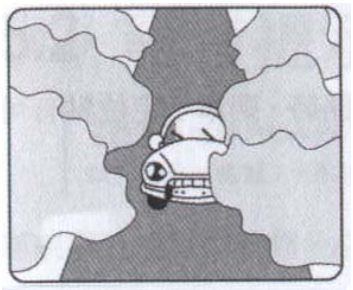
	Inside a tunnel, where the GNSS signal is blocked.
	Underneath infrastructure (e.g. a bridge), where the GNSS signal is blocked.
	Inside a building, where the GNSS signal is blocked.

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

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

- 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.
- GPS satellites are property of United States Army. Sometimes they will tune-down the accuracy for unknown reasons. In such cases, the GPS position may not be accurate.