Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

EVK User Guide

AirPrime XA1110/XM1110

SIERRA WIRELESS®

41111056
Rev 1

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.

Safety and Hazards

Do not operate the Sierra Wireless modem in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, the Sierra Wireless modem **MUST BE POWERED OFF**. The Sierra Wireless modem can transmit signals that could interfere with this equipment.

Do not operate the Sierra Wireless modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless modem **MUST BE POWERED OFF**. When operating, the Sierra Wireless modem can transmit signals that could interfere with various onboard systems.

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.

The driver or operator of any vehicle should not operate the Sierra Wireless modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

Limitation of Liability

The information in this manual is subject to change without notice and does not represent a commitment on the part of Sierra Wireless. SIERRA WIRELESS AND ITS AFFILIATES SPECIFICALLY DISCLAIM LIABILITY FOR ANY AND ALL DIRECT, INDIRECT, SPECIAL, GENERAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUE OR ANTICIPATED PROFITS OR REVENUE ARISING OUT OF THE USE OR INABILITY TO USE ANY SIERRA WIRELESS PRODUCT, EVEN IF SIERRA WIRELESS AND/OR ITS AFFILIATES HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR THEY ARE FORESEEABLE OR FOR CLAIMS BY ANY THIRD PARTY.

Notwithstanding the foregoing, in no event shall Sierra Wireless and/or its affiliates aggregate liability arising under or in connection with the Sierra Wireless product, regardless of the number of events, occurrences, or claims giving rise to liability, be in excess of the price paid by the purchaser for the Sierra Wireless product.

Patents

This product may contain technology developed by or for Sierra Wireless Inc. This product includes technology licensed from QUALCOMM®. This product is manufactured or sold by Sierra Wireless Inc. or its affiliates under one or more patents licensed from InterDigital Group and MMP Portfolio Licensing.

Copyright

© 2017 Sierra Wireless. All rights reserved.

Trademarks

Sierra Wireless®, AirPrime®, AirLink®, AirVantage® and the Sierra Wireless logo are registered trademarks of Sierra Wireless.

Windows® and Windows Vista® are registered trademarks of Microsoft Corporation.

Macintosh® and Mac OS X® are registered trademarks of Apple Inc., registered in the U.S. and other countries.

QUALCOMM® is a registered trademark of QUALCOMM Incorporated. Used under license.

Other trademarks are the property of their respective owners.

Contact Information

Sales information and technical support, including warranty and returns	Web: sierrawireless.com/company/contact-us/ Global toll-free number: 1-877-687-7795 6:00 am to 6:00 pm PST
Corporate and product information	Web: sierrawireless.com

Revision History

Revision number	Release date	Changes
1	June 23, 2017	Initial revision in SWI Template

>>| Contents

>> 1: Introduction

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

Figure 1-1: EV Kit MT3333 Series Device

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 EV-kit via RS232 (DB-9 Connector).

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

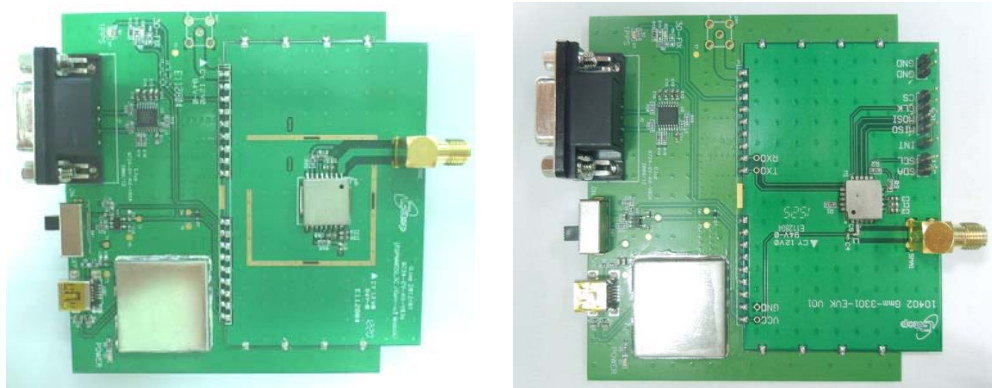**With External Active Antenna (Series 1):**

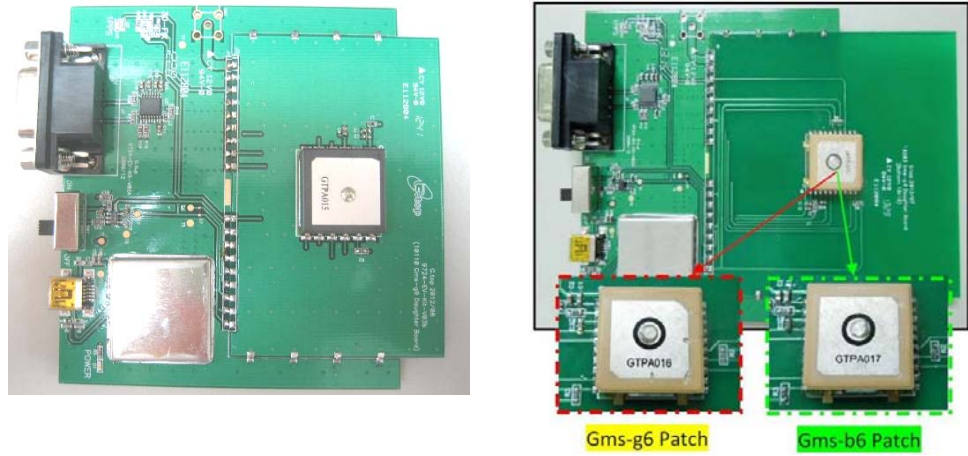*Figure 1-2: Left: Gmm-g3. Right: XM1110*

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

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 EV-kit inside any infrastructures such as buildings, tunnels, or nearby any huge objects and/or obstruction. That signal being cut off does not does not mean the EV-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
- EV-Kit user manual

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

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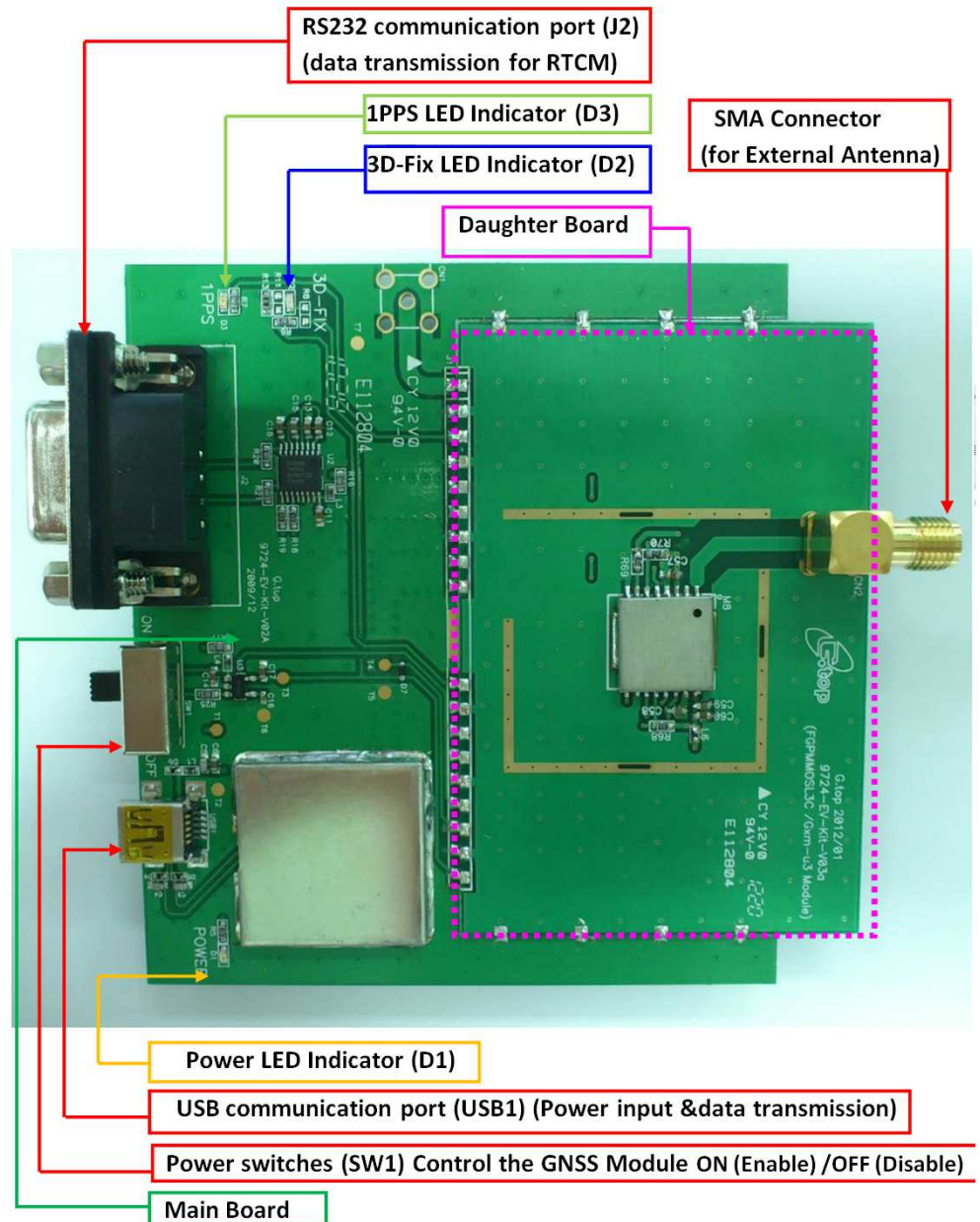
2: Hardware Overview

RS232 communication port (J2)
(data transmission for RTCM)

1PPS LED Indicator (D3)

3D-Fix LED Indicator (D2)

SMA Connector
(for External Antenna)

Daughter Board

Power LED Indicator (D1)

USB communication port (USB1) (Power input &data transmission)

Power switches (SW1) Control the GNSS Module ON (Enable) /OFF (Disable)

Main Board

Figure 2-1: Compatible Models: (Series 1) Gmm-g3
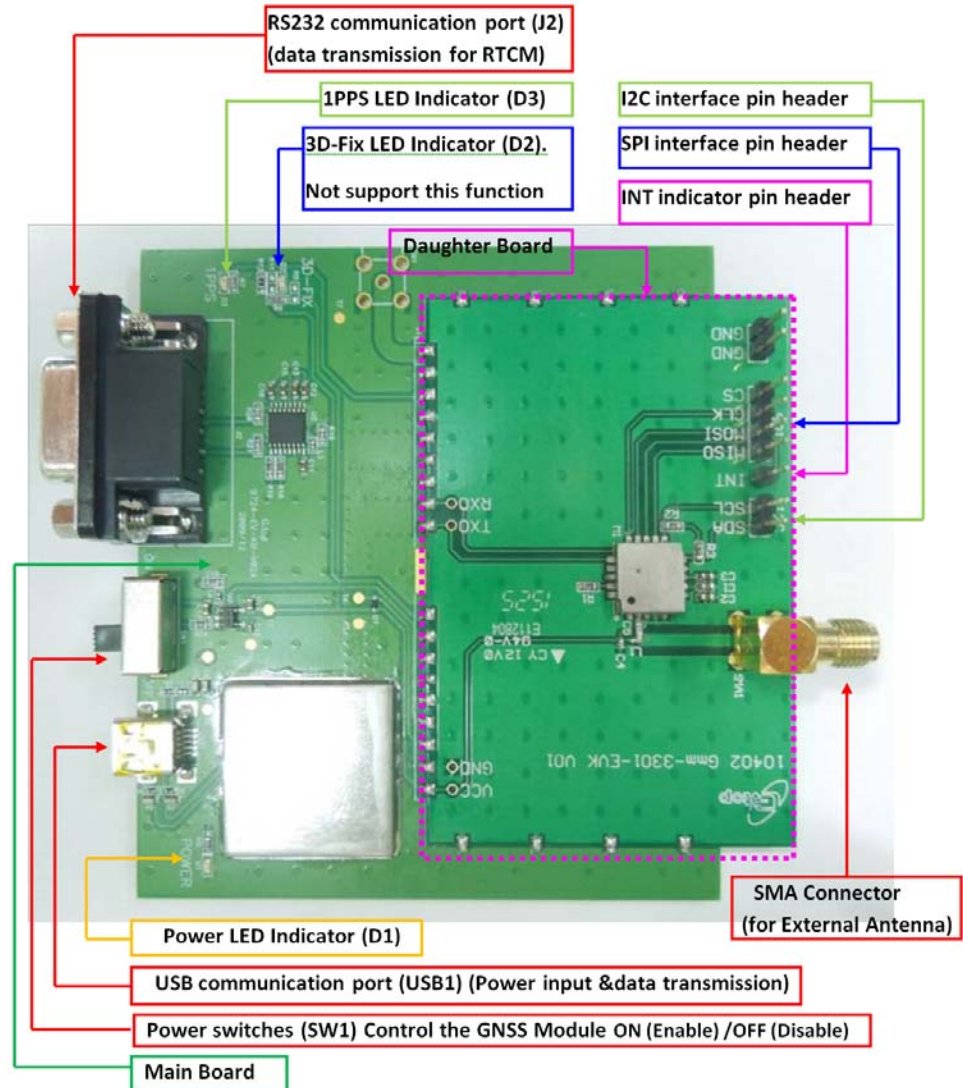
Figure 2-2: Compatible Models: (Series 1) XM1110
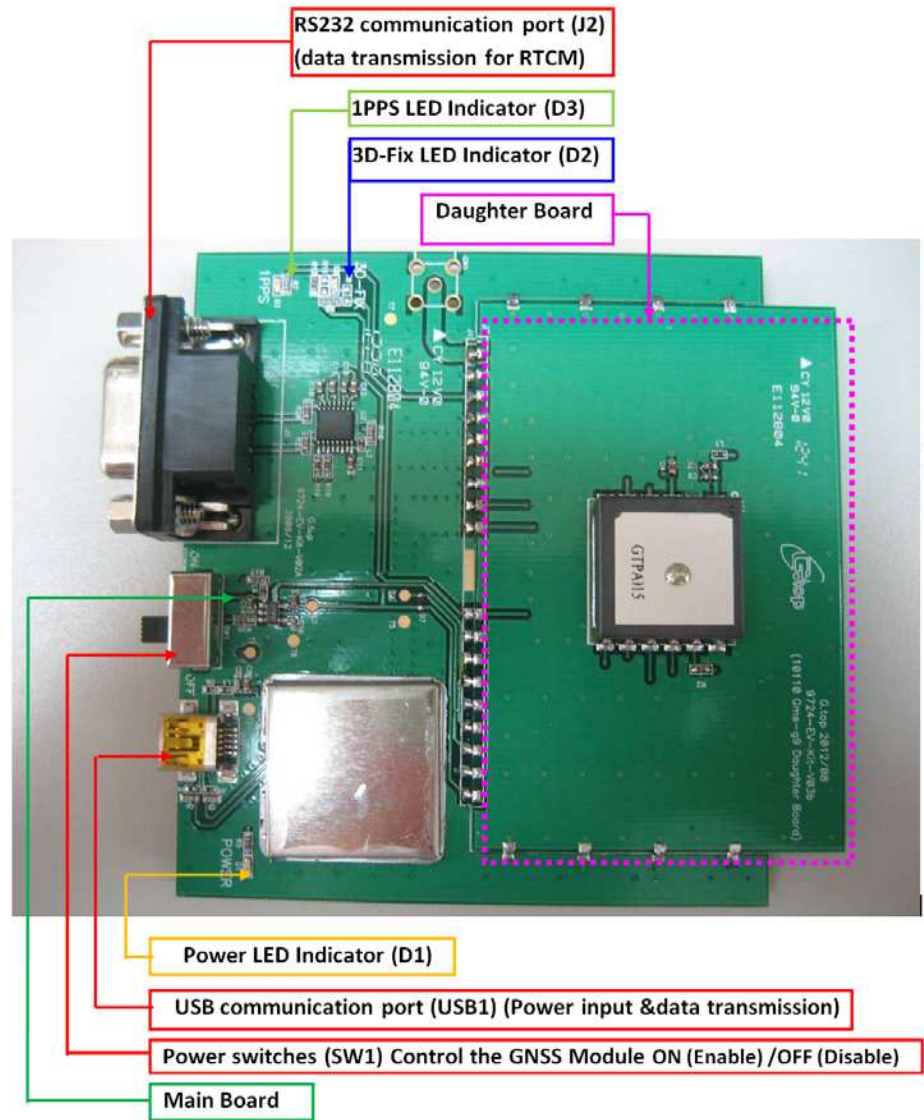
Figure 2-3: Compatible Model: (Series 2) Gms-g9

RS232 communication port (J2)
(data transmission for RTCM)

1PPS LED Indicator (D3)

3D-Fix LED Indicator (D2)

Daughter Board

Power LED Indicator (D1)

USB communication port (USB1) (Power input &data transmission)

Power switches (SW1) Control the GNSS Module ON (Enable) /OFF (Disable)

Main Board
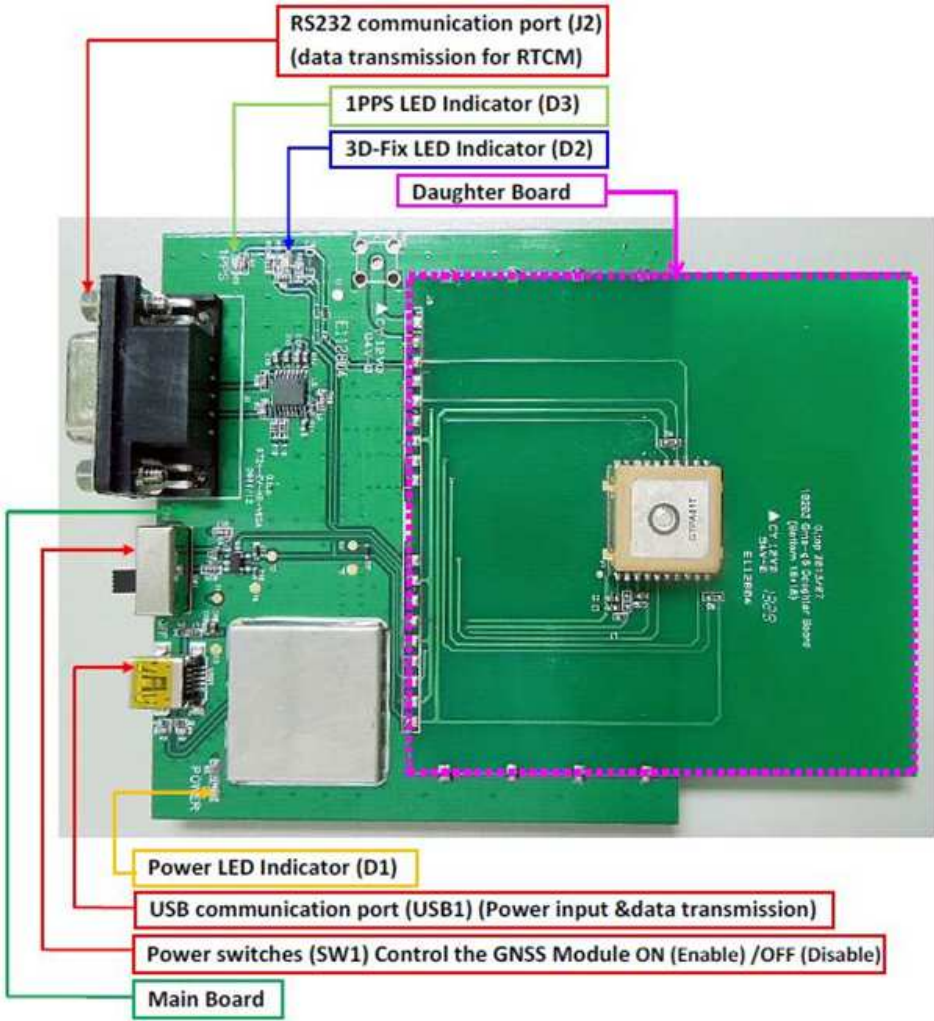
Figure 2-4: Compatible Model: (series 2) Gms-g6 / Gms-b6(Common board)

RS232 communication port (J2)
(data transmission for RTCM)

1PPS LED Indicator (D3)

3D-Fix LED Indicator (D2)

Daughter Board

Power LED Indicator (D1)

USB communication port (USB1) (Power input &data transmission)

Power switches (SW1) Control the GNSS Module ON (Enable) /OFF (Disable)

Main Board

Figure 2-5: Compatible Model: (series 3) Gms-g6a
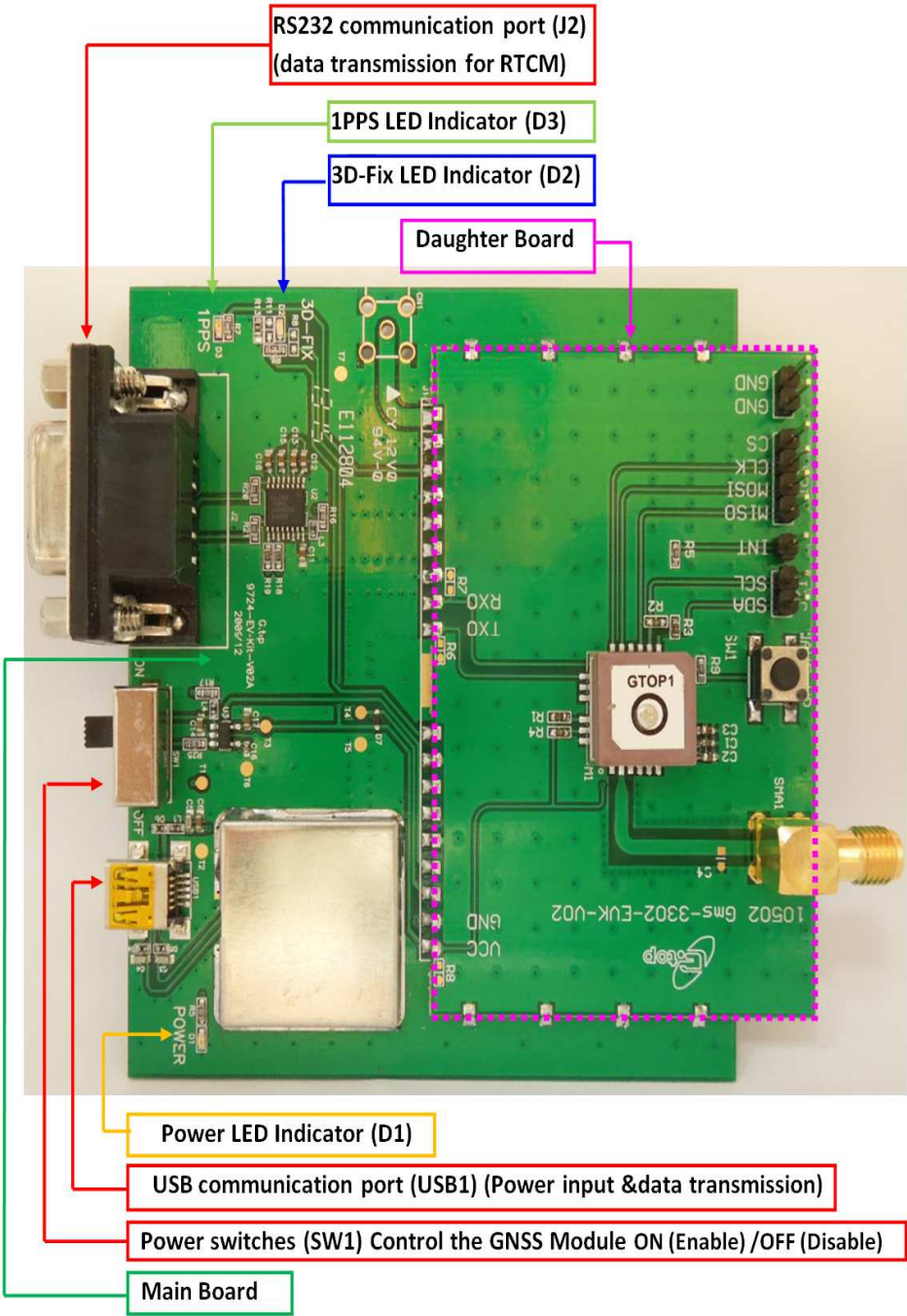
Figure 2-6: Compatible Model: (series 4) XA1110

3: Function Testing

Preparation for Power and Data Communication (Compatible Model: All series)

1. Connect USB cable to the EV-kit and to the PC.
   - The USB cable supplies power for the EV-Kit, and transmits data between EV-kit & 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.
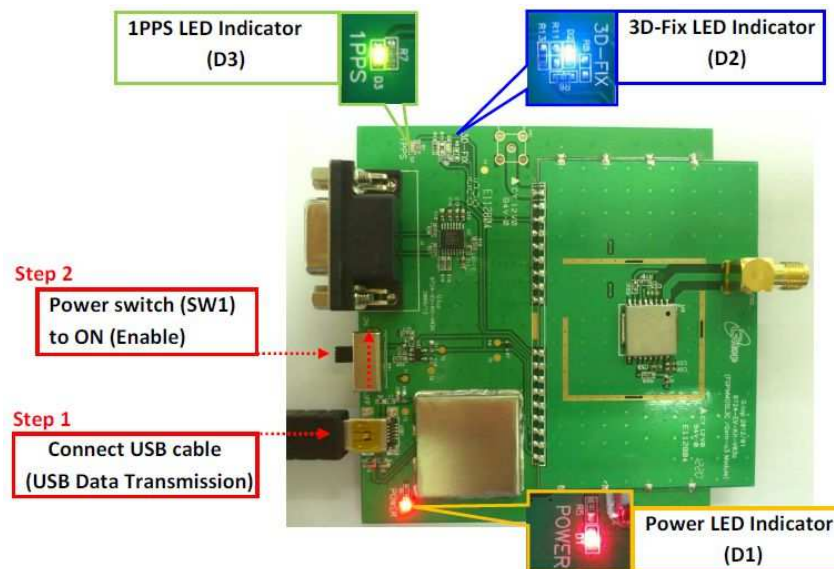
Figure 3-1: Device Features

Application for RF Reception

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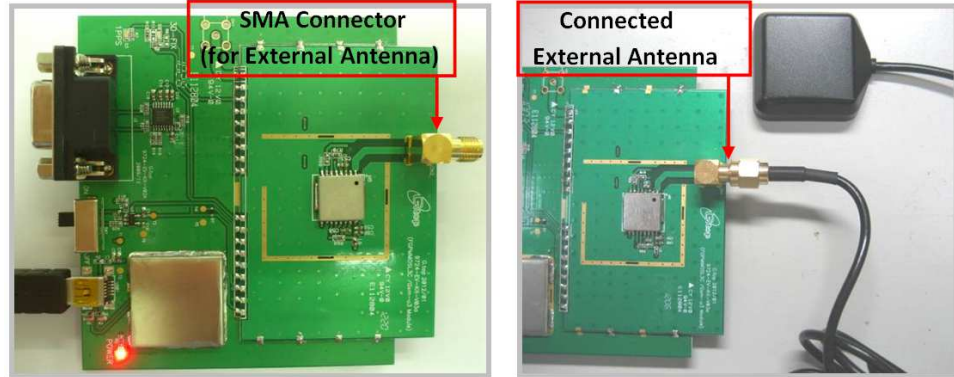

Figure 3-2: External Active Antenna Attachments

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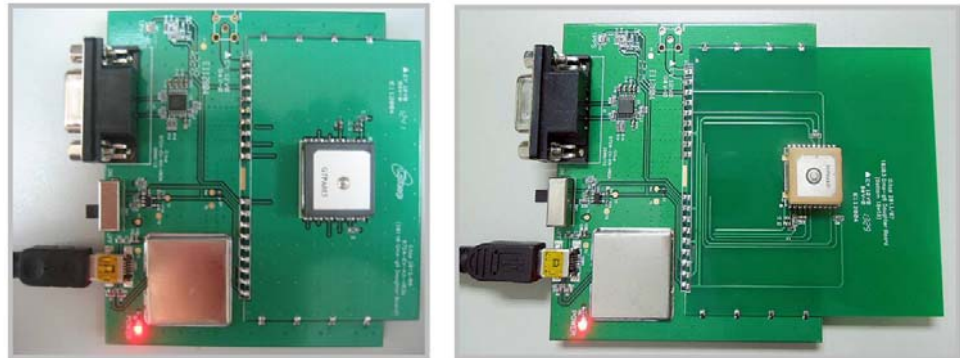

Figure 3-3: Left: Gms-g9. Right: Gms-b6.

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.
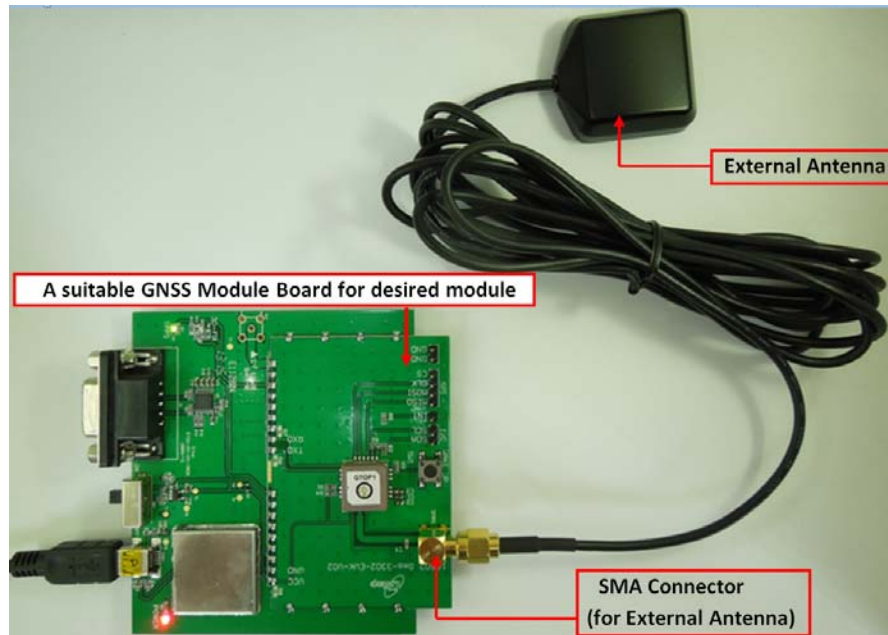

Figure 3-5: XA1110 external active antenna

≫ 4: Software Usage

System Requirements

- **Operation System**: Microsoft Windows OS (7,8,10)Microsoft .NET Framework 4.5
- Microsoft Visual C++ 2015 Redistributable Package (x86)
- **USB Driver**: CP210x VCPInstaller.zip
- **GNSS Tool**: GNSS Tool.exe

USB Driver and GNSS Tool

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

You will need the **EV-kit USB Driver (CP210xVCP)** and **GNSS Tool.exe** to operate the EV-kit.

Installing the USB Driver and Microsoft Framework

1. Double click **CP210x_VCP_Win.exe** to begin driver installation:
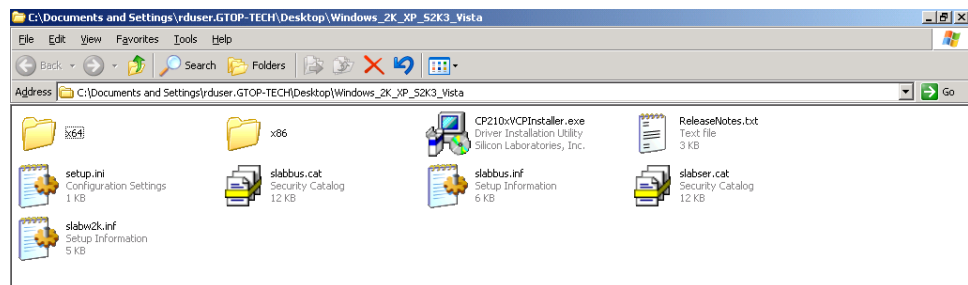
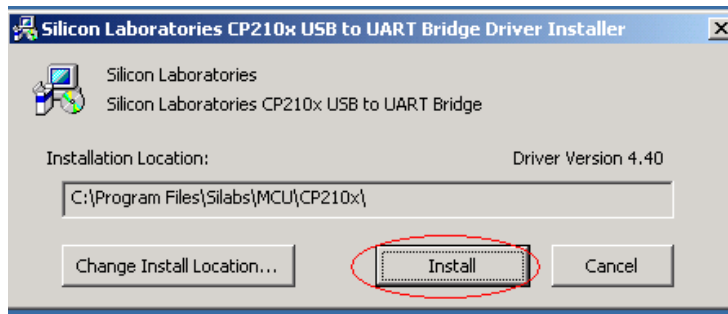*Figure 4-1: Driver Installation Folder*

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**:
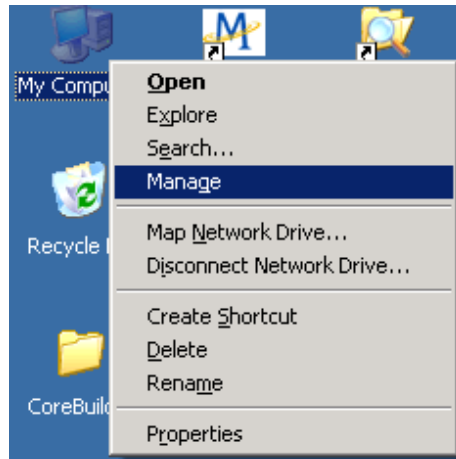

Figure 4-3: Selecting Manage

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 EV-Kit is set up and ready for use.
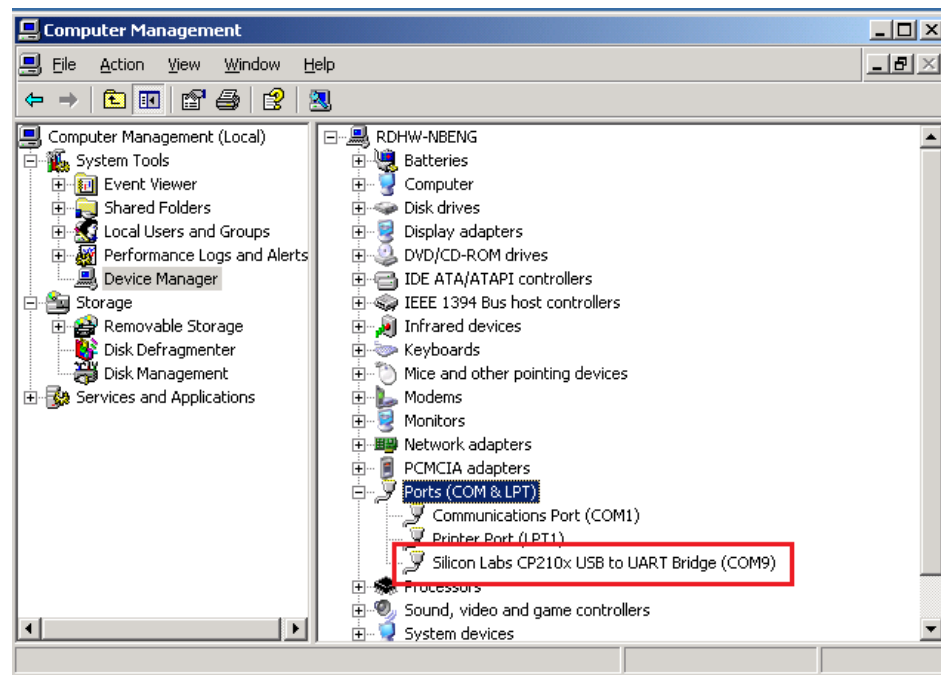
Figure 4-4: Accessing the Port Properties

"COM9" represents the virtual COM port number generated for the USB connection to the EV-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 EV-Kit.

After completing the installation, please proceed to the GNSS Tool User Manual.

Note: for using the GNSS Tool, Microsoft Framework version 4.5 or later is needed.

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 EV-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).
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 EV-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 EV-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 it back to us for inspection.

Causes of Poor GPS Signals

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

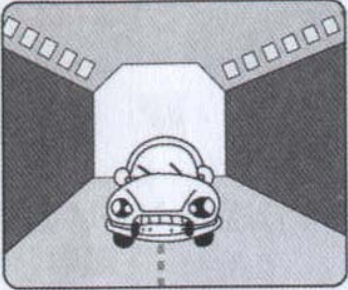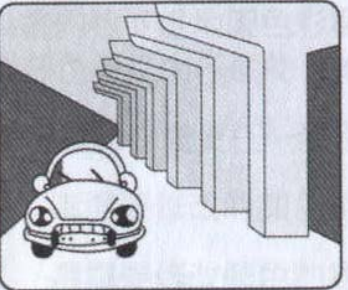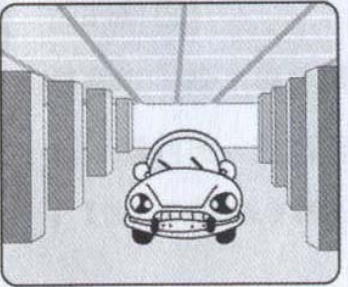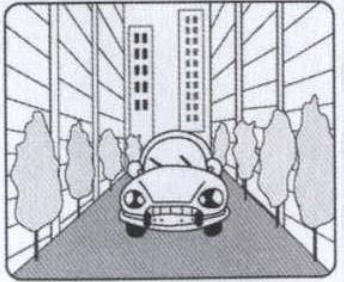**Table 5-2: Examples where Poor GPS Signals may Occur**
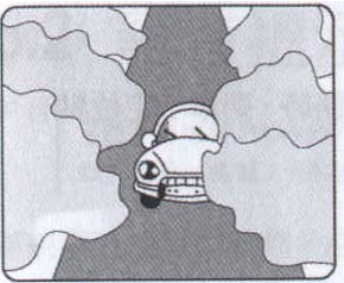
	Inside a tunnel, where the GNSS signal is blocked.
	Underneath infrastructure (e.g. a bridge), where the GNSS signal is blocked.
	Inside a building, where the GNSS signal is blocked.

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

	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 EV-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.