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# GS2000 Based Module Programming

## User Guide

***Using UART or SPI Interface***

**GS2K-EVB-FP-UG-001206**

***Modules***

**GS2011M and GS2100M**

**GainSpan® 802.11b/g/n Ultra-Low Power WiFi® Series Modules**

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## About This Manual

This manual provides guidelines for programming the Flash memory on the GainSpan® GS2011M and GS2100M modules through either the UART or SPI interface on the GS2000 evaluation board.

Refer to the following sections:

- [Revision History, page 6](#)
- [Audience, page 7](#)
- [Standards, page 7](#)
- [Documentation Conventions, page 8](#)
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- [Contacting GainSpan Technical Support, page 14](#)
- [Returning Products to GainSpan, page 15](#)
- [Accessing the GainSpan Portal, page 16](#)

## Revision History

This version of the *GainSpan GS2000 Based Module Programming User Guide* contains the following new information listed in [Table 1, page 6](#).

**Table 1 Revision History**

Version	Date	Remarks
1.0	November 2013	Initial Release
1.1	February 2014	Updated flash programming instructions. See <a href="#">2.3 Programming the Evaluation Boards, page 28</a> .
1.2	April 2014	Updated instructions for building binaries using the SDK Builder. See <a href="#">2.1 Building Binaries Using the SDK Builder Application, page 20</a> .
1.3	May 2014	Updated DOS flash programming instructions. See <a href="#">2.3.4 Programming the Module Flash Using DOS, page 39</a> .
1.4	June 2014	Updated GUI application to support 921600 Baud Rate, Program same firmware image at multiple locations. See <a href="#">2.3.2 Programming Firmware Image to Multiple Locations, page 34</a> and <a href="#">2.3.3 Programming the Module on the Evaluation Board Using 921600 Baud Rate, page 36</a> .
1.4.1	September 2014	Updated Serial Flash Programmer for GS2000 screen capture and instructions to support version 1.2.2. See <a href="#">2.3.1 Programming the Module Using GUI Application, page 28</a> .
1.4.2	October 2014	Updated instructions to include additional screen captures representing programming the GS2000 module. See <a href="#">2.3.1 Programming the Module Using GUI Application, page 28</a> .
1.5	December 2014	Added DOS instructions for programming the evaluation boards using 115200 and 921600 Baud Rate settings. See <a href="#">2.5 Programming the Module Using DOS for UART Interface, page 43</a> and <a href="#">2.8 Programming the Module Using DOS for SPI Interface, page 66</a> .

## Audience

This manual is designed for software engineers who want to program the on-board Flash to evaluate and run Serial-to-WiFi or Temperature and Light Sensor applications for their environment using DOS or Graphical User Interface procedures. These modules can be programmed using UART or SPI interface procedures.

## Standards

The standards that are supported by the GainSpan GS module supports IEEE 802.11b/g/n.

## Documentation Conventions

This manual uses the following text and syntax conventions:

- Special text fonts represent particular commands, keywords, variables, or window sessions
- Color text indicates cross-reference hyper links to supplemental information
- Command notation indicates commands, subcommands, or command elements

[Table 2, page 8](#), describes the text conventions used in this manual for software procedures that are explained using the AT command line interface.

**Table 2 Document Text Conventions**

Convention Type	Description
command syntax monospaced font	This monospaced font represents command strings entered on a command line and sample source code.  AT XXXX
Proportional font description	Gives specific details about a parameter.  <Data> DATA
UPPERCASE Variable parameter	Indicates user input. Enter a value according to the descriptions that follow. Each uppercased token expands into one or more other token.
lowercase Keyword parameter	Indicates keywords. Enter values exactly as shown in the command description.
[ ] Square brackets	Enclose optional parameters. Choose none; or select one or more an unlimited number of times each. Do not enter brackets as part of any command.  [parm1   parm2   parm3]
?	Used with the square brackets to limit the immediately following token to one occurrence.
<ESC> Escape sequence	Each escape sequence <ESC> starts with the ASCII character 27 (0x1B). This is equivalent to the Escape key.  <ESC>C
<CR> Carriage return	Each command is terminated by a carriage return.
<LF> Line feed	Each command is terminated by a line feed.

**Table 2 Document Text Conventions (Continued)**

<b>Convention Type</b>	<b>Description</b>
<CR> <LF> Carriage return Line feed	Each response is started with a carriage return and line feed with some exceptions.
<> Angle brackets	Enclose a numeric range, endpoints inclusive. Do not enter angle brackets as part of any command.
= Equal sign	<SSID> Separates the variable from explanatory text. Is entered as part of the command.  PROCESSID = <CID>
. dot (period)	Allows the repetition of the element that immediately follows it multiple times. Do not enter as part of the command.  .AA:NN can be expanded to 1:01 1:02 1:03.
A.B.C.D IP address	IPv4-style address.  10.0.11.123
X:X::X:X IPv6 IP address	IPv6-style address.  3ffe:506::1 Where the :: represents all 0x for those address components not explicitly given.
LINE End-to-line input token	Indicates user input of any string, including spaces. No other parameters may be entered after input for this token.  string of words
WORD Single token	Indicates user input of any contiguous string (excluding spaces).  singlewordnospaces

Table 3, page 10, describes the symbol conventions used in this manual for notification and important instructions.

**Table 3 Symbol Conventions**

Icon	Type	Description
	Note	Provides helpful suggestions needed in understanding a feature or references to material not available in the manual.
	Alert	Alerts you of potential damage to a program, device, or system or the loss of data or service.
	Caution	Cautions you about a situation that could result in minor or moderate bodily injury if not avoided.
	Warning	Warns you of a potential situation that could result in death or serious bodily injury if not avoided.
	Electro-Static Discharge (ESD)	Notifies you to take proper grounding precautions before handling a product.

## Documentation

The GainSpan documentation suite listed in [Table 4, page 11](#) includes the part number, documentation name, and a description of the document. The documents are available on the GainSpan Portal. Refer to [Accessing the GainSpan Portal, page 16](#) for details.

**Table 4 Documentation List**

Part Number	Document Title	Description
GS2K-QS-001205	GainSpan GS2000 Based Module Kit Quick Start Guide	Provides an easy to follow guide on how to unpack and setup GainSpan GS2000 based module kit for the GS2011M and GS2100M modules.
GS2K-EVB-FP-UG-001206	GainSpan GS2000 Based Module Programming User Guide	Provides users steps to program the on-board Flash utilizing either UART or SPI interface for the GainSpan GS2000 based modules using DOS or Graphical User Interface utility provided by GainSpan. The user guide uses the evaluation boards as a reference example board.
GS2K-SMP-EXP-UG-001207	GainSpan GS2000 Based Module Sample Examples for using Serial-to-WiFi AT Commands to Create TCP or UDP Connection User Guide	Provides an easy to follow instructions on how to setup, create, and run connection examples for UDP client/server and TCP client/server. This manual also provides instructions for provisioning the board, setting up Limited AP mode, and WiFi Protected Setup (WPS), and Web provisioning over Ad-hoc.
GS2011-S2W-APP-PRG-RG-001208	GainSpan Serial-to-WiFi Adapter Application Programmer Reference Guide	Provides a complete listing of AT serial commands, including configuration examples for initiating, maintaining, and evaluating GainSpan WiFi GS2011M series modules.
GS2100-S2W-APP-PRG-RG-001208	GainSpan Serial-to-WiFi Adapter Application Programmer Reference Guide	Provides a complete listing of AT serial commands, including configuration examples for initiating, maintaining, and evaluating GainSpan WiFi GS2100M series modules.
GS2K-SDK-DB-UG-001209	GS2000 Based Module Software Development Kit and Debugging User Guide	This manual provides SDK user installation instructions, IAR IDE workbench application, and I-Jet hardware used for JTAG Serial-to-WiFi (S2W) and TLS application development and debugging.

**Table 4 Documentation List (Continued)**

<b>Part Number</b>	<b>Document Title</b>	<b>Description</b>
GS2K-EVB-HW-UG-001210	GainSpan GS2000 Based Module Evaluation Board Hardware User Guide.	Provides instructions on how to setup and use the GS2000 based module evaluation board along with component description, jumper settings, board specifications, and pinouts.
GS2011M-DS-001211	GainSpan GS2011M Low Power WiFi Module Data Sheet	Provides information to help WiFi system designers to build systems using GainSpan GS2011M module and develop wireless applications.
GS2100M-DS-001212	GainSpan GS2100M Low Power WiFi Module Data Sheet	Provides information to help WiFi system designers to build systems using GainSpan GS2100M module and develop wireless applications.
GS2K-HTTP-EAP-UG-001213	GainSpan GS2000 Based Module Configuration Examples for using Serial-to-WiFi AT Commands to Create HTTP, HTTPS, and EAP Connection User Guide	Provides an easy to follow instructions on how to setup, create, and run connection examples for HTTP, HTTPS, and EAP.
GS2011MxxS-DS-001214	GainSpan GS2011MxxS Low Power WiFi Module Data Sheet	Provides information to help WiFi system designers to build systems using GainSpan GS2011MxxS module and develop wireless applications.
GS2K-SDK-BLDR-UG-001223	GainSpan Based Module Software Developer Kit (SDK) Builder User Guide	Provides instructions that allow OEMs to configure and generate custom firmware binary images.
GS2K-SDK-QS-001225	GainSpan GS2000 Based Module Software Development Kit Quick Start Guide	Provides an easy to follow guide that will walk you through easy steps to setup, evaluation, develop, and debug the full capabilities and features of the GS2011M or GS2100M embedded platform software.
GS2K-IP2WIFI-APP-PRG-RG-001247	GainSpan GS2000 Based Module IP-to-WiFi Adapter Application Programmer Reference Guide	Provides a complete listing of AT serial commands, including configuration examples for initiating, maintaining, and evaluation GainSpan IP-to-WiFi GS2000 based modules.

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments by logging into [GainSpan Support Portal](#). If you are using e-mail, be sure to include the following information with your comments:

- Document name
- URL or page number
- Hardware release version (if applicable)
- Software release version (if applicable)

## References

The GainSpan references listed in [Table 5, page 13](#) are available on the GainSpan Portal. Refer to [Accessing the GainSpan Portal](#), page 16 for details.

**Table 5 Other Documents and References**

Title	Description
Schematics	GS2000 Based Module Evaluation Board schematics supporting: <ul style="list-style-type: none"><li>• GS2011M</li><li>• GS2100M</li></ul>
Module Firmware and Programming Utilities	<ul style="list-style-type: none"><li>• Serial-to-WiFi (S2W) based firmware</li><li>• Temperature and Light Sensor (TLS) based firmware<ul style="list-style-type: none"><li>– For use with GS2011M EVK only</li></ul></li><li>• Firmware Release Notes</li><li>• GSFlashprogram utility for programming the modules</li></ul>
Smart Phone Applications	<ul style="list-style-type: none"><li>• Smart Phone applications for iOS and Android to evaluate and demonstrate the Temperature and Light Sensor (TLS) firmware.<ul style="list-style-type: none"><li>– For use with GS2011M EVK only</li></ul></li></ul>
Software Utilities	Serial terminal program to evaluate and demonstrate Serial-to-WiFi (S2W) applications

## Contacting GainSpan Technical Support

Use the information listed in [Table 6, page 14](#), to contact the GainSpan Technical Support.

**Table 6 GainSpan Technical Support Contact Information**

North America	1 (408) 627-6500 - <a href="mailto:techsupport@gainspan.com">techsupport@gainspan.com</a>
Outside North America	Europe: <a href="mailto:EUsupport@gainspan.com">EUsupport@gainspan.com</a> China: <a href="mailto:Chinasupport@gainspan.com">Chinasupport@gainspan.com</a> Asia: <a href="mailto:Asiasupport@gainspan.com">Asiasupport@gainspan.com</a>
Postal Address	GainSpan Corporation 3590 North First Street Suite 300 San Jose, CA 95134 U.S.A.

For more Technical Support information or assistance, perform the following steps:

1. Point your browser to <http://www.gainspan.com>.
2. Click **Contact**, and click **Request Support**.
3. Log in using your customer **Email** and **Password**.
4. Select the **Location**.
5. Select **Support Question** tab.
6. Select **Add New Question**.
7. Enter your technical support question, product information, and a brief description.

The following information is displayed:

- Telephone number contact information by region
- Links to customer profile, dashboard, and account information
- Links to product technical documentation
- Links to PDFs of support policies

## Returning Products to GainSpan

If a problem cannot be resolved by GainSpan technical support, a Return Material Authorization (RMA) is issued. This number is used to track the returned material at the factory and to return repaired or new components to the customer as needed.



**NOTE:** *Do not return any components to GainSpan Corporation unless you have first obtained an RMA number. GainSpan reserves the right to refuse shipments that do not have an RMA. Refused shipments will be returned to the customer by collect freight.*

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For more information about return and repair policies, see the customer support web page at: <https://www.gainspan.com/secure/login>.

To return a hardware component:

1. Determine the part number and serial number of the component.
2. Obtain an RMA number from Sales/Distributor Representative.
3. Provide the following information in an e-mail or during the telephone call:
  - Part number and serial number of component
  - Your name, organization name, telephone number, and fax number
  - Description of the failure
4. The support representative validates your request and issues an RMA number for return of the components.
5. Pack the component for shipment.

## Guidelines for Packing Components for Shipment

To pack and ship individual components:

- When you return components, make sure they are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.
- Use the original shipping materials if they are available.
- Place individual components in electrostatic bags.
- Write the RMA number on the exterior of the box to ensure proper tracking.



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**CAUTION!** *Do not stack any of the components.*

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## Accessing the GainSpan Portal

To find the latest version of GainSpan documentation supporting the GainSpan product release you are interested in, you can search the GainSpan Portal website by performing the following steps:



**NOTE:** You must first contact GainSpan to set up an account, and obtain a customer user name and password before you can access the GainSpan Portal.

1. Go to the [GainSpan Support Portal](#) website.
2. Log in using your customer **Email** and **Password**.
3. Click the **Getting Started** tab to view a Quick Start tutorial on how to use various features within the GainSpan Portal.
4. Click the **Actions** tab to buy, evaluate, or download GainSpan products.
5. Click on the **Documents** tab to search, download, and print GainSpan product documentation.
6. Click the **Software** tab to search and download the latest software versions.
7. Click the **Account History** tab to view customer account history.
8. Click the **Legal Documents** tab to view GainSpan Non-Disclosure Agreement (NDA).

# Chapter 1 GS2K Evaluation Board Overview

This chapter provides an overview of the GainSpan® Evaluation Board (EVB) based on the GS2011M or GS2100M ultra-low power wireless module solution for WiFi networks.

- [Introduction, page 17](#)
- [Requirements, page 18](#)

## 1.1 Introduction

The EVB provides customers the means to evaluate the capabilities of GainSpan ultra-low power wireless module solutions for WiFi® networks. The Serial-to-WiFi embedded software on the modules allows devices to easily add WiFi capabilities to their products.

The evaluation board comes with preloaded Serial-to-WiFi firmware that supports limited station AP mode, with built-in web server for provisioning the device.

The following steps are outlined in this user guide to program the firmware and related files onto the evaluation board using the programming utility provided:

- [Chapter 2 Programming Modules on the Evaluation Board, page 19](#)
- [Chapter 3 Associating and Verifying, page 73](#)
- [Chapter 4 Starting the Serial-to-WiFi Application, page 77](#)

## 1.2 Requirements

The following hardware and software are needed to program the GS2000 evaluation boards.

- For UART Interface Programming:
  - GS2011M or GS2100M Evaluation Board
  - mini-USB Cable
  - gs2k\_flashprogram GUI and DOS application
  - SDK Builder - to build firmware binaries
  - Tera Term VT or similar terminal emulation software
- For SPI Interface Programming:
  - GS2011M or GS2100M Evaluation Board
  - Cheetah SPI Host Adapter (High-Speed USB to SPI Interface)
  - mini-USB Cable
  - gs2k\_flashprogram GUI and DOS application
  - SDK Builder - to build firmware binaries
  - Tera Term VT or similar terminal emulation software
  - TotalPhaseUSB Drivers for Cheetah SPI Host Adapter - download the latest at: <http://www.totalphase.com/products/usb-drivers-windows>

# Chapter 2 Programming Modules on the Evaluation Board

This chapter provides step-by-step instructions on how to program the modules and evaluation board using the *gs2k\_flashprogram* GUI application or DOS procedures with a new/different firmware image via UART or SPI interface connections.

- Building Binaries Using the SDK Builder Application, page 20
- Preparing the Evaluation Boards for UART Interface, page 26
- Programming the Evaluation Boards Using the GUI Application, page 28
- Programming the Module Using the UART Interface, page 30
- Programming the Module Using DOS for UART Interface, page 43
- Preparing the Evaluation Boards for SPI Interface, page 54
- Programming the Module Using the SPI Interface, page 56
- Programming the Module Using DOS for SPI Interface, page 66



***ESD ALERT!*** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.



***NOTE:*** GainSpan recommends you copy the contents of the flash program utilities to a created folder on your C:\drive.

## 2.1 Building Binaries Using the SDK Builder Application

The SDK Builder application allows you to build binaries to program the flash for the GS2011M and GS2100M. To use the SDK Builder application, perform the following:

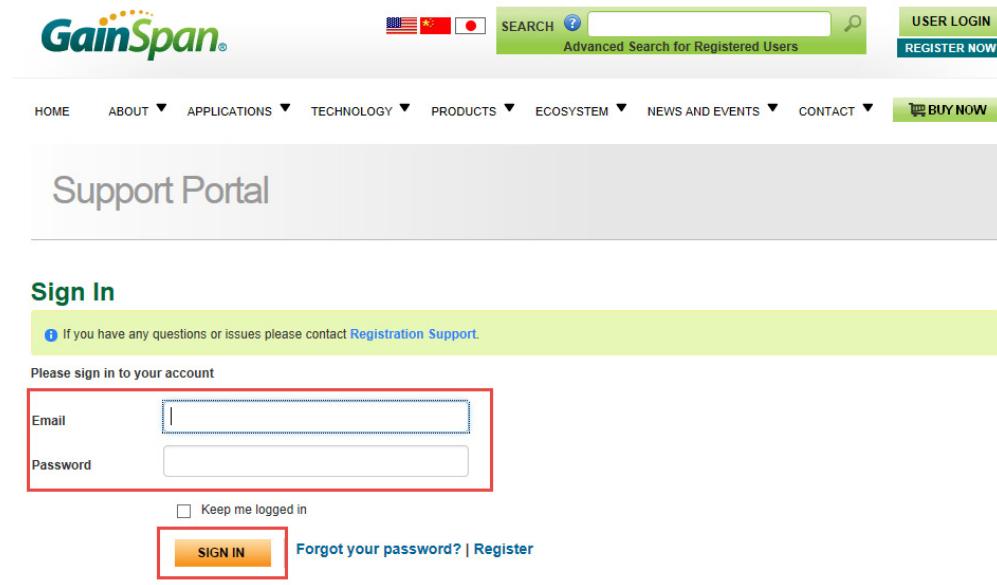
1. Open a web browser, and enter the following website at: [www.gainspan.com](http://www.gainspan.com), and click on the **USER LOGIN** button at the top right corner of the GainSpan web page (see Figure 1, page 20).

**Figure 1 Logging Into Your GainSpan Account**



2. The GainSpan User Sign In screen will display (see [Figure 2, page 21](#)). Enter your **Email** and **Password** and click **SIGN IN**.

**Figure 2** Sign In To Your GainSpan Account



The figure shows the 'Support Portal' section of the GainSpan website. At the top, there is a navigation bar with links for HOME, ABOUT, APPLICATIONS, TECHNOLOGY, PRODUCTS, ECOSYSTEM, NEWS AND EVENTS, CONTACT, and a green 'BUY NOW' button. Below the navigation is a search bar with options for 'SEARCH', 'Advanced Search for Registered Users', and language selection (USA, China, Japan). On the right side of the header are 'USER LOGIN' and 'REGISTER NOW' buttons. The main content area is titled 'Support Portal'. Below it, a 'Sign In' form is displayed. The form has a yellow header bar with the text: 'If you have any questions or issues please contact Registration Support.' It includes fields for 'Email' and 'Password', both of which are highlighted with a red border. There is also a 'Keep me logged in' checkbox and a 'SIGN IN' button. Below the 'SIGN IN' button are links for 'Forgot your password?' and 'Register'.

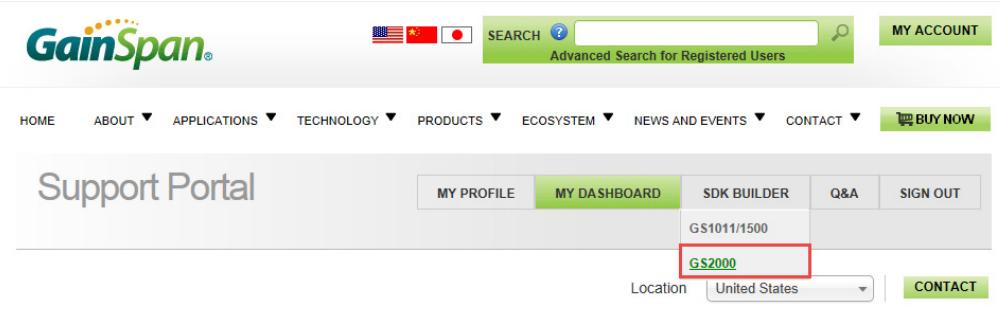
3. The **Getting Started** will guide you through helpful tips on how to program GainSpan products, search for support documentation, and navigate through the website. It will also give you a link directly to the SDK Builder (see [Figure 3, page 22](#)).

**Figure 3 Getting Started**

The screenshot shows the GainSpan Support Portal interface. At the top, there's a navigation bar with tabs: MY PROFILE, RESOURCES (which is highlighted in green), SDK BUILDER, Q&A, and SIGN OUT. Below the navigation bar, there are location settings (Location: United States) and a CONTACT button. A secondary navigation bar below the main one includes links for Getting Started, Agreements, Documents, Software, Kits Purchased, Legal Documents, and Certifications. The main content area is titled 'Quick Start Guide'. It contains a brief introduction about the website being an integral part of the user experience and committing to providing tools and information for GainSpan products. Below this is a section titled 'PROGRAMMING YOUR GAINSPAN PRODUCTS'. It describes the 'SDK Builder' as a powerful utility for programming GainSpan products, mentioning it's available for Evaluation Boards, Application Evaluation Kits, and Software Development Kits. It highlights that the SDK builder guides users through configuration choices and provides tailored firmware binaries and documentation. A small graphic of a stack of colorful blocks labeled 'APPLICATION PROCESS', 'WIRELESS', 'TEST AND MEASURE', and 'POWER' is shown next to this text. A green button labeled 'Check out the SDK Builder Now' with a right-pointing arrow is located to the right. Further down, there are three tutorial sections: 'TUTORIAL: SEARCHING FOR DOCUMENTATION & SOFTWARE', 'TUTORIAL: SIMPLE SEARCH OF THE PUBLIC AREAS OF THE GAINSPAN SITE', and 'TUTORIAL: ASKING A SUPPORT QUESTION'. Each tutorial is accompanied by a screenshot of the portal's search or support features.

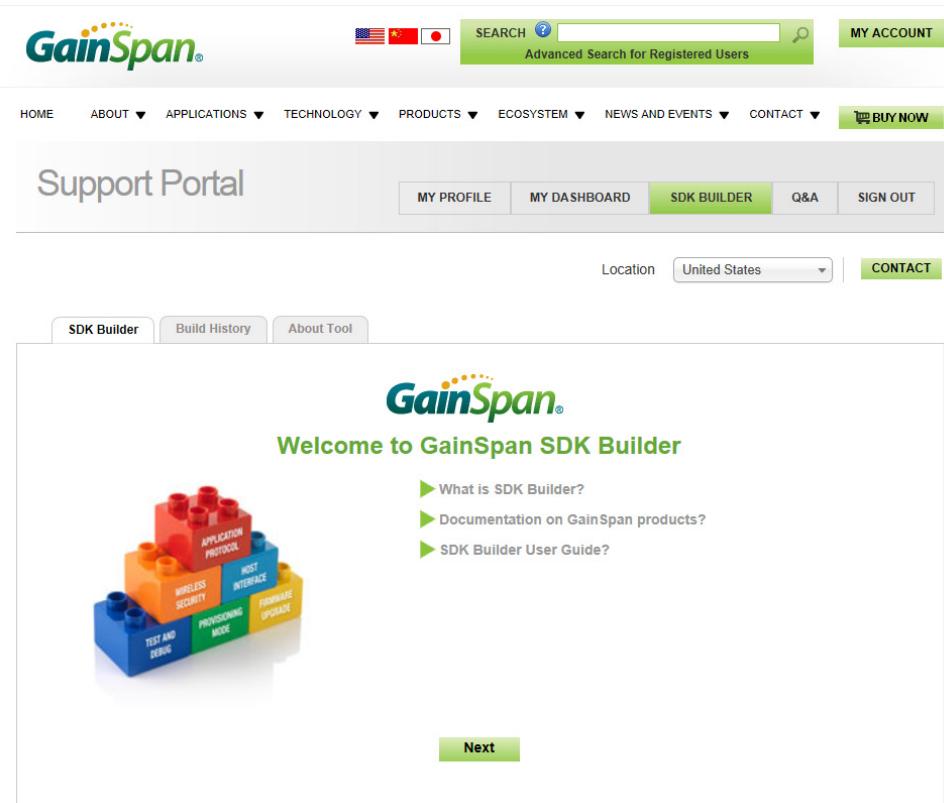
4. You can also click on the **SDK Builder** and select a GainSpan module to create the firmware. For this example we are going to select **GS2000** (see Figure 4, page 23).

**Figure 4 Select GainSpan Module to Create Firmware**



5. The GainSpan SDK Builder Welcome screen displays links that give a brief explanation of the SDK Builder and Documentation (see Figure 5, page 23).

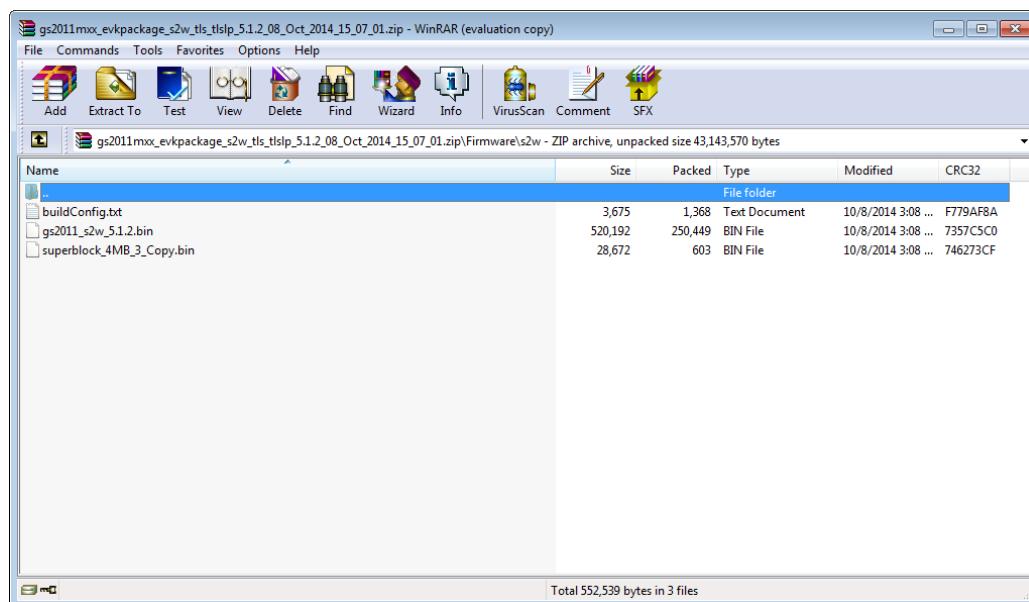
**Figure 5 GainSpan SDK Builder Welcome**



6. Click the **Next** button to select your SDK Builder configuration.

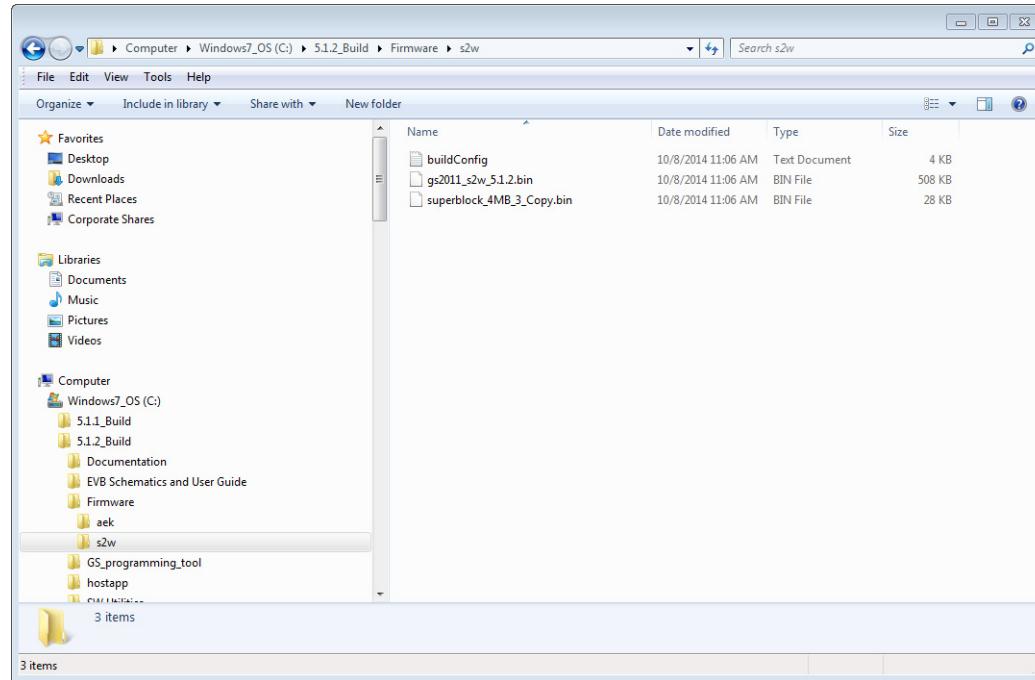
7. The GainSpan SDK Builder Configuration screen allows you to select your firmware configuration options and submit your build. For details and description of each field, refer to the *GainSpan GS2000 Based Module Software Developer Kit (SDK) Builder User Guide*.
8. When the SDK Builder completes the process, it will compile and build your custom software. You will be notified through your email account once the build image is ready for download under the **Build History** tab.
9. Login to your GainSpan SDK Builder account and download the files.
10. Open or Save the Zip binary files to a created directory on your C:\drive, and unzip (Figure 6, page 24).

**Figure 6 Firmware Binary Files**



11. The firmware binary files for the module are displayed (see [Figure 7, page 25](#)). The created binary files are used to program the module using the GUI program.

**Figure 7 Binary Files Created Using the SDK Builder**



For instructions how to program the flash using DOS, refer to [2.5 Programming the Module Using DOS for UART Interface, page 43](#) and [2.8 Programming the Module Using DOS for SPI Interface, page 66](#).

## 2.2 Preparing the Evaluation Boards for UART Interface

### 2.2.1 GS2011M Evaluation Board



**ALERT!** Make sure you unplug/plug the mini-USB cable with the ON/OFF switch in the OFF position.

The following steps will guide you through programming the GS2011M evaluation board with the Serial-to-WiFi binaries using UART interface (see 1.2 Requirements, page 18):

1. Plug the mini-USB cable into the **USB0** port as shown in Figure 8, page 26.
2. Plug the other end of the mini-USB cable into a **USB** port on your computer.
3. Turn the PROGRAM/RUN switch on the GS2011M to the **PROGRAM** position.
4. Turn the ON/OFF power switch on the GS2011M to the **ON** position. The Program Flash LED will be lit **RED**, indicating that the module is ready to be programmed.

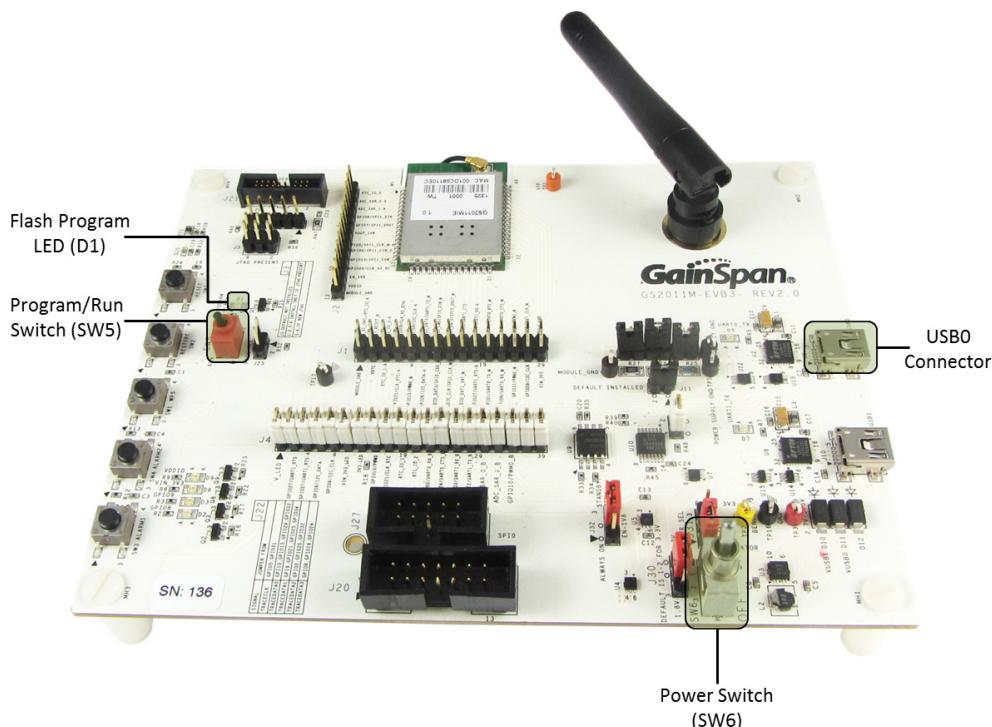


**NOTE:** Refer to the *GS2000 Based Module Evaluation Board Hardware User Guide* for a list of components, jumpers, switches, and LEDs.



**NOTE:** GS2000 Evaluation Board versions may differ from the picture below.

Figure 8 Setting Up the GS2011M Evaluation Board to Program Flash Using UART



## 2.2.2 GS2100M Evaluation Board



***ALERT!*** Make sure you unplug/plug the mini-USB cable with the ON/OFF switch in the OFF position.

The following steps will guide you through programming the GS2100M evaluation board with the Serial-to-WiFi binaries using UART interface (see [1.2 Requirements, page 18](#)):

1. Plug the mini-USB cable into the **USB0** port as shown in [Figure 9, page 27](#).
2. Plug the other end of the mini-USB cable into a **USB** port on your computer.
3. Turn the PROGRAM/RUN switch on the GS2100M to the **PROGRAM** position.
4. Turn the ON/OFF power switch on the GS2100M to the **ON** position. The Program Flash LED will be lit **RED**, indicating that the module is ready to be programmed.

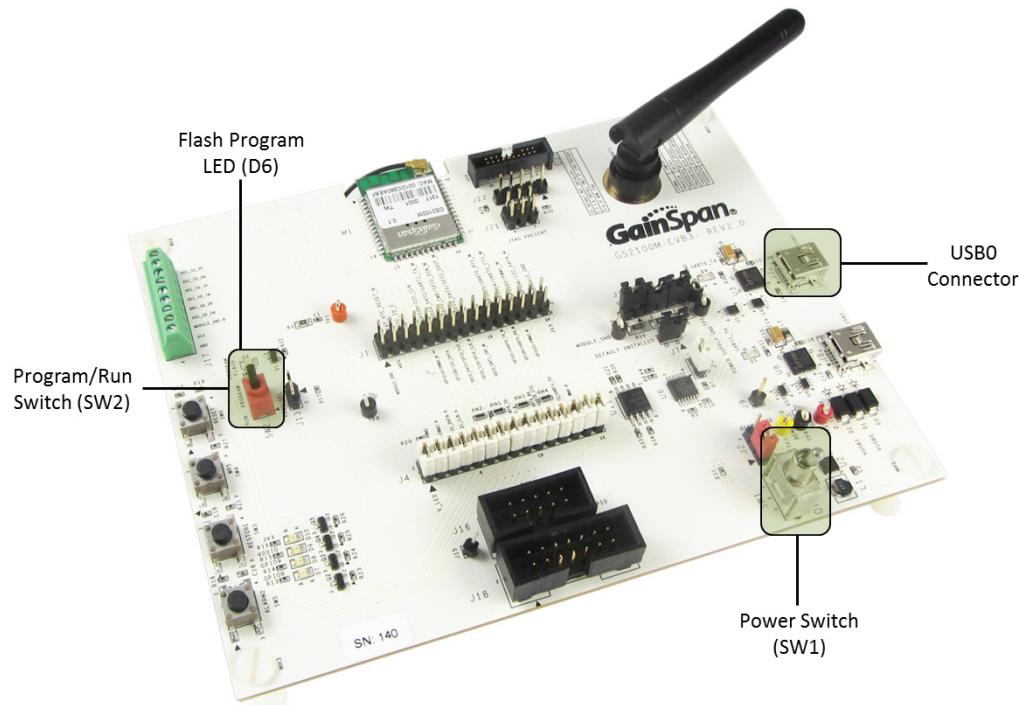


***NOTE:*** Refer to the [GS2000 Based Module Evaluation Board Hardware User Guide](#) for a list of components, jumpers, switches, and LEDs.



***NOTE:*** GS2000 Evaluation Board versions may differ from the picture below.

**Figure 9 Setting Up the GS2100M Evaluation Board to Program Flash Using UART**



## 2.3 Programming the Evaluation Boards Using the GUI Application

The GainSpan GS2011M and GS2100M evaluation boards are programmed using the GS2000 Graphical User Interface (GUI) application.

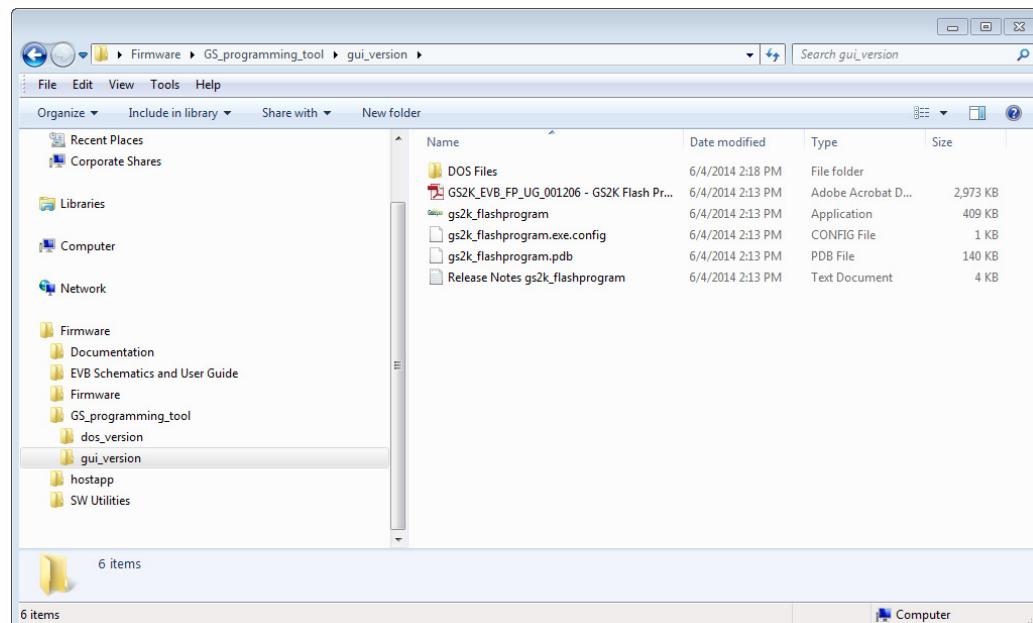


**NOTE:** *The following instructions are the same for programming the flash with different firmware types after the appropriate file name is chosen.*

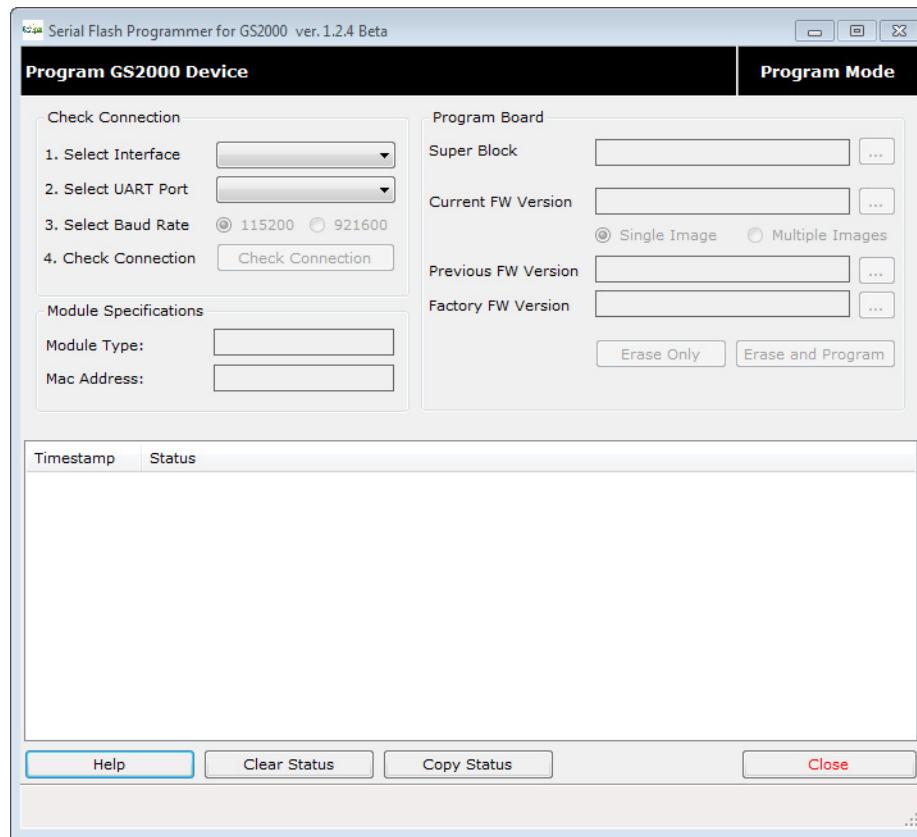
To program the Flash using the GUI application, perform the following:

1. Open the location where your SDK package resides on your C:\drive. Refer to the *GainSpan GS2000 Based Module Software Developer Kit (SDK) Builder User Guide* for instructions on how to build SDK packages.
2. Open the **GS\_programming\_tool** folder, select and click on the **gs2k\_flashprogram** application (see Figure 10, page 28).

**Figure 10 gs2k\_flashprogram Application**



3. The **Serial Flash Programmer** window will display (see Figure 11, page 29).

**Figure 11 gs2k\_flashprogram Application**

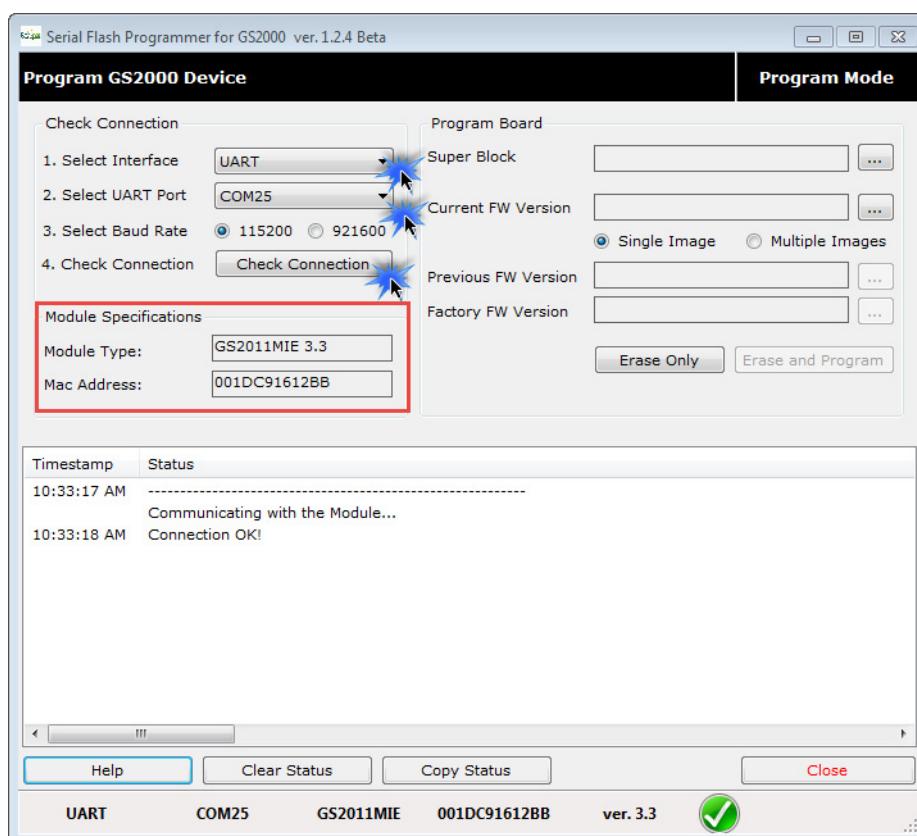
4. Turn the PROGRAM/RUN switch to the **PROGRAM** mode and turn the ON/OFF power switch **ON**. The Program Flash LED will be lit **RED**, indicating the board is ready for programming the module flash.

## 2.4 Programming the Module Using the UART Interface

For programming the GS2011M, GS2011MxxS, and GS2100M modules using UART interface, perform the following:

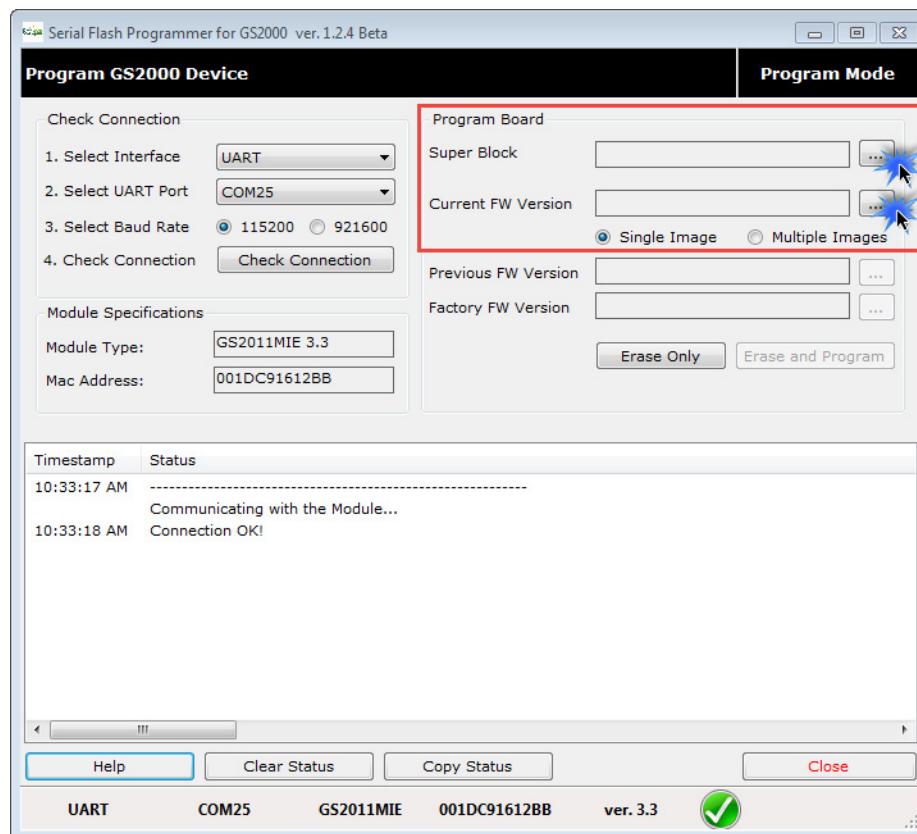
1. Select the **Single UART Interface** from the pull-down tab.
2. Select the **UART port**.
3. Select **Baud Rate**. The Baud Rate 115200 will automatically be selected. When selecting 921600 Baud Rate there are additional hardware instructions that need to be followed. Refer to [2.4.2 Programming the Module Using 921600 Baud Rate - UART, page 40](#).
4. Click the **Check Connection** button. The software will communicate with the GS2011M or GS2100M evaluation board to check the connection and display the **Module Specifications** (Module Type and Mac Address of the module). A **Green** check will display at the bottom of the screen indicating the Connection and Communication with the board is successful along with the selections specified (see [Figure 12, page 30](#)).

**Figure 12 Communicating with the GainSpan Module - (UART)**



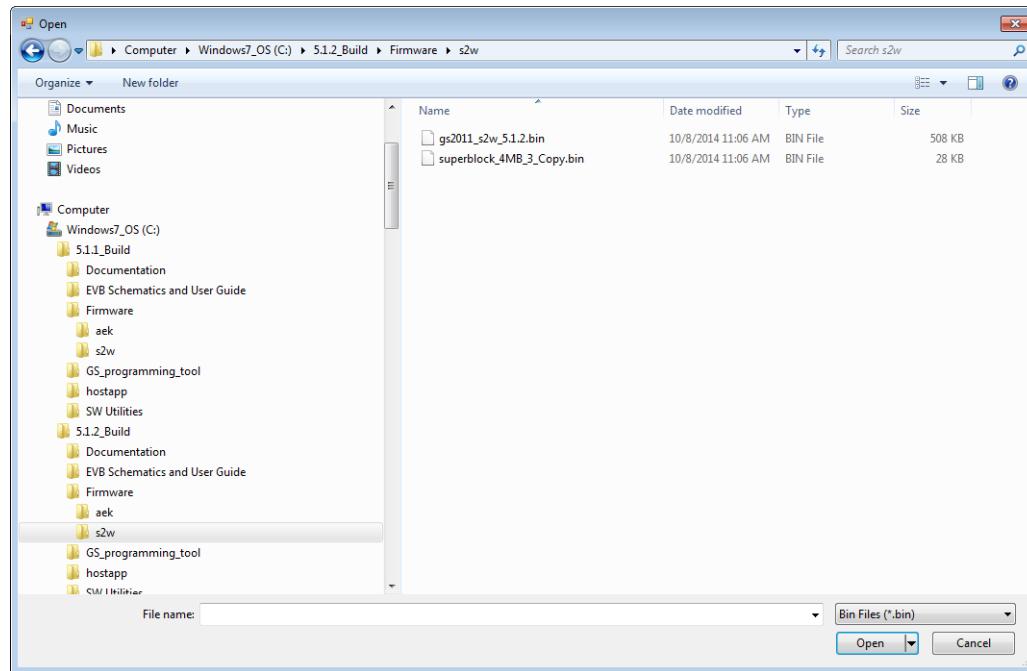
5. Select the Firmware and Binaries to program the board with a Single Image. Click the **Browse (...)** buttons next to the **Super Block** and **Current FW Version** to download (see Figure 13, page 31).

**Figure 13 Select Super Block and Firmware Single Image Binaries - (UART)**

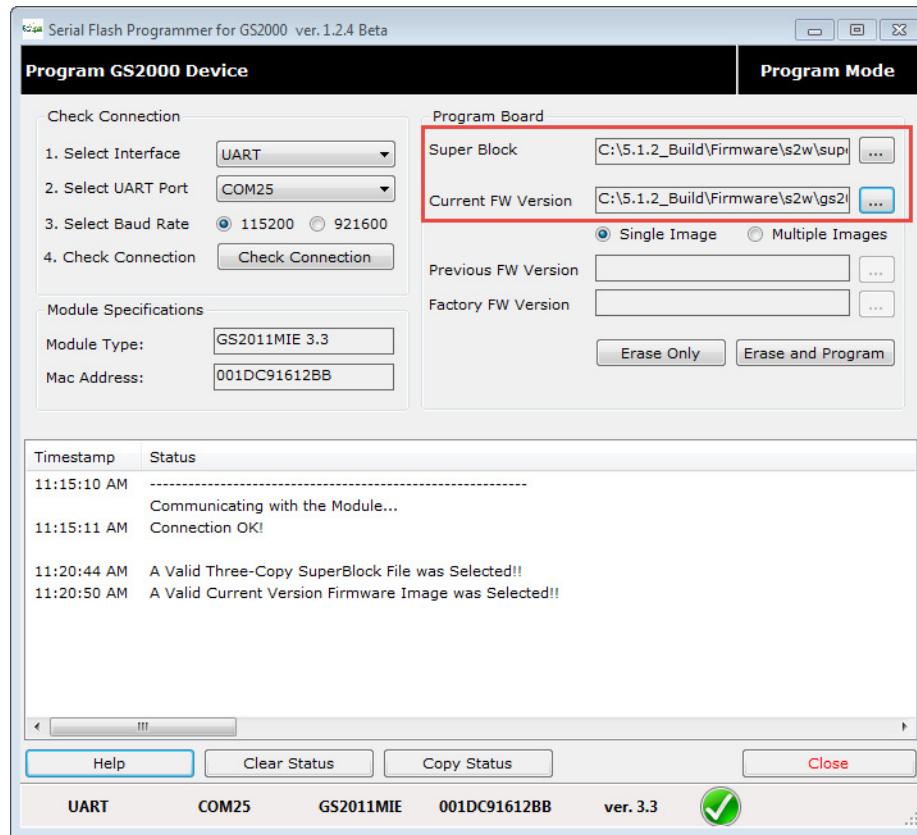


6. Select Single Image to program. This will program the module with a single firmware binary image. *This is the default and recommended method* (see Figure 14, page 32). For instructions on how to program the board with multiple images, refer to [2.4.1 Programming the Module With Multiple Images - UART](#), page 35.

**Figure 14 Selecting Single Image Firmware - (UART)**

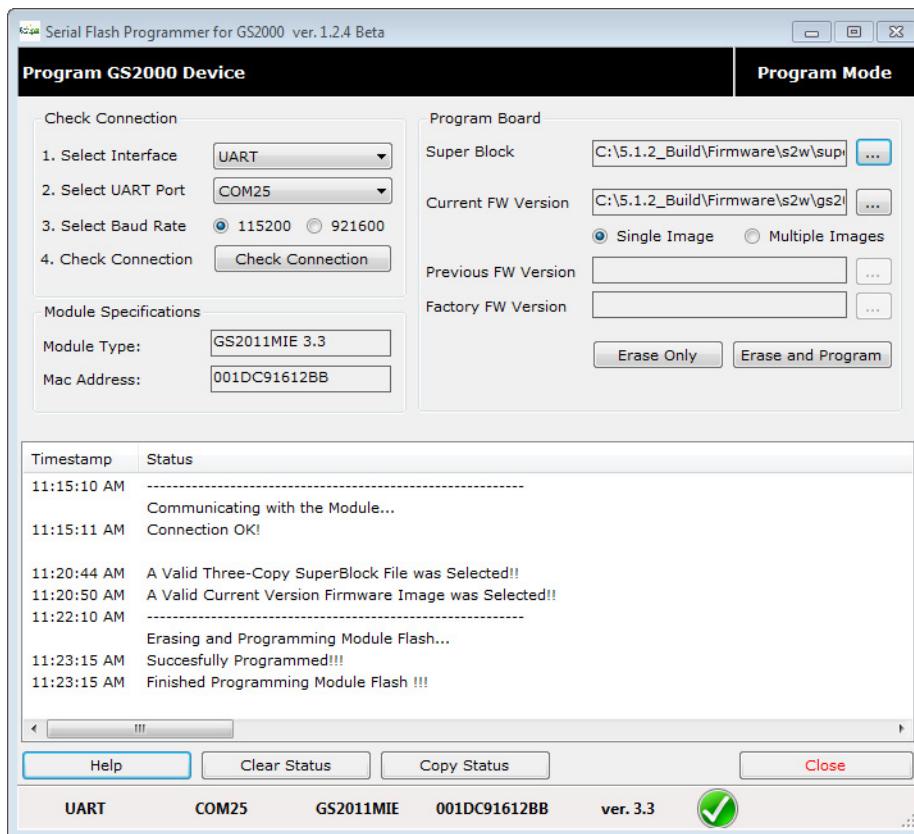


7. Once selected, a message will display indicating that a valid Super Block and Firmware Image have been selected (see [Figure 15](#), page 33).

**Figure 15 Valid Super Block and Firmware Single Image Selected - (UART)**

8. Click the **Erase and Program** button. The GUI software will go through a process of programming the module flash with the new firmware and binaries. When complete a **Green** check will display indicating the flash has been programmed successfully (see Figure 16, page 34).

**Figure 16 Programming Single Image Complete - (UART)**



**NOTE:** *The Erase Flash button will erase the entire flash on the module.*

9. Click the **Close** button. Turn the ON/OFF switch to the **OFF** position. Turn the PROGRAM/RUN switch to the **RUN** position. Turn the ON/OFF switch back to the **ON** position.

The GS2011M or GS2100M is now ready to be verified. Refer to [Chapter 3 Associating and Verifying, page 73](#).

To program the module flash using DOS, follow the instructions in [2.5 Programming the Module Using DOS for UART Interface, page 43](#).

For instructions on how to program the module using the SPI interface, refer to [2.7 Programming the Module Using the SPI Interface, page 56](#).

## 2.4.1 Programming the Module With Multiple Images - UART

Programming the evaluation board with multiple images is used when you want to have previous or factory default versions of firmware binaries programmed onto the same board. For example, if a current build isn't working for your environment, you can revert back to a previous build.

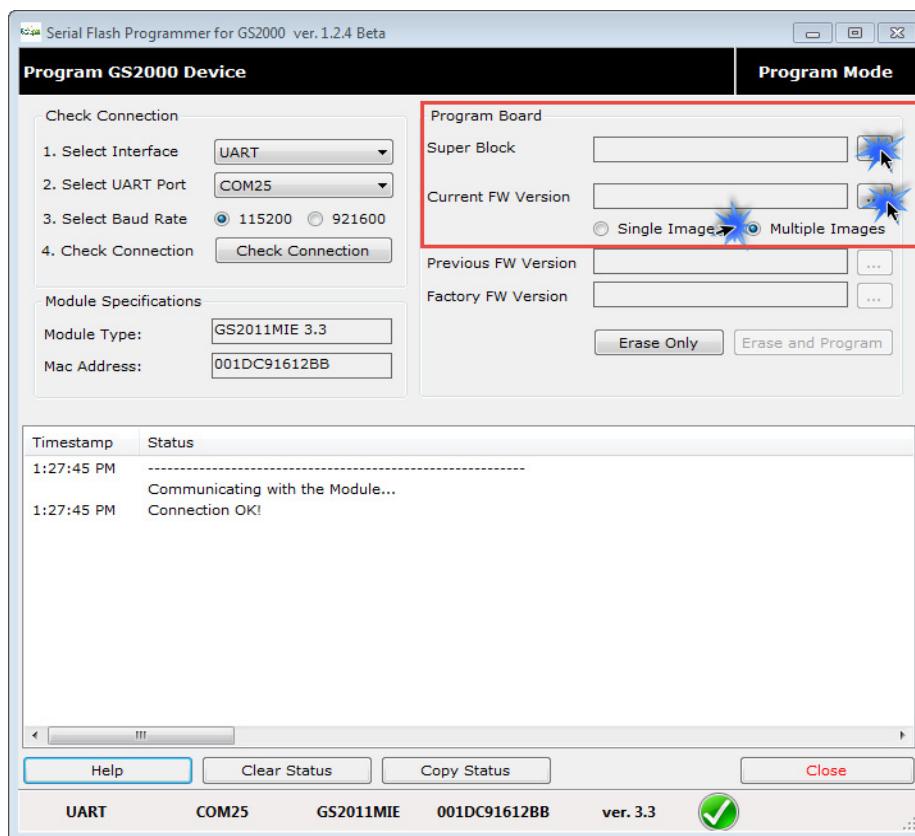
To program multiple images using UART interface, perform the following:

1. Follow the instructions for connecting to an Interface, UART port, Baud Rate, and Check Connection to communicate with the board (see [2.3 Programming the Evaluation Boards Using the GUI Application, page 28](#)).
2. Select the **Multiple Images** button, and select the Firmware and Binaries to program the board. Click the **Browse (...)** buttons next to the Super Block and Current FW Version to download (see [Figure 17, page 35](#) and [Figure 18, page 36](#)).



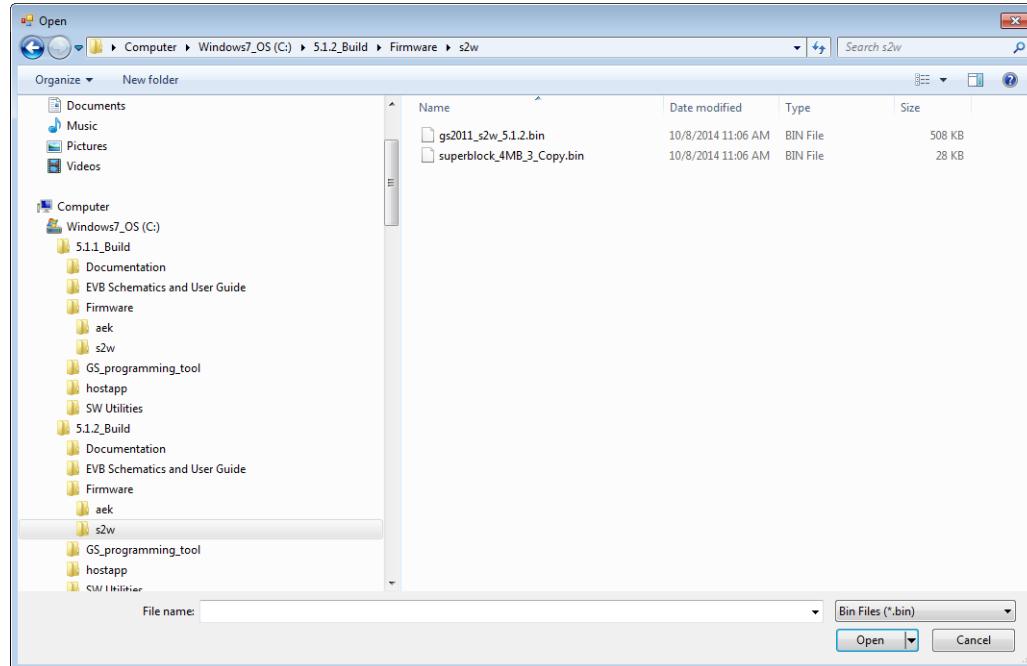
**NOTE:** The Super Block and Current FW Version should be the latest version when programming multiple images.

**Figure 17 Select Super Block and Firmware Multiple Image Binaries - (UART)**



3. Select the Super Block and Current FW Version to program the board (see [Figure 18, page 36](#)). For the Multiple Images, version 5.1.2 was selected.

**Figure 18 Selecting Super Block and Current Firmware Version - (UART)**



4. Once selected a message will display indicating that a valid Super Block and Firmware Image have been selected.
5. Select the **Previous FW Version** and/or **Factory FW Version**. Click the **Browse (...)** button next to the **Previous FW Version** and/or **Factory FW Version**. For the previous and factory firmware versions, 5.1.1 was selected (see [Figure 19, page 37](#) and [Figure 20, page 38](#)).

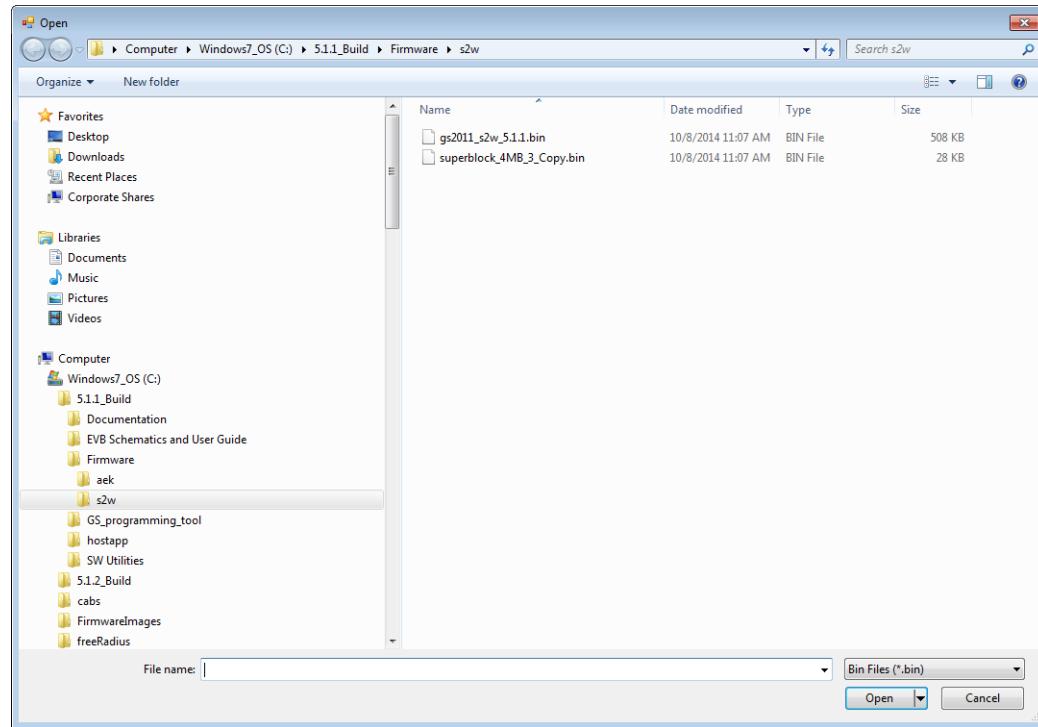
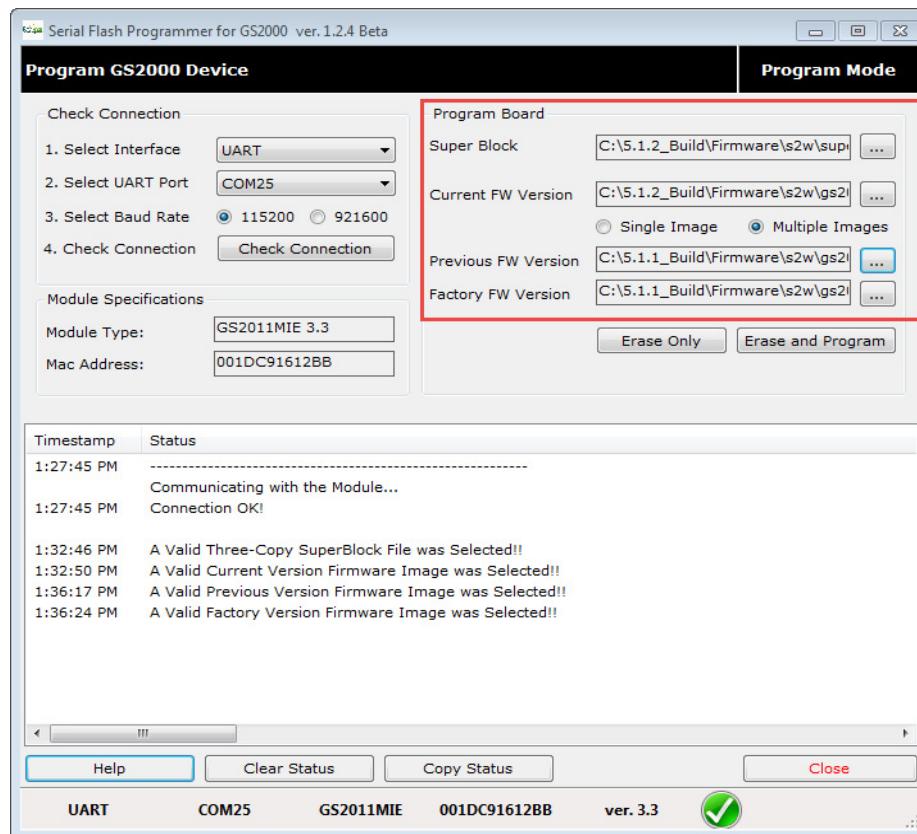
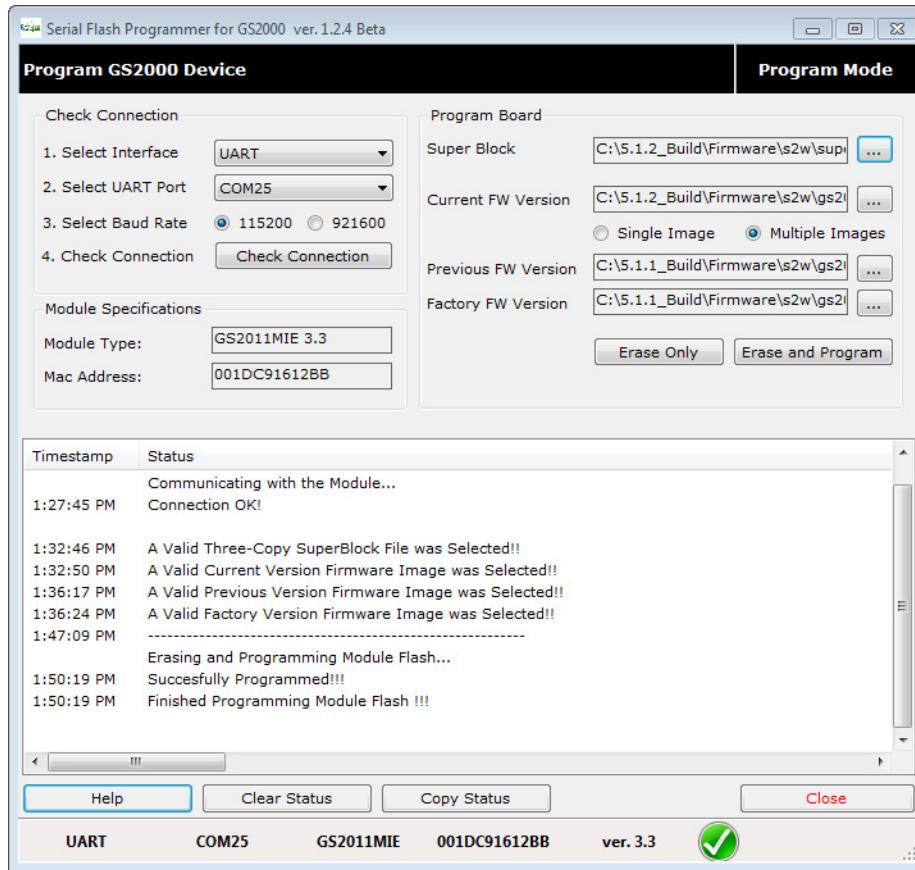
**Figure 19 Selecting Previous and Factory Firmware Versions - (UART)**

Figure 20 Valid Multiple Images Selected - (UART)



6. Click the **Erase and Program** button. The GUI software will go through a process of programming the module flash with the current firmware and binaries, and previous and factory versions for Multiple Images. When complete a **Green** check will display indicating the flash has been programmed successfully (see [Figure 21, page 39](#)).

**Figure 21 Programming Multiple Images Complete - (UART)**

**NOTE:** *The Erase Flash button will erase the entire flash on the module.*

- Click the **Close** button. Turn the ON/OFF switch to the **OFF** position. Turn the PROGRAM/RUN switch to the **RUN** position. Turn the ON/OFF switch back to the **ON** position.

The GS2011M or GS2100M is now ready to be verified. Refer to [Chapter 3 Associating and Verifying, page 73](#).

For instructions on how to program the module using the SPI interface, refer to [2.7 Programming the Module Using the SPI Interface, page 56](#).

## 2.4.2 Programming the Module Using 921600 Baud Rate - UART

To program the GS2000 module on the evaluation board using Baud Rate 921600, perform the following:

1. Turn the ON/OFF switch on the evaluation board to the **OFF** position.
2. Install a jumper on pin **J25** on the GS2011M (see [Figure 22, page 40](#)) evaluation board and pin **J13** on the GS2100M (see [Figure 23, page 41](#)) evaluation board and then power **ON** the board.

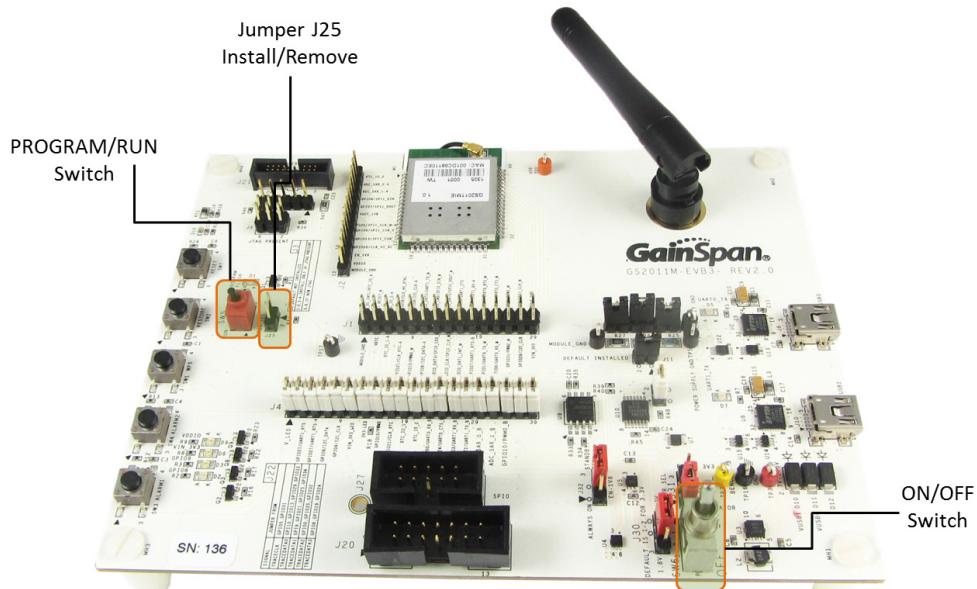


**NOTE:** Refer to the *GS2000 Based Module Evaluation Board Hardware User Guide* for a list of components, jumpers, switches, and LEDs.

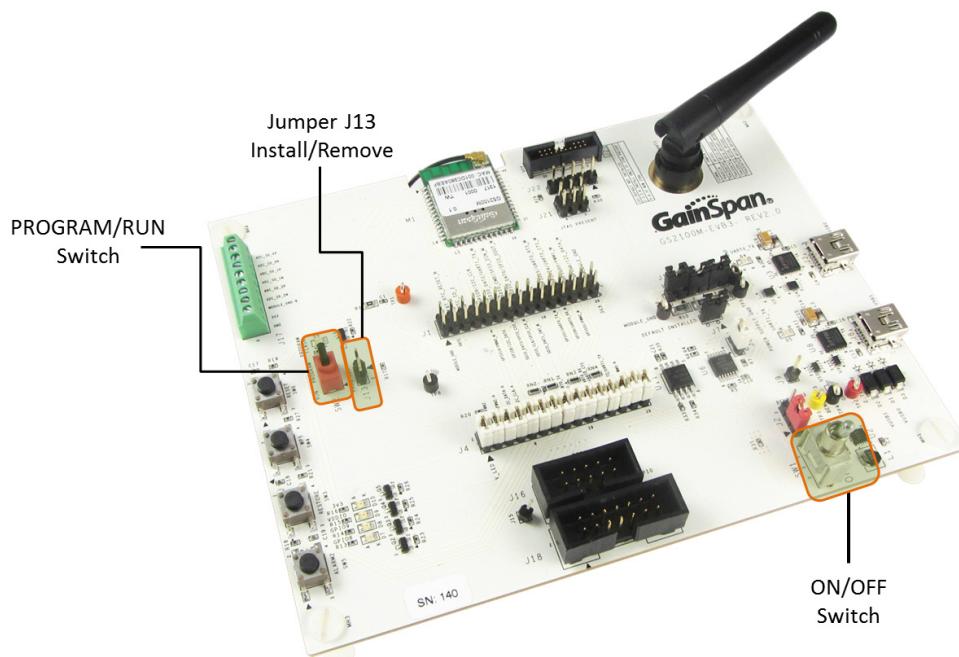


**NOTE:** GS2000 Evaluation Board versions may differ from the picture below.

**Figure 22 GS2011M Baud Rate Jumper Settings - (UART)**



**NOTE:** The Jumper does not need to be installed on the evaluation boards when programming the Flash using SPI Interface.

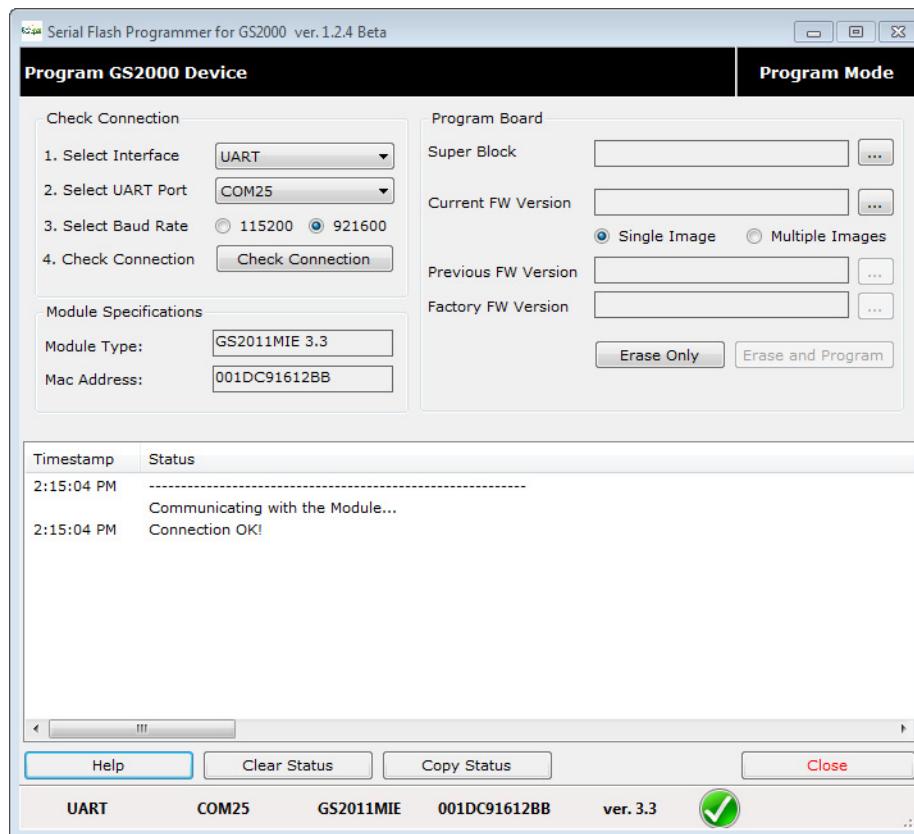
**Figure 23 GS2100M Baud Rate Jumper Settings - (UART)**

**NOTE:** The Jumper does not need to be installed on the evaluation boards when programming the Flash using SPI Interface.

---

3. Select the Baud Rate **921600** (see Figure 24, page 42).

**Figure 24 Selecting 921600 Baud Rate - (UART)**



4. Continue with programming the Flash for Single or Multiple Images. Refer to [2.4 Programming the Module Using the UART Interface, page 30](#) and [2.4.1 Programming the Module With Multiple Images - UART, page 35](#).
5. When complete, turn the ON/OFF switch on the evaluation board to the **OFF** position.
6. Remove the jumper on pin **J25** on the GS2011M evaluation board (see [Figure 22, page 40](#)) or pin **J13** on the GS2100M (see [Figure 23, page 41](#)) evaluation board.



**NOTE:** Refer to the *GS2000 Based Module Evaluation Board Hardware User Guide* for a list of components, jumpers, switches, and LEDs.



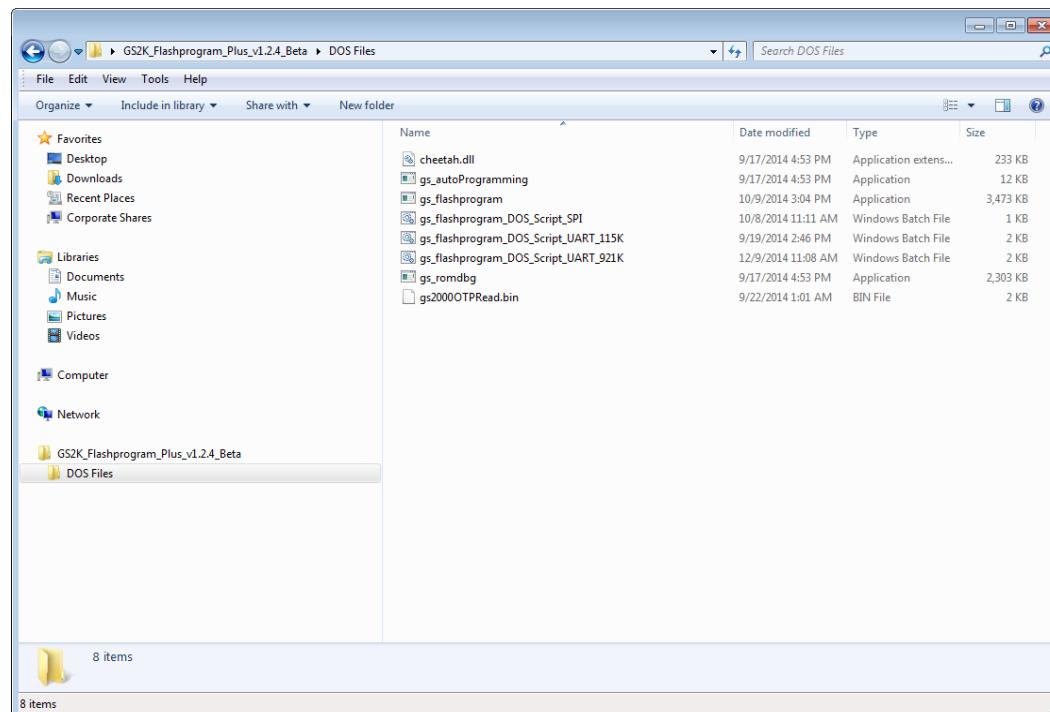
**NOTE:** The board will not run if these jumpers are installed with the PROGRAM switch in RUN mode.

7. Turn the PROGRAM/RUN switch to the **RUN** position. Turn the ON/OFF switch to the **ON** position. The evaluation board is now ready to be verified as well as accept AT commands. Refer to [Chapter 3 Associating and Verifying, page 73](#).

## 2.5 Programming the Module Using DOS for UART Interface

The following instructions are used to program the flash on the GS2011M and GS2100M evaluation boards using the DOS procedure for UART interface using different Baud Rates (115200 or 921600). The **gs\_flashprogram\_DOS\_UART\_115K** and **9121K** scripts are located under the DOS folder (see [Figure 25, page 43](#)).

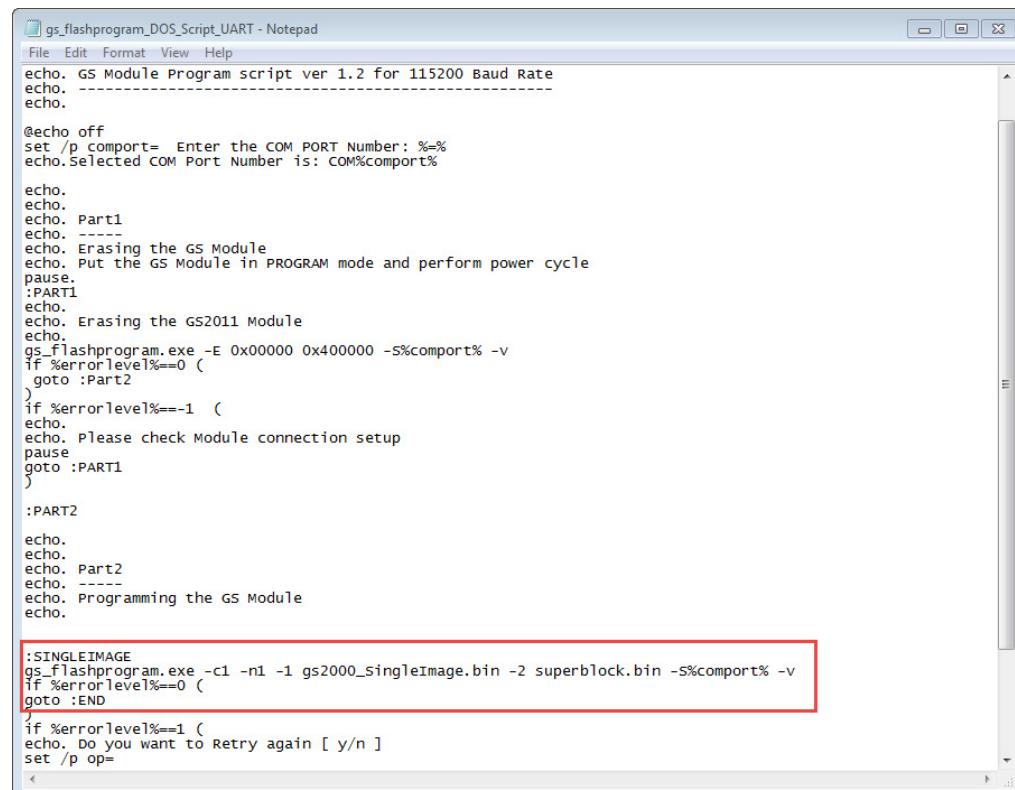
**Figure 25 GS\_Flashprogram DOS Script for 115200 or 921600 Baud Rate - (UART)**



## 2.5.1 Programming the Module Using DOS 115200 Baud Rate - UART

1. Select **gs\_flashprogram\_DOS\_Script\_UART\_115K** and right-mouse click on the batch file and select Edit. This will open the DOS script for UART 115K in a text editing tool like Notepad. Scroll down until you reach the **SINGLEIMAGE** script binary files (see Figure 26, page 44).

Figure 26 Edit gs\_flashprogram DOS Script for 115200 Baud Rate - (UART)



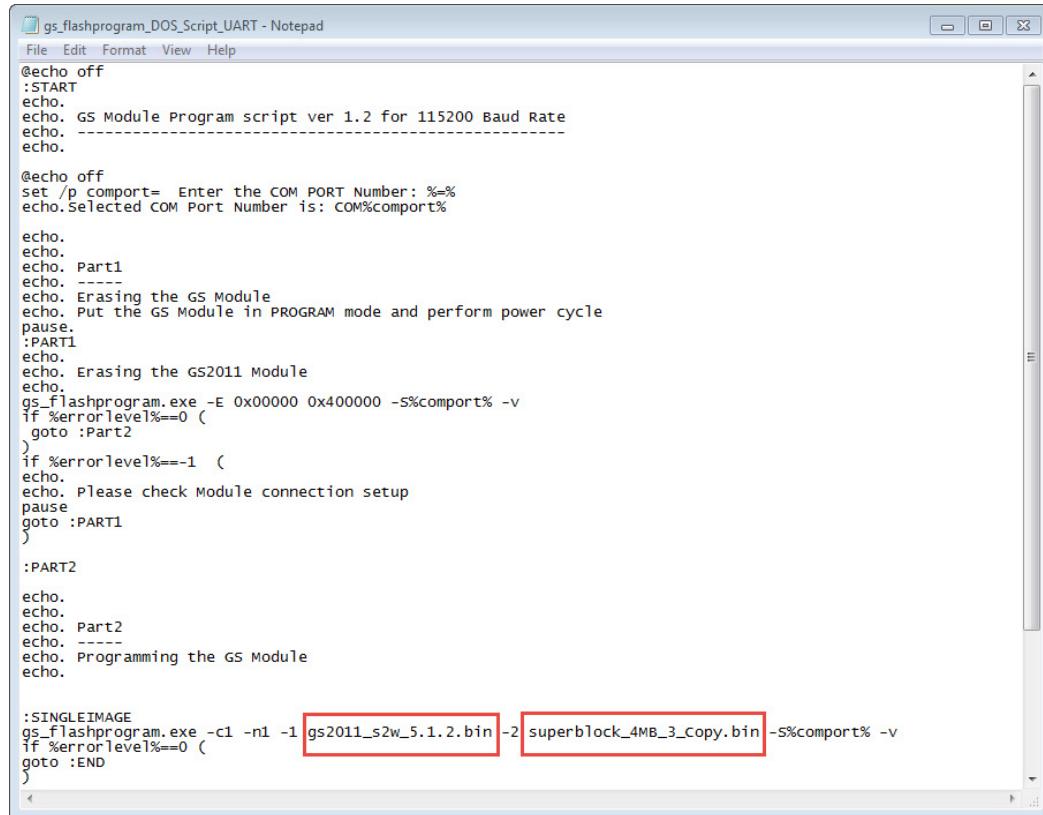
```
gs_flashprogram_DOS_Script_UART - Notepad
File Edit Format View Help
echo. GS Module Program script ver 1.2 for 115200 Baud Rate
echo. -----
echo.

@echo off
set /p comport= Enter the COM PORT Number: %=%
echo.Selected COM Port Number is: COM%comport%
echo.
echo.
echo. Part1
echo. -----
echo. Erasing the GS Module
echo. Put the GS Module in PROGRAM mode and perform power cycle
pause.
:PART1
echo.
echo. Erasing the GS2011 Module
echo.
gs_flashprogram.exe -E 0x00000 0x400000 -S%comport% -v
if %errorlevel%==0 (
    goto :Part2
)
if %errorlevel%==-1 (
    echo.
    echo. Please check Module connection setup
    pause
    goto :PART1
)
:PART2
echo.
echo.
echo. Part2
echo. -----
echo. Programming the GS Module
echo.

:SINGLEIMAGE
gs_flashprogram.exe -c1 -n1 -l gs2000_singleImage.bin -2 superblock.bin -S%comport% -v
goto :END
if %errorlevel%==1 (
    echo. Do you want to Retry again [ y/n ]
    set /p op=
)
```

2. Edit the binary file names (see [Figure 27, page 45](#)) to match the binary file names that were created in the build (see [Figure 7, page 25](#)) from the SDK Builder. For this example the names reflect the GS2011M.

**Figure 27 Edited GS2011M Binary File Names for 115200 Baud Rate - (UART)**



```
gs_flashprogram_DOS_Script_UART - Notepad
File Edit Format View Help
@echo off
:START
echo.
echo. GS Module Program script ver 1.2 for 115200 Baud Rate
echo. -----
echo.

@echo off
set /p comport= Enter the COM PORT Number: %=%
echo.Selected COM Port Number is: COM%comport%

echo.
echo. Part1
echo. -----
echo. Erasing the GS Module
echo. Put the GS Module in PROGRAM mode and perform power cycle
pause.
:PART1
echo.
echo. Erasing the GS2011 Module
echo.
gs_flashprogram.exe -E 0x00000 0x400000 -S%comport% -v
if %errorlevel%==0 (
    goto :part2
)
if %errorlevel%==-1 (
    echo.
    echo. Please check Module connection setup
    pause
    goto :PART1
)

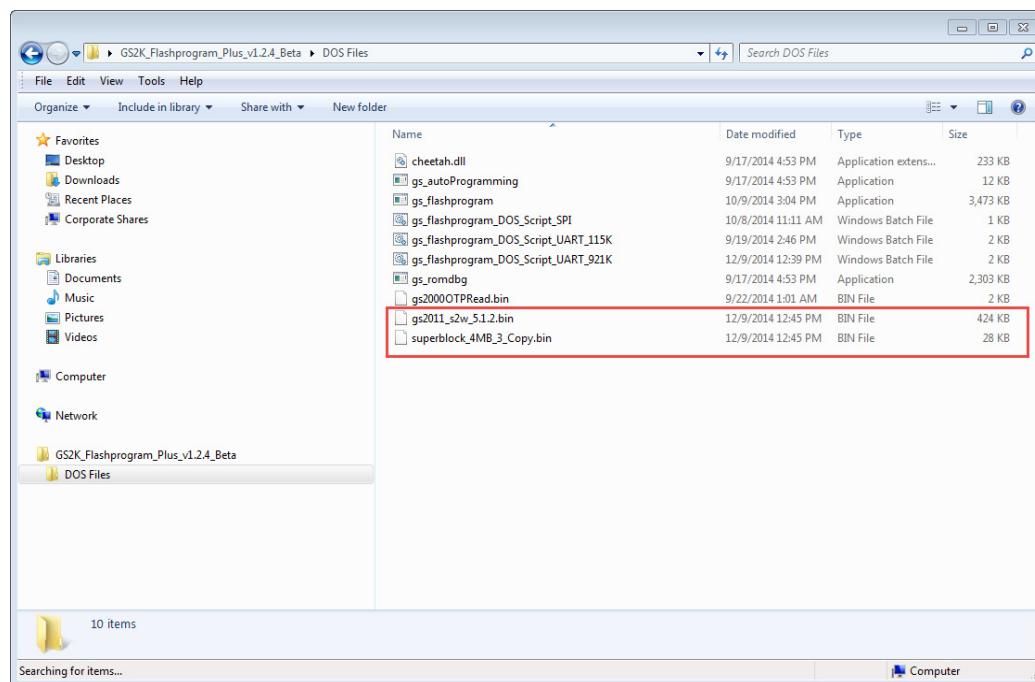
:PART2
echo.
echo. Part2
echo. -----
echo. Programming the GS Module
echo.

:SINGLEIMAGE
gs_flashprogram.exe -c1 -n1 -1 gs2011_s2w_5.1.2.bin -2 superblock_4MB_3_copy.bin -S%comport% -v
if %errorlevel%==0 (
    goto :END
)
```

3. Click the **Save** button. To verify that the DOS script file has been updated, reopen the DOS folder under the **gs2k\_Flashprogram\_Plus** folder and reopen in Notepad.

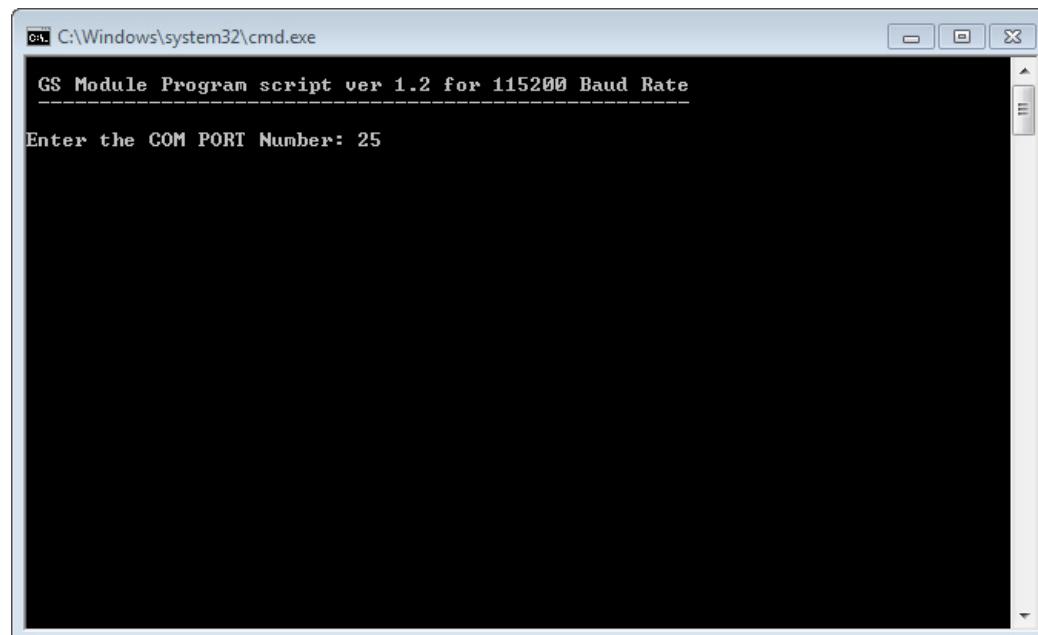
4. Copy the two binary files from the build created with the SDK Builder to the DOS folder (see [Figure 28, page 46](#)). Refer to [Figure 7, page 25](#) to for the binary files to be copied.

**Figure 28 Copy Super Block and Firmware Binary Files to DOS Folder for 115200 Baud Rate - (UART)**



5. To run the GainSpan flash program DOS version, click on the DOS script UART batch file.
6. The **GS Module Program Script** screen will display (see [Figure 29, page 47](#)). For running UART, enter the **COM** port number assigned to the module and press the **Enter** key.

**Figure 29 Running GS Module Program DOS Script for 115200 Baud Rate - (UART)**



**NOTE:** Remove jumper on pin J25 on the GS2011M evaluation board and pin J13 on the GS2100M evaluation board when selecting 115200 Baud Rate for DOS programming.

7. Press any key to continue programming the flash for UART (see [Figure 30, page 48](#)). This will take several minutes.



**NOTE:** If the evaluation board was not in PROGRAM mode, the programming utility will indicate a timeout.

**Figure 30 Programming the Flash Using DOS for 115200 Baud Rate - (UART)**

```
C:\Windows\system32\cmd.exe

Erasing the GS2011 Module
Serial Port: \\.\COM25
Baud Rate: 115200
Using UART
Flash Check and Erase
address= 0x00000000
Size    = 0x00400000      (4194304)
Successfully Erased 0x00400000 bytes at address 0x00000000

Part2
-----
Programming the GS Module
Serial Port: \\.\COM25
Baud Rate: 115200
Using UART
Programming internal Flash with SuperBlock file superblock_4MB_3_Copy.bin

Flash base address :0x0
SRAM start address :0x0
Download chunk size:0x4000

chunk size:0x4000 BundleLength :0x3ec
-----
Done!
Programming internal Flash with Combined binary file gs2011_s2w_5.1.2.bin

Flash base address :0x10000
SRAM start address :0x0
Download chunk size:0x4000
-----
```

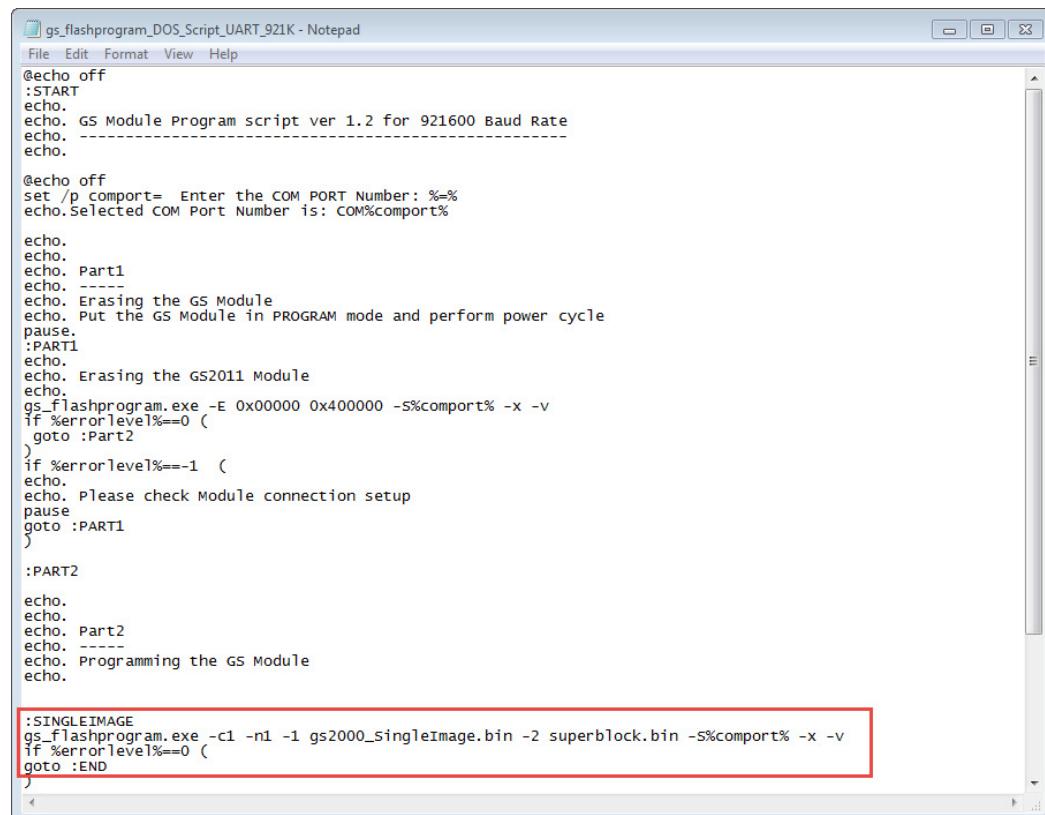
8. When complete, a message will display indicating the module is successfully programmed. Press any key to close the DOS programming screen. Turn the ON/OFF switch on the evaluation board to the **OFF** position.

Refer to [Chapter 3 Associating and Verifying, page 73](#) to verify that the evaluation board has been programmed.

## 2.5.2 Programming the Module Using DOS 921600 Baud Rate - UART

1. Select **gs\_flashprogram\_DOS\_Script\_UART\_921K** and right-mouse click on the batch file and select Edit. This will open the DOS script for UART 921K in a text editing tool like Notepad. Scroll down until you reach the **SINGLEIMAGE** script binary files (see Figure 31, page 49).

Figure 31 Edit gs\_flashprogram DOS Script for 921600 Baud Rate - (UART)



```
gs_flashprogram_DOS_Script_UART_921K - Notepad
File Edit Format View Help
@echo off
:START
echo.
echo. GS Module Program script ver 1.2 for 921600 Baud Rate
echo. -----
echo.

@echo off
set /p comport= Enter the COM PORT Number: %%=%
echo.Selected COM Port Number is: COM%comport%
echo.
echo.
echo. Part1
echo. -----
echo. Erasing the GS Module
echo. Put the GS Module in PROGRAM mode and perform power cycle
pause.
:PART1
echo.
echo. Erasing the GS2011 Module
echo.
gs_flashprogram.exe -E 0x00000 0x400000 -S%comport% -x -v
if %errorlevel%==0 (
    goto :Part2
)
if %errorlevel%==-1 (
    echo.
    echo. Please check Module connection setup
    pause
    goto :PART1
)

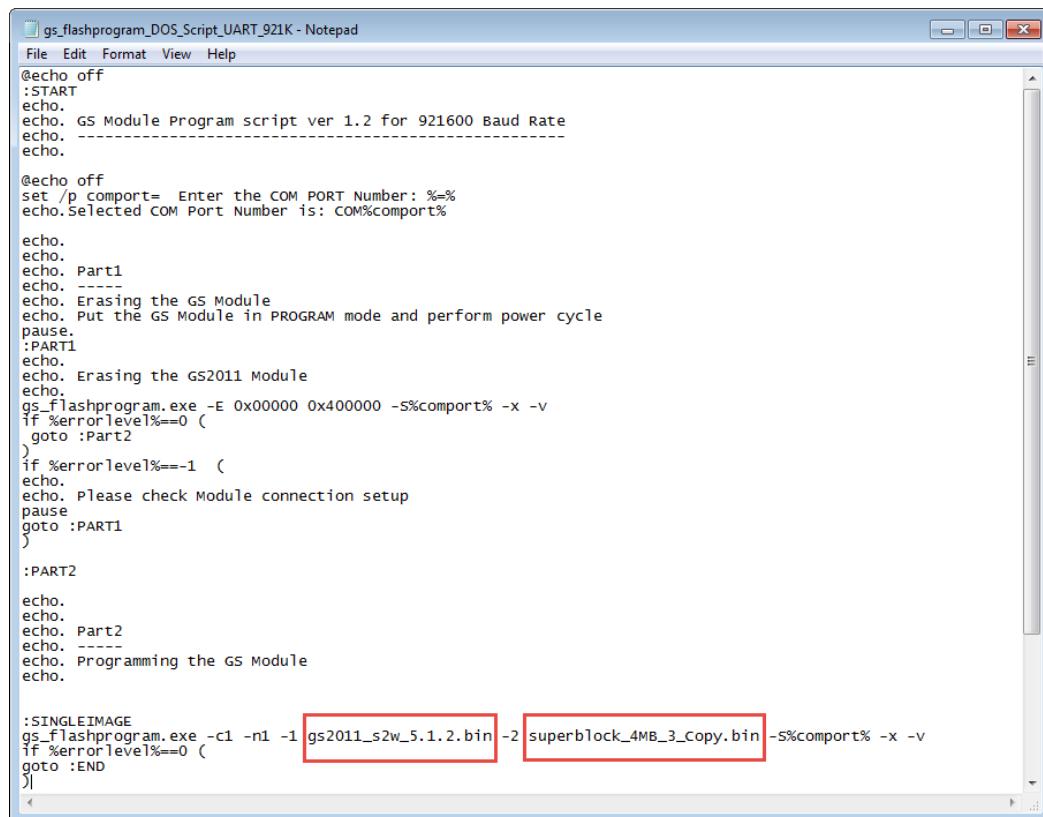
:PART2
echo.
echo.
echo. Part2
echo. -----
echo. Programming the GS Module
echo.

:SINGLEIMAGE
gs_flashprogram.exe -c1 -n1 -1 gs2000_singleimage.bin -2 superblock.bin -S%comport% -x -v
if %errorlevel%==0 (
    goto :END
)

```

2. Edit the binary file names (see [Figure 32, page 50](#)) to match the binary file names that were created in the build (see [Figure 7, page 25](#)) from the SDK Builder. For this example the names reflect the GS2011M.

**Figure 32 Edited GS2011M Binary File Names for 921600 Baud Rate - (UART)**



```
gs_flashprogram_DOS_Script_UART_921K - Notepad
File Edit Format View Help
@echo off
:START
echo.
echo. GS Module Program script ver 1.2 for 921600 Baud Rate
echo. -----
echo.

@echo off
set /p comport= Enter the COM PORT Number: %=%
echo.Selected COM Port Number is: COM%comport%

echo.
echo.
echo. Part1
echo. -----
echo. Erasing the GS Module
echo. Put the GS Module in PROGRAM mode and perform power cycle
pause.
:PART1
echo.
echo. Erasing the GS2011 Module
echo.
gs_flashprogram.exe -E 0x00000 0x400000 -S%comport% -x -v
if %errorlevel%==0 (
    goto :Part2
)
if %errorlevel%==-1 (
    echo.
    echo. Please check Module connection setup
    pause
    goto :PART1
)

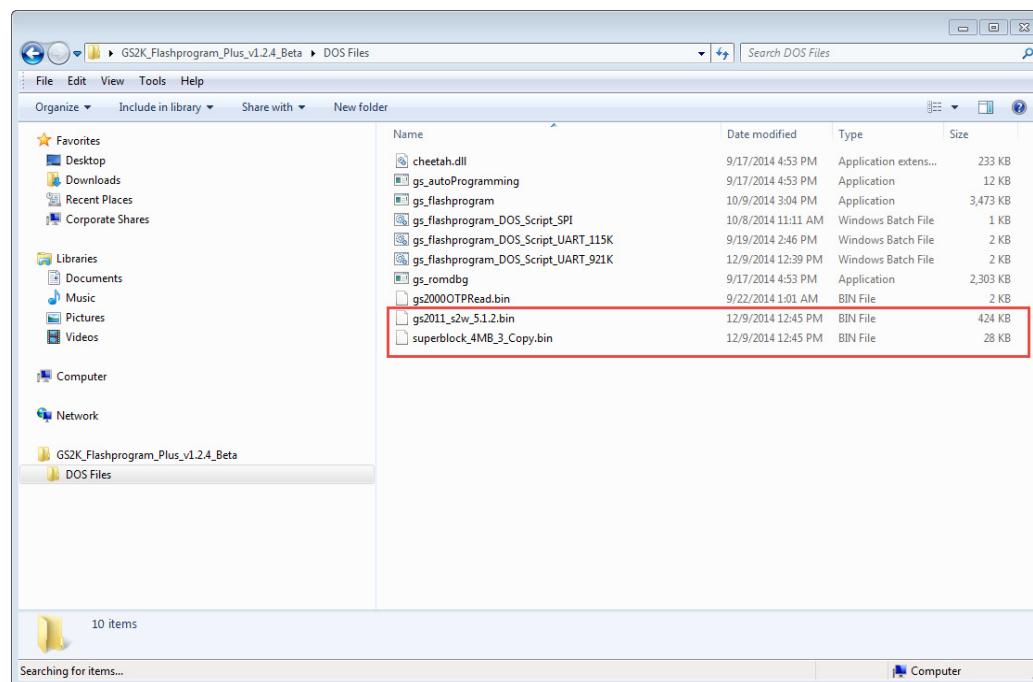
:PART2
echo.
echo.
echo. Part2
echo. -----
echo. Programming the GS Module
echo.

:SINGLEIMAGE
gs_flashprogram.exe -c1 -n1 -1 gs2011_s2w_5.1.2.bin -2 superblock_4MB_3_copy.bin -S%comport% -x -v
if %errorlevel%==0 (
    goto :END
)
|
```

3. Click the **Save** button. To verify that the DOS script file has been updated, reopen the DOS folder under the **gs2k\_Flashprogram\_Plus** folder and reopen in Notepad.

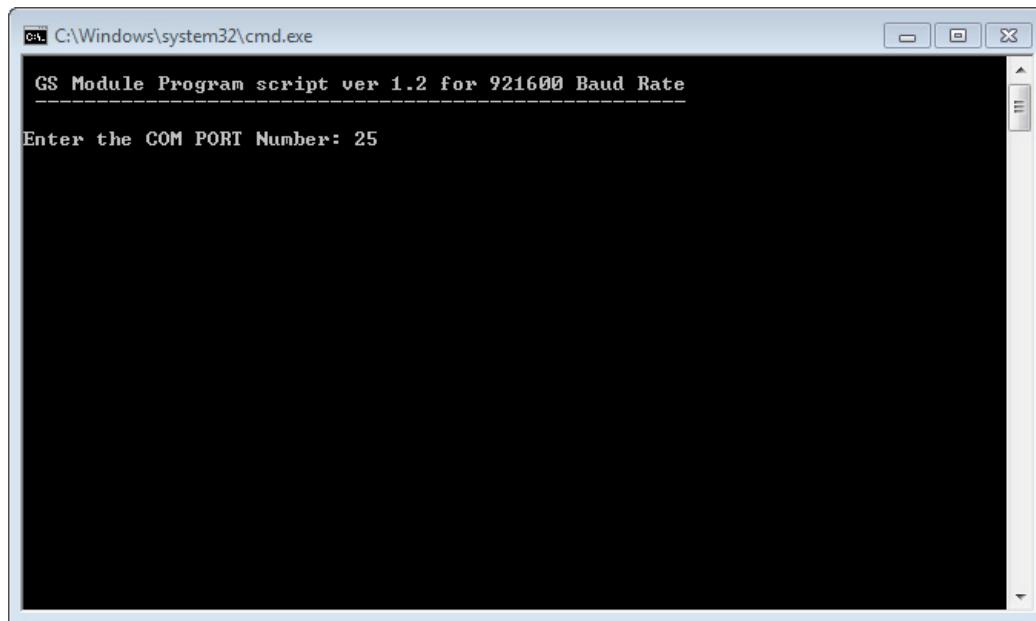
4. Copy the two binary files from the build created with the SDK Builder to the DOS folder (see [Figure 33, page 51](#)). Refer to [Figure 7, page 25](#) to for the binary files to be copied.

**Figure 33 Copy Super Block and Firmware Binary Files to DOS Folder for 921600 Baud Rate - (UART)**



5. To run the GainSpan flash program DOS version, click on the DOS script UART batch file.
6. The **GS Module Program Script** screen will display (see [Figure 34, page 52](#)). For running UART, enter the **COM** port number assigned to the module and press the **Enter** key.

**Figure 34 Running GS Module Program DOS Script for 921600 Baud Rate - (UART)**



**NOTE:** *Install a jumper on pin J25 on the GS2011M evaluation board and pin J13 on the GS2100M evaluation board when selecting 921600 Baud Rate for DOS programming.*

7. Press any key to continue programming the flash for UART (see [Figure 35, page 53](#)). This will take several minutes.



**NOTE:** *If the evaluation board was not in PROGRAM mode, the programming utility will indicate a timeout.*

**Figure 35 Programming the Flash Using DOS for 921600 Baud Rate - (UART)**

```
C:\Windows\system32\cmd.exe
GS Module Program script ver 1.2 for 921600 Baud Rate
-----
Enter the COM PORT Number: 25
Selected COM Port Number is: COM25

Part1
-----
Erasing the GS Module
Put the GS Module in PROGRAM mode and perform power cycle
Press any key to continue . . .

Erasing the GS2011 Module
Serial Port: \.\COM25
Baud Rate: 921600
Using UART
Connection to the Module OK!
Flash Check and Erase
address= 0x00000000
Size = 0x00400000      <4194304>
Successfully Erased 0x00400000 bytes at address 0x00000000

Part2
-----
Programming the GS Module
Serial Port: \.\COM25
Baud Rate: 921600
Using UART
Connection to the Module OK!
Programming internal Flash with SuperBlock file superblock_4MB_3_Copy.bin

Flash base address :0x0
SRAM start address :0x0
Download chunk size:0x4000
-----
Done!
Programming internal Flash with Combined binary file gs2011_s2w_5.1.2.bin
```

- When complete, a message will display indicating the module is successfully programmed. Press any key to close the DOS programming screen. Turn the ON/OFF switch on the evaluation board to the **OFF** position.

Refer to [Chapter 3 Associating and Verifying, page 73](#) to verify that the evaluation board has been programmed.

## 2.6 Preparing the Evaluation Boards for SPI Interface

### 2.6.1 GS2011M Evaluation Board



***ALERT!*** Make sure you unplug/plug the mini-USB cable from the USB0 port and the Cheetah SPI Host Adapter from the SPI0 connector with the ON/OFF switch in the OFF position.

The following steps will guide you through programming the GS2011M evaluation board with the Serial-to-WiFi binaries using the SPI Host Adapter:

1. Plug the mini-USB cable into the **USB0** port as shown in [Figure 36, page 54](#).
2. Plug the other end of the mini-USB cable into a **USB** port on your computer.
3. Plug the ribbon cable into the SPI0 connector on the GS2011M board (see [Figure 36, page 54](#)).
4. Plug the USB 2.0 cable into the Cheetah SPI Host Adapter and plug the other end into a **USB** port on your computer (see [Figure 36, page 54](#)).
5. Download the Cheetah SPI Host Adapter Device Drivers (see [1.2 Requirements, page 18](#)).
6. Turn the PROGRAM/RUN switch on the GS2011M to the **PROGRAM** position.
7. Turn the ON/OFF power switch on the GS2011M to the **ON** position. The Program Flash LED will be lit **RED**, indicating that the module is ready to be programmed.



***NOTE:*** Refer to the [GS2000 Based Module Evaluation Board Hardware User Guide](#) for a list of components, jumpers, switches, and LEDs.

**Figure 36** Setting Up the GS2011M Evaluation Board to Program Flash Using SPI



## 2.6.2 GS2100M Evaluation Board



***ALERT!*** Make sure you unplug/plug the mini-USB cable from the USB0 port and the Cheetah SPI Host Adapter from the SPI0 connector with the ON/OFF switch in the OFF position.

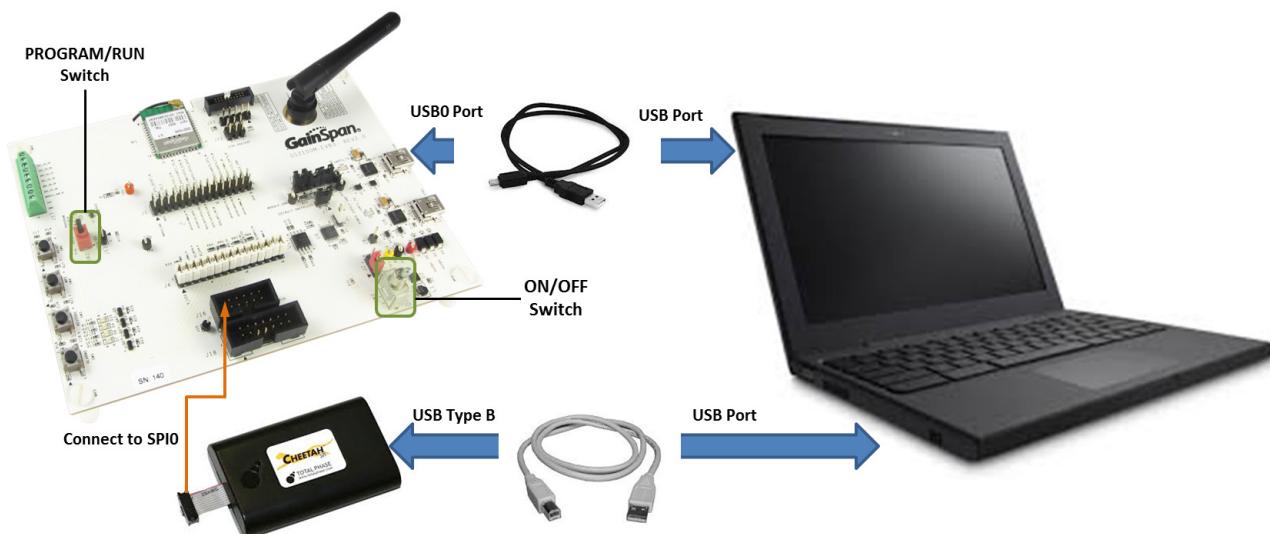
The following steps will guide you through programming the GS2100M evaluation board with the Serial-to-WiFi binaries using the SPI Host Adapter (see [1.2 Requirements, page 18](#)):

1. Plug the mini-USB cable into the **USB0** port as shown in [Figure 37, page 55](#).
2. Plug the other end of the mini-USB cable into a **USB** port on your computer.
3. Plug the ribbon cable into the SPI0 connector on the GS2100M board (see [Figure 37, page 55](#)).
4. Plug the USB 2.0 cable into the Cheetah SPI Host Adapter and plug the other end into a USB port on your computer (see [Figure 37, page 55](#)).
5. Download the Cheetah SPI Host Adapter Device Drivers (see [1.2 Requirements, page 18](#)).
6. Turn the PROGRAM/RUN switch on the GS2100M to the **PROGRAM** position.
7. Turn the ON/OFF power switch on the GS2100M to the **ON** position. The Program Flash LED will be lit **RED**, indicating that the module is ready to be programmed.



***NOTE:*** Refer to the [GS2000 Based Module Evaluation Board Hardware User Guide](#) for a list of components, jumpers, switches, and LEDs.

**Figure 37** Setting Up the GS2100M Evaluation Board to Program Flash Using SPI



## 2.7 Programming the Module Using the SPI Interface

For programming the GS2011M, GS2011MxxS, and GS2100M modules using SPI interface, perform the following:

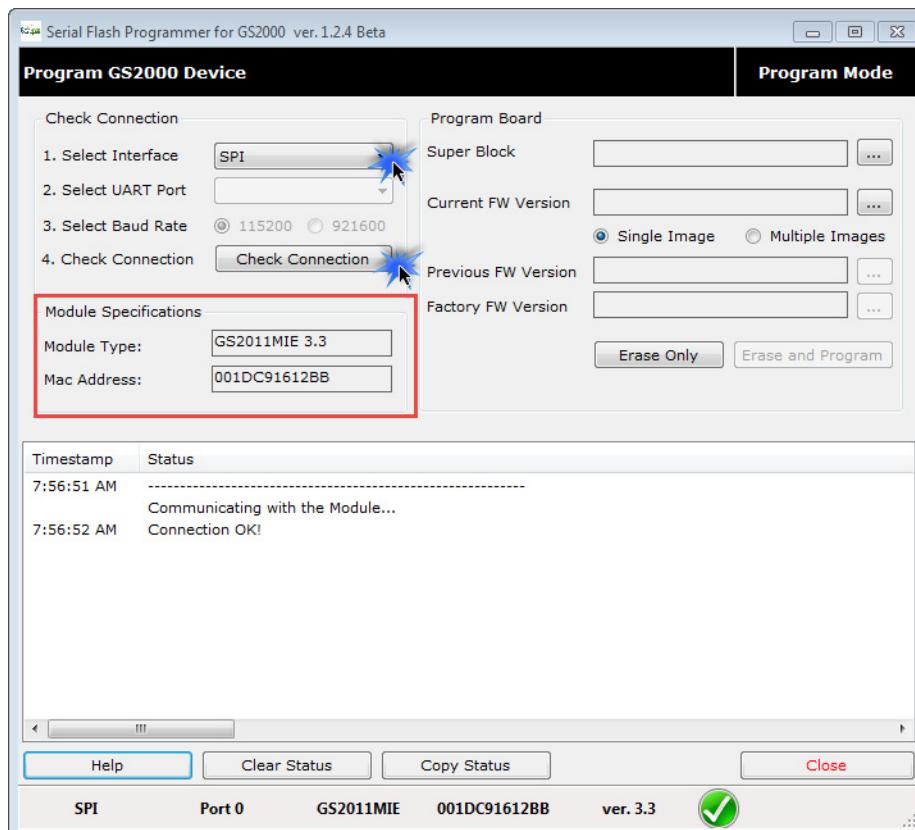
1. Follow the instructions in [2.3 Programming the Evaluation Boards Using the GUI Application, page 28](#) to start the **gs2k\_flashprogram** GUI application.
2. Select the **SPI** interface.



**NOTE:** When selecting SPI interface, the Port and Baud Rate will automatically be selected via the Cheetah SPI Host Adapter.

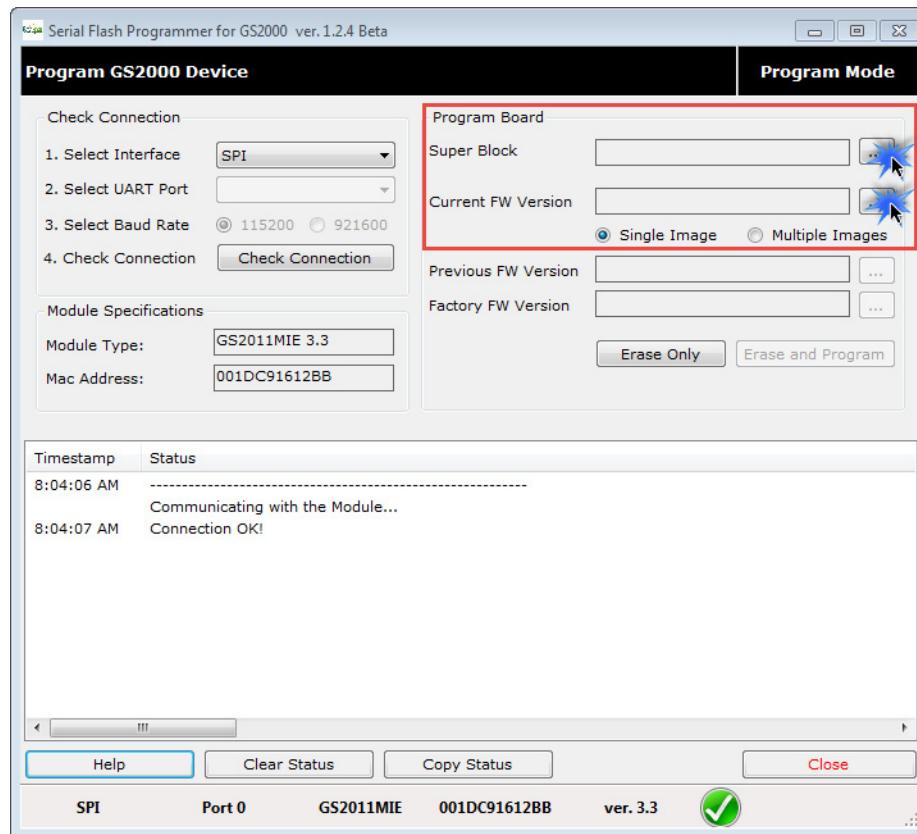
3. Click the **Check Connection** button. The software will communicate with the GS2011M or GS2100M evaluation board to check the connection and display the **Module Specifications** (Module Type and Mac Address of the module). A **Green** check will display at the bottom of the screen indicating the Connection and Communication with the board is successful (see [Figure 38, page 56](#)).

**Figure 38** Communicating with the GainSpan Module - (SPI)



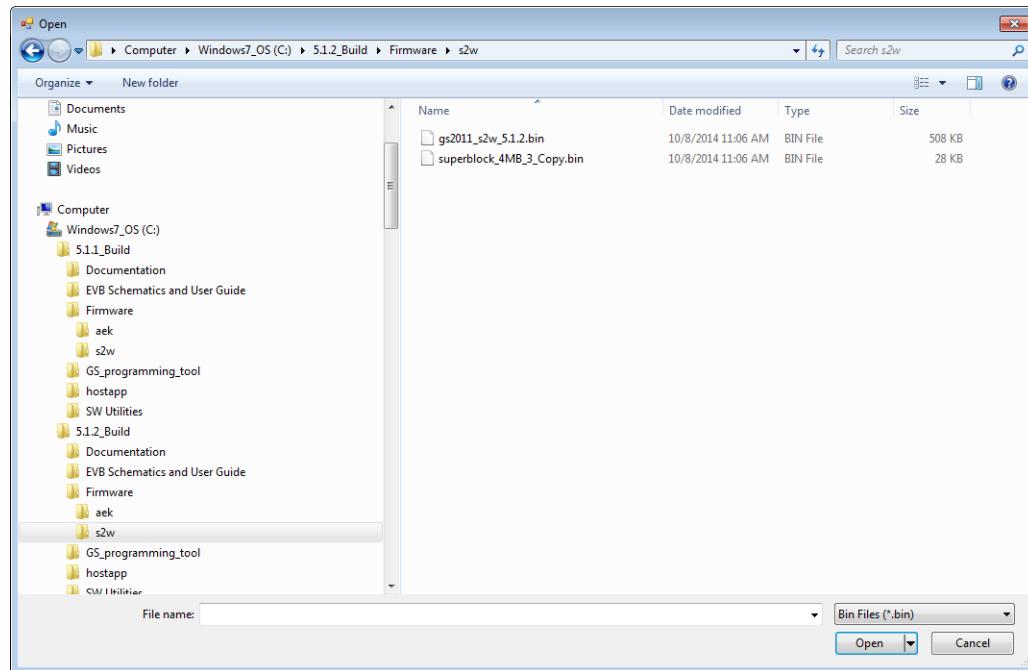
4. Select the Firmware and Binaries to program the board with a Single Image. Click the **Browse (...)** buttons next to the **Super Block** and **Current FW Version** to download (see [Figure 39, page 57](#)).

**Figure 39 Select Super Block and Firmware Single Image Binaries - (SPI)**



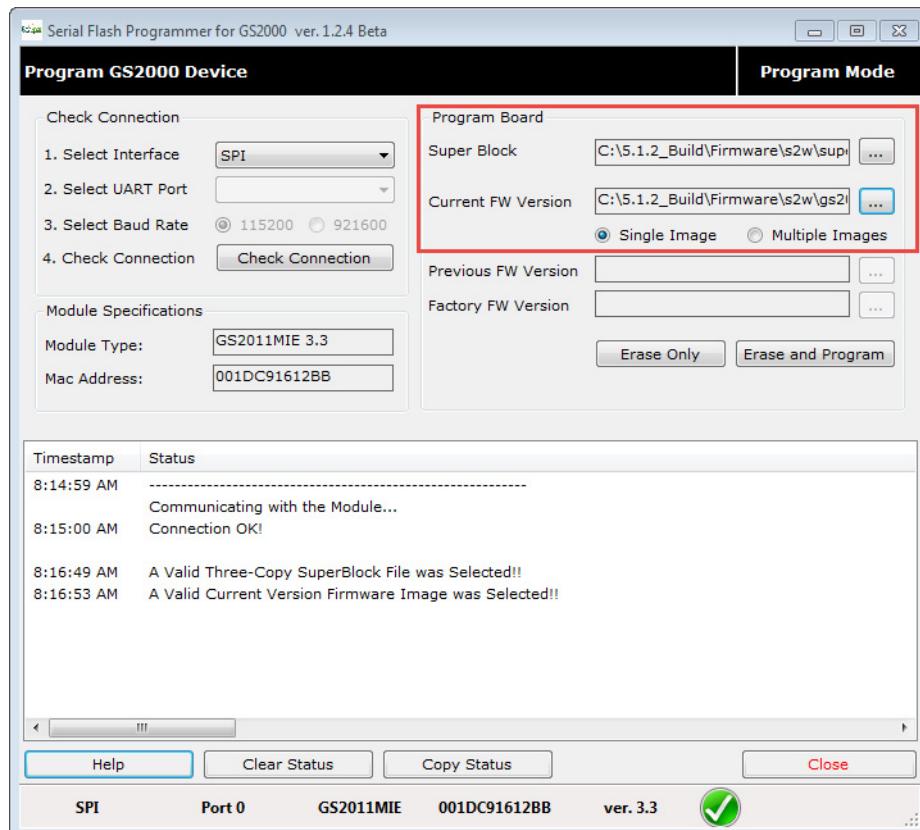
5. Select **Single Image** to program. This will program the module with a single firmware binary image. *This is the default and recommended method* (See Figure 40, page 58). For instructions on how to program the board with multiple images, refer to [2.7.1 Programming the Module With Multiple Images - SPI](#), page 61.

**Figure 40 Select Single Image Firmware - (SPI)**



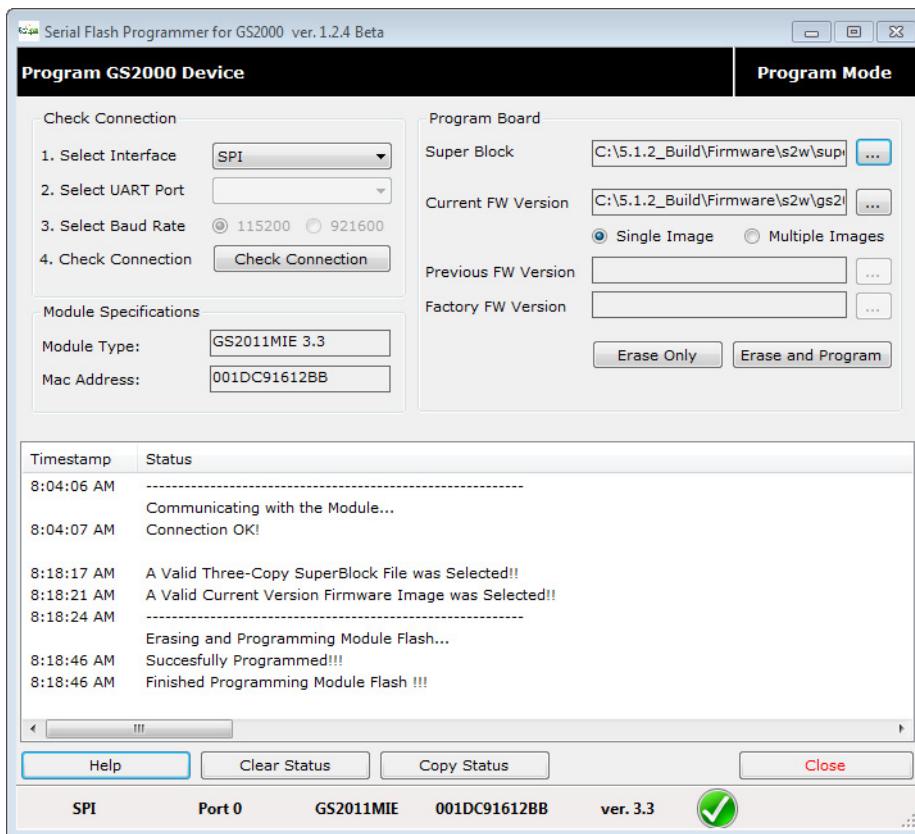
6. Once selected, a message will display indicating that a valid Super Block and Firmware Image have been selected (see Figure 41, page 59).

**Figure 41 Valid Super Block and Firmware Images Selected - (SPI)**



7. Click the **Erase and Program** button. The GUI software will go through a process of programming the module flash with the new firmware and binaries. When complete a Green check will display indicating the flash has been programmed successfully (see Figure 42, page 60).

**Figure 42 Programming Single Image Complete - (SPI)**



**NOTE:** *The Erase Flash button will erase the entire flash on the module.*

8. Click the **Close** button. Turn the ON/OFF switch to the **OFF** position. Turn the PROGRAM/RUN switch to the RUN position. Turn the ON/OFF switch back to the **ON** position.

The GS2011M or GS2100M is now ready to be verified. Refer to Chapter 3 Associating and Verifying, page 73.

To program the module flash using DOS for SPI, follow the instructions in 2.8 Programming the Module Using DOS for SPI Interface, page 66

## 2.7.1 Programming the Module With Multiple Images - SPI

Programming the evaluation board with multiple images is used when you want to have previous or factory default versions of firmware binaries programmed onto the same board. For example, if a current build isn't working for your environment, you can revert back to a previous build.

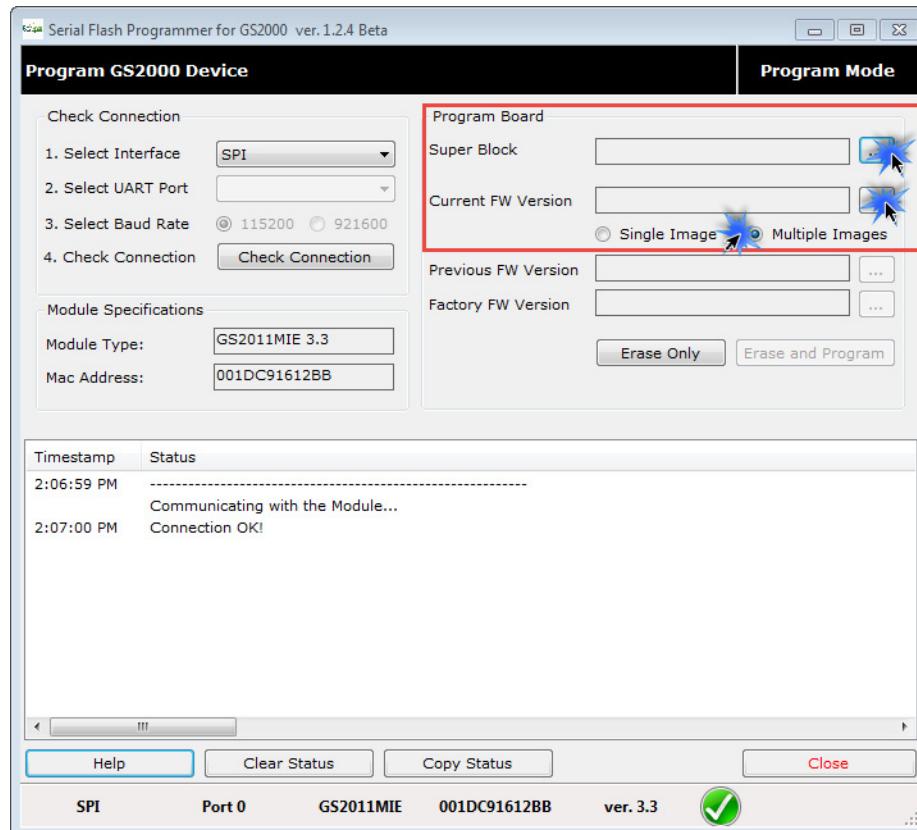
To program multiple images, perform the following:

1. Select SPI Interface.
2. Click the **Check Connection** button. The software will communicate with the GS2011M or GS2100M evaluation board to check the connection and display the **Module Specifications** (Module Type and Mac Address of the module). A **Green** check will display at the bottom of the screen indicating the Connection and Communication with the board is successful.
3. Select the **Multiple Images** button, and select the Firmware and Binaries to program the board. Click the **Browse (...)** buttons next to the Super Block and Current FW Version to download (see [Figure 43, page 61](#) and [Figure 44, page 62](#)).



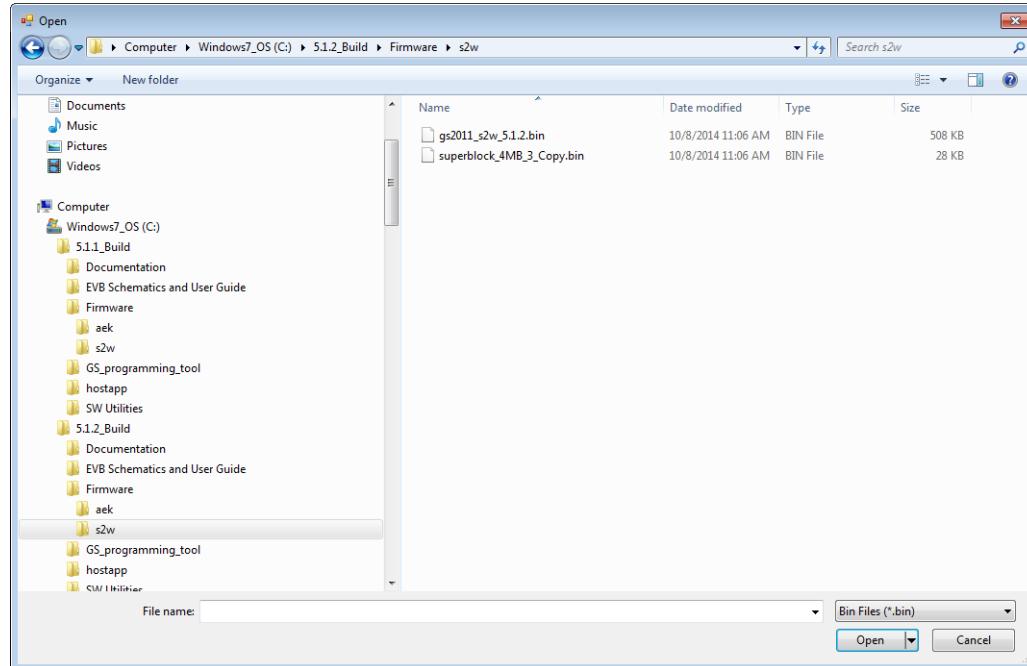
**NOTE:** The Super Block and Current FW Version should be the latest version when programming multiple images.

**Figure 43 Select Super Block and Firmware Multiple Image Binaries - (SPI)**



4. Select the **Super Block** and **Current FW Version** to program the board (see [Figure 44, page 62](#)). For the Multiple Images, version 5.1.2 was selected.

**Figure 44 Selecting Super Block and Current Firmware Version - (SPI)**



5. Once selected a message will display indicating that a valid Super Block and Firmware Image have been selected.
6. Select the **Previous FW Version** and/or **Factory FW Version**. Click the **Browse (...)** button next to the **Previous FW Version** and/or **Factory FW Version**. For the previous and factory firmware versions, 5.1.1 was selected (see [Figure 45, page 63](#) and [Figure 46, page 64](#)).

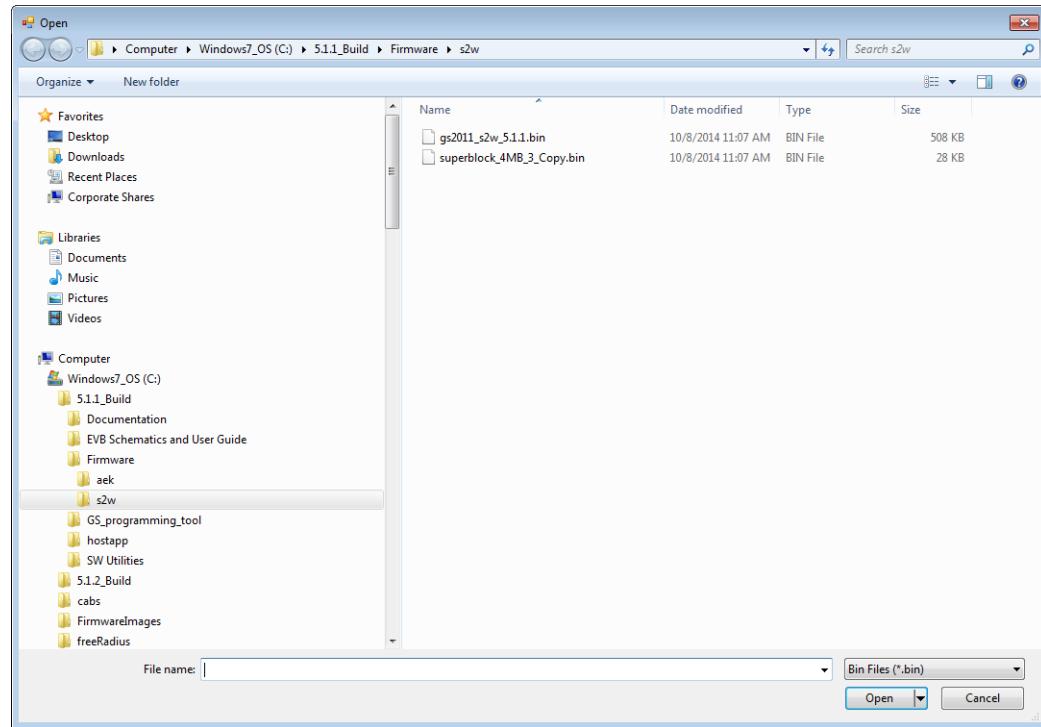
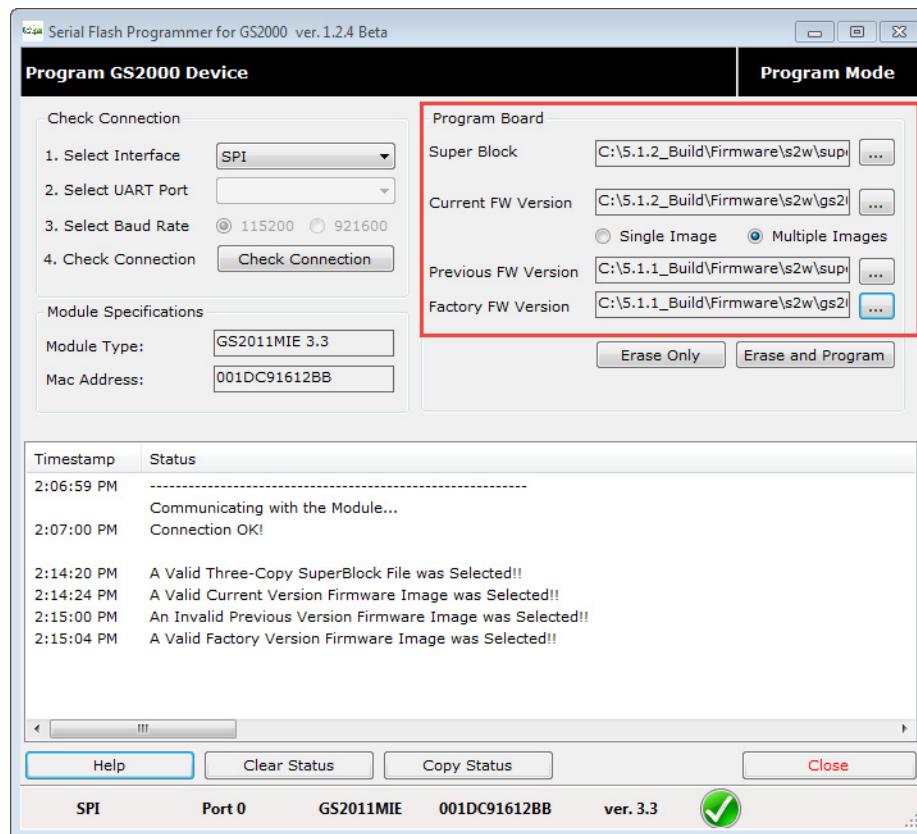
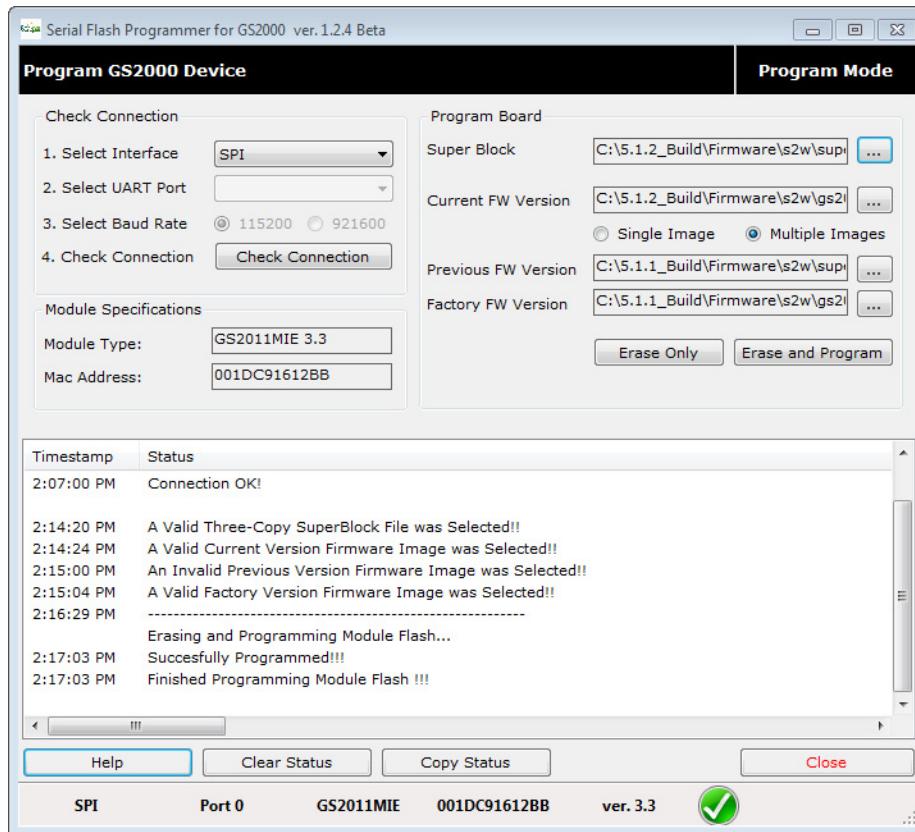
**Figure 45 Selecting Previous and Factory Firmware Versions - (SPI)**

Figure 46 Valid Multiple Images Selected - (SPI)



7. Click the **Erase and Program** button. The GUI software will go through a process of programming the module flash with the current firmware and binaries, and previous and factory versions for Multiple Images. When complete a **Green** check will display indicating the flash has been programmed successfully (see [Figure 47, page 65](#)).

**Figure 47 Programming Multiple Images Complete - (SPI)**

**NOTE:** The Erase Flash button will erase the entire flash on the module.

8. Click the **Close** button. Turn the ON/OFF switch to the **OFF** position. Turn the PROGRAM/RUN switch to the **RUN** position. Turn the ON/OFF switch back to the **ON** position.

The GS2011M or GS2100M is now ready to be verified. Refer to [Chapter 3 Associating and Verifying](#), page 73.

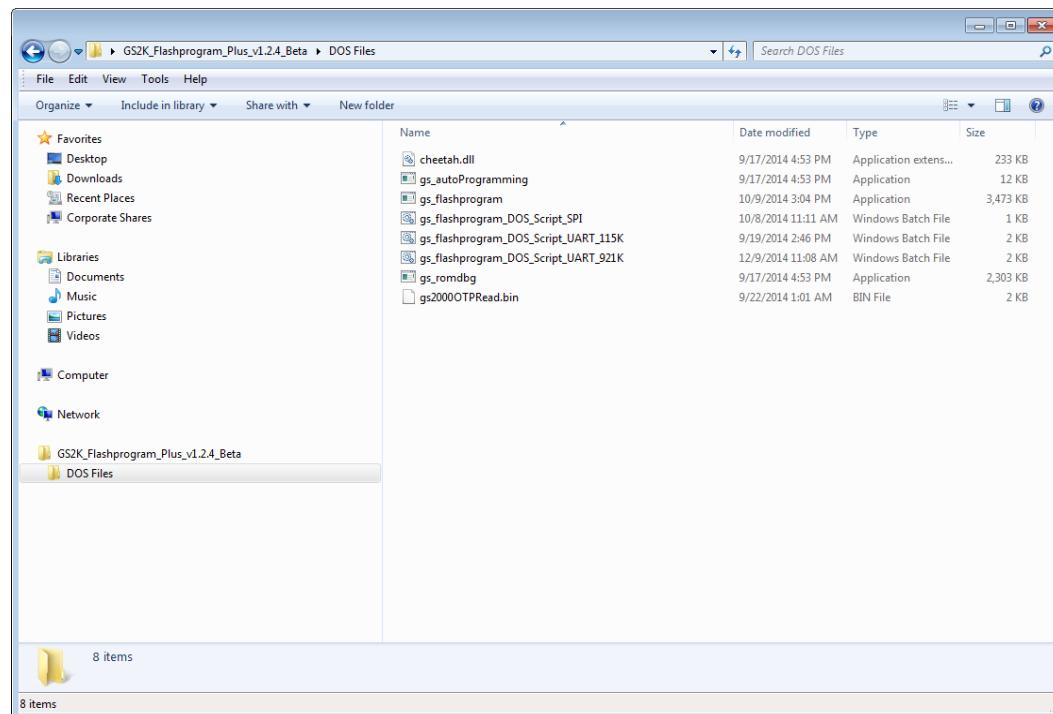
For instructions on how to program the module using the SPI interface, refer to [2.7 Programming the Module Using the SPI Interface](#), page 56.

## 2.8 Programming the Module Using DOS for SPI Interface

The following instructions are used to program the flash on the GS2011M and GS2100M evaluation boards using the DOS procedure for SPI interface.

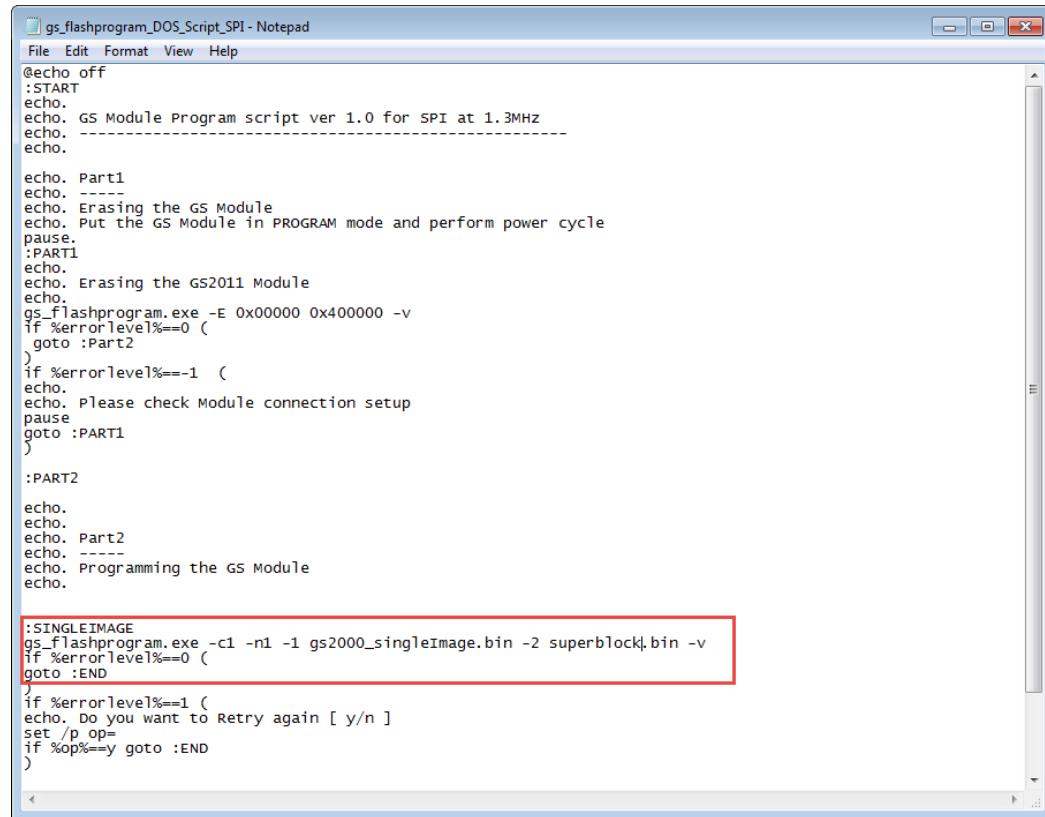
1. Locate the **SPI** script under the DOS folder (see [Figure 48, page 66](#)). The DOS folder is located under **gs2k\_flashprogram\_plus** directory.

**Figure 48 GS\_Flashprogram DOS Script - (SPI)**



2. Select **gs\_flashprogram\_DOS\_Script\_SPI** and right-mouse click on the batch file and select Edit. This will open the DOS script for SPI in a text editing tool like Notepad. Scroll down until you reach the **SINGLEIMAGE** script binary files (see Figure 49, page 67).

**Figure 49 Edit gs\_flashprogram DOS Script - (SPI)**



```
@echo off
:START
echo.
echo. GS Module Program script ver 1.0 for SPI at 1.3MHz
echo. -----
echo.

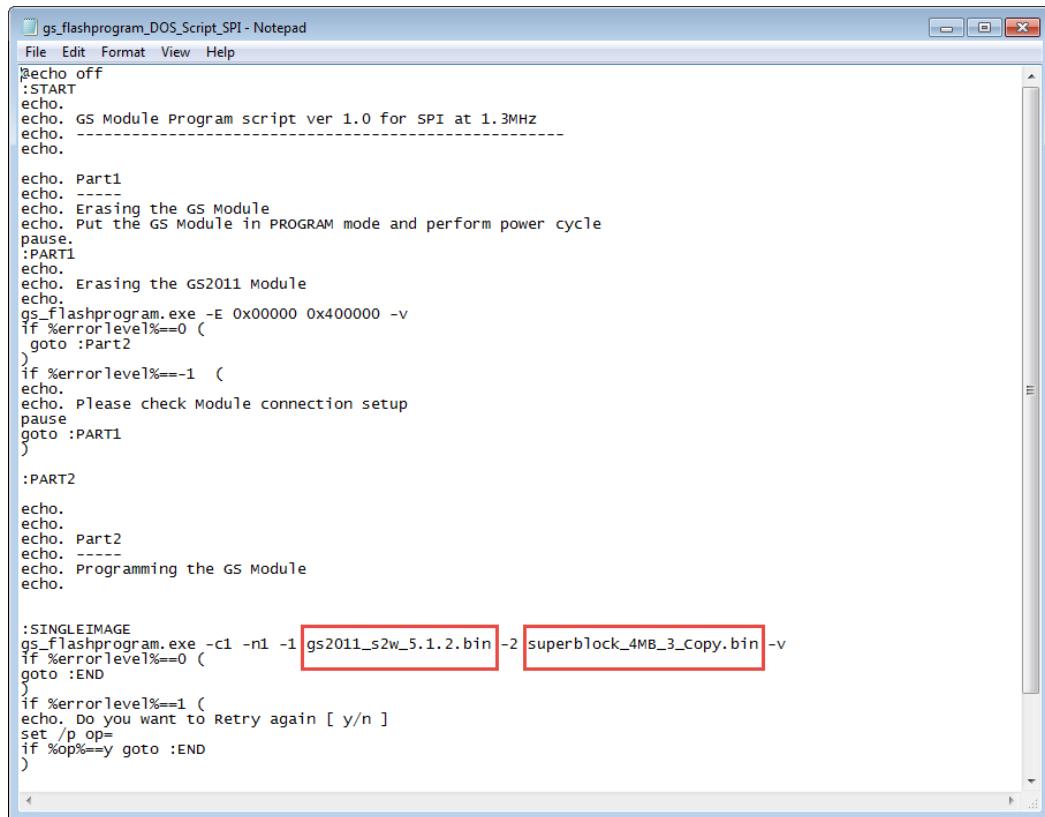
echo. Part1
echo. -----
echo. Erasing the GS Module
echo. Put the GS Module in PROGRAM mode and perform power cycle
pause
:PART1
echo.
echo. Erasing the GS2011 Module
echo.
gs_flashprogram.exe -E 0x00000 0x400000 -v
if %errorlevel%==0 (
    goto :Part2
)
if %errorlevel%==-1 (
    echo.
    echo. Please check Module connection setup
    pause
    goto :PART1
)

:PART2
echo.
echo.
echo. Part2
echo. -----
echo. Programming the GS Module
echo.

:SINGLEIMAGE
gs_flashprogram.exe -c1 -n1 -1 gs2000_singleImage.bin -2 superblock1.bin -v
if %errorlevel%==0 (
    goto :END
)
if %errorlevel%==1 (
    echo. Do you want to Retry again [ y/n ]
    set /p op=
    if %op%==y goto :END
)
```

3. Edit the binary file names (see [Figure 50, page 68](#)) to match the binary file names that were created in the build (see [Figure 7, page 25](#)) from the SDK Builder. For this example the names reflect the GS2011M.

**Figure 50 Edited GS2011M Binary File Names - (SPI)**



```
gs_flashprogram_DOS_Script_SPI - Notepad
File Edit Format View Help
@echo off
:START
echo.
echo. GS Module Program script ver 1.0 for SPI at 1.3MHz
echo. -----
echo.

echo. Part1
echo. -----
echo. Erasing the GS Module
echo. Put the GS Module in PROGRAM mode and perform power cycle
pause.
:PART1
echo.
echo. Erasing the GS2011 Module
echo.
gs_flashprogram.exe -E 0x00000 0x400000 -v
if %errorlevel%==0 (
    goto :Part2
)
if %errorlevel%==-1 (
    echo.
    echo. Please check Module connection setup
    pause
    goto :PART1
)

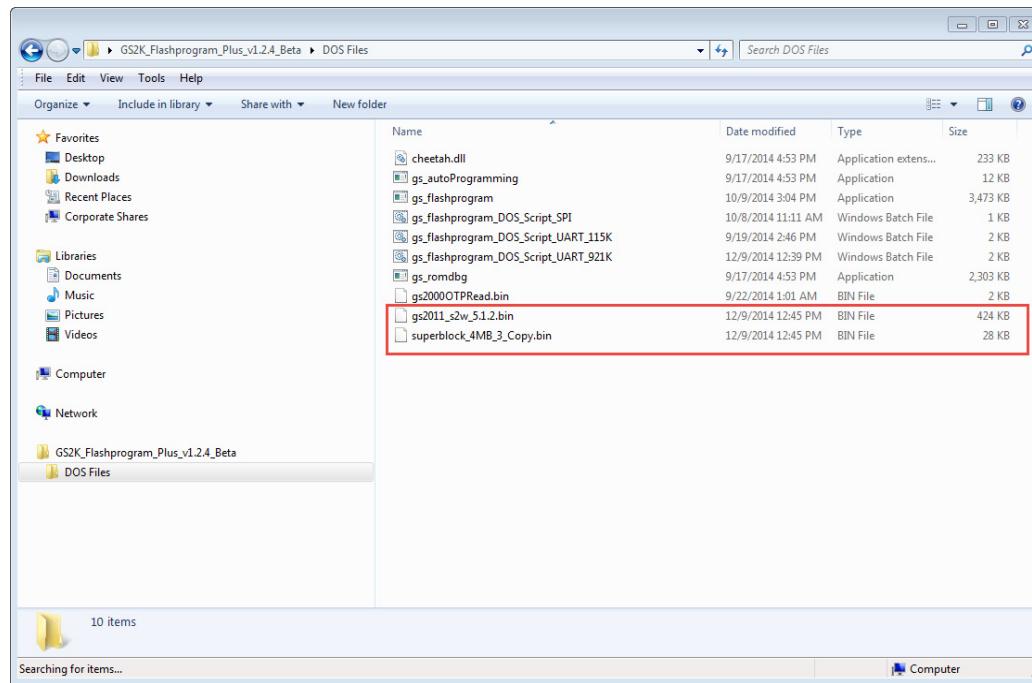
:PART2
echo.
echo.
echo. Part2
echo. -----
echo. Programming the GS Module
echo.

:SINGLEIMAGE
gs_flashprogram.exe -c1 -n1 -1 gs2011_s2w_5.1.2.bin -2 superblock_4MB_3_copy.bin -v
if %errorlevel%==0 (
    goto :END
)
if %errorlevel%==1 (
    echo. Do you want to Retry again [ y/n ]
    set /p op=
    if %op%==y goto :END
)
```

4. Click the **Save** button. To verify that the DOS script file has been updated, reopen the DOS folder under the **gs2k\_Flashprogram\_Plus** folder and reopen in Notepad.

5. Copy the two binary files from the build created with the SDK Builder to the DOS folder (see [Figure 51, page 69](#)). Refer to [Figure 7, page 25](#) to for the binary files to be copied.

**Figure 51 Copy Super Block and Firmware Binary Files to DOS Folder - (SPI)**



6. To run the GainSpan flash program DOS version, click on the DOS script SPI batch file.
7. The **GS Module Program Script** screen will display (see [Figure 52, page 70](#)). For running SPI, you do not need to enter a COM port number.



**NOTE:** *The Cheetah SPI Host Adapter must be connected to the GainSpan board when running the DOS GS Module Program Script for SPI.*

**Figure 52** Running GS Module Program Script for DOS - (SPI)

```
C:\Windows\system32\cmd.exe
GS Module Program script ver 1.0 for SPI at 1.3MHz
Part1
Erasing the GS Module
Put the GS Module in PROGRAM mode and perform power cycle
Press any key to continue . . .
```

8. Press any key to continue programming the flash for SPI (see [Figure 53, page 71](#)). This will take several minutes.



**NOTE:** *If the evaluation board was not in PROGRAM mode, the programming utility will indicate a timeout.*



**NOTE:** The Cheetah SPI Host Adapter must be connected to the GainSpan board when programming the Flash using DOS and SPI.

**Figure 53 Programming the Flash Using DOS - (SPI)**

```
C:\Windows\system32\cmd.exe
-----
Part1
-----
Erasing the GS Module
Put the GS Module in PROGRAM mode and perform power cycle
Press any key to continue . . .

Erasing the GS2011 Module

port: 0
Using SPI
Bitrate set to 1200 kHz
Flash Check and Erase
address= 0x00000000
Size = 0x00400000      <4194304>
Successfully Erased 0x00400000 bytes at address 0x00000000

Part2
-----
Programming the GS Module

port: 0
Using SPI
Bitrate set to 1200 kHz
Programming internal Flash with SuperBlock file superblock_4MB_3_Copy.bin

Flash base address :0x0
SRAM start address :0x0
Download chunk size:0x4000

chunk size:0x4000 BundleLength :0x3ec
-----
Done!
Programming internal Flash with Combined binary file gs2011_s2w_5.1.2.bin

Flash base address :0x10000
SRAM start address :0x0
Download chunk size:0x4000
```



**NOTE:** The default clock speed using SPI is 1.3MHz. You can change the clock speed in gs\_flashprogram tool Help screen by following the instructions.

9. When complete, a message will display indicating the module is successfully programmed.
10. Press any key to close the DOS programming screen. Turn the ON/OFF switch on the evaluation board to the OFF position.

Refer to [Chapter 3 Associating and Verifying, page 73](#) to verify that the evaluation board has been programmed.

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# Chapter 3 Associating and Verifying

This chapter provides instructions on associating a GainSpan® GS2000 based module evaluation board to a communication port using Tera Term VT terminal emulator.

- Connecting the Evaluation Board to a Serial COM Port, page 73

## 3.1 Connecting the Evaluation Board to a Serial COM Port

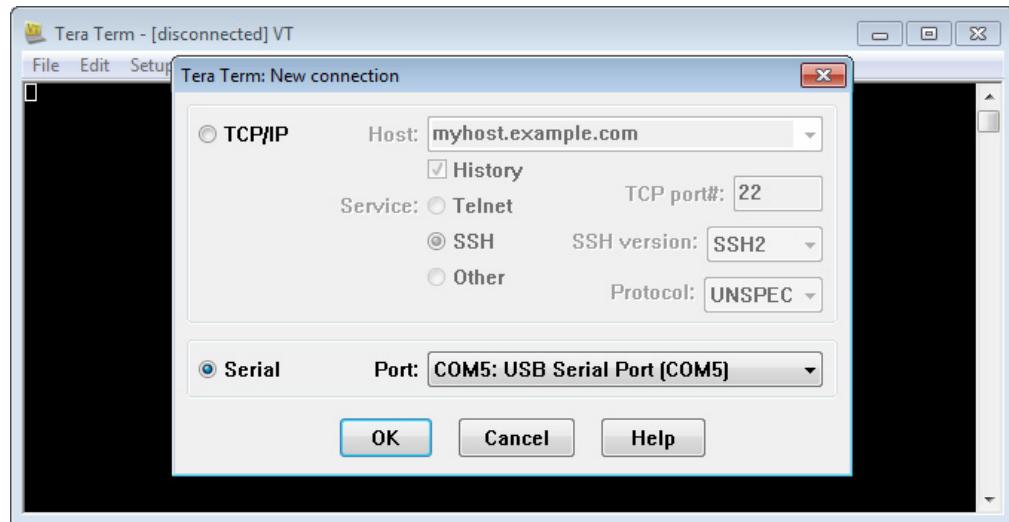
To set up the GS2000 based module evaluation board for Serial-to-WiFi or Temperature and Light Sensor application, perform the following:



**NOTE:** If selecting 921600 Baud Rate when programming the Flash, make sure that jumpers J25 (GS2011M) and J13 (GS2100M) are removed. The board will not run if these jumpers are installed with the PROGRAM switch in RUN mode.

1. Turn the PROGRAM/RUN switch to the **RUN** position.
2. Open the Tera Term VT application from your desktop and select the serial port (COM port) that was assigned to the evaluation board (see [Figure 54, page 73](#)).

**Figure 54** Connect the Evaluation Board to a Serial Port (COM Port)



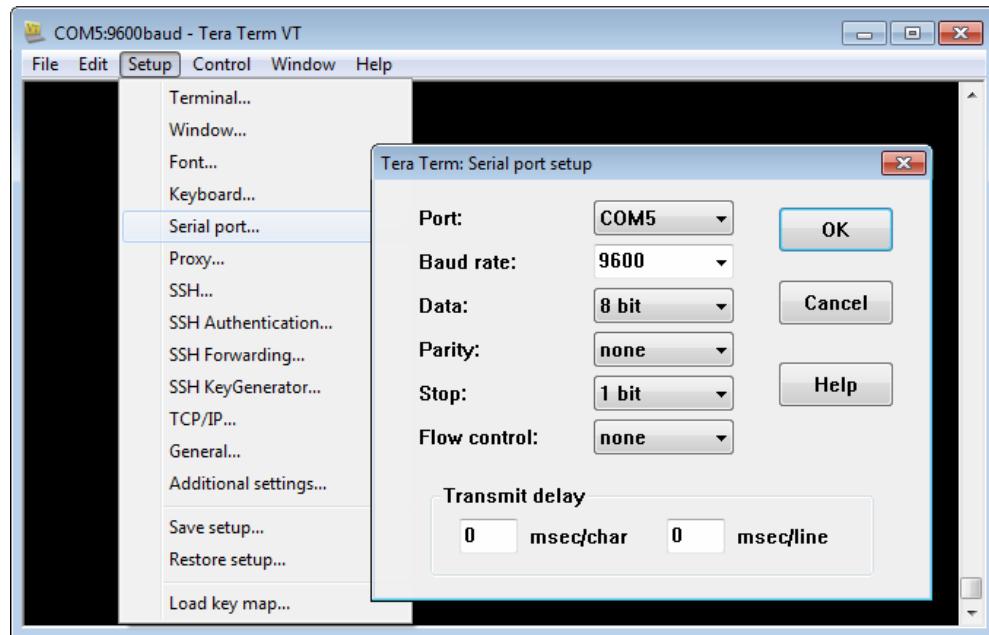
**NOTE:** The Tera Term VT software application is included with the EVK and SDK package.



**NOTE:** The Serial Port (COM) should match the port identified.

3. Select the Serial Port (COM) settings for Serial-to-WiFi (see Figure 55, page 74).

**Figure 55** Select the Serial Port (COM) Settings for S2W



The Serial Port (COM) settings for Serial-to-WiFi are as follows:

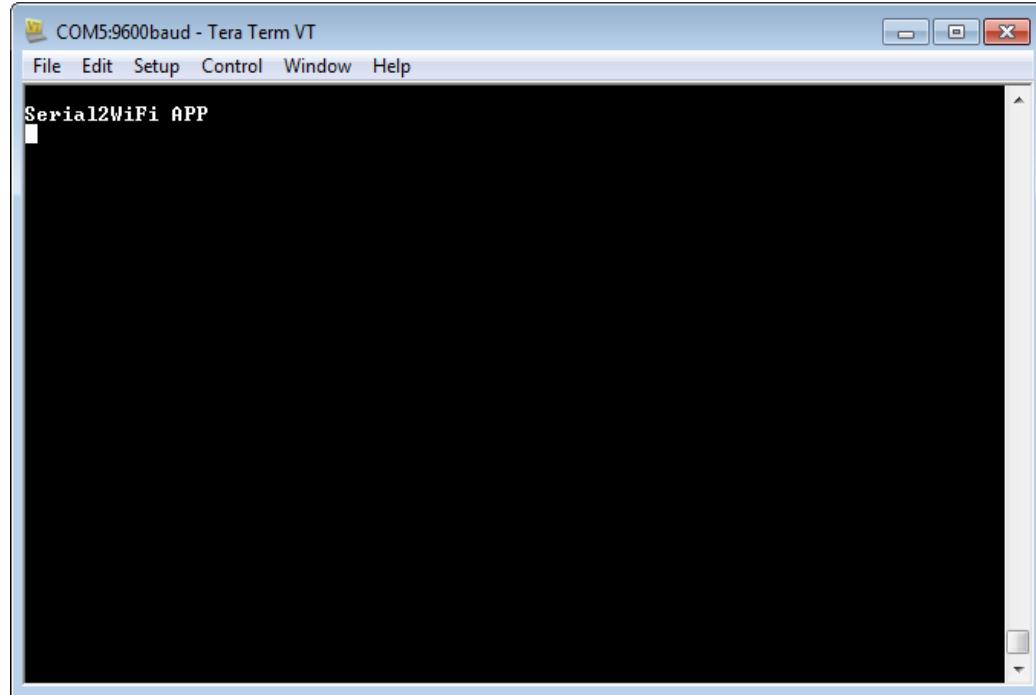
- Port: **COMx** (x is the number of the COM port)
- Baud Rate: **9600**
- Data: **8 bit**
- Parity: **none**
- Stop: **1 bit**
- Flow Control: **none**



**NOTE:** If the user builds firmware with a different default baud rate, then choose that baud rate in the above step.

4. Turn the ON/OFF switch on the evaluation board to the **ON** position. [Figure 56, page 75](#) shows the Tera Term VT window with the “Serial2WiFi APP” ready prompt.

**Figure 56 Serial-to-WiFi Application Ready Prompt**



5. Start the Serial-to-WiFi Application (see [Chapter 4 Starting the Serial-to-WiFi Application, page 77](#)).

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# Chapter 4 Starting the Serial-to-WiFi Application

This chapter provides instructions on how to start the Serial-to-WiFi (S2W) application and communicate with the evaluation board.

- Communicating with the Evaluation Board, page 77

## 4.1 Communicating with the Evaluation Board

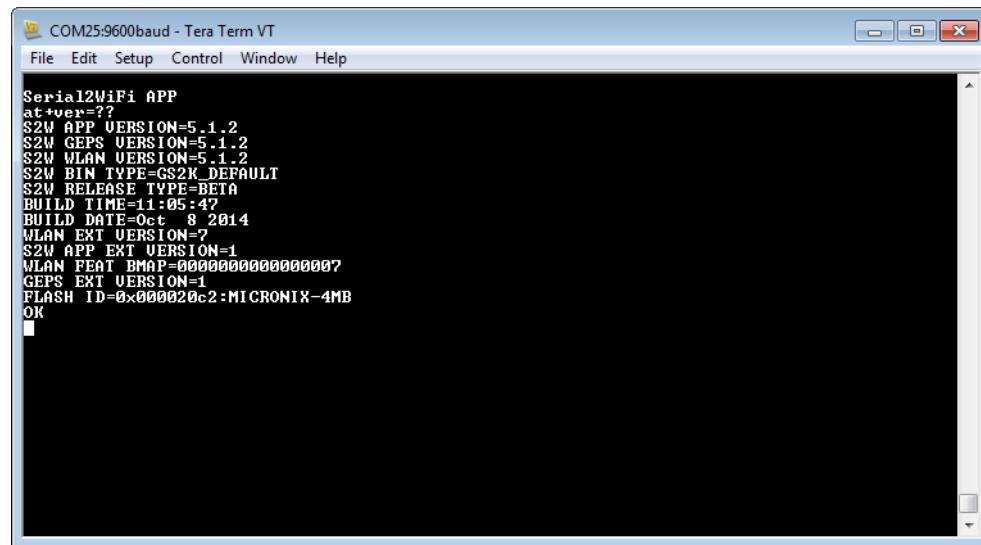
To start the Serial-to-WiFi application, perform the following:

1. In the Tera Term VT window enter the following command to verify the firmware version.

```
AT+VER=??
```

The evaluation board will respond back with Serial-to-WiFi firmware version information (see Figure 57, page 77).

**Figure 57 Serial-to-WiFi Firmware Information**



A screenshot of a Windows application window titled "COM25:9600baud - Tera Term VT". The menu bar includes File, Edit, Setup, Control, Window, and Help. The main window displays the following text output from the Serial2WiFi APP:

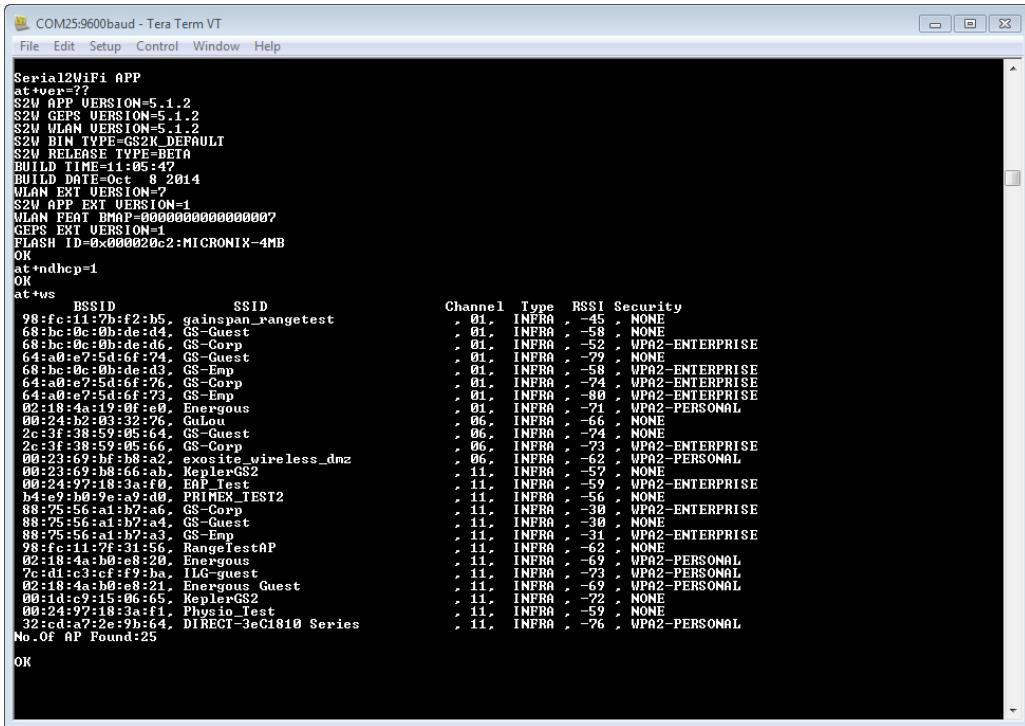
```
Serial2WiFi APP
at+ver=?
S2W APP VERSION=5.1.2
S2W GEPS VERSION=5.1.2
S2W WLAN VERSION=5.1.2
S2W BIN TYPE=GS2K DEFAULT
S2W RELEASE TYPE=BETA
BUILD TIME=11:05:47
BUILD DATE=Oct 8 2014
WLAN EXT VERSION=7
S2W APP EXT VERSION=1
WLAN FEAT BMAP=0000000000000000
GEPS EXT VERSION=1
FLASH ID=0x000020c2:MICRONIX-4MB
OK
```



**NOTE:** When modules are re-programmed on the evaluation board, the MAC ID will be erased. To update the MAC ID to match the number on the module label, issue the command AT+NMAC=<mac address>.

2. The evaluation board is now ready for additional Serial-to-WiFi commands to be issued. [Figure 58, page 78](#) shows a sample output of the evaluation board connected to an access point DHCP server.

**Figure 58 Receiving an IP Address from the Access Point DHCP Server**



```

COM2@9600baud - Tera Term VT
File Edit Setup Control Window Help

Serial2@WiFi APP
at+ver?
S2W APP VERSION=5.1.2
S2W GEPS VERSION=5.1.2
S2W WLAN VERSION=5.1.2
S2W BIN TYPE=GS2K_DEFAULT
S2W RELEASE TYPE=BETA
BUILD TIME=11:05:47
BUILD DATE=Oct 8 2014
WLAN EXT VERSION=?
S2W APP EXT VERSION=1
GSN FEAT IMM=00000000000000000000000000000000
GEPS EXT VERSION=0
FLASH ID=0x000020c2:MICRONIX-4MB
OK
at+dhcp=1
OK
at+ws
          BSSID           SSID
98:fc:11:b2:f2:b5, gainspan_rangetest
68:bc:0c:0b:de:d4, GS-Guest
68:bc:0c:0b:de:d6, GS-Corp
68:bc:0c:0d:a1:a4, GS-Guest
c9:1e:0e:0b:de:a2, GS-Guest
64:a0:e7:5d:6f:76, GS-Corp
64:a0:e7:5d:6f:73, GS-Emp
02:18:4a:19:0f:e0, Energous
00:24:b2:03:32:76, GuLoc
2c:3f:38:59:05:64, GS-Guest
2c:3f:38:59:05:66, GS-Corp
00:23:69:bf:bb:a2, exosite_wireless_dmz
00:23:69:bf:bb:66, KeylensGS2
00:23:69:bf:bb:67, KeylensGS2
h4:c9:10:9e:a9:d0, PRIMEX_TEST2
88:75:56:a1:b7:a5, GS-Corp
88:75:56:a1:b7:a4, GS-Guest
88:75:56:a1:b7:a3, GS-Emp
98:fc:11:7f:31:56, RangeTestAP
02:18:4a:b0:e8:28, Energous
7c:d1:c3:cff9:ba, ILG_guest
00:1d:c6:15:06:65, Repliengs2
00:24:97:08:a1:f1, Phylo_test
32:cd:a7:2e:9b:64, DIRECT-3eC1810 Series
No. Of AP Found=25
OK

```

For more information on how to setup the GS2000 based module evaluation board, refer to the *GainSpan Evaluation Board Quick Start Guide*.

For step-by-step procedures on how to evaluate S2W or TLS firmwares, refer to the following documents:

- *GainSpan GS2000 Based Module Sample Examples (for using Serial-to-WiFi AT Commands to Create TCP and UDP Connection)*
- *GainSpan GS2000 Based Module Configuration Examples (for using Serial-to-WiFi Commands to Create HTTP, HTTPS, and EAP Connections)*
- *Temperature and Light Sensor (TLS) Demo Application Note*