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# GS2000 Based Module Software Developer Kit (SDK) Builder

## User Guide

**GS2K-SDK-BLDR-UG-001223**

### ***Modules***

***GS2011M and GS2100M***

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

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# Table of Contents

Chapter 1 Using the SDK Builder .....	21
1.1 What Can the SDK Builder Do? .....	22
1.2 How the SDK Builder Works .....	25
1.3 Logging Into Your GainSpan Account .....	26
1.4 SDK Builder Welcome .....	31
1.5 Selecting SDK Builder Configuration .....	32
1.6 Building Packages .....	35
1.6.1 Building Default Evaluation Packages .....	35
1.6.1.1 EVK Package .....	35
1.6.1.2 AEK Package .....	35
1.6.2 Building New Packages .....	36
1.6.2.1 Custom Package .....	36
1.6.2.2 SDK Package .....	36
1.6.2.3 ADK Package .....	36
1.6.2.4 ADK Package (including SDK) .....	36
1.6.3 Re-Building Packages .....	37
1.7 Build Configuration Summary .....	37
1.8 Build History .....	41
1.8.1 Download Complete .....	42
1.9 About Tool .....	44
1.10 Release Notes .....	45
Chapter 2 Building Serial-to-WiFi Applications .....	47
2.1 Serial-to-WiFi Module Information .....	47
2.1.1 Host Interface .....	49
2.1.1.1 Serial Options .....	50
2.1.1.2 Host Connection Options .....	51
2.1.1.3 Host MCU .....	52
2.1.1.4 Host Stack/RTOS .....	52
2.1.2 Host Settings .....	53
2.1.3 802.11 WLAN .....	55
2.1.3.1 WiFi Settings .....	56
2.1.3.2 Common Configuration .....	56
2.1.3.3 802.11 WLAN WiFi Modes .....	58
2.1.4 802.15.4 WLRPAN .....	70
2.1.5 ZigBee IP Modes .....	71
2.1.6 Concurrent Modes .....	72
2.1.6.1 WiFi Station and WiFi (Limited) AP .....	73
2.1.6.2 WiFi Direct Concurrent Mode .....	73
2.1.6.3 WiFi Station and ZigBee IP Host .....	73
2.1.7 Networking Services .....	74
2.1.7.1 Core Network Services .....	74
2.1.7.2 IPv4 and IPv6 .....	75
2.1.7.3 Other Networking Services .....	81
2.1.8 Energy Measurement .....	84
2.1.9 Provisioning .....	85
2.1.9.1 WPS 2.0 Enrollee/Strict WPS 2.0 Compliance .....	86
2.1.9.2 WPS 2.0 Registrar .....	86

---

2.1.9.3 Wireless Provisioning/Provisioning Pages .....	87
2.1.9.4 Group Provisioning (For Android Devices) .....	89
2.1.9.5 WAC Provisioning (IOS) .....	91
2.1.10 Firmware Update .....	93
2.1.10.1 Firmware Update Method .....	94
2.1.10.2 Firmware Update Options .....	95
2.1.10.3 Firmware Update Interface .....	95
2.1.10.4 Digital Signature .....	95
2.1.11 Clock/Power Settings .....	96
2.1.11.1 Standby/RTC Clock .....	96
2.1.11.2 Standby to Wakeup Clock .....	97
2.1.11.3 Deep Sleep to Wakeup Clock .....	97
2.1.11.4 Input Power Turn-On Time .....	97
2.1.12 Memory Settings .....	98
2.1.13 Miscellaneous .....	99
2.1.14 Serial-to-WiFi Build Configuration Summary .....	101
<b>Chapter 3 Building IP-to-WiFi Applications .....</b>	<b>103</b>
3.1 IP-to-WiFi Module Information .....	103
3.1.1 IP-to-WiFi Hosted Overview .....	104
3.1.2 IP-to-WiFi Build Configuration Summary .....	105
<b>Chapter 4 Building Default and Custom Packages .....</b>	<b>107</b>
4.1 Building Custom TLS AEK Application .....	108
4.1.1 IoT/Cloud Connectivity .....	109
4.1.1.1 IoT/Cloud Connectivity/Post Method .....	110
4.1.2 TLS AEK Build Configuration Summary .....	110
4.2 Building Custom TLS Low Power AEK Application .....	111
4.2.1 IoT/Server Connectivity .....	112
4.2.1.1 IoT/Server Connectivity/Post Method .....	113
4.2.2 TLS Low Power AEK Build Configuration Summary .....	113
4.3 Building Custom Audio AEK Application .....	114
4.3.1 Usecase Selection .....	114
4.3.1.1 Remote Speaker .....	114
4.3.1.2 Remote Microphone .....	114
4.3.1.3 Walkie Talkie .....	115
4.3.2 Audio AEK Build Configuration Summary .....	115
4.4 Building Custom Music AEK Application .....	116
4.4.1 Music Settings .....	116
4.4.1.1 MP3 .....	116
4.4.1.2 AAC .....	116
4.4.1.3 FLAC .....	117
4.4.1.4 DOLBY 5.1 .....	117
4.4.1.5 DLNA .....	117
4.4.2 Music AEK Build Configuration Summary .....	118
4.5 Building Custom VGA Video AEK Application .....	119
4.5.1 Video Settings .....	120
4.5.1.1 Resolution .....	120
4.5.1.2 Bit Rate .....	120
4.5.1.3 Frames Per Second (FPS) .....	120
4.5.2 VGA Video AEK Build Configuration Summary .....	121
4.6 Building Custom HD720p Video AEK Application .....	122
4.6.1 HD720p Video Settings .....	123
4.6.1.1 Resolution .....	123
4.6.1.2 Bit Rate .....	123

---

---

4.6.1.3 Frames Per Second (FPS) .....	123
4.6.2 Miscellaneous HD720p Video .....	125
4.6.3 HD720p Video AEK Build Configuration Summary .....	126
4.7 Building Custom HD720p Video AEK Geo Application .....	127
4.7.1 HD720p Video Geo Settings .....	128
4.7.1.1 Resolution .....	128
4.7.1.2 Bit Rate .....	128
4.7.1.3 Frames Per Second (FPS) .....	128
4.7.2 Miscellaneous HD720p Video Geo .....	129
4.7.3 HD720p Video AEK Geo Build Configuration Summary .....	130
4.8 Building Custom Smart Plug AEK Application .....	131
4.8.1 Smart Plug Settings .....	132
4.8.2 Smart Plug AEK Build Configuration Summary .....	132
4.9 Building Default EVK and AEK Applications .....	133
<b>Chapter 5 Building SDK Packages .....</b>	<b>137</b>
5.1 Building SDK Applications .....	137
<b>Chapter 6 Building ADK Including SDK Packages .....</b>	<b>141</b>
6.1 Building Provisioning ADK Application .....	142
<b>Chapter 7 Building ADK Packages .....</b>	<b>145</b>
7.1 Building OTAFU ADK Application .....	146
<b>Chapter 8 Re-Building Packages .....</b>	<b>149</b>
8.1 Re-Building Packages .....	149

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# About This Manual

This manual provides guidelines that allows OEMs to configure and generate custom firmware binary images and SDK packages for GainSpan® GS2000 based modules.

Refer to the following sections:

- [Revision History, page 8](#)
- [Audience, page 11](#)
- [Standards, page 11](#)
- [Documentation Conventions, page 12](#)
- [Documentation, page 15](#)
- [References, page 17](#)
- [Contacting GainSpan Technical Support, page 18](#)
- [Returning Products to GainSpan, page 19](#)
- [Accessing the GainSpan Portal, page 20](#)

## Revision History

This version of the *GainSpan GS2000 Based Module Software Developer Kit (SDK) Builder User Guide* contains the following new information listed in Table 1, page 8.

**Table 1 Revision History**

Version	Date	Remarks
1.0	March 2014	Initial Release
1.1	June 2014	Added a new configuration for Build Type with New Build and Default Evaluation Build support. New Build supports Custom, SDK, and ADK package, and Default Build supports EVK and AEK package. See <a href="#">Chapter 1 Using the SDK Builder, page 21</a> .
1.2	July 2014	GA Release.
1.3	August 2014	<p>Added New ADK support for Music, HD 720p Video. See <a href="#">Chapter 6 Building ADK Including SDK Packages, page 141</a>.</p> <p>Added ADK Package (without SDK) for New Build to include TLS, Provisioning, and OTAFU. See <a href="#">Chapter 7 Building ADK Packages, page 145</a>.</p> <p>Added variable packet size for ping under Network Services tab when building custom applications. See <a href="#">Table 16, page 75</a>.</p> <p>Added Strict WPS2.0 compliance under Provisioning tab when building custom applications. See <a href="#">2.1.9.1 WPS 2.0 Enrollee/Strict WPS 2.0 Compliance, page 86</a>.</p>
1.4	September 2014	<p>Added instructions on how to build Custom AEKs for Music and Video. See <a href="#">4.4 Building Custom Music AEK Application, page 116</a>, <a href="#">122</a>, and <a href="#">4.7 Building Custom HD720p Video AEK Geo Application, page 127</a>.</p> <p>Added instructions on how to build Default AEKs. See <a href="#">4.9 Building Default EVK and AEK Applications, page 133</a>.</p> <p>Extended the default value of MAC Level Retries Count to 8. See <a href="#">Table 12, page 59</a>.</p>
1.5	October 2014	<p>Added check box selection to Include or Exclude Documentation and Utilities from the output build zip file. This option is only available for New Build with Custom Package. See <a href="#">1.8.1 Download Complete, page 42</a>.</p> <p>Added link tab to select Release Notes per software version. See <a href="#">1.10 Release Notes, page 45</a>.</p>
1.6	November 2014	Added new settings that support different hardware versions that tie to different ADC pins for the Smart Plug. See <a href="#">4.8.1 Smart Plug Settings, page 132</a> .
1.7	December 2014	Added Re-Build feature to allow rebuilding previously generated firmware builds using the build id generated in the SDK Builder. See <a href="#">Chapter 8 Re-Building Packages, page 149</a> .

**Table 1 Revision History (Continued)**

<b>Version</b>	<b>Date</b>	<b>Remarks</b>
1.8	December 2014	<p>Added support for WiFi Direct feature under 802.11 WLAN tab. See <a href="#">WiFi Direct, page 67</a>.</p> <p>Added Common Configuration settings for Regulatory Domain and Default Mode under 802.11 WLAN tab. See <a href="#">2.1.3.2 Common Configuration, page 56</a>.</p> <p>Added support for WiFi (Limited) AP Default Settings Phy Modes. See <a href="#">Table 13, page 65</a>.</p> <p>Added support for Concurrent Mode (WiFi Station and WiFi (Limited AP). See <a href="#">2.1.6.1 WiFi Station and WiFi (Limited AP, page 73</a> and <a href="#">2.1.6.2 WiFi Direct Concurrent Mode, page 73</a>.</p> <p>Added support for DTLS Client under Network Services tab. See <a href="#">2.1.7 Networking Services, page 74</a>.</p> <p>Added support for WAC Provisioning (IOS). Use only for Serial-to-WiFi and TLS applications. See <a href="#">2.1.9.5 WAC Provisioning (IOS), page 91</a>.</p> <p>Updated RTC NVS RAM Memory Settings to 9KB and RTC Standby will be 6uA. See <a href="#">2.1.12 Memory Settings, page 98</a>.</p> <p>Added support for building WiFi Adapter Card ADK package. See <a href="#">Chapter 6 Building ADK Including SDK Packages, page 141</a>.</p>
1.9	January 2015	<p>Added information on module Certifications. See <a href="#">1.3 Logging Into Your GainSpan Account, page 26</a>.</p> <p>Added description for Group Provisioning for Android Devices description. See <a href="#">2.1.9.4 Group Provisioning (For Android Devices), page 89</a>.</p> <p>Added support for 32Khz RC for Standby/RTC Clock. See <a href="#">2.1.11.1 Standby/RTC Clock, page 96</a>.</p> <p>Removed FTC Support under Miscellaneous Additional Features. See <a href="#">2.1.13 Miscellaneous, page 99</a>.</p>

**Table 1 Revision History (Continued)**

<b>Version</b>	<b>Date</b>	<b>Remarks</b>
2.0	January 2015	<p>Added support for Concurrent Mode for Stations Supported under 802.11 WLAN. See <a href="#">Table 13, page 65</a>.</p> <p>Added selections for both Discovery mDNS, DNS-SD (Station), and Discovery mDNS, DNS-SD (Limited AP) under Networking Services. See <a href="#">2.1.7.2 IPv4 and IPv6, page 75</a>.</p> <p>Added L4 configuration for NCM for Limited AP and Station interfaces. See <a href="#">2.1.7.3 Other Networking Services, page 81</a>.</p> <p>Added WPS 2.0 Registrar and changed WPS 2.0 to WPS 2.0 Enrollee under Provisioning. See <a href="#">2.1.9.1 WPS 2.0 Enrollee/Strict WPS 2.0 Compliance, page 86</a>.</p> <p>Added description for Auto Start for Group Provisioning for NCM. See <a href="#">2.1.9.4 Group Provisioning (For Android Devices), page 89</a>.</p> <p>Added description for WAC Provisioning (IOS) for NCM. See <a href="#">2.1.9.5 WAC Provisioning (IOS), page 91</a>.</p> <p>Added support for TLS AEK Group and WAC Provisioning. See <a href="#">4.1 Building Custom TLS AEK Application, page 108</a>.</p>
2.1	March 2015	Added Serial to Pulse Width Modulation (PWM) and Serial to I2C function under the Serial Options within the Host Interface selection. See <a href="#">2.1.1 Host Interface, page 49</a> and <a href="#">2.1.1.1 Serial Options, page 50</a> .

## Audience

The SDK Builder allows OEMs and system developers to configure and generate custom firmware binary images and SDK packages for GainSpan low power embedded GS2000 based WiFi modules. The SDK Builder supports the GainSpan GEPS software released, including the corresponding WLAN firmware.

## 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 12](#), 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	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.
<CR><LF> Carriage return Line feed	Each response is started with a carriage return and line feed with some exceptions.

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

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

Table 3, page 14, 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 15](#) includes the part number, documentation name, and a description of the document. The documents are available from the GainSpan Portal. Refer to [Accessing the GainSpan Portal, page 20](#) 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 on 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 GS2000 Based Module Software Developer Kit (SDK) Builder User Guide	Allows OEMs and system developers to configure and generate custom firmware binary images for GainSpan low power embedded GS2000 based WiFi modules. The SDK Builder supports the GainSpan GEPS software released, including the corresponding WLAN firmware.
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 17](#) are available on the GainSpan Portal. Refer to [Accessing the GainSpan Portal, page 20](#) 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 18](#), 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.
8. Click the **Save** button. An email will be sent with a link to your Support Question.

The following additional information is displayed:

- 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.*

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.



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

## 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 Using the SDK Builder

This chapter describes how to use the GainSpan SDK Builder application.

- [What Can the SDK Builder Do?, page 22](#)
- [How the SDK Builder Works, page 25](#)
- [Logging Into Your GainSpan Account, page 26](#)
- [SDK Builder Welcome, page 31](#)
- [Selecting SDK Builder Configuration, page 32](#)
- [Building Packages, page 35](#)
- [Build Configuration Summary, page 37](#)
- [Build History, page 41](#)
- [About Tool, page 44](#)
- [Release Notes, page 45](#)

## 1.1 What Can the SDK Builder Do?

The GainSpan SDK Builder can build firmware binaries and SDK/ADK package for the GS2000 based modules (see [Table 7, page 22](#)).

**Table 7 SDK Build Options**

Build Type	Build Output	Application	Feature Configuration/ Selections Allowed	Build Output	Purchase/ Free	Remarks	
New Build	Custom Package	S2W	Yes	<i>Custom Package (Check Box Selection):</i>	Free	Check box selection to Include or Exclude Documentation and Utilities to be downloaded. It is enabled by default. Uncheck to Exclude Documentation and Utilities and only get Firmware images in the output zip file.	
		IP2W		• Documentation			
		TLS AEK		• Firmware			
		TLS Low Power AEK		• GS_programming_tool			
		Audio AEK		• hostapp			
		Music AEK		• Readme.txt			
		VGA Video AEK		<i>Custom Package (Uncheck Box):</i>	Purchase		
		HD720p Video AEK		• Firmware and Utilities only			
		HD720p Video AEK Geo					
		SmartPlug AEK					
SDK Package	S2W/TLS/TLS Low Power	SDK Package with:	No	• ADK	Purchase	N/A	
				• Documentation			
				• EVB Schematics			
				• GEPS			
				• hostapp			
				• tools			
				• userapps			
				• userlib			
				• wfw			
				• GS2K_5_1_x_Release_Notes.pdf			
				• GS2K_SDK_QS_001225.pdf			
				• ReadMe.txt			

**Table 7 SDK Build Options (Continued)**

<b>Build Type</b>	<b>Build Output</b>	<b>Application</b>	<b>Feature Configuration/ Selections Allowed</b>	<b>Build Output</b>	<b>Purchase/ Free</b>	<b>Remarks</b>
New Build (cont.)	ADK Package (including SDK)	Provisioning OTAFU TLS/TLS Low Power Audio VGA Video SmartPlug Music HD 720p Video HD 720p Video (Geo) WAC ADK (Need Apple MFI license to enable)	No	<p><i>SDK Package:</i></p> <ul style="list-style-type: none"> <li>• ADK</li> <li>• Documentation</li> <li>• EVB Schematics</li> <li>• GEPS</li> <li>• hostapp</li> <li>• tools</li> <li>• userapps</li> <li>• userlib</li> <li>• wfw</li> <li>• GS2K_5_1_x_Release_Notes.pdf</li> <li>• GS2K_SDK_QS_001225.pdf</li> <li>• ReadMe.txt</li> </ul> <p><i>ADK Package with selected ADK from the SDK builder along with:</i></p> <ul style="list-style-type: none"> <li>• Android</li> <li>• docs</li> <li>• Quick Start</li> <li>• web</li> </ul>	Purchase	Multiple ADK selections allowed. Builder will check for both ADK and SDK purchase and only allow if both are purchased.
	ADK Package	Provisioning OTAFU TLS	No	<p><i>ADK Package with:</i></p> <ul style="list-style-type: none"> <li>• Quick Start</li> <li>• Documentation</li> <li>• Andriod</li> <li>• iOS</li> <li>• web</li> <li>• binaries</li> </ul>	Purchase	N/A

**Table 7 SDK Build Options (Continued)**

Build Type	Build Output	Application	Feature Configuration/ Selections Allowed	Build Output	Purchase/ Free	Remarks
Default Build	EVK Package	S2W/TLS/ TLS Low Power IP to WiFi	No	<p><i>EVK Package with:</i></p> <ul style="list-style-type: none"> <li>• Documentation</li> <li>• EVB Schematics and User Guide</li> <li>• Firmware</li> <li>• GS_programming_tool</li> <li>• hostapp</li> <li>• SW Utilities</li> <li>• GS2K_EVK_QS_001205 - EVK Quick Start Guide.pdf</li> <li>• ReadMe.txt</li> </ul>	Free	N/A
				<p><i>AEK Package with:</i></p> <ul style="list-style-type: none"> <li>• Andriod</li> <li>• iOS</li> <li>• GS_programming_tool</li> <li>• Documentation</li> <li>• Quick Start</li> <li>• web</li> <li>• ReadMe.txt</li> </ul>		
Re-Build		This option Re-Builds previously generated packages (Custom, SDK, ADK, ADK (with SDK package), EVK, and AEK by using the Build ID. The Re-build option is specific for re-building Custom Packages to allow for further editing and modifying of the build to be re-submitted.				



**NOTE:** Screen captures throughout this document may differ slightly than the current SDK Builder application being used.

## 1.2 How the SDK Builder Works

Once initial registration is approved, you can login to the GainSpan support portal (<https://www.gainspan.com/secure/login>) and perform the following:

- Select New Build to build Custom, SDK, or ADK Packages, ADK Package (includes SDK Package), select Default Evaluation Build, which builds default EVK or AEK Packages or Re-Build to re-build previously generated packages (Custom, SDK, ADK, ADK (with SDK package), EVK, and AEK by using the Build ID).
- Select GainSpan Build Type, Module, Firmware Version, Build Output, Application, and to include documents and utilities or build with only the images.
- Select different tabs to show logical grouping of features
  - Each logical group has various build configurations to choose from. There are several features that are built into the binaries by default and these will not be allowed to select (grayed out and selected by default). After making the feature selections, you can submit the build to process.
- The SDK Builder will display a summary of the user selected configuration, and review and submit your request to the Build Server. An email will be sent acknowledging your build request.
- Once the firmware binaries or SDK packages are generated, a zip file containing Firmware binary image or SDK package and related components will be uploaded to your SDK Builder account under Build History:

An email will be sent to you confirming availability of the binary files which can be picked up from the Build History tab.



**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom, SDK, or ADK Packages for your environment.

## 1.3 Logging Into Your GainSpan Account

To log into your GainSpan account, perform the following:

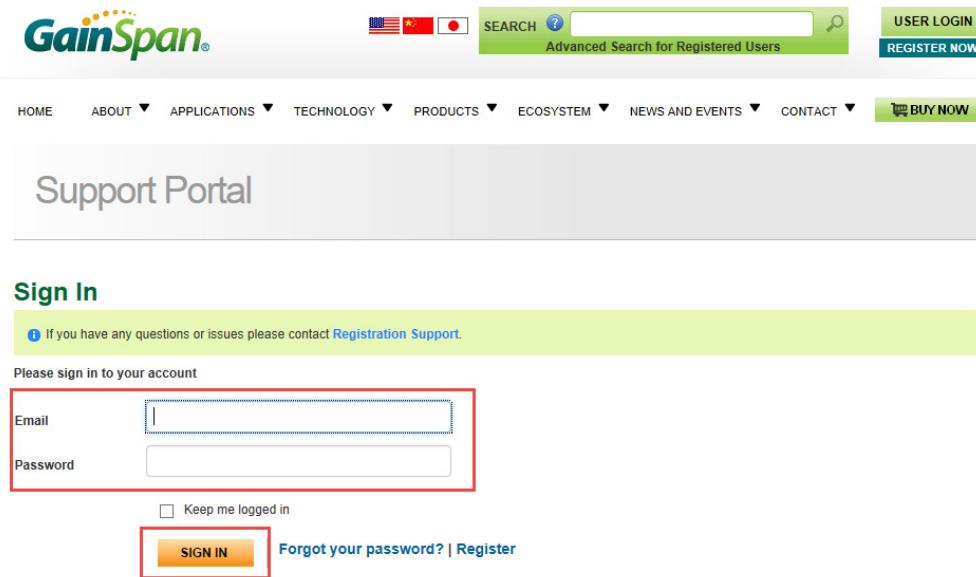
1. Open a web browser, and enter the following website at: [www.gainspan.com](http://www.gainspan.com), and click on the **USER LOGIN** button at the top right corner of the GainSpan web page (see Figure 1, page 26).

**Figure 1** Logging Into Your GainSpan Account



2. The GainSpan **User Sign In** screen will display (see [Figure 2, page 27](#)). Enter your **Email** and **Password** and click **SIGN IN**.

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



3. The **Getting Started** will guide you through helpful video tutorials on how to search for product documentation and software, search public areas within the GainSpan website, and how to ask a technical support question. It will also give you simple instructions on how to program your GainSpan products, as well as a link directly to the SDK Builder (see [Figure 3](#), page 28).

**Figure 3 Getting Started**

The screenshot shows a web-based interface for the GainSpan Support Portal. At the top, there is a navigation bar with tabs: Getting Started (which is highlighted), Agreements, Documents, Software, Kits Purchased, Legal Documents, and Certifications. Below the navigation bar, there are three main tutorial sections:

- Quick Start Guide**: This section includes a brief introduction about the GainSpan website being an integral part of the user experience and committing to providing tools and information for the most out of GainSpan's products. It features a graphic of four interconnected blocks labeled: APPLICATION PROTOCOL, WIRELESS SECURITY, HOST INTERFACE, and PROGRAMMING GUIDE. A call-to-action button says "Check out the SDK Builder Now ▶".
- TUTORIAL: SEARCHING FOR DOCUMENTATION & SOFTWARE**: This section shows a screenshot of a search results page from the GainSpan website. The search bar at the top has the text "Search for your product...". Below it, there are several search results, each with a thumbnail image, title, and a "View Details" button.
- TUTORIAL: SIMPLE SEARCH OF THE PUBLIC AREAS OF THE GAINSPAN SITE**: This section shows a screenshot of the GainSpan website homepage. It features a large green play button graphic in the center. Below the play button, there is a banner with the text "Starting to software is just as simple". The page displays news articles and other site content.
- TUTORIAL: ASKING A SUPPORT QUESTION**: This section shows a screenshot of the GainSpan Support Portal. It features a large green play button graphic in the center. Below the play button, there is a banner with the text "Starting to software is just as simple". The page displays a list of support cases or tickets.

4. Additional Support Portal features include Software License Agreements, Kits Purchased (dated list of all software license purchased), Legal Documents (NDAs), and Certifications (GainSpan module certificates - see Figure 4, page 29).

**Figure 4 GainSpan Module Certifications**

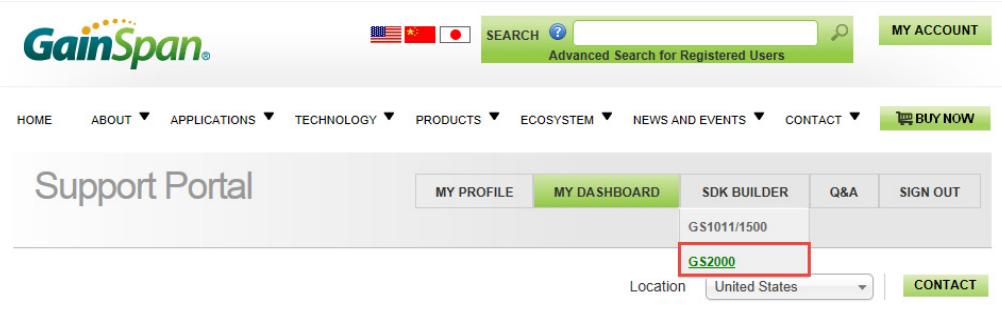
## Certifications

[GS2011MIE\\_MIZ](#) [GS2011MIES\\_MIPS](#) [GS2100MIE\\_MIP](#)

Certification	Region	Documents	Regulatory site
	Europe	<a href="#">GS2011MIE_MIZ_CE.zip</a>	<a href="#">www.ce.org</a>
	North America	<a href="#">GS2011MIE_MIZ_FCC_IC.zip</a>	<a href="#">www.fcc.gov</a> <a href="#">www.ic.gc.ca</a>
	Japan	<a href="#">GS2011MIE_MIZ_TELEC.zip</a>	<a href="#">www.tele.soumu.go.jp</a>
	Korea	Pending	<a href="#">www.ktr.or.kr</a>
	ALL	<a href="#">GS2K modules Certificate.pdf</a>	<a href="#">www.wi-fi.org</a>

5. 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 5, page 30).

**Figure 5 Select GainSpan Module to Create Firmware**

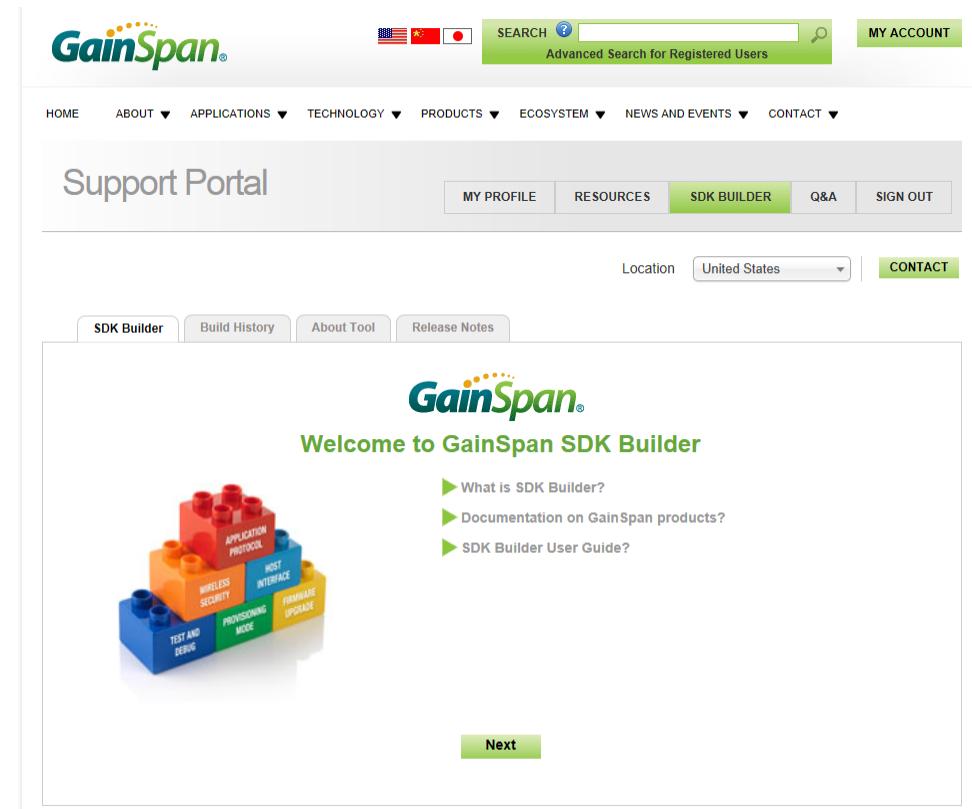


6. The **Select your SDK-Builder Configuration** screen will display (see [1.5 Selecting SDK Builder Configuration, page 32](#)).

## 1.4 SDK Builder Welcome

The GainSpan SDK Builder Welcome screen displays links that briefly describe the SDK Builder as well as a link to related documentation (see [Figure 6, page 31](#)). Click the **Next** button to continue building new Custom, SDK, and ADK packages, default EVK and AEK packages, or re-build packages using previous build Id.

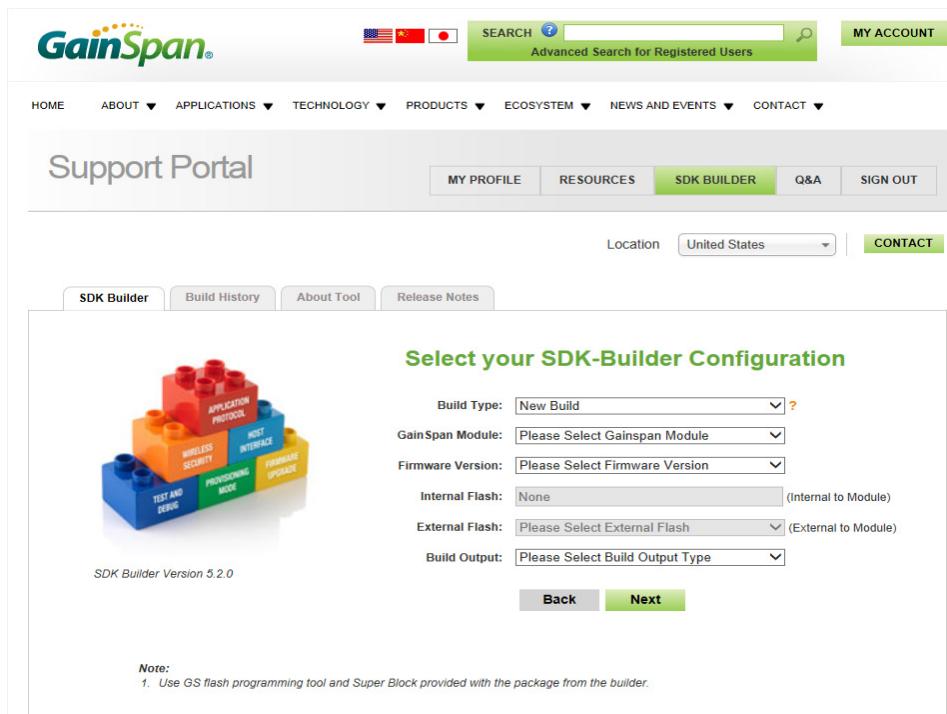
**Figure 6 GainSpan SDK Builder Welcome**



## 1.5 Selecting SDK Builder Configuration

The GainSpan SDK Builder Configuration main screen allows you to select your SDK configuration options (see [Figure 7, page 32](#)).

**Figure 7 Select SDK Builder Configuration Options**



To build your firmware you can select the following:

- Build Type - this allows you to build New Custom, SDK, or ADK packages, Default EVK and AEK packages, or to Re-Build to previously generated packages (Custom, SDK, ADK, ADK (with SDK package), EVK, and AEK by using the Build ID).
- GainSpan Module - this is the module you want to configure (GS2011M or GS2100M).
- Firmware Version - this is the firmware version you want to create for your module.
- Internal Flash - this is the Flash inside the GS module. Depending on which GainSpan Module you are building firmware for, this is automatically updated or selected 2MB or 4MB.
- External Flash - this is the Flash external to the Module. This will be supported in future releases.

- Build Output (depends if building new build or default evaluation build):
  - New Build - For a **New Build**, click the **Next** button, the SDK Builder tool will provide you several screens with options and selectable features you want to include in building your Custom Package. Once the SDK Builder completes the process, the SDK Builder will compile and build your application. You will be notified through your email account once the image is ready for downloading.
  - Custom Package: this option builds applications for Serial-to-WiFi, IP-to-WiFi, TLS, TLS Low Power, Audio, Music, VGA Video, HD720p Video, HD720p Video Geo, and Smart Plug by selecting and customizing different features and configurations. When selecting a Custom Package to build you can include or exclude Documentation and Utilities in the output zip file.
  - SDK Package: (*needs to be purchased*): It provides SDK package with source code for Serial-to-WiFi (Hosted), Temperature and Light Sensor (TLS) Web Server, and Temperature and Light Sensor (TLS) Low Power.
  - ADK Package (including SDK): this option builds ADK package containing SDK package (with embedded code for selected ADKs) such as Android and iOS mobile applications, Provisioning, OTAFU, TLS, Audio, VGA Video, Smart Plug, HD 720p Video, HD 720p Video (Geo), Music, and WiFi Adapter Card (WAC) ADK (need Apple MFI license to enabled).
  - ADK Package: this option builds ADK package only for Android, and iOS mobile applications, Provisioning, OTAFU, and TLS.
- Default Evaluation Build - For a **Default Build**, click the **Build** button to compile and build your default EVK or AEK Package. Once the SDK Builder completes the process, the SDK Builder will compile and build your default software. You will be notified through your email account once the image is ready for downloading.
  - EVK Package: this option builds a default EVK package consisting of firmware binary (default configuration) for Serial-to-WiFi (Hosted), TLS and TLS low power (Hostless) applications, or IP to WiFi application.
  - AEK Package: this option builds a default AEK package consisting of firmware binary (default configuration) for TLS AEK (Hostless Web Server), TLS Low Power AEK (Hostless, Web/CoAP Client), Audio AEK (Hostless), Music AEK (Hostless), VGA Video AEK (Hostless), HD 720p Video AEK (Hostless), HD 720p Video AEK Geo (Hostless), and Smart Plug AEK (Hostless).
- Re-Build - For a **Re-Build**, enter a previously Build Id number that is located under the Build History tab. Once the SDK Builder completes the process, the SDK Builder will compile and re-build previously generated build software to be modified or edited and re-submitted for build. You will be notified through your email account once the image is ready for downloading.

- Packages that use can be re-built using the Build ID are: Custom, EVK, AEK, ADK, SDK, and ADK (with SDK package). The Re-build option is specific for re-building Custom Packages to allow for further editing and modifying of the build to be re-submitted.
- Application - For Custom Packages such as Audio, Video, Smart Plug, Music, HD720p, and HD720p Geo need to be purchased. Serial-to-WiFi, IP-to-WiFi, TLS, and TLS Low Power are free for evaluation.
- Include Documentation & Utilities - This option is enabled by default. Uncheck this option to exclude Documentation and Utilities and only get firmware images in the output zip file. This option will be enabled only for New Build with Custom Package.

## 1.6 Building Packages

There are two ways to build packages under the SDK Builder. They are:

- Default Evaluation Build
- New Build
- Re-Build

### 1.6.1 Building Default Evaluation Packages

Selecting the Default Evaluation Build option under the Built Type will allow you to build default firmware for:

- EVK Package
- AEK Package

#### 1.6.1.1 EVK Package

The EVK Package contains firmware binary (default configuration) for Serial-to-WiFi (Hosted), TLS and TLS low power (Hostless) applications or IP-to-WiFi application, Documentation, Programming Tool, Hostapp, SW utilities, EVB Schematics, Release Notes and Quick Start Guide. This is used if an Evaluation Board (EVB) is purchased.

#### 1.6.1.2 AEK Package

The AEK Package contains firmware binary (default configuration) for Application chosen, Android and iOS Mobile applications (apk, ipa files), Web pages (if applicable), Documentation, Programming Tool, Release Notes, and Quick Start Guide.

To build Audio, Music, VGA Video, HD 720p Video, HD 720pVideo Geo, or Smart Plug AEKs, the AEKs need to be purchased.



---

**NOTE:** A “?” next to options in the SDK Builder can be selected to open a window describing the feature.

---

## 1.6.2 Building New Packages

Selecting the New Build option under the Built Type will allow you to build new firmware for:

- Custom Package
- SDK Package
- ADK Package
- ADK Package (including SDK)

### 1.6.2.1 Custom Package

The Custom Package allows you to build an Application such as Serial-to-WiFi, by selecting and customizing different features and configurations (e.g., 802.11 WLAN, Network Stack features, Network Connection Manager, Provisioning, OTAFU, etc.). It provides a zip file containing firmware binary, build configuration file based on features selected, Documentation, Programming Tool, and Hostapp. You can also exclude Documentation and Utilities from the Custom Build.

### 1.6.2.2 SDK Package

The SDK Package allows you to build SDK packages and provides a zip file containing source code for Serial-to-WiFi, TLS and TLS Low Power applications, Userlib (NCM) source code, OTAFU and Provisioning embedded source code, Web page sources, GEPS and ROM patch libraries, WLAN binary, Various tools, Documentation, Hostapp, Release Notes, and Quick Start Guide.

### 1.6.2.3 ADK Package

The ADK Package allows you build ADK package only for Provisioning, OTAFU, and TLS (Hostless, Web Server). It provides a zip file containing an ADK package which includes Andriod and iOS mobile application sources, Web application sources, Quick Start Guide, and Documentation.

### 1.6.2.4 ADK Package (including SDK)

The ADK Package (including SDK) allows you to build ADK packages and provides a zip file containing SDK package, along with Embedded source code for selected ADKs and an ADK package containing Android and iOS Mobile application sources, Web application sources, Quick Start Guide, and Documentation.



**NOTE:** A “?” next to options in the SDK Builder can be selected to open a window describing the feature.

### 1.6.3 Re-Building Packages

Selecting the Re-Build option under the Built Type will allow re-building previous Custom, EVK, AEK, ADK, and ADK (with SDK package) packages by using the Build ID from the Build History tab.

## 1.7 Build Configuration Summary

There are two ways of displaying the Build Configuration Summary.

- New Build
- Default Evaluation Build
- Re-Build

Selecting a New Build under the SDK Builder tab will display the configuration settings, options, and features selected (see [Figure 8, page 37](#)). The Build Summary can also be viewed under the Build History tab (see [Figure 9, page 38](#)). See [1.8 Build History, page 41](#).

**Figure 8 Build Configuration Summary Within SDK Builder**

SRAM SUMMARY		FLASH SUMMARY	
APP CPU SRAM Total	512KB	Internal Flash Total	4096KB
APP CPU SRAM Available	0KB	Internal Flash Available	3757KB
WLAN CPU SRAM Total	512KB	External Flash Total	None
WLAN CPU SRAM Available	0KB	External Flash Available	None
RTC NVSRAM Available	0KB		

Module Configuration	
Build Type	New Build
Product Name	GS2011 MIZ/MIE v3.3 or later
Firmware Version	GEPS v5.1.5 Beta
Internal Flash	4MB
External Flash	None
Application	Serial to Wi-Fi (Hosted)
Build Output	Custom Package
Include Documents & Utilities	Yes
GEPS Version	5.1.5.8
APP Version	5.1.5.8
WLAN Version	5.1.5.9

**Note:**  
1. Use GS flash programming tool and Super Block provided with the package from the builder.

The Build Configuration Summary screen can also be displayed by selecting the Default Evaluation Build, New Build, or Re-Build link under the Configuration SDK Builder column within the Build History tab (see [Figure 9, page 38](#)). See [1.8 Build History, page 41](#).

**Figure 9 Build Configuration Summary Within Build History**

Module Configuration	
Build Type	New Build
Product Name	GS2011 MIZ/MIE v3.3 or later
Firmware Version	GEPS v5.1.5 Beta
Internal Flash	4MB
External Flash	None
Application	Serial to Wi-Fi (Hosted)
Build Output	Custom Package
Include Documents & Utilities	Yes
GEPS Version	5.1.5.8
APP Version	5.1.5.8
WLAN Version	5.1.5.9

Clock/Power Settings	
Input Power Turn-On Time	0µs

Host Interface	
Serial Options	Serial to Wi-Fi Serial to I2C Serial to PWM
Host options for Serial Application	Single UART Command and Data

Host Settings	
UART0	9600

**OK**

The Build Configuration Summary page will display the output of the SDK Builder options and features. This build summary output will depend on the firmware binary being configured.

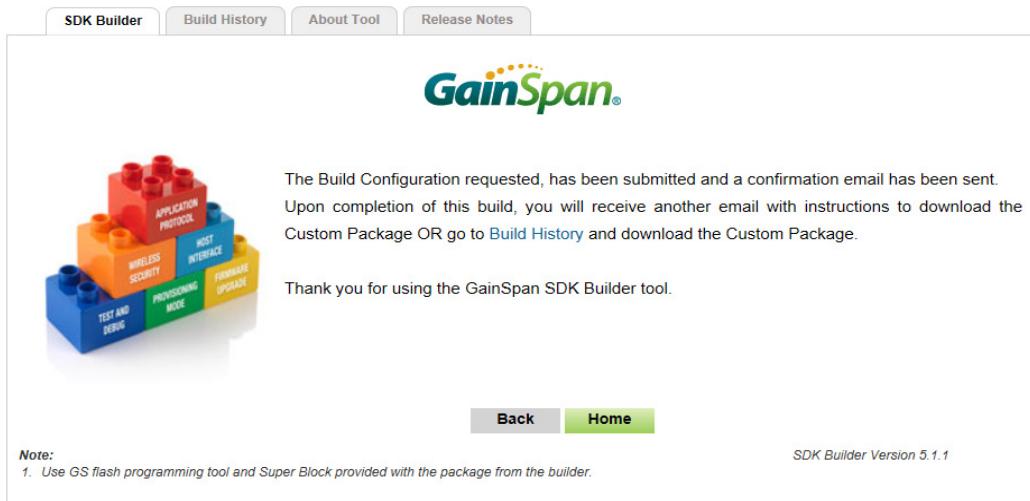
- Module Configuration Information (Build Type, Product Name, Firmware Version, Internal/External Flash, Application, Build Output, Include Documents & Utilities)
- Host Interface (Serial Options, Host Connection, Host MCU, Host Stack/RTOS)
- Host Settings (UART, SPI, SDIO), Baud Rate information
- 802.11 WLAN Settings and Modes (WiFi Station, Power Save Modes, WiFi (Limited) AP, WiFi Direct, WiFi Beacon Mode, ISO Tx Mode, RF Test)
- 802.15.4 WLRPAN (802.15.4)
- ZigBee IP Modes (Host, Router, Border Router)
- Concurrent Modes (WiFi Station and WiFi (Limited) AP, WiFi Direct Concurrent Mode, WiFi Station and ZigBee IP Host)
- Networking Services (IPv4, IPv6, IPv4/IPv6), ARP, ICMP, UDP, TCP, etc., DNS Server, IP Configuration (Station and Limited AP), DNS Server, Discovery mDNS, DNS-SD, HTTPS/HTTP Client, SNTP Client, HTTPS/HTTP Server,

IGMP Multicast, CoAP, DTLS Client, Ping and Trace Route, TLS over TCP Client/Server

- Other Networking Services (GSLink with XML Parsing, Network Connection Manager)
- Network Connection Manager (Auto Start, CPU Wait Period, L3 and L4 Connect Period and Retry Count)
- Energy Measurement (supported only on the GS2100M)
- Provisioning (WPS2.0, Wireless Provisioning, Provisioning Pages, Group Provisioning)
- Firmware Update (OTAFU Push/Pull, Backup Copy, Factory Restore Copy, No Additional Copies, GainSpan Web Pages, Digital Signature using Certificate and Keys)
- Clock/Power Settings (Standby/RTC Clock, Standby to Wakeup Clock, Deep Sleep to Wakeup Clock, and Input Power Turn-on Time)
- Memory Settings (WLAN CPU SRAM, Shared/Assignable, SRAM and APP CPU SRAM, RTC NVSRAM and RTC Features)
- Miscellaneous information (Async Support, Debug Trace, Firmware Binary Name)
- Additional Build Configuration Summary is displayed when creating firmware for:
  - TLS AEK
  - TLS Low Power AEK
  - Audio AEK
  - VGA Video AEK
  - Smart Plug AEK
  - HD 720p Video AEK
  - HD 720p Video AEK Geo
  - Music AEK

Depending on which type of build you are creating (New Build, Default Eval Build, or Re-Build), once complete, review the firmware build. For a **New Build** select the **OK** button, then the **Build** button, for a **Default Eval Build** select the **Build** button, and for the **Re-Build** select the **Build** button. This will confirm the requested build. A message will display that a confirmation build configuration email will be sent along with instructions on how to download the firmware and binary files (see [Figure 10, page 40](#)).

**Figure 10 Build Configuration Request**



## 1.8 Build History

The Build History tab under the SDK Builder will display the configuration history information such as Build Type, Build Output Type, Build ID, Configuration SDK Builder Download status, Created date and time information, and Action column consisting of a Re-build button to take you back to the SDK Builder to select different options and features to rebuild the selected firmware. See [Figure 11, page 41](#).



**NOTE:** The Download column will display “Pending” status during the build operation.

**Figure 11 Build History**

Build Type	Build Output Type	Build ID	Configuration SDK Builder	Download	Created On	Action
New Build	Custom Package	5725	Product - GS2011MXX, F/W Version - 5.1.5, Application - Serial to Wi-Fi	Pending	10:02 pm 06 Mar 2015	<b>Re-build</b>
New Build	Custom Package	4852	Product - GS2011MXX, F/W Version - 5.1.3, Application - Serial to Wi-Fi	Download	06:43 pm 25 Nov 2014	<b>Not Available</b>
Re-Build	AEK Package	4851	Product - GS2011MXX, F/W Version - 5.1.1, Application - Music AEK	Download	06:09 pm 25 Nov 2014	<b>Not Available</b>
Re-Build	AEK Package	4849	Product - GS2011MXX, F/W Version - 5.1.1, Application - Audio AEK	Download	03:36 pm 25 Nov 2014	<b>Not Available</b>
Re-Build	AEK Package	4848	Product - GS2011MXX, F/W Version - 5.1.2, Application - HD 720p Video AEK	Download	03:33 pm 25 Nov 2014	<b>Not Available</b>
Default Eval build	AEK Package	4812	Product - GS2011MXX, F/W Version - 5.1.2, Application - HD 720p Video AEK	Download	06:18 pm 20 Nov 2014	<b>Not Available</b>
New Build	ADK Package(including SDK)	4811	Product - GS2100MXX, F/W Version - 5.1.2, Application - Smart Plug ADK	Download	04:03 pm 20 Nov 2014	<b>Not Available</b>
Default Eval build	AEK Package	4765	Product - GS2011MXX, F/W Version - 5.1.2, Application - HD 720p Video AEK Geo	Download	06:31 pm 18 Nov 2014	<b>Not Available</b>
Default Eval build	AEK Package	4764	Product - GS2011MXX, F/W Version - 5.1.2, Application - HD 720p Video AEK	Download	06:29 pm 18 Nov 2014	<b>Not Available</b>
Default Eval build	AEK Package	4763	Product - GS2011MXX, F/W Version - 5.1.2, Application - VGA Video AEK	Download	06:26 pm 18 Nov 2014	<b>Not Available</b>
New Build	ADK Package(including SDK)	4762	Product - GS2100MXX, F/W Version - 5.1.2, Application - Smart Plug ADK	Download	06:19 pm 18 Nov 2014	<b>Not Available</b>
New Build	ADK Package(including SDK)	4761	Product - GS2011MXX, F/W Version - 5.1.2, Application - OTAFU ADK	Download	06:08 pm 18 Nov 2014	<b>Not Available</b>
New Build	ADK Package(including SDK)	4760	Product - GS2011MXX, F/W Version - 5.1.2, Application - Provisioning ADK	Download	06:01 pm 18 Nov 2014	<b>Not Available</b>
Default Eval build	AEK Package	4759	Product - GS2011MXX, F/W Version - 5.1.2, Application - Music AEK	Download	05:58 pm 18 Nov 2014	<b>Not Available</b>
Default Eval build	AEK Package	4758	Product - GS2011MXX, F/W Version - 5.1.2, Application - Audio AEK	Download	05:54 pm 18 Nov 2014	<b>Not Available</b>
Default Eval build	AEK Package	4757	Product - GS2011MXXS, F/W Version - 5.1.2, Application - TLS Low Power AEK	Download	05:51 pm 18 Nov 2014	<b>Not Available</b>

## 1.8.1 Download Complete

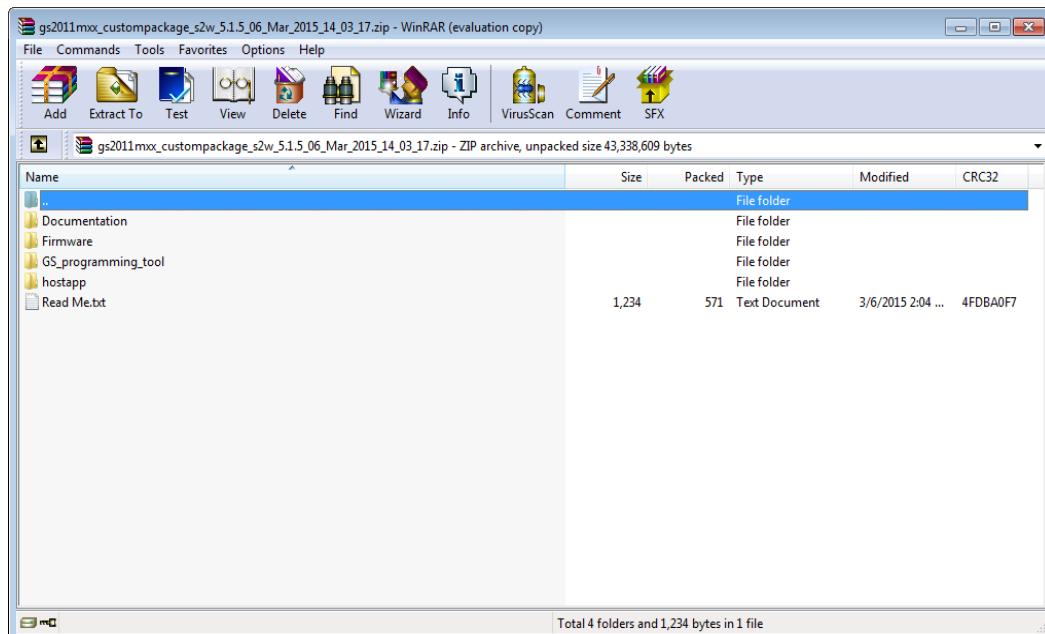
Once the build is complete, click the **Download** link under the **Build History** tab. You can open your software build or save it to a location on your computer (e.g., C:\S2W\..). When complete, a zip file will open displaying the build you configured.

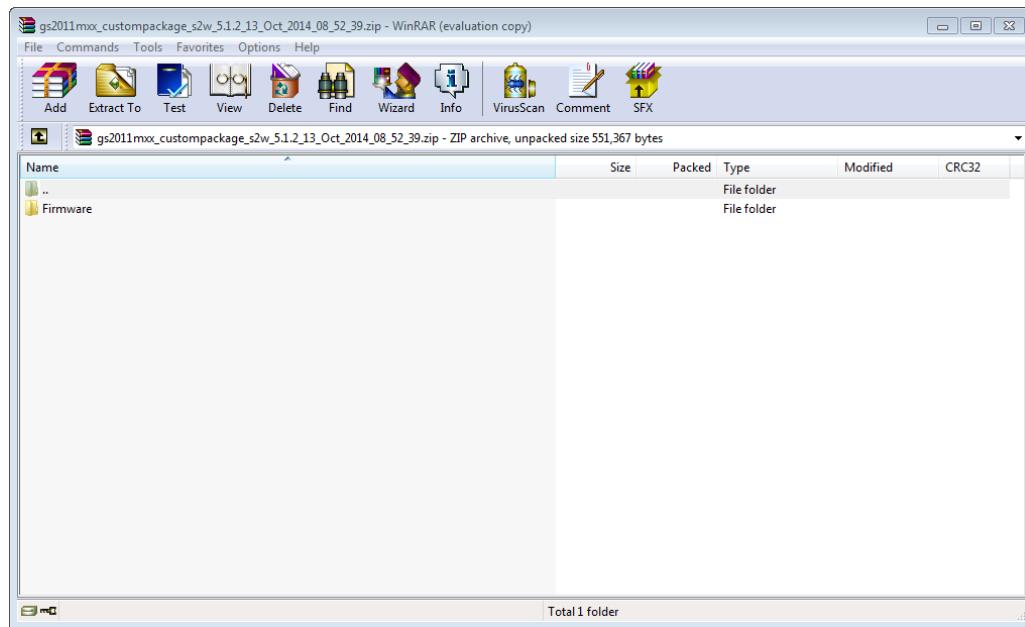
There are two types of Custom Packages that can be built:

- Complete package includes: Documentation, Firmware, GS Programming Tool, Hostapp, and Readme file (see [Figure 12, page 42](#)).
- Simplified package includes: Firmware ONLY (see [Figure 13, page 43](#)).

Use these files to program the Flash on the GS2000 based modules.

**Figure 12 GS2000 Software Build Files Complete Package**



**Figure 13 GS2000 Software Build Files (without Documentation and Utilities)**

For step-by-step instructions on how to program the flash with the latest firmware and binary files onto the evaluation board using the *gs2k\_flashprogram* utility, refer to the *GainSpan GS2000 Based Module Programming User Guide*.

## 1.9 About Tool

The About Tool tab under the SDK Builder displays a brief overview and explanation of how to use the SDK Builder along with firmware information (see [Figure 14, page 44](#)).

**Figure 14** **SDK Builder Tool Overview**

The screenshot shows the 'About Tool' tab selected in the top navigation bar. The main content area contains the following sections:

- Overview:** Describes the GainSpan SDK Builder's purpose and supported modules. It lists specific module and firmware version combinations supported by different versions of the tool.
- How To Use Tool:** A link to a help page.
- SDK Builder Releases:** A list of 12 release entries, each with a date and version number.
- Custom Web Page Size:** A note about maximum total size allowed for custom web pages.
- Maximum Total Size Allowed:** A table mapping module types to their maximum allowed size.

At the bottom, there is a support email address and the 'SDK Builder Version 5.2.0' footer.

Module	Max Size Allowed	Remarks
GS2011	500KB	Default
GS2011	1012KB	If 2 versions is selected in Firmware Update Options.
GS2100	52KB	Default
GS2100	116KB	If 2 versions is selected in Firmware Update Options.

## 1.10 Release Notes

The Release Notes tab under the SDK Builder will display the release build history information such as Release Version, Release Date, and a link to download specific Release Note information (see Figure 15, page 45).

**Figure 15 SDK Builder Release Notes Tab**

The screenshot shows the GainSpan Support Portal interface. At the top, there is a navigation bar with links for HOME, ABOUT, APPLICATIONS, TECHNOLOGY, PRODUCTS, ECOSYSTEM, NEWS AND EVENTS, and CONTACT. On the right side of the top bar are buttons for MY ACCOUNT, SEARCH, and MY PROFILE. Below the navigation bar, the main header says "Support Portal". Underneath it, there is a sub-navigation bar with tabs for MY PROFILE, RESOURCES, **SDK BUILDER**, Q&A, and SIGN OUT. Further down, there is a "Location" dropdown set to "United States" and a "CONTACT" button. The main content area features a table titled "Release Notes" with columns for Release Version, Release Date, and Actions. The table contains three rows: v5.1.1 GA (2014/09/30), v5.1.2 GA (2014/11/21), and v5.1.3 Beta (2014/12/11). Each row has a "Download" link in the Actions column. At the bottom of the content area, it says "SDK Builder Version 5.2.0". At the very bottom of the page, there is a footer bar with social media links for Twitter, Facebook, YouTube, and LinkedIn, along with links for Home, About Us, Applications, Technology, Products, Ecosystem, News & Events, Contact, and Login. It also includes a copyright notice: "©2014 GainSpan Corporation. All rights reserved."

Release Version	Release Date	Actions
v5.1.1 GA	2014/09/30	<a href="#">Download</a>
v5.1.2 GA	2014/11/21	<a href="#">Download</a>
v5.1.3 Beta	2014/12/11	<a href="#">Download</a>

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# Chapter 2 Building Serial-to-WiFi Applications

This chapter provides instructions on how to use the GainSpan® SDK Builder to generate firmware and binary images for Serial-to-WiFi (Hosted) applications.

## 2.1 Serial-to-WiFi Module Information

Selecting the Serial-to-WiFi (Hosted) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the Serial-to-WiFi (Hosted) application (see [Figure 16, page 47](#)).

**Figure 16 Serial-to-WiFi (Hosted) Feature Selection**

Module Information			
Module: GS2100 MIP/MIE v3.1R or later	Firmware: GEPS v5.1.0 GA	Application: Serial to Wi-Fi (Hosted)	Build Output: Custom Package
SRAM SUMMARY		FLASH SUMMARY	
APP CPU SRAM Total	512KB	Internal Flash Total	2048KB
APP CPU SRAM Available	0KB	Internal Flash Available	1821KB
WLAN CPU SRAM Total	512KB	External Flash Total	None
WLAN CPU SRAM Available	0KB	External Flash Available	None
RTC NVS RAM Available	0KB		



**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom, SDK, or ADK Packages for your environment.

The tabular selections to build your Serial-to-WiFi (Hosted) application and firmware are as follows:

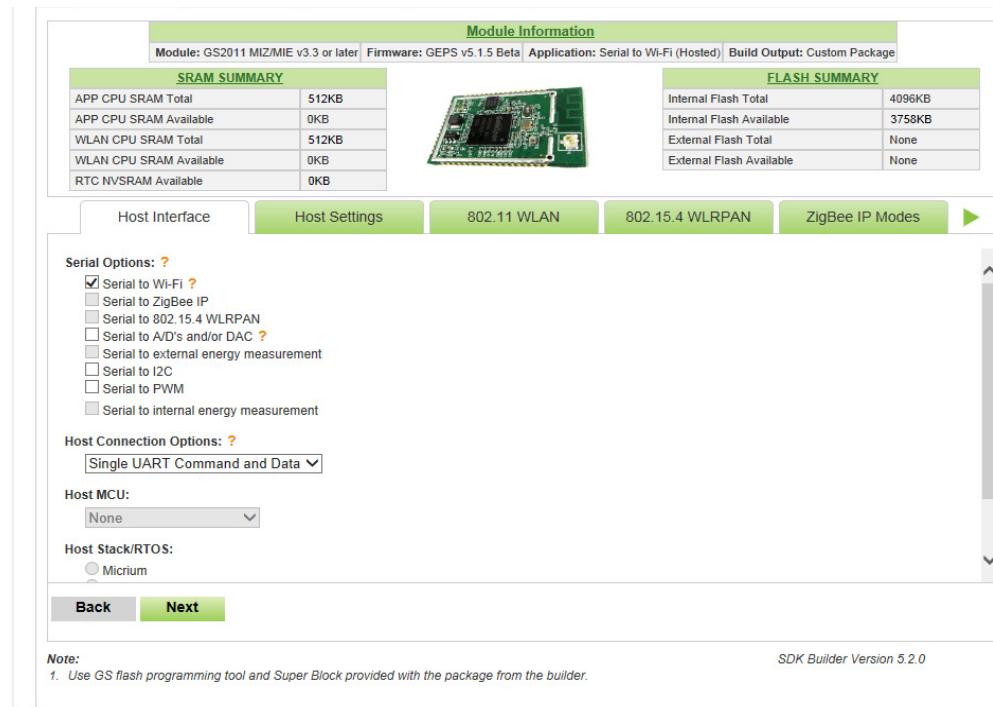
- [Host Interface, page 49](#)
- [Host Settings, page 53](#)
- [802.11 WLAN, page 55](#)
- [802.15.4 WLRPAN, page 70](#)
- [ZigBee IP Modes, page 71](#)
- [Concurrent Modes, page 72](#)
- [Networking Services, page 74](#)
- [Energy Measurement, page 84](#)
- [Provisioning, page 85](#)
- [Firmware Update, page 93](#)
- [Clock/Power Settings, page 96](#)
- [Memory Settings, page 98](#)
- [Miscellaneous, page 99](#)
- [Serial-to-WiFi Build Configuration Summary, page 101](#)

## 2.1.1 Host Interface

Figure 17, page 49 shows the Host Interface options that can be selected. These options are:

- Serial Options, page 50
- Host Connection Options, page 51

**Figure 17 Host Interface**



The Host MCU and Host Stack/RTOS aren't available for selection.



**NOTE:** A “?” next to options in the SDK Builder can be selected to open a window describing the features.

### 2.1.1.1 Serial Options

Select which Serial option you are going to configure. [Table 8, page 50](#) describes these options.

**Table 8 Host Options**

Options	Description
Serial-to-WiFi	This option is default and automatically selected. Use this option for GainSpan AT command-line interface to design, configure, and provision the GainSpan series modules in a WiFi network, using serial commands.
Serial to ZigBee IP	Select this option to use GainSpan AT command-line interface to design, configure, and provision the GainSpan series modules in a Zigbee IP network, using serial commands.
Serial to 802.15.4 WLRPAN	Select this option to use GainSpan AT command-line interface to design, configure, and provision the GainSpan series modules in a 802.15.4 WLRPAN network, using serial commands.
Serial to A/D's and/or DAC	Select this option to use a Serial Interface Analog or Digital, or a DAC (Digital to Analog Converter). It is supported only on GS2011M. 12-bit SAR A/Ds are used.
Serial to external energy measurement	Using a Serial to an external energy measurement device such as a Smart Meter.
Serial to I2C	Select this option to use GainSpan AT command-line interface to design, configure, and provision the GainSpan series modules in a Serial to I2C network, using serial commands.
Serial to PWM	Select this option to use GainSpan AT command-line interface to design, configure, and provision the GainSpan series modules in a Serial to PWM (Pulse Width Modulation) network, using serial commands.
Serial to internal energy measurement	Select this option to use a Serial to an internal energy measurement device such as a Thermostat. It is supported only on GS2100M. 16 bit Sigma Delta is used.

### 2.1.1.2 Host Connection Options

This drop-down menu allows you to select the Host Connection. [Table 9, page 51](#) describes these options.

The embedded host (e.g., MCU) can use either one of the host connection interfaces (UART/SPI/SDIO) to connect to GainSpan AT command-line interface.

Single interface can be used if both AT command/responses and data transmission/receive is required in the same interface (e.g., Single UART/SPI/SDIO Command and Data).

Dual interface can be used if AT command/responses is required in one interface and Data transmission/receive is required in another interface (e.g., Dual UART Command and Data, UART Command and SPI/SDIO data).

Use the Host Settings Tab to configure the interface settings such as baud rate, clock rate, flow control, SPI master/slave, SPI with/without DMA.

**Table 9 Host Connection Options**

Options	Description
Single UART Command and Data	Single Universal Asynchronous Receiver/Transmitter command and data.
Dual UART Command and Data	Dual Universal Asynchronous Receiver/Transmitter command and data.
Single SPI Command and Data	Single Serial Peripheral Interface.
Dual SPI Command and Data	Dual Serial Peripheral Interface.
Single SDIO Command and Data	Single Secure Digital Input Output command and data.
UART Command and SPI Data	Universal Asynchronous Receiver/Transmitter command and Serial Peripheral Interface data.
UART Command and SDIO Data	Universal Asynchronous Receiver/Transmitter command and Secure Digital Input Output data.
SPI Command and SDIO Data	Serial Peripheral Interface command and Secure Digital Input Output data.

### 2.1.1.3 Host MCU

*This option will be supported in future releases.*

### 2.1.1.4 Host Stack/RTOS

*This option will be supported in future releases.*

## 2.1.2 Host Settings

Figure 18, page 53 shows the Host Settings that are associated with the Host Interface Connection Options that have been selected under the Host Interface tab.

**Figure 18 Host Settings**

Module Information

Module: GS2100 MIP/MIE v3.1R or later | Firmware: GEPS v5.1.0 GA | Application: Serial to Wi-Fi (Hosted) | Build Output: Custom Package

SRAM SUMMARY	
APP CPU SRAM Total	512KB
APP CPU SRAM Available	0KB
WLAN CPU SRAM Total	512KB
WLAN CPU SRAM Available	0KB
RTC NVSRAM Available	0KB



FLASH SUMMARY	
Internal Flash Total	2048KB
Internal Flash Available	1820KB
External Flash Total	None
External Flash Available	None

Host Interface
Host Settings
802.11 WLAN
802.15.4 WLRPAN
ZigBee IP Modes
▶

UART0 Command

UART Baud Rate: ?

9600  19200  38400  57600  
 115200  230400  460800  921600

UART Bits Per Char: ?

8  7  6  5

UART Parity: ?

None  Odd  Even

UART Stop Bits: ?

One  Two

UART Flow Control: ?

None  Software  Hardware

Apply Command Settings to Data

UART1 Data

UART Baud Rate:

9600  19200  38400  57600  
 115200  230400  460800  921600

UART Bits Per Char:

8  7  6  5

UART Parity:

None  Odd  Even

UART Stop Bits:

One  Two

UART Flow Control:

None  Software  Hardware

Back
Next

**Note:**

1. Use GS flash programming tool and Super Block provided with the package from the builder.

SDK Builder Version 5.1.0 GA

There are several Host Interface Connection Options that are associated with the Host Settings. When changing these Host Connection options under the Host Interface tab, the Host Settings options will reflect the Host Connection Options selected. [Table 10, page 54](#) describes these options.

**Table 10 Host Settings**

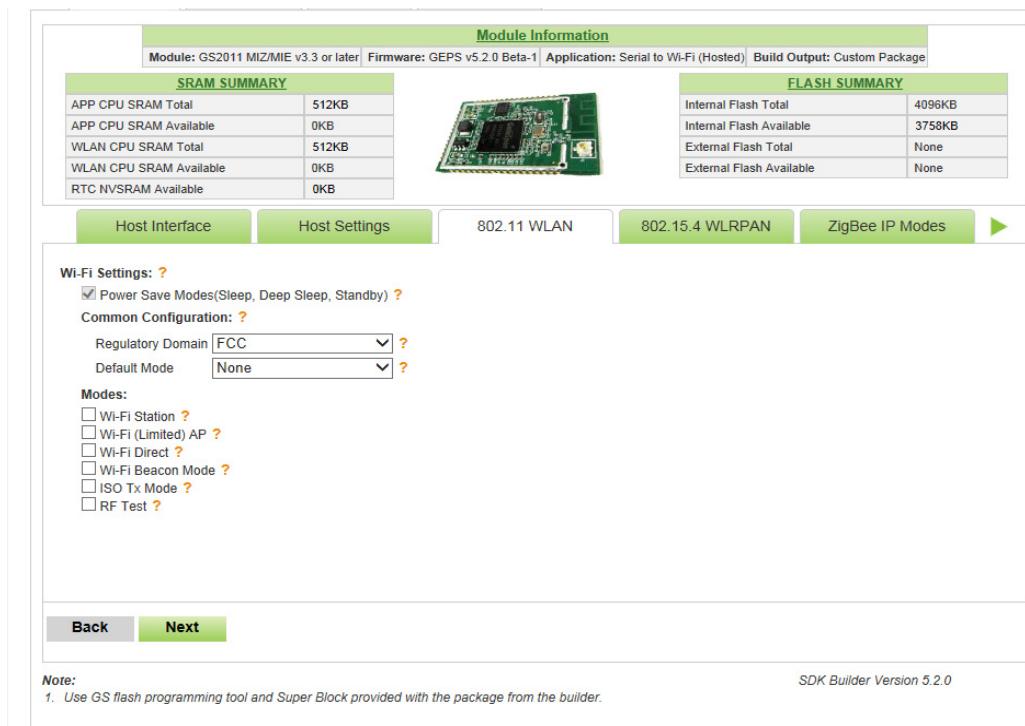
Host Interface Connection Options	Host Settings	Description
Single UART Command and Data	UART0 Command & Data	Used for Single UART Baud Rate, Bits Per Character, Parity, Stop Bits, and Flow Control settings.
Dual UART Command and Data	UART0 Command / UART1 Data	Used for Dual UART Baud Rate, Bits Per Character, Parity, Stop Bits, and Flow Control Command settings.
Single SPI Command and Data	SPI0 Command & Data	Used for Single SPI Configuration Module SPI Slave, Host SPI Master, Module SPI Master, Host SPI Slave, SPI Mode (0, 1, 3), SPI Protocol (Byte, Block with/without DMA), and SPI Master Clock Speed (6.67MHz and 10MHz).
Single SDIO Command and Data	SDIO Command & data	Used for Single SDIO Modes (in Bits) and Block Size (in Bytes) settings.
UART Command and SPI Data	UART0 Command / SPI0 Data	Used for UART Baud Rate, Bits Per Character, Parity, Stop Bits, and Flow Control, and SPI Configuration Module SPI Slave, Host SPI Master, Module SPI Master, Host SPI Slave, SPI Mode (0, 1, 3), SPI Protocol (Byte, Block with/without DMA), and SPI Master Clock Speed (6.67MHz and 10MHz).
UART Command and SDIO Data	UART0 Command / SDIO Data	Used for UART Baud Rate, Bits Per Character, Parity, Stop Bits and Flow Control settings and SDIO Mode and Block Size settings.

## 2.1.3 802.11 WLAN

Figure 19, page 55 shows the 802.11 WLAN options that can be selected. These options are:

- WiFi Settings, page 56
- 802.11 WLAN WiFi Modes, page 58

**Figure 19 802.11 WLAN**



### 2.1.3.1 WiFi Settings

The WiFi Settings Power Save Mode like Sleep, Deep Sleep, and Standby are automatically selected.

### 2.1.3.2 Common Configuration

The Common Configuration is used to configure the Default Mode and Regulatory Domain of the system. If None is configured, the default mode shall not be configured at build time. However, system defaults will be used at run time and the system shall still be in station mode. You can use AT commands to connect the system to an Access Point (AP) or bring up as WiFi Limited AP mode. Figure 20, page 56 shows the Common Configuration Regulatory Domain and Default Mode selections.

**Figure 20 Common Configuration**

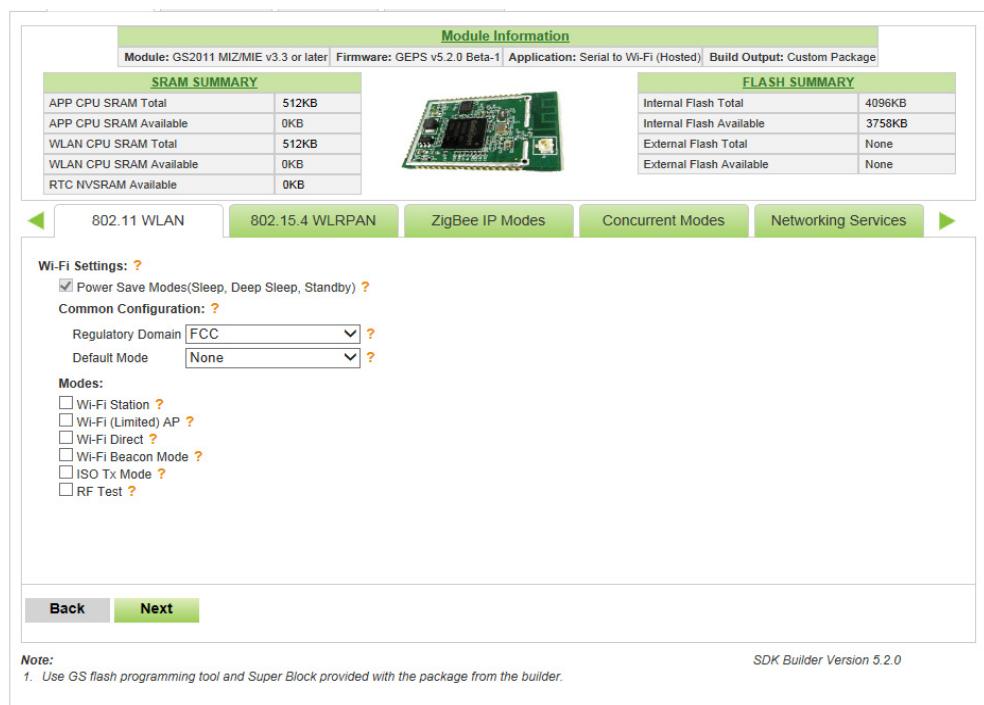


Table 11, page 57 describes the Common Configuration settings.

**Table 11 Common Configuration Settings**

Settings	Options	Description
Regulatory Domain	FCC	Federal Communications Commission is used for regulating interstate and international communications.
	ETSI	European Telecommunications Standards Institute is used for equipment makers and network operators in Europe
	TELEC	Technical regulations conformity certification is specific to radio equipment that conforms to the technical standards under the Radio Law of Japan.
Default Mode	None	This can be used to configure the default mode of the system. If None is configured, default mode shall not be configured at build time however system defaults will be used at run time and system shall still be in station mode. User has to use AT commands to connect system to an access point or bring up as Wi-Fi Limited AP etc.
	WiFi Station	If <b>WiFi Station</b> is selected, the same will be configured as default mode and the configurations under Modes: WiFi Station shall be used as build configuration. If NCM Auto start feature is enabled (under Networking Services tab > Other Networking Services > Network Connection Manager > Auto Start), these configurations will be saved in profile and NCM will automatically connect to the Access Point configured at boot time. If Auto Start is not enabled, the configurations will only be saved in profile.
	Wi-Fi (Limited) AP	Similarly you can use this to configure <b>WiFi Limited AP</b> or <b>Concurrent Mode (STA+AP)</b> as default modes and use NCM Auto Start feature to start the WiFi Limited AP or Concurrent Mode (STA+AP) respectively with configured parameters at boot time. When selecting Concurrent (STA+AP) mode under Default Mode, the values for Beacon Interval is 100 fixed and Stations Supported value range is 1 to 16, default is 8.
	Wi-Fi Direct	<b>WiFi Direct (P2P)</b> can also be selected as default mode and if done the configurations under Modes: WiFi Direct shall be stored into profile and the system will be in this mode at boot time. You can issue specific P2P commands to operate the system in this mode.
	ISO Tx Mode	<b>ISO Tx Mode</b> is a special mode and NCM Auto Start is not supported. If <b>ISO Tx Mode</b> is selected as Default mode, the configurations shall be stored just into profile and the system will be in this mode at boot time and you have to use specific ISO Tx AT commands to operate the system in this mode.
	Concurrent (STA+AP) - (see 2.1.6 Concurrent Modes, page 72)	

### 2.1.3.3 802.11 WLAN WiFi Modes

The WiFi Modes allow configuring (build time) GainSpan module to work as a WiFi Station, WiFi (Limited) AP, etc. Each of these modes allows specific configurations to be set at build time and in turn save embedded host (code space) to issue AT commands to configure at run time. You can also configure GainSpan module to start automatically in WiFi Station or AP mode at boot time using NCM (Network Connection Manager) auto start feature available under Networking Services tab > Other Networking Services > Network Connection Manager > Auto Start (this feature is not enabled by default).

The following Modes can be selected.

- [WiFi Station, page 59](#)
- [WiFi \(Limited\) AP, page 64](#)
- [WiFi Direct, page 67](#)
- [WiFi Beacon Mode, page 68](#)
- [ISO Tx Mode, page 69](#)
- [RF Test, page 69](#)

## WiFi Station

Figure 21, page 59 shows the 802.11 WLAN WiFi Station mode. By default WiFi Station is configured as default mode and if NCM Auto start feature is enabled, these settings will be saved in profile and NCM will automatically connect to the Access Point configured at boot time. If Auto Start is not enabled, only the settings will be saved in profile. To expand or collapse the advanced WiFi Station settings, click the plus sign (+) or minus sign (-).

**Figure 21 WiFi Station**

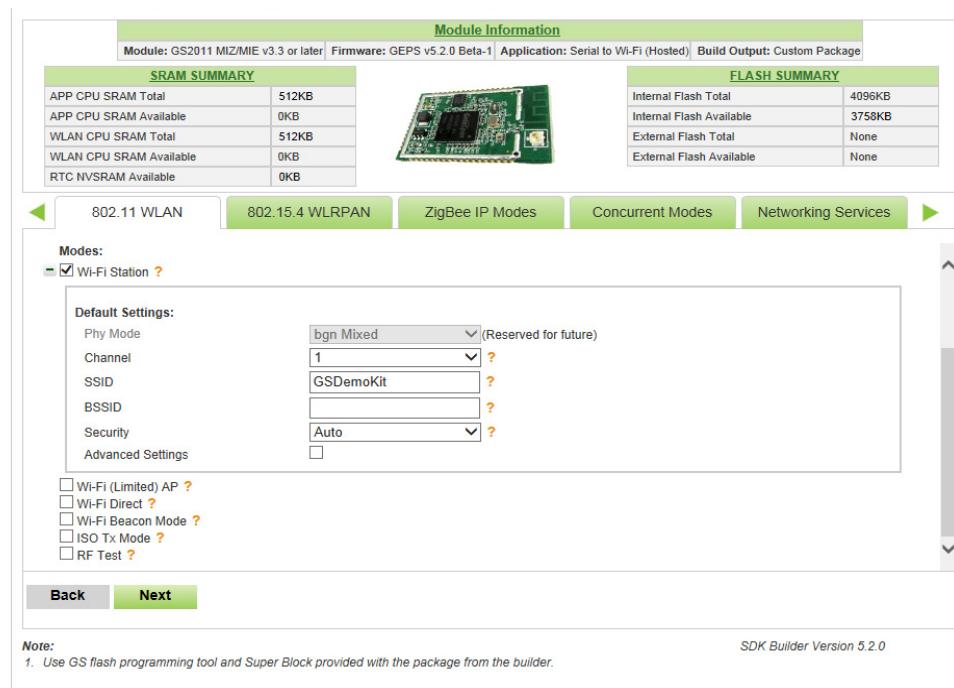


Table 12, page 59 describes the WiFi Station mode settings.

**Table 12 WiFi Station Mode Settings**

Settings	Options	Description
Phy Mode	bgn Mixed	This option is grayed out. <i>Reserved for future use.</i>
Channel	1 through 11 (FCC) 1 through 13 (ETSI) 1 through 14 (TELEC)	These are the WiFi Channel numbers to select. The number of channels are different for each regulatory domain.
SSID	Can be any combination of symbols and alphanumeric characters (up to 19 characters in length) Default is GSDemoKit.	The Service Set Identifier name used to uniquely identify a wireless network.
BSSID	Can be any combination of symbols and alphanumeric characters (up to 19 characters in length).	The Basic Service Set Identifier to describe associated clients.

**Table 12 WiFi Station Mode Settings (Continued)**

Settings	Options	Description
	Auto	The Station can connect to an access point to any security.
	Open	The security type is Open, meaning no authentication is being used.
Security	<b>WEP</b>	<p>Wired Equivalent Privacy is a security protocol for wireless networks that will encrypt transmitted data.</p> <p>When selecting WEP the following additional options will display:</p> <ul style="list-style-type: none"> <li>• WEP Auth Mode - Open or Shared</li> <li>• WEP Key Index - 1 through 4</li> <li>• WEP Key* - Enter a WEP key associated with the WEP</li> </ul> <p><b>Note:</b> Refer to the Serial-to-WiFi Adapter Programmer Reference Guide for complete description and values used for WEP security settings.</p>
	<b>WPA Personal</b>	<p>WiFi Protected Access protects unauthorized network access by utilizing a network password/key that encrypts data.</p> <p>When selecting WPA Personal the following additional options will display:</p> <ul style="list-style-type: none"> <li>• Passphrase - A string containing between 8 and 63 ASCII characters used as a seed to create the WPA pre-shared key (PSK).</li> <li>• Confirm Passphrase - Reenter the passphrase to confirm.</li> </ul> <p><b>Note:</b> Refer to the Serial-to-WiFi Adapter Programmer Reference Guide for complete description and values used for WPA Personal security settings.</p>
<p><b>Note:</b> The TKIP protocol will be used for WPA Personal.</p>		

**Table 12 WiFi Station Mode Settings (Continued)**

Settings	Options	Description
Security (cont.)	<b>WPA2 Personal</b>	<p>WiFi Protected Access protects unauthorized network access by utilizing a network password/key that encrypts data. WPA2 is the latest version of WiFi Protected Access being used.</p> <p>When selecting WPA2 Personal the following additional options will display:</p> <ul style="list-style-type: none"> <li>• Passphrase - A string containing between 8 and 63 ASCII characters used as a seed to create the WPA2 pre-shared key (PSK).</li> <li>• Confirm Passphrase - Reenter the passphrase to confirm.</li> </ul>
	<b>Note:</b> Refer to the Serial-to-WiFi Adapter Programmer Reference Guide for complete description and values used for WPA2 Personal security settings.	
	<b>Note:</b> The AES protocol will be used for WPA2 Personal.	
	<b>WPA/WPA2 Enterprise</b>	<p>WiFi Protected Access protects unauthorized network access by authenticating individual users to an external server via a user name and password. Gives a unique encryption key.</p> <p>When selecting WPA Enterprise the following additional options will display:</p>
	<ul style="list-style-type: none"> <li>• <sup>1</sup>EAP Type - Select one of the following (see Note 1): <ul style="list-style-type: none"> <li>- EAP-FAST/GTC</li> <li>- EAP-FAST/MSCHAPv2</li> <li>- EAP-TTLS/MSCHAPv2</li> <li>- PEAPv0/EAP-MSCHAPv2</li> <li>- PEAPv1/EAP-GTC</li> <li>- EAP-TLS</li> </ul> </li> <li>• EAP Username - The user name is an ASCII string with a maximum length of 32 ASCII characters.</li> <li>• EAP Password - The password is an ASCII string with a maximum length of 32 ASCII characters.</li> <li>• Confirm EAP Password - Reenter the EAP password.</li> <li>• Certificate Upload (update in DER/PEM format) - Upload</li> <li>• CA Root Certificate - The name of the CA Certificate to be used for Server Certificate Authentication in case SSL is enabled. The CA Certificate must be provisioned before this. It uses the certificate configuration on the GS node identified by the certificate name.</li> <li>• Client Certificate - The client certificate name is required for SSL client authentication and must be provisioned before using this parameter.</li> <li>• Client Key - The client key name is required for SSL client authentication and must be provisioned before using this parameter.</li> </ul>	<p><b>Note:</b> Refer to the Serial-to-WiFi Adapter Programmer Reference Guide for complete description and values used for WPA Enterprise security settings.</p>
<b>Note:</b> WPA Enterprise uses TKIP protocol and WPA2 Enterprise uses AES protocol.	Time Settings	Set node time to current UTC time.

**Table 12 WiFi Station Mode Settings (Continued)**

<b>Settings</b>	<b>Options</b>	<b>Description</b>
Advanced Settings	MAC Level Ack Missing Count*	MAC level acknowledgment missing counter.
	MAC Level Retries Count*	MAC level retry count is the maximum number of times a data packet is retransmitted. If an 802.11 ACK is not received. Allows 8 retries.
	Scan Time* (milisec)	This is used to set the minimum and maximum scan time per channel. 150 is the default value and it can take values from 5-16000.
Radio Rx Configuration - Radio Rx Mode	Always On	When selecting Always On, the Power Save Mode is turned off.
	Power Save	When selected, Radio receiver will be in Power save mode based on one of the Wake up options selected.
	Wake Up Options	<ul style="list-style-type: none"> <li>• Every Beacon - When this option is selected, the Radio receiver shall wake up for every beacon received from the Access Point.</li> <li>• Listen Interval - When this option is selected and Listen Interval configured, the Radio receiver shall wake up based on Listen Interval value configured and the same will be advertised in Association Request sent by the Station. Listen interval can take values between 1 to 65535. However it is recommended if this option is used to use a smaller value (e.g., 5).</li> <li>• DTIM Interval - When this option is selected, the Radio receiver shall wake up for every DTIM Interval configured on the Access Point.</li> <li>• Custom Interval - When this option is selected and Custom Interval configured, the Radio receiver shall wake up based on custom interval value configured. Listen interval can take values between 1 to 65535. However it is recommended if this option is used to use a smaller value (e.g., 5).</li> </ul>
	Sync Loss Interval*	This configures the synchronization loss interval from the access point if the GainSpan Station does not receive the beacons for the interval configured. For example, If 100 (default value) is configured as Sync Loss Interval, then the GainSpan station will indicate synchronization loss if it does not receive 100 beacons.
	Listen Multicast (Yes/No)	This is used to enable or disable Multicast and Broadcast reception.
	Keep Alive Timer*	This is used by the GainSpan station to indicate to the Access Point that the station is still connected to the AP in case of inactivity. This will be triggered every Keep Alive Time configured (e.g., every 45 seconds if configured value is 45) after station is associated to the Access Point.

Note: 1. EAP Type (References - RFC 3748, RFC 2284, RFC 5247, RFC 5281, RFC 5216, RFC 2759):

EAP-FAST/GTC - Flexible Authentication via Secure Tunnel (FAST) is very similar to PEAP. FAST was created as an alternative to PEAP that allows for faster re-authentications and supports faster wireless roaming. Just like PEAP, FAST forms a TLS outer-tunnel and then transmits the client credentials within that TLS tunnel. Where FAST differs from the PEAP is the ability to use Protected Access Credentials (PACs). A PAC can be thought of like a secure cookie, stored locally on the host as proof of a successful authentication. EAP-Generic Token Card (GTC). This inner method was created to allow generic authentication to virtually any identity store.

EAP-FAST/MSCHAPv2 - Flexible Authentication via Secure Tunnel (FAST) is very similar to PEAP. FAST as an alternative to PEAP that allows for faster re-authentications and supports faster wireless roaming. Just like PEAP, FAST forms a TLS outer-tunnel and then transmits the client credentials within that TLS tunnel. Where FAST differs from the PEAP is the ability to use Protected Access Credentials (PACs). A PAC can be thought of like a secure cookie, stored locally on the host as proof of a successful authentication. Using this inner method, the client's credentials are sent to the server encrypted within an MSCHAPv2 session. This is the most common inner method, as it allows for simple transmission of username and password, or even computer-name and computer-passwords to the RADIUS server, which in-turn will authenticate them.

EAP-TTLS/MSCHAPv2 - EAP-TTLS (Tunneled Transport Layer Security) is designed to provide authentication that is as strong as EAP-TLS, but it does not require that each user be issued a certificate. Instead, only the authentication servers are issued certificates. User authentication is performed by password, but the password credentials are transported in a securely encrypted tunnel established based upon the server certificates. Using this inner method, the client's credentials are sent to the server encrypted within an MSCHAPv2 session. This is the most common inner method, as it allows for simple transmission of usernames and passwords, or even computer-name and computer-passwords, to the RADIUS server, which in turn will authenticate them.

PEAPv0/EAP-MSCHAPv2 - Protected EAP. PEAP will form a potentially encrypted TLS tunnel between the client and server, using the x.509 certificate on the server in much the same way the SSL tunnel is established between a web browser and a secure website. After the tunnel has been formed, PEAP will use another EAP type as an inner method – authenticating the client using EAP within the outer tunnel. Using this inner method, the client's credentials are sent to the server encrypted within an MSCHAPv2 session. This is the most common inner method, as it allows for simple transmission of usernames and passwords, or even computer-name and computer-passwords, to the RADIUS server, which in turn will authenticate them.

PEAPv1/EAP-GTC - Protected EAP. PEAP will form a potentially encrypted TLS tunnel between the client and server, using the x.509 certificate on the server in much the same way the SSL tunnel is established between a web browser and a secure website. After the tunnel has been formed, PEAP will use another EAP type as an inner method – authenticating the client using EAP within the outer tunnel. EAP Generic Token Card (GTC). This inner method was created as an alternative to MSCHAPv2 that allows generic authentications to virtually any identity store, including One-Time-Password (OTP) token servers, LDAP, and more. EAP-TLS - An EAP type that uses TLS (Transport Layer Security) to provide the secure identity transaction. This is very similar to SSL and the way encryption is formed between your web browser and a secure website. EAP-TLS has the benefit of being an open IETF standard, and is considered universally supported. EAP-TLS uses X.509 certificates and provides the ability to support mutual authentication, where the client must

trust the server's certificate, and vice-versa. It is considered among the most secure EAP Types, since password capture is not an option; the endpoint must still have the private-key.

### WiFi (Limited) AP

Figure 22, page 64 shows the 802.11 WLAN WiFi (Limited) AP mode. To expand or collapse the advanced WiFi (Limited) AP mode settings, click the **plus sign (+)** and **minus sign (-)** next to WiFi (Limited) AP.

**Figure 22 WiFi Limited AP**

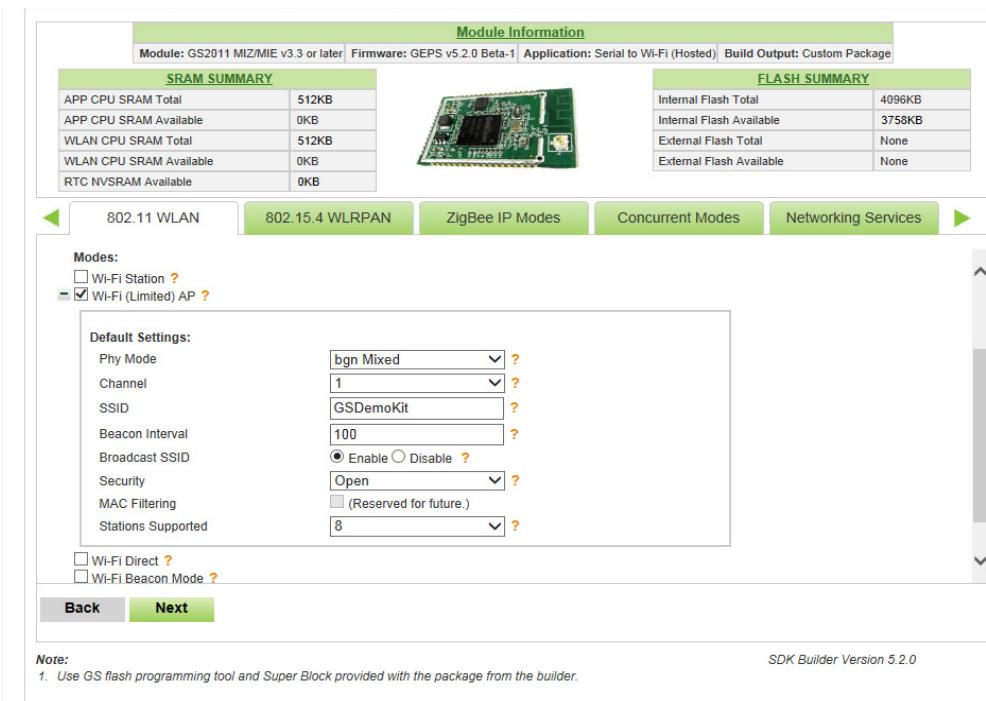


Table 13, page 65 describes the WiFi Limited AP mode settings.

**Table 13 WiFi Limited AP Mode Settings**

Settings	Options	Description
Phy Mode	bgn Mixed	This is the PHY mode configuration only applicable to WiFi Limited AP. When configured with one of the values, WiFi Limited AP shall operate as an AP in this PHY mode with corresponding supported rates.
	bg Mixed	
	gn Mixed	
	g only	
	b only	
Channel	1 through 11 (FCC) 1 through 13 (ETSI) 1 through 14 (TELEC)	Select a Channel number associated with the WiFi settings.
SSID	Can be any combination of symbols and alphanumeric characters (up to 32 characters in length). Default is GSDemoKit.	This is the SSID of the access point to which the WiFi Stations should connect to. Can be from 1-32 ASCII characters.
Beacon Interval	Range 50 to 1500 (in milliseconds)	The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the router synchronized to the wireless network. Beacon Interval range from 50 to 1500. Beacon Interval range of 50 is recommended in poor reception.  When selecting Concurrent (STA+AP) mode under Default Mode under the 802.11 WLAN tab, the values for Beacon Interval is 100 fixed for Limited AP mode.
Broadcast SSID	Enabled or Disabled	Enable - enables broadcasting of your network transmitting a service set identifier (SSID) so devices with a wireless network adapter can see the networks range of their device to attempt connection.  Disable - disables broadcasting of the SSID.

**Table 13 WiFi Limited AP Mode Settings (Continued)**

Settings	Options	Description
Security	Open	The security type is Open, meaning no authentication is being used.
	WEP-40 (Open) - ( <i>not available in this release</i> )	Wired Equivalent Privacy (Open) is a security protocol for wireless networks that will encrypt transmitted data. This is a 40-bit key containing 10 hexadecimal digits.
	WPA and WPA2-Personal	Used to protect unauthorized network access by using a network password/key that encrypts data. WPA personal uses TKIP encryption for both unicast and broadcast traffic. WPA2 uses AES encryption for both unicast and broadcast traffic.
	WPA/WPA Personal (Mixed)	Used to protect unauthorized network access by using a network password/key that encrypts data. It uses AES encryption for unicast traffic and TKIP for broadcast traffic.
	WiFi Protected Access protects unauthorized network access by utilizing a network password/key that encrypts data. When selecting WPA2 Personal the following additional options will display: <ul style="list-style-type: none"><li>• Passphrase - A string containing between 8 and 63 ASCII characters used as a seed to create the WPA2 pre-shared key (PSK).</li><li>• Confirm Passphrase* - Reenter the passphrase to confirm.</li></ul> <b>Note: Refer to the Serial-to-WiFi Adapter Programmer Reference Guide for complete description and values used for WPA2 Personal security settings.</b>	
MAC Filtering	This option is grayed out.	This option is grayed out. <i>Reserved for future use.</i>
Stations Supported	1 through 64	The number of stations associated with the Limited access point. When selecting Concurrent (STA+AP) mode under Default Mode under the 802.11 WLAN tab for Limited AP mode, the values for Stations Supported range is 1 to 16, default is 8.

## WiFi Direct

Selecting this option enables devices to connect easily with each other without requiring a wireless access point and to communicate at typical WiFi speeds. [Figure 23, page 67](#) shows the 802.11 WLAN WiFi Direct mode. To expand or collapse the advanced WiFi Direct mode settings, click the **plus sign (+)** and **minus sign (-)** next to WiFi Direct.

**Figure 23 WiFi Direct**

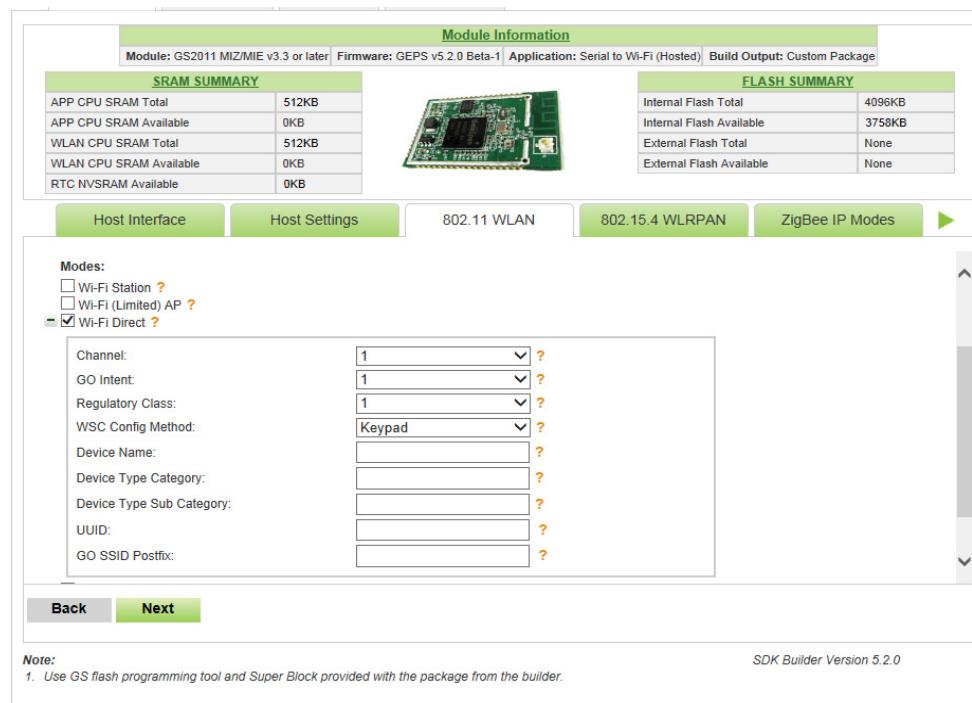


Table 14, page 68 describes the WiFi Direct mode settings.

**Table 14 WiFi Direct Mode Settings**

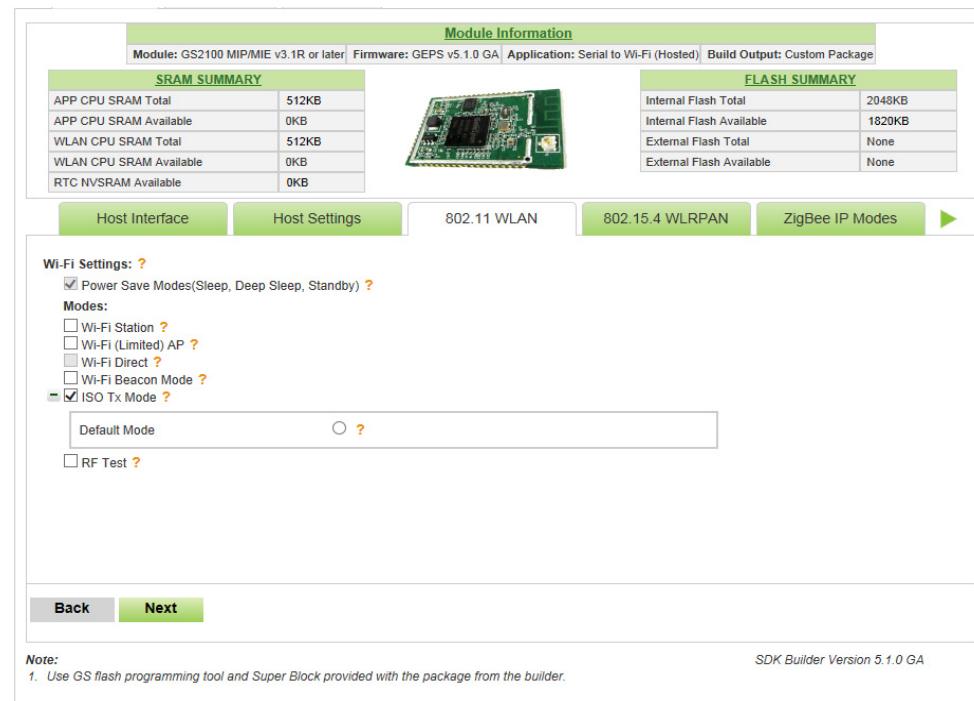
Settings	Options	Description
Channel	FCC (1 through 11)	The number of WiFi channels depends on the type of regulatory domain selected
	ETSI (1 through 13)	
	TELEC (1 through 14)	
GO Intent	1 through 15	The GO intent value is used for group negotiation.
Regulatory Class	FCC (1 through 11)	The regulatory domain in which the device or system works in. The channel numbers are selected based on Regulatory Domain selected in the Default Mode under Common Configurations.
	ETSI (1 through 13)	
	TELEC (1 through 14)	
WSC Config Method	Keypad	This is the WPS configuration methods supported.
	Display	
	Push Button	
Device Name	Enter a unique device name	This is a unique device name that identifies the device.
Device Type Category	Refer to the P2P specification for device categories.	This is the primary Device Type Category used by the P2P Device.
Device Type Sub Category	Refer to the P2P specification for device subcategories.	This is the Device Sub Category used by the P2P Device.
UUID	Enter a 32-bit UUID	This is a 32-bit Universal Unique Identifier used by a P2P device.
GO SSID Postfix	Enter a SSID Group Owner	This is an SSID post fix to be used when creating the Group Owner. If not provided it will be generated.

#### WiFi Beacon Mode

Beacon mode or Unassociated Mode is a special Mode to receive and transmit frames on WLAN interface without association.

**ISO Tx Mode**

Figure 24, page 69 shows the 802.11 WLAN WiFi ISO Tx mode. To expand or collapse the advanced ISO Tx mode settings, click the **plus sign** (+) and **minus sign** (-) next to ISO Tx mode. Selecting this option enables special mode to broadcast ISO 24730-2 60MHz beacons (for RTLS).

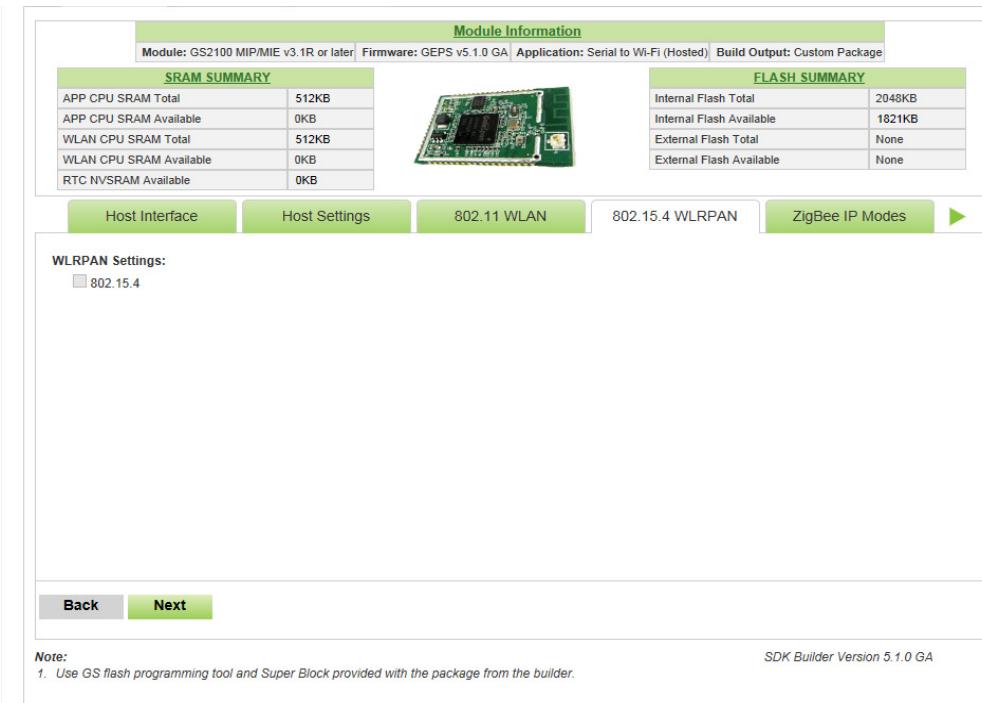
**Figure 24 ISO Tx Mode****RF Test**

Supports different types of frame transmission for RF capability measurement. It supports asynchronous data transmission/reception and modulated/un-modulated wave transmission.

## 2.1.4 802.15.4 WLRPAN

Figure 25, page 70 shows the 802.15.4 WLRPAN options that can be selected. This option is automatically selected when Serial to ZigBee IP or Serial to 802.15.4 WLRPAN is selected. This will turn on the media access control for low-rate wireless personal area networks. This can be used with standard Internet protocols.

Figure 25 802.15.4 WLRPAN

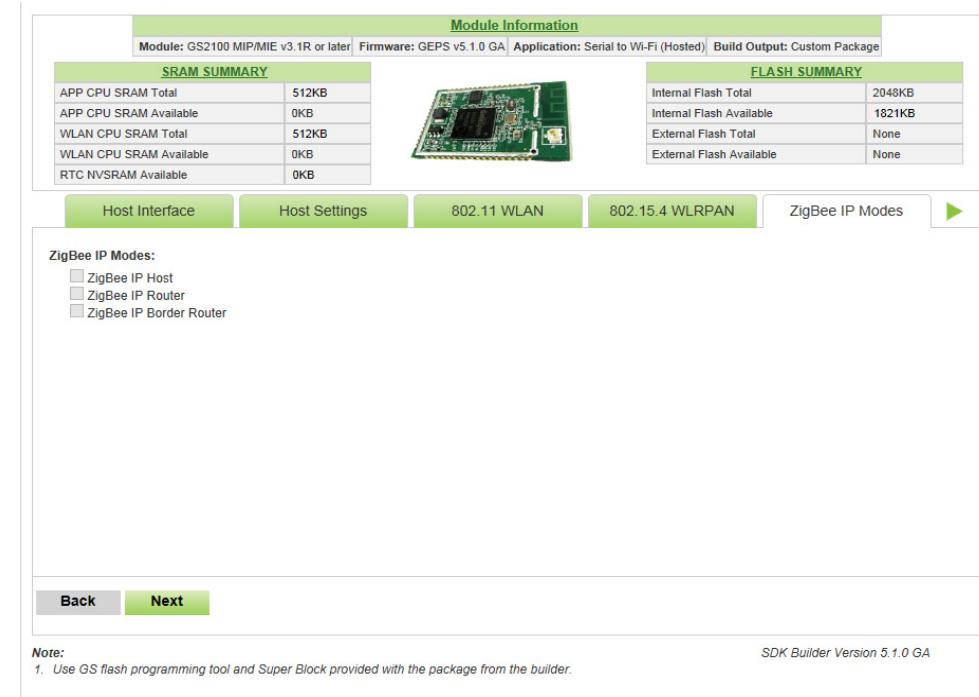


For a description of WLAN 802.15.4 supported AT commands and security attributes, refer to the *GainSpan Serial-to-WiFi Adapter Application Programmer Reference Guide*.

## 2.1.5 ZigBee IP Modes

Figure 26, page 71 shows the ZigBee IP Modes that can be selected. These modes are automatically selected when Serial to Zigbee IP is selected. Zigbee IP Host and Zigbee IP Border Router modes are supported.

**Figure 26 ZigBee IP Modes**



The following ZigBee Modes supports several device types:

- ZigBee IP Host - this mode performs specific sensing or control functions (supported).
- ZigBee IP Router - this mode extends the range of networks to be used to control networks (not supported).
- ZigBee IP Border Router - this mode extends the networks for Internet control access (supported).

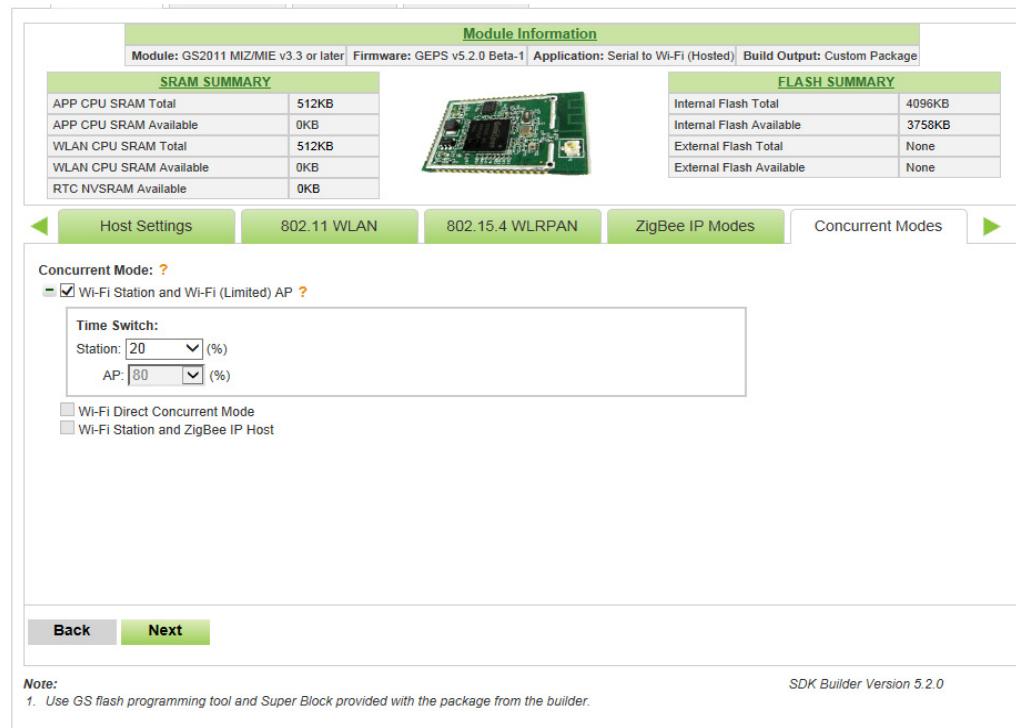
An example using ZigBee modes within a network would be a smart home, the coordinator may be a programmable thermostat with support for in-home display. Devices such as smart plugs, thermostats and smart appliances could be configured as routing devices. Simple devices such as smart appliances and temperature sensors could be end devices.

## 2.1.6 Concurrent Modes

Figure 27, page 72 shows the Concurrent Modes options that can be selected. These options are:

- WiFi Station and WiFi (Limited) AP, page 73
- WiFi Direct Concurrent Mode, page 73
- WiFi Station and ZigBee IP Host, page 73

**Figure 27 Concurrent Modes**



### 2.1.6.1 WiFi Station and WiFi (Limited) AP

Selecting this option will indicate the combined operating mode for WiFi adapter acting as a client that connects to a WiFi access point (usually a router) to a wireless network as well as using the adapter acting as an access point to enable other adapters to connect to it.

This allows the GS2000 to behave both as STA and AP together (using Time Division on a single radio). It has the ability to switch between the two without loss of context. The application views it as two interfaces available at the same time.

[Table 15, page 73](#) describes the WiFi Station and WiFi (Limited) AP Time Switch percentages.

**Table 15 WiFi Station and WiFi (Limited) AP Settings**

Station	AP
10%	90%
20%	80%
30%	70%

### 2.1.6.2 WiFi Direct Concurrent Mode

Selecting this option will allow a WiFi direct device to take on the role of a Client and a P2P Group Owner. It also can be executed simultaneously by the same device (concurrent mode).

### 2.1.6.3 WiFi Station and ZigBee IP Host

*Reserved for future use.*

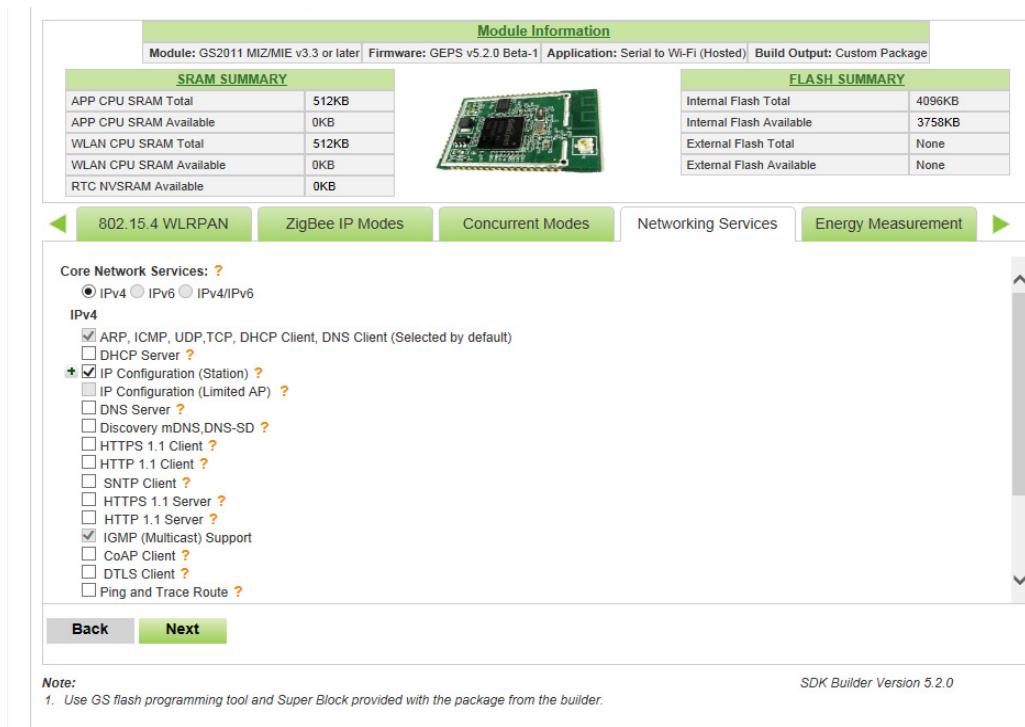
Selecting this option will indicate the combined operating mode for WiFi adapter acting as a client that connects to a WiFi access point (usually a router) to a wireless network as well as an IP Host.

## 2.1.7 Networking Services

Figure 28, page 74 shows the Networking Services options that can be selected. These options are:

- Core Network Services, page 74
- IPv4 and IPv6, page 75
- Other Networking Services, page 81

**Figure 28 Networking Services**



### 2.1.7.1 Core Network Services

The Core Network Services supported are IPv4, IPv6, and IPv4/IPv6.

### 2.1.7.2 IPv4 and IPv6

There are several network services for IPv4 and IPv6 that can be selected. Both IPv4 and IPv6 Network stack are supported. Choose either IPv4 or IPv6 stack required. Support for dual stack will be available in future. Required network service can be chosen and configured from the below list of services (see [Table 16, page 75](#)).

**Table 16 IPv4 and IPv6 Network Services Settings**

Settings	Options	Description
ARP, ICMP, UDP, TCP, DHCP Client, DNS Client, IPV4, IPV6	This box is automatically selected.	<p>ARP - Address Resolution Protocol used for resolution of network layer addresses.</p> <p>ICMP - Internet Control Message Protocol used by network devices like routers.</p> <p>UDP - User Datagram Protocol is a set of network protocols used in Internet.</p> <p>TCP - Transmission Control Protocol are core protocols used when devices are connected to the Internet.</p> <p>DHCP Client - Dynamic Host Configuration Protocol used by servers on an IP network to allocate IP addresses to computers.</p> <p>DNS Client - is the client component that resolves and caches Domain Name System (DNS) domain names.</p> <p>IPV4 - Internet Protocol Version 4 is used to route most traffic on the Internet.</p> <p>IPV6 - Internet Protocol Version 6 is used to route most traffic on the Internet.</p>
DHCP Server	No of Address	The number of clients to be supported by the DHCP server.
	Lease Time (Seconds)	This is the amount of time the IP address (provided by DHCP server to its clients) is leased for. By default it is set to 1 day (86400 seconds).
IP Configuration (Station)	Check box selection	This will enable if 802.11 WLAN and WiFi Station is selected. This can be used to configure GainSpan Station to use DHCP client to obtain IP address from DHCP server configured in the network, or use Static IP address configuration.
IP Configuration (Limited AP)	Check box selection	This will enable if 802.11 WLAN and WiFi (Limited AP) is selected. This can be used to configure the Limited AP's address, Subnet Mask, and Default Gateway.

**Table 16 IPv4 and IPv6 Network Services Settings (Continued)**

Settings	Options	Description
DNS Server	Static DNS IP 1	First DNS Server Static IP address to be used.
	Static DNS IP 2	Second DNS Server Static IP address to be used.
	Static DNS IP 3	Third DNS Server Static IP address to be used.
Discovery mDNS, DNS-SD (Station)	Host Name	Unique Host Name (name should be unique).
	Domain Name	Enter the Local Domain Name.
	Service Instance Name	Unique Service Instance Name (name should be unique).
	Service Sub Type	Array of service type identifiers.
	Service Type (HTTP, HTTPS, DNS-SD)	HTTP - Hypertext Transfer Protocol. HTTPS - Hypertext Transfer Protocol Secure (uses for secure communication over network). DNS-SD - DNS Services Discovery (uses standard DNS programming interfaces, servers, and packet formats to browse the network for services).
	Protocol (TCP, UDP)	Transmission Control Protocol - is a connection-oriented protocol. When a file or message is sent it will get delivered unless connections fail. If connection is lost, the server will request the lost part. There is no corruption when transferring a message.  User Datagram Protocol - is a connectionless protocol. When you send data or message, there could be corruption while transferring the message.
	Port	Port number associated with the type of server (80 for HTTP, 443 for HTTPS).
	Default Key (0,1, 2)	This is used by GainSpan as default key value pairs to be used with iPhone/Android mobile applications.  <b>For example:</b> 0 - can be used if only web applications are used to discover the service. 1 - can be used if Provisioning service is to be discovered using iPhone/Android Provisioning application. 2 - can be used if Over the Air Firmware Upgrade (OTAFU) service is to be discovered using iPhone/Android OTAFU application.

**Table 16 IPv4 and IPv6 Network Services Settings (Continued)**

<b>Settings</b>	<b>Options</b>	<b>Description</b>
Discovery mDNS, DNS-SD (Station) - (Continued)	Text Record	This is specific to each type of service. Any new service type needs to define format or text record.  <b>For example:</b> For provisioning GainSpan uses path=/gsprov.html as the text record and for OTA FU it uses path=otafu.html. These are used with Web based discovery of services.
	Auto Correct (Enable, Disable)	Enable - Enables auto correct. Disable - Disables auto correct.
	Scope (Enable, Disable)	Enable - Enables scope. Disable - Disables scope.
	Conflict Detect (Yes, No)	Yes - System can detect a conflict. No - System will not detect conflict.
	TTL (Range 0 to 255)	Transistor-transistor logic range.
Discovery mDNS, DNS-SD (Limited AP)	Host Name	Unique Host Name (name should be unique).
	Domain Name	Enter the Local Domain Name.
	Service Instance Name	Unique Service Instance Name (name should be unique).
	Service Sub Type	Array of service type identifiers.
	Service Type (HTTP, HTTPS, DNS-SD)	HTTP - Hypertext Transfer Protocol. HTTPS - Hypertext Transfer Protocol Secure (uses for secure communication over network). DNS-SD - DNS Services Discovery (uses standard DNS programming interfaces, servers, and packet formats to browse the network for services).
	Protocol (TCP, UDP)	Transmission Control Protocol - is a connection-oriented protocol. When a file or message is sent it will get delivered unless connections fail. If connection is lost, the server will request the lost part. There is no corruption when transferring a message.  User Datagram Protocol - is a connectionless protocol. When you send data or message, there could be corruption while transferring the message.
	Port	Port number associated with the type of server (80 for HTTP, 443 for HTTPS).

**Table 16 IPv4 and IPv6 Network Services Settings (Continued)**

Settings	Options	Description
Discovery mDNS, DNS-SD (Limited AP) - (Continued)	Default Key (0,1, 2)	<p>This is used by GainSpan as default key value pairs to be used with iPhone/Android mobile applications.</p> <p><b>For example:</b></p> <p>0 - can be used if only web applications are used to discover the service.</p> <p>1 - can be used if Provisioning service is to be discovered using iPhone/Android Provisioning application.</p> <p>2 - can be used if Over the Air Firmware Upgrade (OTA FU) service is to be discovered using iPhone/Android OTA FU application.</p>
	Host Name	Unique Host Name (name should be unique).
	Text Record	This is specific to each type of service. Any new service type needs to define format or text record.
	Auto Correct (Enable, Disable)	<p><b>For example:</b> For provisioning GainSpan uses path=/gsprov.html as the text record and for OTA FU it uses path=otafu.html. These are used with Web based discovery of services.</p> <p>Enable - Enables auto correct.</p> <p>Disable - Disables auto correct.</p>
	Scope (Enable, Disable)	<p>Enable - Enables scope.</p> <p>Disable - Disables scope.</p>
	Conflict Detect (Yes, No)	<p>Yes - System can detect a conflict.</p> <p>No - System will not detect conflict.</p>
	TTL (Range 0 to 255)	Transistor-transistor logic range.
HTTPS 1.1 Client	Authorization (Basic)	HTTP clients using basic authentication.
	Host IP	IP address of the Host computer.
HTTP 1.1 Client	Authorization (Basic)	Use this option if only HTTP 1.1 Client (No HTTPS Client) is required. This is used to configure the Basic authorization used to connect to HTTP server.
	Host IP	IP address of the HTTP server.
SNTP Client	NTP Server IP	The Simple Network Time Protocol IP address.
	Timeout	The Simple Network Time Protocol Timeout.
	Periodicity (Once, Periodic)	Allow only Once, or set time sync frequency.
	Time Sync Frequency	This option displays when selecting Periodicity. Set the time frequency in seconds.

**Table 16 IPv4 and IPv6 Network Services Settings (Continued)**

<b>Settings</b>	<b>Options</b>	<b>Description</b>
HTTPS 1.1 Server	User Name	The name given for this HTTPS server.
	Password	Password associated with the HTTPS Server user name.
	Confirm Password	Re-enter the password given for the HTTPS Server to confirm.
	URI	The HTTPS Uniform Resource Identifiers.
	Content Type (XML, HTML, JSON, GIF)	XML - Extensible Markup Language HTML - Hypertext Markup Language JSON - JavaScript Object Notation GIF - Graphics Interchange Format
	No of Client Allowed	Allow the HTTPS server to accept a request from a specified number of clients.
	Idle Timeout	The idle connection time out setting for the HTTPS server in seconds.
HTTP 1.1 Server	User Name	The name given for this HTTP server.
	Password	Password associated with the HTTP Server user name.
	Confirm Password	Re-enter the password given for the HTTP Server to confirm.
	URI	Uniform Resource Identifier used to identify a name of a web resource.
	Content Type (XML, HTML, JSON, GIF)	XML - Extensible Markup Language HTML - Hypertext Markup Language JSON - JavaScript Object Notation GIF - Graphics Interchange Format
	No of Clients Allowed	Allow the HTTP server to accept a request from a specified number of clients.
	Idle Timeout	The idle connection time out setting for the HTTP server in seconds.
IGMP (Multicast) Support	Check box selection	Internet Group Management Protocol Multicast Support is used by hosts and routers on IP networks to establish multicast group memberships. This is used for many networking applications such as online streaming video.
RTP/RTSP	Check box selection	Real-time Transport Protocol (RTP) - Used for delivering audio and video over IP networks. Real Time Streaming Protocol (RTSP) - Used to establish and control streaming media sessions between endpoints.

**Table 16 IPv4 and IPv6 Network Services Settings (Continued)**

Settings	Options	Description
CoAP Client	Check box selection	Constrained Application Protocol is a software protocol that allows devices to communicate over the Internet.
DTLS Client	Check box selection	Datagram Transport Layer Security provides communications privacy for application that use datagram transport protocols and allows client application to communicate in a way that is design to prevent eavesdropping and detect tampering or message forgery.
Ping and Trace Route	Variable Packet Size	The Ping will determine whether or not a specific IP address is accessible, while the trace route will trace a packet from a computer to an Internet host showing how many hops the packet requires to reach the host and how long each hop takes.  Select this option to enable configuration of variable ping packet size up to maximum of 1400 bytes. Use the AT+PING AT command to configure the ping packet size.
TLS 1.2 over TCP Client <sup>1</sup>	Check box selection	Transport Layer Security 1.2 over Transmission Control Protocol (TCP) Client.
TLS 1.0 over TCP Server <sup>2</sup>	Check box selection	Transport Layer Security 1.0 over Transmission Control Protocol (TCP) Server.

Note: 1. When selecting HTTPS 1.1 Client option, TLS 1.2 over TCP Client option isn't available.

Note: 2. When selecting HTTPS 1.1 Server option, TLS 1.0 over TCP Server option isn't available.

### 2.1.7.3 Other Networking Services

There are additional network services that can be selected. Table 17, page 81 describes the other networking services.

**Table 17 Other Networking Services**

Settings	Options	Description
GSLink with XML Parsing	Check box selection	Activates HTTP Server and Client with XML parser. GSLink provides a mechanism to send and receive raw HTTP data as well as data in XML format and enables communication between embedded host (through GainSpan module), Smart phones or PCs/Servers. With GainSpan node acting as server (HTTP/S Server), data can be sent and received either as a complete data as part of an HTTP message (raw HTTP method) or it can be sent and received as XML data, with each element being sent and received individually. With GainSpan node as Client (HTTP Client), it would know the type of communication it is doing with the server and can choose the raw HTTP or XML format of communication accordingly, because the communication is initiated by the GainSpan node. When in raw HTTP communication mode, the complete XML data is sent or received by the embedded host as one data unit. In the case of the XML communication format, each element of the XML thread can be written individually and could be received individually helping the embedded host parse and process each element easily.
Network Connection Manager (Station) - manages L2 (WiFi or WLAN), L3 (IP/DHCP), L4 (TCP/UDP) level connections automatically. This support is enabled by default. Un-select to disable NCM support.	Auto Start	Select this for NCM to start 802.11 WLAN WiFi Station or WiFi (Limited) AP whichever is selected as default in 802.11 WLAN tab. This will start both L2 and L3 after boot and the same configuration will be stored in profile.
	CPU Wait Period (Range is 1 to 65535) in milliseconds	Set CPU wait time.
	Known Channel Scan Period (Range is 1 to 65535) in milliseconds	Set known channel scan period.
	Known Channel Scan Retry Count (Range is 1 to 65535) in milliseconds	Set known channel scan retry count.

**Table 17 Other Networking Services (Continued)**

Settings	Options	Description
Network Connection Manager (Station) - (continued)	All Channels Scan Period (Range is 1 to 65535) in milliseconds	Set all channels scan period.
	All Channels Scan Retry Count (Range is 1 to 65535) in milliseconds	Set all channels scan retry count range.
	L3 Connect Period (Range is 1 to 65535) in milliseconds	Set the L3 connection period range.
	L3 Connect Retry Count (Range is 1 to 65535) in milliseconds	Set the L3 connection retry count range.
	L4 Connect Period (Range is 1 to 65535) in milliseconds	Set the L4 connection period range.
	L4 Connect Retry Count (Range is 1 to 65535) in milliseconds	Set the L4 connecting retry count range.
	Start L4	Starts L4 configuration for NCM Station.
	Protocol	Select UDP or TCP protocol for NCM Station.
	Mode	Select Server or Client mode for NCM Station.
	Port	Enter Server or Client port number for NCM Station.
	Source Port	Enter Server or Client Source port number for NCM Station.
	Server IPv4 Address	When selecting Client mode enter the Server IPv4 Address for NCM Station.
	Server Host Name	When selecting Client mode enter the Server Host Name for NCM Station.
	Enable Roaming - Select this to enable Roaming feature which works based on RSS (PER and other statistics are not used). Roaming works with NCM and requires roaming parameters such as RSSI threshold, etc. to be configured.	Lower RSSI Threshold (Received Signal Strength Indicator) - Signal Low (dB).  Higher RSSI Threshold (Received Signal Strength Indicator) - Signal High (dB).  Time Between Background Scan in milliseconds.

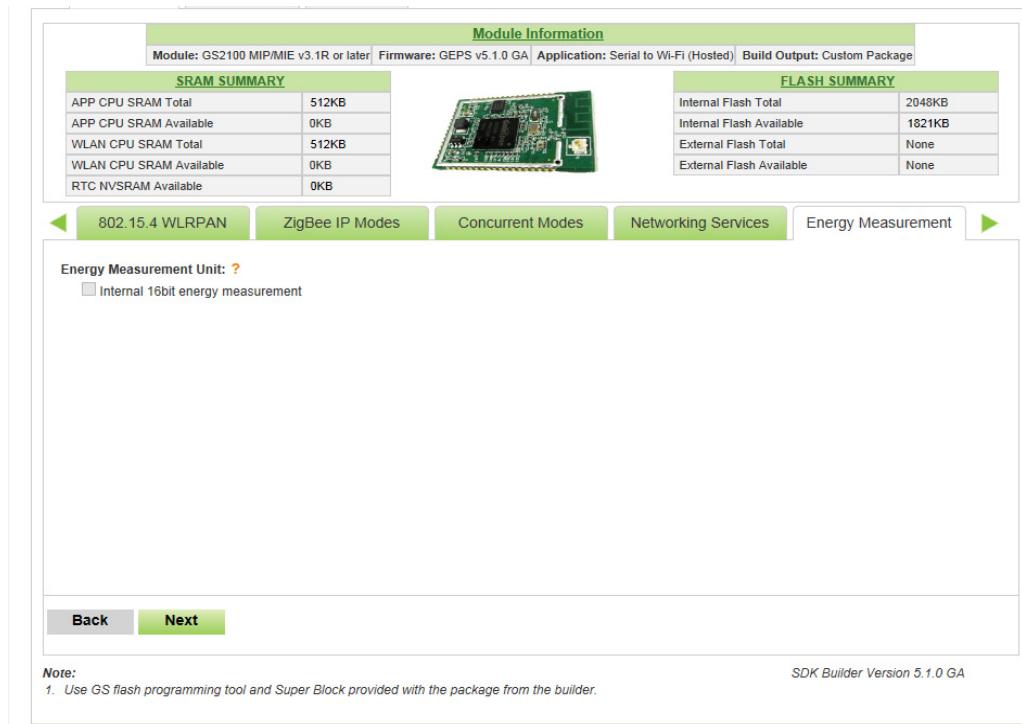
**Table 17 Other Networking Services (Continued)**

<b>Settings</b>	<b>Options</b>	<b>Description</b>
Network Connection Manager (Limited AP)	Start L4 (Check Box)	Starts L4 configuration for NCM (Limited AP)
	Protocol	Select UDP or TCP protocol for NCM Limited AP.
	Mode	Select Server or Client mode for NCM Limited AP.
	Port	Enter Server or Client port number for NCM Limited AP.
	Source Port	Enter Server or Client Source port number for NCM Limited AP.
	Server IPv4 Address	When selecting Client mode enter the Server IPv4 Address for NCM Limited AP.
	Server Host Name	When selecting Client mode enter the Server Host Name for NCM Limited AP.

## 2.1.8 Energy Measurement

Figure 29, page 84 shows the Energy Measurement options that can be selected. The GS2100M based module supports internal 16-bit ADC for energy measurement in smart energy applications.

**Figure 29 Energy Measurement**

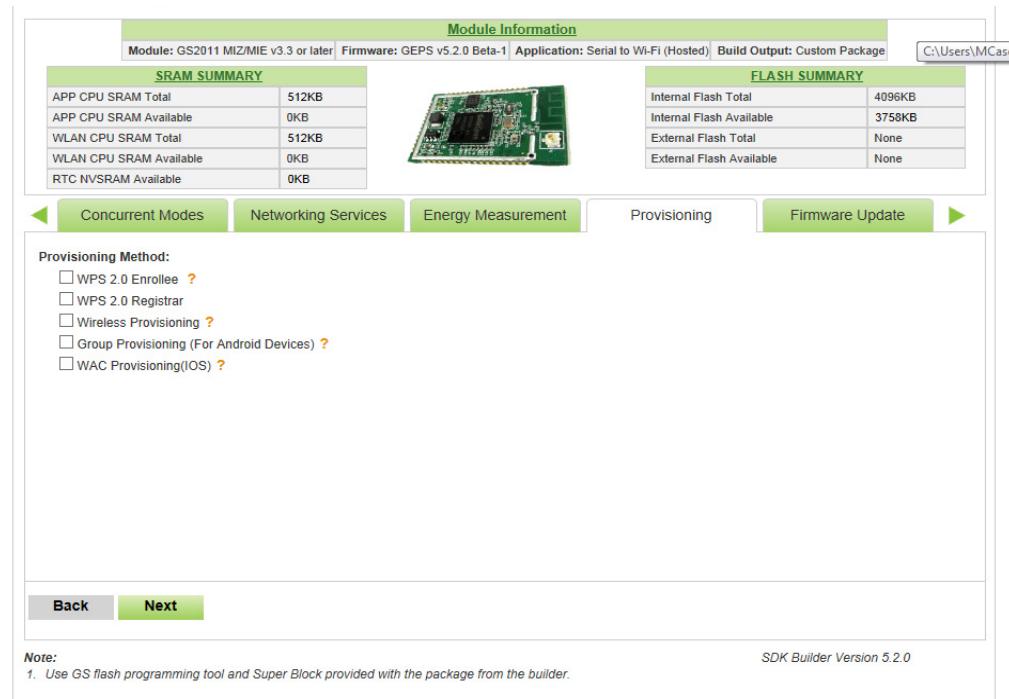


## 2.1.9 Provisioning

Figure 30, page 85 shows the Provisioning options that can be selected. The provisioning methods are:

- WPS 2.0 Enrollee/Strict WPS 2.0 Compliance, page 86
- WPS 2.0 Registrar, page 86
- Wireless Provisioning/Provisioning Pages, page 87
- Group Provisioning (For Android Devices), page 89
- WAC Provisioning (IOS), page 91

**Figure 30 Provisioning**



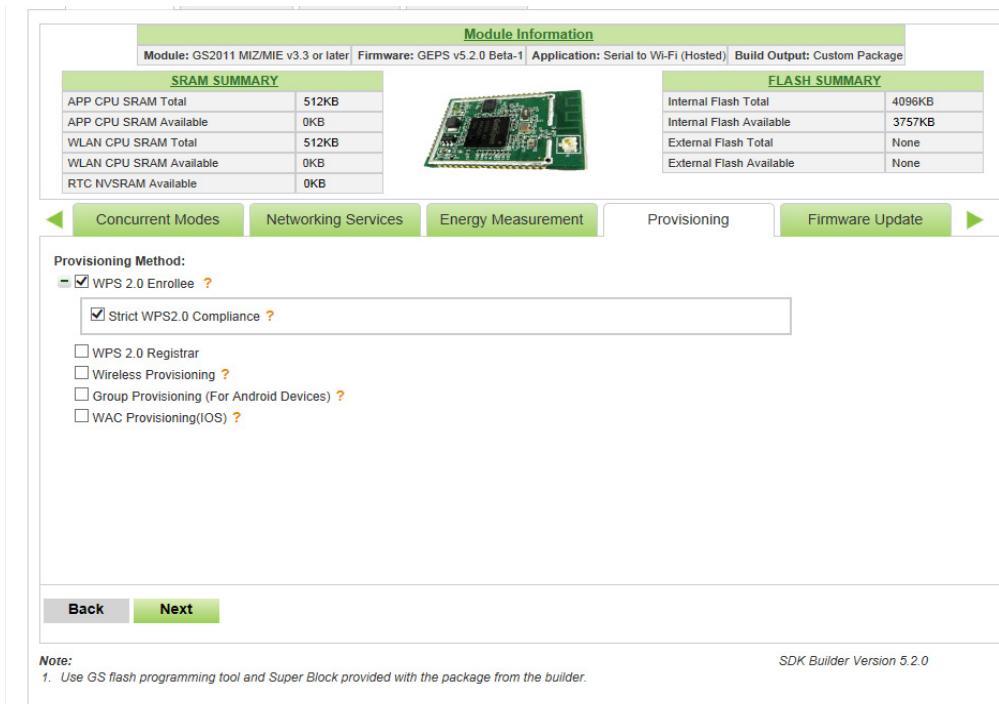
**NOTE:** *Group Provisioning (For Android Devices) and WAC Provisioning (IOS) are not supported with Concurrent Mode (WiFi Station and WiFi (Limited) AP).*

### 2.1.9.1 WPS 2.0 Enrollee/Strict WPS 2.0 Compliance

Select this option to enable WPS method on GainSpan module to connect to Access Point. WPS PUSH, PIN and Default PIN methods are supported.

Select Strict WPS2.0 Compliance option to enable. WEP and TKIP security will not be supported (see [Figure 31, page 86](#)).

**Figure 31 WPS 2.0 Enrollee Strict WPS 2.0 Compliance**



### 2.1.9.2 WPS 2.0 Registrar

Select this option to connect Stations in Limited AP mode to connect GainSpan module using WPS.

### 2.1.9.3 Wireless Provisioning/Provisioning Pages

Select the option to enable Wireless provisioning. GainSpan module can be provisioned using web pages or iPhone/Android Mobile Applications. For provisioning using Mobile Applications, Provisioning ADK package need to be purchased. Provisioning using web pages can be configured (see Figure 32, page 87).

**Figure 32 Wireless Provisioning/Provisioning Pages**

Module Information
Module: GS2011 MIZ/MIE v3.3 or later
Firmware: GEPS v5.2.0 Beta-1
Application: Serial to Wi-Fi (Hosted)
Build Output: Custom Package

SRAM SUMMARY		FLASH SUMMARY	
APP CPU SRAM Total	512KB	Internal Flash Total	4096KB
APP CPU SRAM Available	0KB	Internal Flash Available	3736KB
WLAN CPU SRAM Total	512KB	External Flash Total	None
WLAN CPU SRAM Available	0KB	External Flash Available	None
RTC NVRAM Available	0KB		

◀
Concurrent Modes
Networking Services
Energy Measurement
Provisioning
Firmware Update
▶

**Provisioning Method:**

WPS 2.0 Enrollee ?  
 WPS 2.0 Registrar  
 Wireless Provisioning ?

**Provisioning Pages:**

GainSpan Web pages ?  Custom Web pages ?  None ?

Client only  
 Limited AP only  
 Professional(AP and Client)  
 Certificate upload  
 Load Company Logo & Favorites Icon (Before uploading save in .zip format) ?

Group Provisioning (For Android Devices) ?  
 WAC Provisioning(iOS) ?

Back
Next

**Note:**

1. Use GS flash programming tool and Super Block provided with the package from the builder.

SDK Builder Version 5.2.0

Table 18, page 88 describes the provisioning pages options.

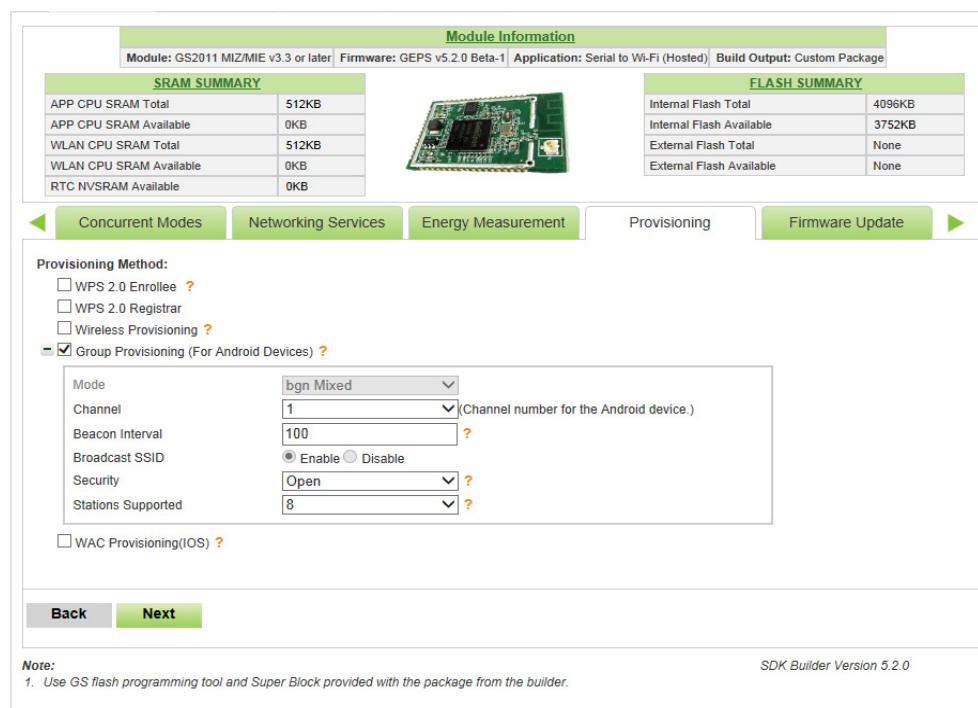
**Table 18 Provisioning Pages**

Settings	Options	Description
GainSpan Web Pages	Uploads sample GainSpan Web pages.	Uses standard GainSpan web page for provisioning.
	Client only	This option will allow the user to provision the WiFi Station.
	Limited AP only	This option will allow the user to provision the Limited AP.
	Professional (AP and Client)	This option will allow the user to provision both the Limited AP and the WiFi Station.
	Certificate upload	Uploads a digital certificate to allow the exchanging of information securely over the Internet using the public key infrastructure.
	Load Company Logo & Favorites Icon (Before upload save in zip format)	Browse and load company logo and favorites icon.
Custom Web Pages	Upload Custom Web Page Directory (Before upload save in zip format)	Browse and upload custom web pages.
	Load Company Logo & Favorites Icon (Before upload save in zip format)	Browse and upload specified company logo and favorites.
None	None	Doesn't upload any provisioning pages.

### 2.1.9.4 Group Provisioning (For Android Devices)

Select the option to enable Group provisioning for Android Devices. This is a wireless based provisioning for one or more devices using Android 4.0+ based mobile device (iOS not supported as required features not supported). Android application uses SSID pattern to identify devices and provisions them securely using TLS/SSL. Android application verifies provisioning status by connecting to the target network and performing discovery using mDNS/DNS-SD. If this feature is enabled, the GainSpan module will come up in Limited AP mode (uses NCM Auto Start) at boot time, starts the HTTPS servers and Discovery (mDNS/DNS-SD) services. Click the **plus (+)** sign and configure the Limited AP configuration. By default HTTPS server and Discovery is also selected under Network Services tab (see [Figure 33, page 89](#)).

**Figure 33 Group Provisioning (For Android Devices)**



When selecting Group Provisioning then Discovery mDNS, DNS-SD (Station), Network Connection Manager, and Auto Start will automatically be selected under the Networking Services tab. These cannot be de-selected. This is required for Group Provisioning (For Android Devices).

Table 19, page 90 describes the group provisioning options.

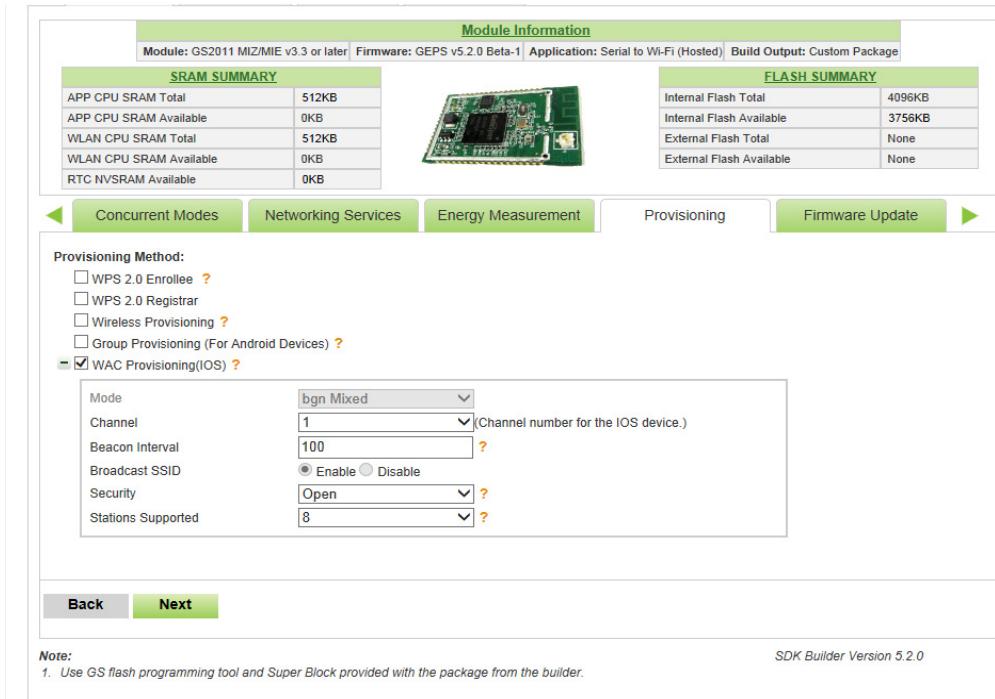
**Table 19 Group Provisioning Options**

Settings	Options	Description
Group Provisioning (For Android Devices)	Mode	bgn Mixed. This is grayed out. <i>For future use.</i>
	Channel	The Channel number of the Andriod Device.
	Beacon Interval (milliseconds)	The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the router synchronized to the wireless network. 50 is recommended in poor reception. Range is 50 to 1500.
	Broadcast SSID (Enable/Disable)	Enable - enables broadcasting of your network transmitting a service set identifier (SSID) so devices with a wireless network adapter can see the networks range of their device to attempt connection. Disable - disables broadcasting of the SSID.
	Security	The security type is Open, meaning no authentication is being used.
	Stations Supported (1 through 64)	The number of WiFi stations supported.

## 2.1.9.5 WAC Provisioning (IOS)

This enables Apple's Wireless Accessory Configuration support. This check box gets enabled, if you use a valid MFI License and have purchased the WAC ADC from GainSpan (see Figure 34, page 91).

**Figure 34 WAC Provisioning (IOS)**



When selecting WAC Provisioning then Discovery mDNS, DNS-SD (Station), Network Connection Manager, and Auto Start will automatically be selected under the Networking Services tab. These cannot be de-selected. This is required for WAC Provisioning (IOS).

Table 20, page 92 describes the WAC provisioning options.

**Table 20 WAC Provisioning (IOS) Options**

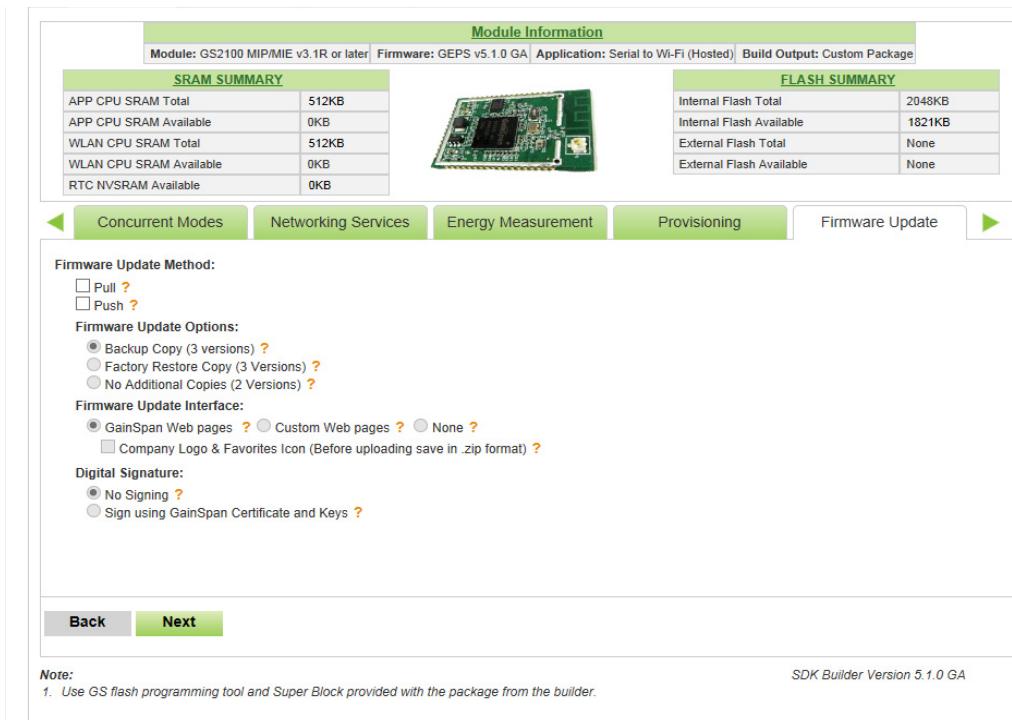
Settings	Options	Description
WAC Provisioning (IOS)	Mode	bgn Mixed. This is grayed out. <i>For future use.</i>
	Channel	The Channel number of the Andriod Device.
	Beacon Interval (milliseconds)	The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the router synchronized to the wireless network. 50 is recommended in poor reception. Range is 50 to 1500.
	Broadcast SSID (Enable/Disable)	Enable - enables broadcasting of your network transmitting a service set identifier (SSID) so devices with a wireless network adapter can see the networks range of their device to attempt connection. Disable - disables broadcasting of the SSID.
	Security	The security type is Open, meaning no authentication is being used.
	Stations Supported (1 through 64)	The number of WiFi stations supported.

## 2.1.10 Firmware Update

Figure 35, page 93 shows the Firmware Update options that can be selected. These options are:

- Firmware Update Method, page 94
- Firmware Update Options, page 95
- Firmware Update Interface, page 95
- Digital Signature, page 95

**Figure 35 Firmware Update**



### 2.1.10.1 Firmware Update Method

The Firmware Update Method option can be done in two ways, Pull and Push (see [Table 21, page 94](#)).

**Table 21 Firmware Update Method**

Settings	Options	Description
Pull	Check box selection	Wireless over the air update of the firmware from the module. It uses internal (to module) flash to store the firmware. HTTP/HTTPS client is used to download the firmware from an external HTTP/HTTPS server. Click plus (+) sign to configure the server configuration and firmware location.
	Server IP	The server IP address where the firmware will be pulled from.
	Server Port	The server port where the firmware will be pulled from.
	Proxy Server Present (Yes, No)	Yes - Select if there is a proxy server present within the network. Enter Proxy Server IP Address and Proxy Server Port number. No - If there isn't a proxy server present.
	Firmware Binary Path URL	The URL where the firmware binary resides.
	SSL Enabled (Yes, No)	Yes - Enables the Secure Sockets Layer to establish encrypted link between a server and a browser to remain private. No - Do not enable SSL.
Push	Check box selection	Wireless over the air update of the firmware from a Mobile Device. Use either web application (from a web browser) or Mobile application (from a Smart Phone) for push method. It uses internal (to module) flash to store the firmware. HTTP/HTTPS Server shall be running on the GainSpan module for the push method.



**NOTE:** When selecting "Pull" the Custom Web Pages and Company Logo & Favorites Icon option under Firmware Update Interface cannot be selected.

### 2.1.10.2 Firmware Update Options

The Firmware Update options allow you to select a backup and restore method (see [Table 22, page 95](#)).

**Table 22 Firmware Update Options**

Options	Description
Backup Copy (3 versions)	Use this method to have three (3) backup copies of the firmware and not retain a factory firmware image (will replace the factory/first image upon multiple upgrades).
Factory Restore Copy (3 versions)	Use this method to have three (3) copies of the firmware and to retain a factory firmware image copy (will retain a factory/first firmware image).
No Additional Copies (2 versions)	Use this method to have two (2) copies of the firmware and not retain a factory image (will replace the factory/first image upon multiple upgrades).

### 2.1.10.3 Firmware Update Interface

The Firmware Update Interface allows you to select default web pages, custom web pages to upload logo and favorite icon to display or no web pages used.



**NOTE:** When selecting “Pull” the Custom Web Pages and Company Logo & Favorites Icon option under Firmware Update Interface cannot be selected.

### 2.1.10.4 Digital Signature

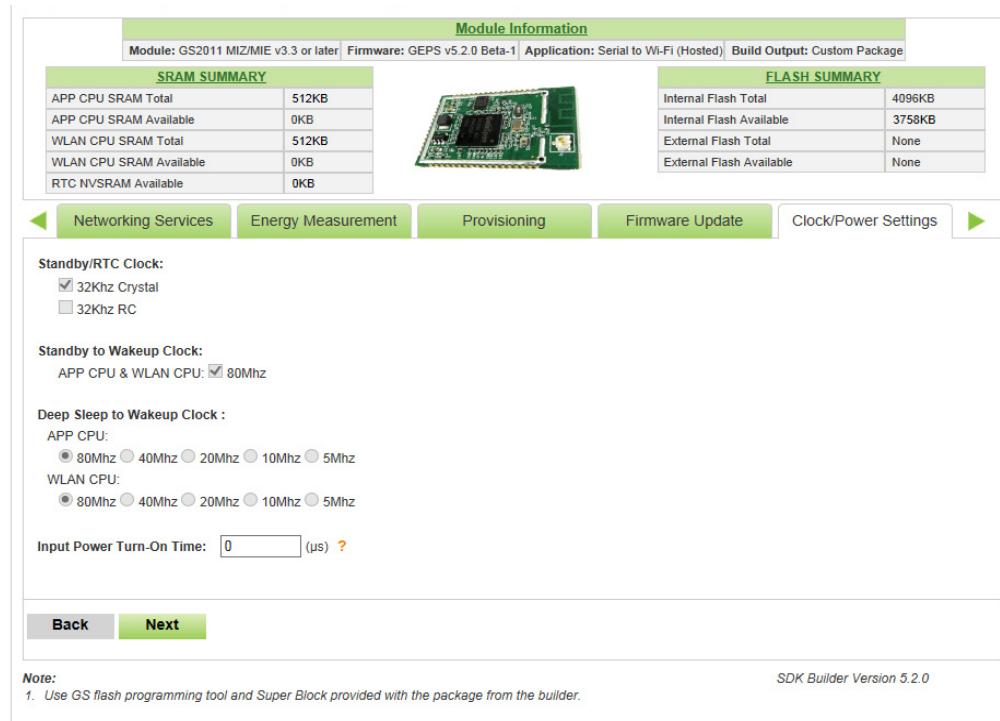
The Digital Signature verification (with certificates) is used with over the air firmware update (OTAFU). Signing using only GainSpan certificates and keys is supported.

## 2.1.11 Clock/Power Settings

Figure 36, page 96 shows the Clock/Power Settings options that can be selected. These options are:

- Standby/RTC Clock, page 96
- Standby to Wakeup Clock, page 97
- Deep Sleep to Wakeup Clock, page 97
- Input Power Turn-On Time, page 97

**Figure 36 Clock/Power Settings**



### 2.1.11.1 Standby/RTC Clock

The Real Time Clock (RTC) is a computer clock that keeps track of the current time. There are two options available for the embedded RTC (see Table 23, page 96).

**Table 23 Real Time Clock (RTC)**

Options	Description
32Khz Crystal	Select this option to save on the external 32Khz crystal.
32Khz RC	Select this option to save on the external 32Khz RC.

### 2.1.11.2 Standby to Wakeup Clock

The Standby to Wakeup Clock is used to set the clock rate for APP CPU and WLAN CPU. The APP CPU and WLAN CPU Clock Startup frequency setting is 80MHz (standard setting).

### 2.1.11.3 Deep Sleep to Wakeup Clock

These are the settings for Deep Sleep and Wakeup Clock for the APP CPU and WLAN CPU (see [Table 24, page 97](#)).

**Table 24 Deep Sleep to Wakeup Clock**

Settings	Options	Description
APP CPU	80Mhz	APP CPU Clock Startup frequency setting. 80Mhz is standard setting.
	40Mhz	
	20Mhz	
	10Mhz	
	5Mhz	
WLAN CPU	80Mhz	WLAN CPU frequency setting. 80Mhz is standard setting.
	40Mhz	
	20Mhz	
	10Mhz	
	5Mhz	

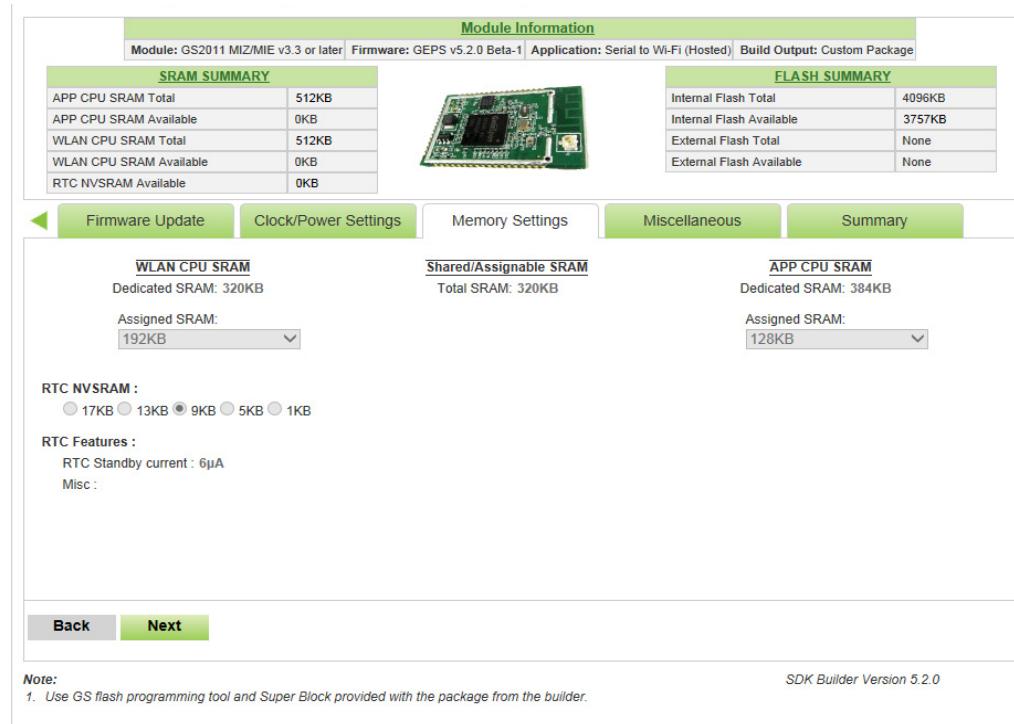
### 2.1.11.4 Input Power Turn-On Time

Time in  $\mu$ s from dc\_dc\_cntl signal going high to VIN\_3V3 and VDDIO power being stable.

## 2.1.12 Memory Settings

The Memory Settings displays the WLAN CPU SRAM, Shared/Assignable SRAM, and APP CPU SRAM assigned, dedicated, and total SRAM information. The memory configuration screen also displays the RTC (Real Time Clock) NVRAM and RTC feature information (see [Figure 37, page 98](#)).

**Figure 37 Memory Settings**

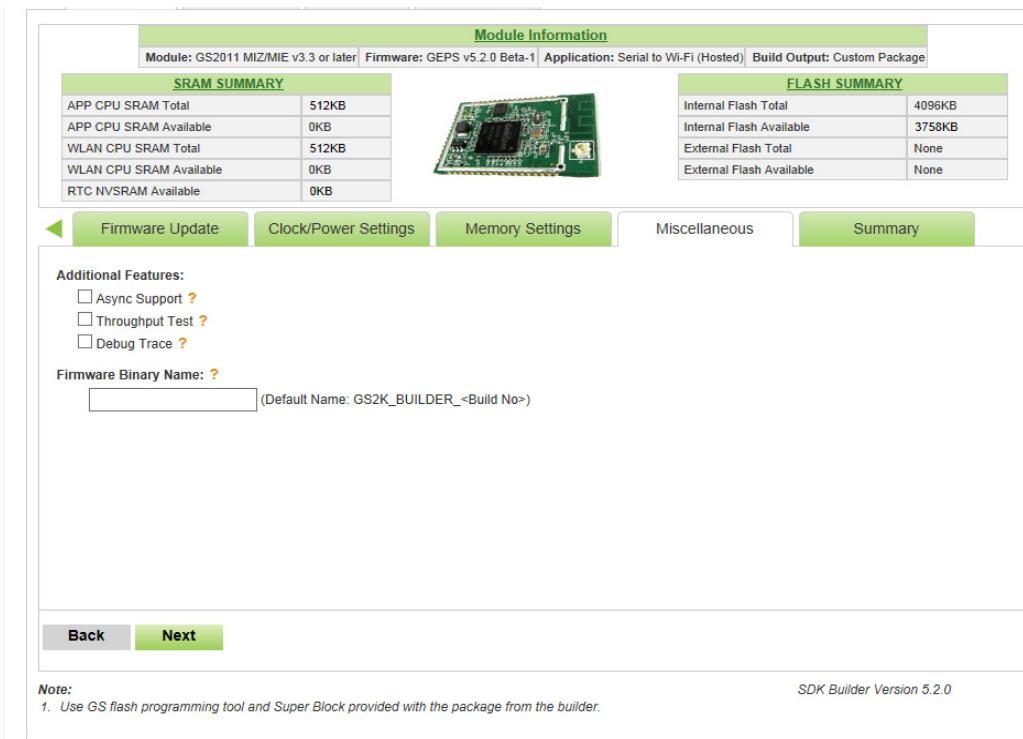


## 2.1.13 Miscellaneous

The Miscellaneous features include the following (see [Figure 38, page 99](#)).

- Additional Features
  - Async Support
  - Throughput Test
  - Debug Trace
- Firmware Binary Name

**Figure 38 Miscellaneous Features**



These are the settings for Miscellaneous features (see [Table 25](#), page 100).

**Table 25 Miscellaneous**

Settings	Options	Description
Additional Features	Async Support	Select the Async Support option for enhanced asynchronous notification for asynchronous events. All asynchronous notifications shall be sent to the embedded host with a header and GPIO 19 shall be made high.
	Throughput Test	This is used for enabling Throughput Test.
	Debug Trace	Selecting the Debug Trace option is used specifically for debugging purposes and should not be used for production. This enables debug traces for resets and provides error code/reason (more information) along with AT command response (supported only for at+wa) in case of an error.
Firmware Binary Name	GS2K_BUILDER_<Build No> (Default Name)	Enter a Firmware Binary Name to keep track of Firmware Binary built. If left blank, GS2K_BUILDER_<Build No> shall be added. <Build No> is unique build identifier generated by the SDK builder.

## 2.1.14 Serial-to-WiFi Build Configuration Summary

Once you have completed selecting the options and features for building the Serial-to-WiFi (Hosted) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, 802.11 WLAN, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

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# Chapter 3 Building IP-to-WiFi Applications

This chapter provides instructions on how to use the GainSpan® SDK Builder to generate firmware and binary images for IP-to-WiFi (Hosted) applications.

## 3.1 IP-to-WiFi Module Information

Selecting the IP-to-WiFi (Hosted) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the IP-to-WiFi (Hosted) application (see [Figure 39, page 103](#)).

- Host Interface, [page 49](#)
- Host Settings, [page 53](#)
- 802.11 WLAN, [page 55](#)
- Concurrent Modes, [page 72](#)
- Provisioning, [page 85](#)
- Firmware Update, [page 93](#)
- Clock/Power Settings, [page 96](#)
- Memory Settings, [page 98](#)
- Miscellaneous, [page 99](#)
- IP-to-WiFi Build Configuration Summary, [page 105](#)

**Figure 39 IP-to-WiFi (Hosted) Feature Selection**

Module Information	
Module: GS2100 MIP/MIE v3.1R or later	Firmware: GEPS v5.1.0 GA
SRAM SUMMARY	
APP CPU SRAM Total	512KB
APP CPU SRAM Available	0KB
WLAN CPU SRAM Total	512KB
WLAN CPU SRAM Available	0KB
RTC NVRAM Available	0KB
FLASH SUMMARY	
Internal Flash Total	2048KB
Internal Flash Available	1815KB
External Flash Total	None
External Flash Available	None

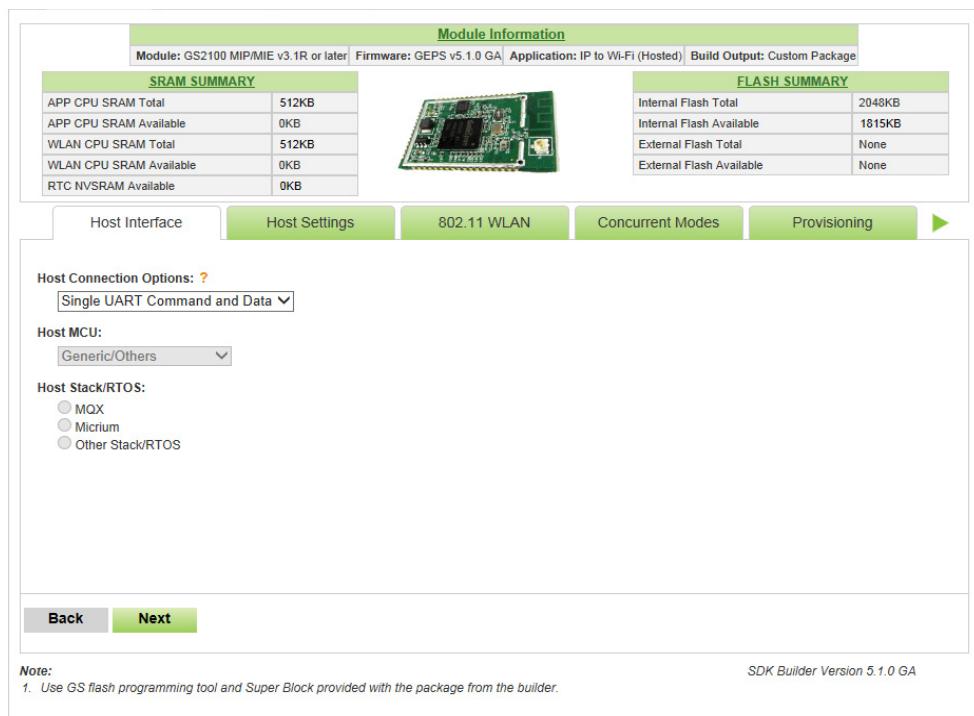


**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom, SDK, or ADK Packages for your environment.

### 3.1.1 IP-to-WiFi Hosted Overview

The IP-to-WiFi (Hosted) option under the SDK Builder allows you to build standard or custom firmware applications that enable embedded devices with UART/SPI interfaces to gain access to 802.11 compliant WiFi wireless network connection (see [Figure 40, page 104](#)).

**Figure 40 IP-to-WiFi (Hosted)**



The embedded host (e.g., MCU) can use either one of the host connection interfaces (UART/SPI/SDIO) to connect to GainSpan AT command-line interface.

Single interface can be used if both AT command/responses and data transmission/receive is required in the same interface (e.g., Single UART/SPI/SDIO Command and Data).

Dual interface can be used if AT command/responses is required in one interface and Data transmission/receive is required in another interface (e.g., Dual UART Command and Data, UART Command, and SPI/SDIO data).

Use the Host Settings Tab to configure the interface settings such as baud rate, clock rate, flow control, SPI master/slave, SPI with/without DMA.

### 3.1.2 IP-to-WiFi Build Configuration Summary

Once you have completed selecting the options and features for building the IP-to-WiFi (Hosted) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, Miscellaneous, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

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# Chapter 4 Building Default and Custom Packages

This chapter provides instructions on how to use the GainSpan® SDK Builder to build Default and Custom EVK and AEK packages.

For building custom AEK applications, refer to the following:

- [Building Custom TLS AEK Application, page 108](#)
- [Building Custom TLS Low Power AEK Application, page 111](#)
- [Building Custom Audio AEK Application, page 114](#)
- [Building Custom Music AEK Application, page 116](#)
- [Building Custom VGA Video AEK Application, page 119](#)
- [Building Custom HD720p Video AEK Application, page 122](#)
- [Building Custom HD720p Video AEK Geo Application, page 127](#)
- [Building Custom Smart Plug AEK Application, page 131](#)



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***NOTE: When building Custom Packages you can Include or Exclude Documentation and Utilities to be download in your build. This selection is checked by default in the SDK Builder.***

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For building custom Serial-to-WiFi and IP2WiFi applications, refer to the following:

- [Chapter 2 Building Serial-to-WiFi Applications, page 47](#)
- [Chapter 3 Building IP-to-WiFi Applications, page 103](#)

For building default EVK and AEK applications, refer to the following:

- [Building Default EVK and AEK Applications, page 133](#)

## 4.1 Building Custom TLS AEK Application

Selecting the TLS AEK (Hostless, Web Server) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the TLS AEK (Hostless, Web Server) application (see [Figure 41, page 108](#)).

- [802.11 WLAN, page 55](#)
- [Networking Services, page 74](#)
- [Provisioning, page 85](#)
- [Firmware Update, page 93](#)
- [IoT/Cloud Connectivity, page 109](#)
- [TLS AEK Build Configuration Summary, page 110](#)

**Figure 41 TLS AEK Feature Selection**



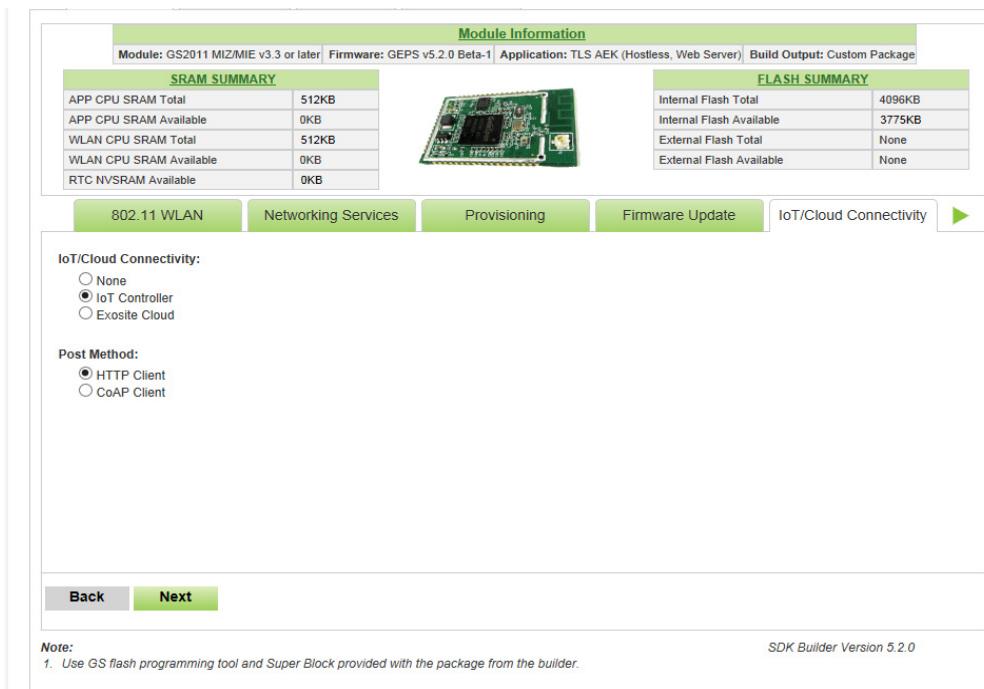
**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

When building Custom TLS AEK, you can select Group Provisioning (For Android Devices), and WAC Provisioning (IOS). For more information about Group and WAC Provisioning, see [2.1.9 Provisioning, page 85](#).

#### 4.1.1 IoT/Cloud Connectivity

The Internet of Things (IoT)/Cloud Connectivity can connect an IoT Controller using HTTP or CoAP Client protocols. The IoT/Cloud Connectivity through the Exosite Cloud selection can allow direct control by connecting to the cloud devices so they can be monitored, managed, and controlled remotely from computers smartphones and tablets. (see [Figure 42, page 109](#)).

**Figure 42 IoT Cloud Connectivity**



#### 4.1.1.1 IoT/Cloud Connectivity/Post Method

Table 26, page 110 describes the IoT/Cloud Connectivity and Post Method settings.

**Table 26 IoT/Cloud Connectivity and Post Method Settings**

Settings	Options	Description
IoT/Cloud Connectivity	None	No connectivity.
	IoT Controller	Allows connection to an IoT WiFi controllable fixture.
	Exosite Cloud	Allows devices to be monitored, managed and controlled remotely from computers, smartphones, and tablets.
Post Method	HTTP Client	This method is used to post HTTP data on the HTTP client.
	CoAP Client	This method is used to send a CoAP client on the adapter and connect to the server that is specified by the host name or IP address.

#### 4.1.2 TLS AEK Build Configuration Summary

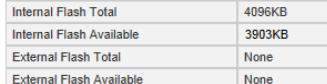
Once you have completed selecting the options and features for building the TLS AEK (Hostless, Web Server) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.2 Building Custom TLS Low Power AEK Application

Selecting the TLS Low Power AEK (Hostless, Web/CoAp Client) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the TLS Low Power AEK (Hostless, Web/CoAp Client) application (see [Figure 43, page 111](#)).

- 802.11 WLAN, [page 55](#)
- Networking Services, [page 74](#)
- IoT/Server Connectivity, [page 112](#)
- TLS Low Power AEK Build Configuration Summary, [page 113](#)

**Figure 43 TLS Low Power AEK Feature Selection**

Module Information																					
Module: GS2011 MIZ/MIE v3.2R or later	Firmware: GEPS v5.1.0 GA	Application: TLS Low Power AEK (Hostless, Web/CoAp Client)	Build Output: Custom Package																		
<b>SRAM SUMMARY</b>			<b>FLASH SUMMARY</b>																		
																					
<table border="1"><thead><tr><th>APP CPU SRAM Total</th><th>512KB</th></tr></thead><tbody><tr><td>APP CPU SRAM Available</td><td>0KB</td></tr><tr><td>WLAN CPU SRAM Total</td><td>512KB</td></tr><tr><td>WLAN CPU SRAM Available</td><td>0KB</td></tr><tr><td>RTC NVSRAM Available</td><td>0KB</td></tr></tbody></table>			APP CPU SRAM Total	512KB	APP CPU SRAM Available	0KB	WLAN CPU SRAM Total	512KB	WLAN CPU SRAM Available	0KB	RTC NVSRAM Available	0KB	<table border="1"><thead><tr><th>Internal Flash Total</th><th>4096KB</th></tr></thead><tbody><tr><td>Internal Flash Available</td><td>3903KB</td></tr><tr><td>External Flash Total</td><td>None</td></tr><tr><td>External Flash Available</td><td>None</td></tr></tbody></table>	Internal Flash Total	4096KB	Internal Flash Available	3903KB	External Flash Total	None	External Flash Available	None
APP CPU SRAM Total	512KB																				
APP CPU SRAM Available	0KB																				
WLAN CPU SRAM Total	512KB																				
WLAN CPU SRAM Available	0KB																				
RTC NVSRAM Available	0KB																				
Internal Flash Total	4096KB																				
Internal Flash Available	3903KB																				
External Flash Total	None																				
External Flash Available	None																				

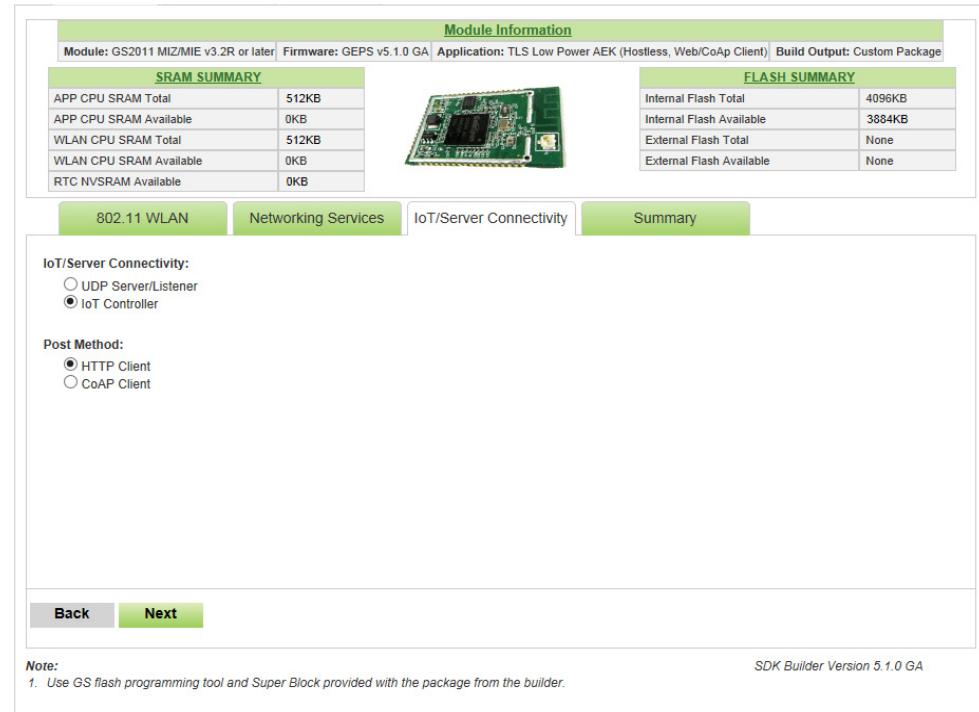


**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

## 4.2.1 IoT/Server Connectivity

The Internet of Things (IoT) and Server Connectivity selection permits direct control using a Smartphone with a home network to send updates to the IoT controller or UDP server/listener and Post via HTTP or CoAP client (see [Figure 44, page 112](#)).

**Figure 44 IoT Server Connectivity**



#### 4.2.1.1 IoT/Server Connectivity/Post Method

Table 27, page 113 describes the IoT/Server Connectivity and Post Method settings.

**Table 27 IoT/Cloud Connectivity and Post Method Settings**

Settings	Options	Description
IoT/Server Connectivity	UDP Server/Listener	Establishes a network connection to a UDP server and listens.
	IoT Controller	Allows connection to an IoT WiFi controllable fixture.
Post Method	HTTP Client	This method is used to post HTTP data on the HTTP client.
	CoAP Client	This method is used to send a CoAP client on the adapter and connect to the server that is specified by the host name or IP address.

#### 4.2.2 TLS Low Power AEK Build Configuration Summary

Once you have completed selecting the options and features for building the TLS Low Power AEK (Hostless, Web/CoAp Client) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.3 Building Custom Audio AEK Application

Selecting the Audio AEK (Hostless) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the Audio AEK (Hostless) application used in wireless speakers, headphones, and walkie-talkies (see [Figure 45, page 114](#)).

- [802.11 WLAN, page 55](#)
- [Networking Services, page 74](#)
- [Provisioning, page 85](#)
- [Firmware Update, page 93](#)
- [Usecase Selection, page 114](#)
- [Audio AEK Build Configuration Summary, page 115](#)

**Figure 45** Audio AEK (Hostless) Feature Selection

Module Information			
Module: GS2011 MIZ/MIE v2.1/3.0	Firmware: GEPS v5.1.0 RC	Application: Audio AEK (Hostless)	Build Output: Firmware Binary
<b>SRAM SUMMARY</b>			<b>FLASH SUMMARY</b>
Internal Flash Total 4096KB			External Flash Available None
Internal Flash Available 3886KB			External Flash Total None
External Flash Total None			External Flash Available None
External Flash Available None			
			



**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

### 4.3.1 Usecase Selection

The Audio AEK settings described below are used to set the remote speaker, remote microphone, and walkie talkie (see [Figure 46, page 115](#)).

#### 4.3.1.1 Remote Speaker

When selecting the Remote Speaker the WiFi music is streamed from a Smartphone to a remote speaker over WiFi. Packets are received and buffered on the WiFi module and sent to the audio codec chip for decoding.

#### 4.3.1.2 Remote Microphone

When the Remote Microphone is selected, the Audio is encoded in mono, linear PCM, 8KHz, 16-bit samples and sent to the iOS application for decoding and playback over UDP.

#### 4.3.1.3 Walkie Talkie

When the Walkie Talkie is selected, there are two-way half-duplex walkie-talkie operations triggered using either the “Push-to-Talk” (PTT) button on the audio board or the Smart Phone application.

**Figure 46 Usecase Selection**



#### 4.3.2 Audio AEK Build Configuration Summary

Once you have completed selecting the options and features for building the Audio AEK (Hostless) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.4 Building Custom Music AEK Application

Selecting the Music AEK (Hostless) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the Music AEK (Hostless) application (see Figure 47, page 116).

- 802.11 WLAN, page 55
- Networking Services, page 74
- Provisioning, page 85
- Firmware Update, page 93
- Music Settings, page 116
- Music AEK Build Configuration Summary, page 118

**Figure 47 Music AEK (Hostless) Feature Selection**

Module Information			
Module: GS2011 MIZ/MIE v3.3 or later	Firmware: GEPS v5.1.1 GA	Application: Music AEK (Hostless)	Build Output: Custom Package
<b>SRAM SUMMARY</b>			
APP CPU SRAM Total	512KB		
APP CPU SRAM Available	0KB		
WLAN CPU SRAM Total	512KB		
WLAN CPU SRAM Available	0KB		
RTC NVSRAM Available	0KB		
FLASH SUMMARY			
Internal Flash Total	4096KB		
Internal Flash Available	3886KB		
External Flash Total	None		
External Flash Available	None		



**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

### 4.4.1 Music Settings

The Music AEK settings described below are used to set the Codec supported (see Figure 46, page 115).

#### 4.4.1.1 MP3

When the MP3 is selected, this codec is a common audio format used for audio streaming or storage.

#### 4.4.1.2 AAC

When the AAC (Advanced Audio Coding) is selected, this is a standard codec used for YouTube, iPhone, iPod, iPad, iTunes, etc. This supports 48 full-bandwidth (up to 96 kHz) audio channels in one stream, plus 16 low frequency effects channels, up to 16 “coupling” or dialog channels, and up to 16 data streams.

#### 4.4.1.3 FLAC

*Reserved for future use.*

Free Lossless Audio Codec (FLAC) is an audio coding format for lossless compression of digital audio.

#### 4.4.1.4 DOLBY 5.1

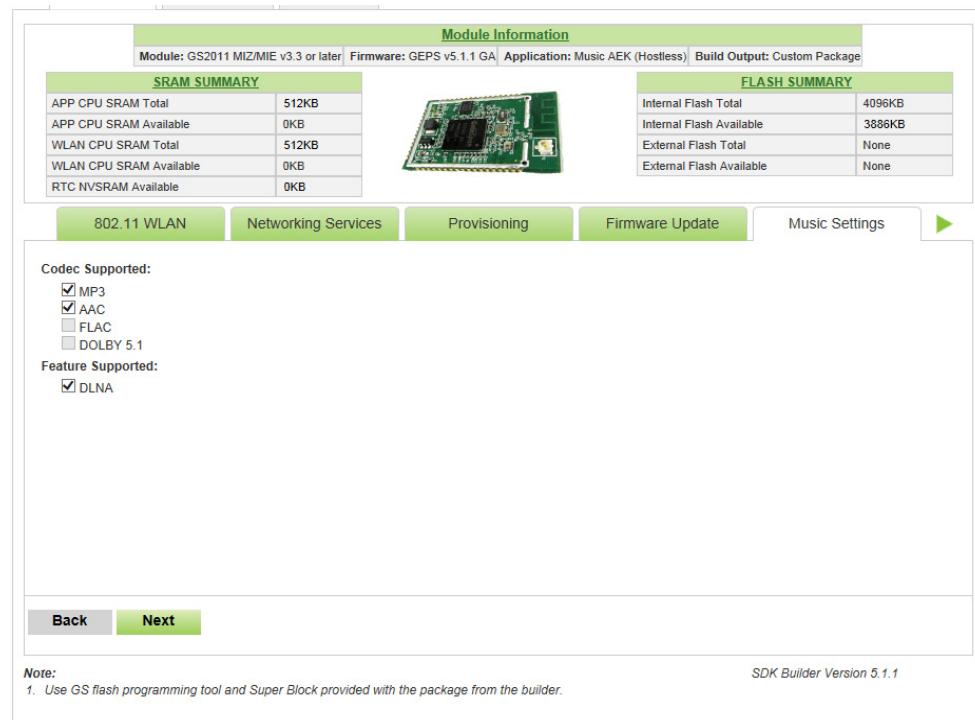
*Reserved for future use.*

Dolby 5.1 Digital Sound is used for audio noise reduction and audio encoding compression. Known as surround sound.

#### 4.4.1.5 DLNA

The Digital Living Network Alliance (DLNA) uses a universal plug and play (UPnP) for media management, discovery and control. UPnP defines the type of device that DLNA supports (server, renderer, controller) and the mechanisms for accessing media over a network.

**Figure 48 Music Settings**



#### 4.4.2 Music AEK Build Configuration Summary

Once you have completed selecting the options and features for building the Music AEK (Hostless) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.5 Building Custom VGA Video AEK Application

Selecting the VGA Video AEK (Hostless) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the VGA Video AEK (Hostless) application used in WiFi doorbells, IP cameras, automobile backup cameras, and baby monitors (see [Figure 49, page 119](#)).

- 802.11 WLAN, page 55
  - Networking Services, page 74
  - Provisioning, page 85
  - Firmware Update, page 93
  - Video Settings, page 120
  - VGA Video AEK Build Configuration Summary, page 121

**Figure 49** VGA Video AEK (Hostless) Feature Selection

Module Information	
Module: GS2011 MIZ/MIE v2.1/3.0	Firmware: GEPS v5.1.0 RC
Application: VGA Video AEK (Hostless)	Build Output: Firmware Binary
SRAM SUMMARY	
APP CPU SRAM Total	384KB
APP CPU SRAM Available	0KB
WLAN CPU SRAM Total	640KB
WLAN CPU SRAM Available	0KB
RTC NVSRAM Available	0KB
FLASH SUMMARY	
Internal Flash Total	4096KB
Internal Flash Available	3880KB
External Flash Total	None
External Flash Available	None



**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

## 4.5.1 Video Settings

The Video Settings described below are used to build HD video applications for iOS and Android Smartphone over WiFi (see [Figure 50, page 121](#)).

### 4.5.1.1 Resolution

Select the Resolution associated with the video player. Resolution settings are:

- VGA 640\*480
- HVGA1 320\*480
- HVGA2 640\*240
- QVGA 320\*240

### 4.5.1.2 Bit Rate

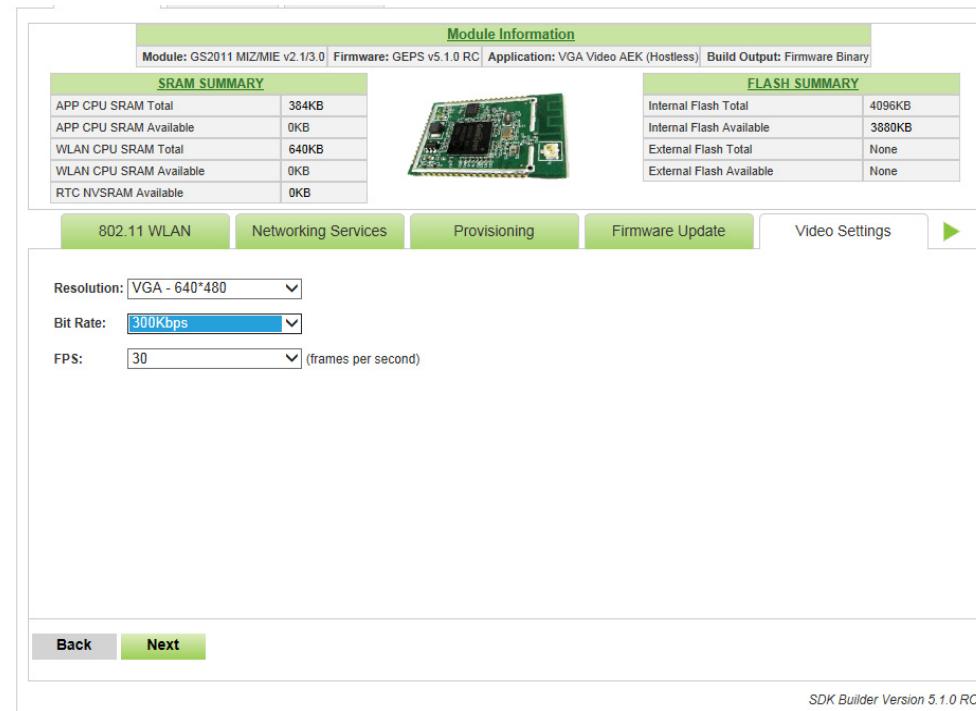
Select the bit rate associated with the video player. Bit rate settings are:

- 300Kbps
- 500Kbps
- 1Mbps

### 4.5.1.3 Frames Per Second (FPS)

Select the FPS associated with the video compression. FPS settings are:

- 30 FPS
- 24 FPS
- 18 FPS

**Figure 50** Video Settings

#### 4.5.2 VGA Video AEK Build Configuration Summary

Once you have completed selecting the options and features for building the VGA Video AEK (Hostless) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.6 Building Custom HD720p Video AEK Application

Selecting the HD720p Video AEK (Hostless) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the HD720p Video AEK (Hostless) application (see [Figure 51, page 122](#)).

- [802.11 WLAN, page 55](#)
- [Networking Services, page 74](#)
- [Provisioning, page 85](#)
- [Firmware Update, page 93](#)
- [HD720p Video Settings, page 123](#)
- [Miscellaneous HD720p Video, page 125](#)
- [HD720p Video AEK Build Configuration Summary, page 126](#)

**Figure 51 HD720p Video AEK (Hostless) Feature Selection**

Module Information													
Module: GS2011 MIZ/MIE v3.3 or later	Firmware: GEPS v5.1.1 GA	Application: HD 720p Video AEK (Hostless)	Build Output: Custom Package										
<b>SRAM SUMMARY</b>													
<table border="1"><tbody><tr><td>APP CPU SRAM Total</td><td>512KB</td></tr><tr><td>APP CPU SRAM Available</td><td>0KB</td></tr><tr><td>WLAN CPU SRAM Total</td><td>512KB</td></tr><tr><td>WLAN CPU SRAM Available</td><td>0KB</td></tr><tr><td>RTC NVSRAM Available</td><td>0KB</td></tr></tbody></table>			APP CPU SRAM Total	512KB	APP CPU SRAM Available	0KB	WLAN CPU SRAM Total	512KB	WLAN CPU SRAM Available	0KB	RTC NVSRAM Available	0KB	<b>FLASH SUMMARY</b>
APP CPU SRAM Total	512KB												
APP CPU SRAM Available	0KB												
WLAN CPU SRAM Total	512KB												
WLAN CPU SRAM Available	0KB												
RTC NVSRAM Available	0KB												
<table border="1"><tbody><tr><td>Internal Flash Total</td><td>4096KB</td></tr><tr><td>Internal Flash Available</td><td>3880KB</td></tr><tr><td>External Flash Total</td><td>None</td></tr><tr><td>External Flash Available</td><td>None</td></tr></tbody></table>			Internal Flash Total	4096KB	Internal Flash Available	3880KB	External Flash Total	None	External Flash Available	None			
Internal Flash Total	4096KB												
Internal Flash Available	3880KB												
External Flash Total	None												
External Flash Available	None												



**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

## 4.6.1 HD720p Video Settings

The Video Settings described below are used to build HD video applications for iOS and Android Smartphone over WiFi (see [Figure 52, page 124](#)).

### 4.6.1.1 Resolution

Select the Resolution associated with the video player. Resolution settings are:

- HD(720p) - 1280\*720

### 4.6.1.2 Bit Rate

Select the bit rate associated with the video player. Bit rate settings are:

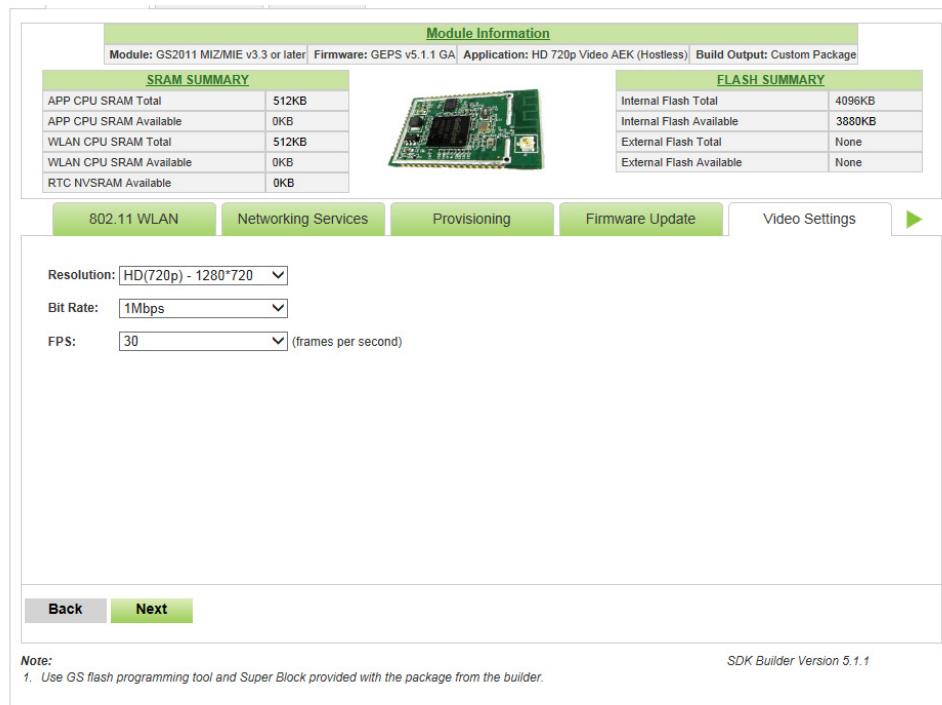
- 1Mbps

### 4.6.1.3 Frames Per Second (FPS)

Select the FPS associated with the video compression. FPS settings are:

- 30 FPS

Figure 52 HD720p Video Settings

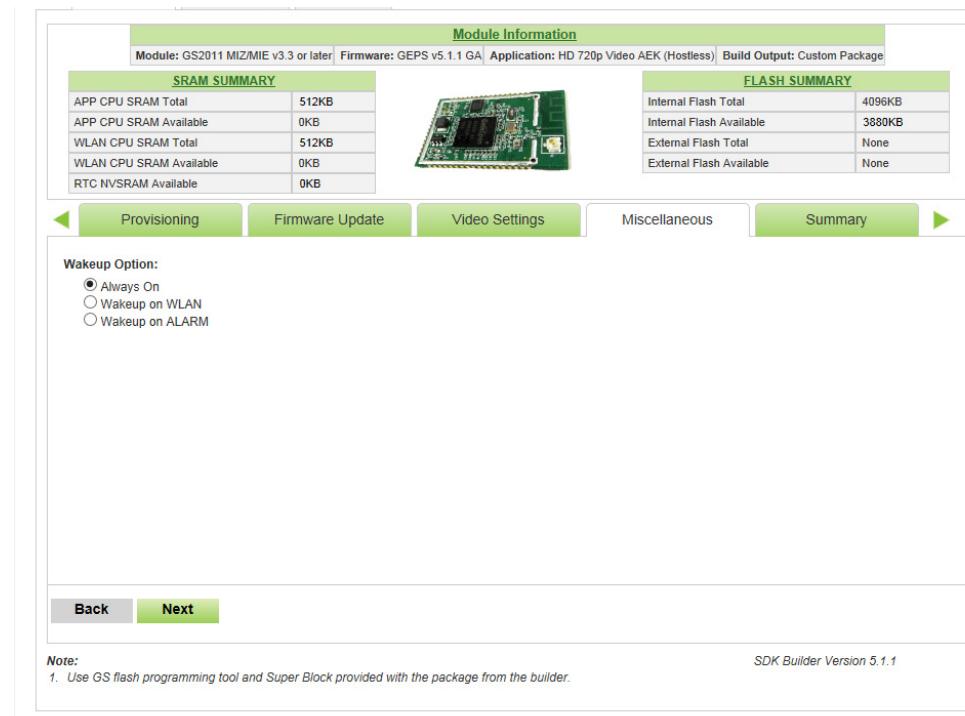


## 4.6.2 Miscellaneous HD720p Video

The Miscellaneous features for HD720p Video include the following (see [Figure 53, page 125](#)).

- Wakeup Option
  - Always On
  - Wakeup on WLAN
  - Wakeup on ALARM

**Figure 53 Miscellaneous Features for HD720p Video**



These are the settings for Miscellaneous features for HD720p Video (see [Table 28, page 125](#)).

**Table 28 Miscellaneous Features for HD720p Video**

Settings	Options	Description
Wakeup Option	Always On	Select the Always On option to allow the video to be always awake.
	Wakeup on WLAN	Select the Wakeup on WLAN option to allow the video device to turn on or awakened by a network message.
	Wakeup on ALARM	Select the Wakeup on ALARM option to allow the video device to turn on or awakened by a video alarm.

#### 4.6.3 HD720p Video AEK Build Configuration Summary

Once you have completed selecting the options and features for building the HD720p Video AEK (Hostless) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.7 Building Custom HD720p Video AEK Geo Application

Selecting the HD720p Video AEK Geo (Hostless) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the HD720p Video AEK Geo (Hostless) application (see [Figure 54, page 127](#)).

- [802.11 WLAN, page 55](#)
- [Networking Services, page 74](#)
- [Provisioning, page 85](#)
- [Firmware Update, page 93](#)
- [HD720p Video Geo Settings, page 128](#)
- [Miscellaneous HD720p Video Geo, page 129](#)
- [HD720p Video AEK Geo Build Configuration Summary, page 130](#)

**Figure 54 HD720p Video AEK Geo (Hostless) Feature Selection**



**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

## 4.7.1 HD720p Video Geo Settings

The Video Settings described below are used to build HD video applications for iOS and Android Smartphone over WiFi (see [Figure 55, page 128](#)).

### 4.7.1.1 Resolution

Select the Resolution associated with the video player. Resolution settings are:

- HD(720p) - 1280\*720

### 4.7.1.2 Bit Rate

Select the bit rate associated with the video player. Bit rate settings are:

- 1Mbps

### 4.7.1.3 Frames Per Second (FPS)

Select the FPS associated with the video compression. FPS settings are:

- 30 FPS

**Figure 55 HD720p Video Geo Settings**

**Module Information**  
Module: GS2011 MIZ/MIE v3.3 or later | Firmware: GEPS v5.1.1 GA | Application: HD 720p Video AEK Geo (Hostless) | Build Output: Custom Package

SRAM SUMMARY	
APP CPU SRAM Total	512KB
APP CPU SRAM Available	0KB
WLAN CPU SRAM Total	512KB
WLAN CPU SRAM Available	0KB
RTC NVSRAM Available	0KB

FLASH SUMMARY	
Internal Flash Total	4096KB
Internal Flash Available	3880KB
External Flash Total	None
External Flash Available	None

Resolution: HD(720p) - 1280\*720 | Bit Rate: 1Mbps | FPS: 30 (frames per second)

Navigation: Provisioning | Firmware Update | Video Settings | Miscellaneous | Summary

Note:  
1. Use GS flash programming tool and Super Block provided with the package from the builder.

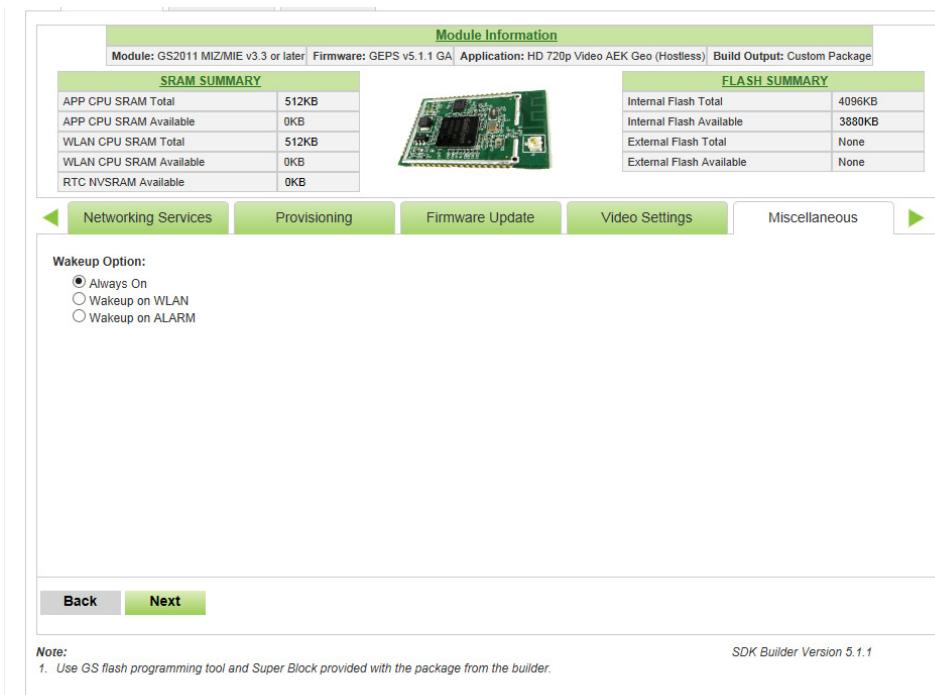
SDK Builder Version 5.1.1

## 4.7.2 Miscellaneous HD720p Video Geo

The Miscellaneous features for HD720p Video Geo include the following (see Figure 56, page 129).

- Wakeup Option
  - Always On
  - Wakeup on WLAN
  - Wakeup on ALARM

**Figure 56 Miscellaneous Features for HD720p Video Geo**



These are the settings for Miscellaneous features for HD720p Video Geo (see Table 29, page 129).

**Table 29 Miscellaneous Features for HD720p Video Geo**

Settings	Options	Description
Wakeup Option	Always On	Select the Always On option to allow the video to be always awake.
	Wakeup on WLAN	Select the Wakeup on WLAN option to allow the video device to turn on or awakened by a network message.
	Wakeup on ALARM	Select the Wakeup on ALARM option to allow the video device to turn on or awakened by a video alarm.

#### 4.7.3 HD720p Video AEK Geo Build Configuration Summary

Once you have completed selecting the options and features for building the HD720p Video AEK Geo (Hostless) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, Host Interface, Host Settings, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.8 Building Custom Smart Plug AEK Application

Selecting the Smart Plug AEK (Hostless) under the SDK Builder Configuration screen displays the module information that includes the module selected, firmware version, application, SRAM (APP/WLAN/RTC), and Flash (Internal/External) summary information. There are several tabs that allow you to select various features and options to build and configure the Smart Plug AEK (Hostless) application used in home energy smart plugs, smart power strips, load control, and power measurement (see Figure 57, page 131).

- 802.11 WLAN, page 55
- Networking Services, page 74
- Provisioning, page 85
- Firmware Update, page 93
- Smart Plug Settings, page 132
- Smart Plug AEK Build Configuration Summary, page 132

**Figure 57 Smart Plug AEK (Hostless) Feature Selection**

Module Information																					
Module: GS2100 MIP/MIE v2.1/3.0	Firmware: GEPS v5.1.0 RC	Application: Smart Plug AEK (Hostless)	Build Output: Firmware Binary																		
<b>SRAM SUMMARY</b>			<b>FLASH SUMMARY</b>																		
																					
<table border="1"><tr><td>APP CPU SRAM Total</td><td>384KB</td></tr><tr><td>APP CPU SRAM Available</td><td>0KB</td></tr><tr><td>WLAN CPU SRAM Total</td><td>640KB</td></tr><tr><td>WLAN CPU SRAM Available</td><td>0KB</td></tr><tr><td>RTC NVRAM Available</td><td>0KB</td></tr></table>			APP CPU SRAM Total	384KB	APP CPU SRAM Available	0KB	WLAN CPU SRAM Total	640KB	WLAN CPU SRAM Available	0KB	RTC NVRAM Available	0KB	<table border="1"><tr><td>Internal Flash Total</td><td>2048KB</td></tr><tr><td>Internal Flash Available</td><td>1849KB</td></tr><tr><td>External Flash Total</td><td>None</td></tr><tr><td>External Flash Available</td><td>None</td></tr></table>	Internal Flash Total	2048KB	Internal Flash Available	1849KB	External Flash Total	None	External Flash Available	None
APP CPU SRAM Total	384KB																				
APP CPU SRAM Available	0KB																				
WLAN CPU SRAM Total	640KB																				
WLAN CPU SRAM Available	0KB																				
RTC NVRAM Available	0KB																				
Internal Flash Total	2048KB																				
Internal Flash Available	1849KB																				
External Flash Total	None																				
External Flash Available	None																				

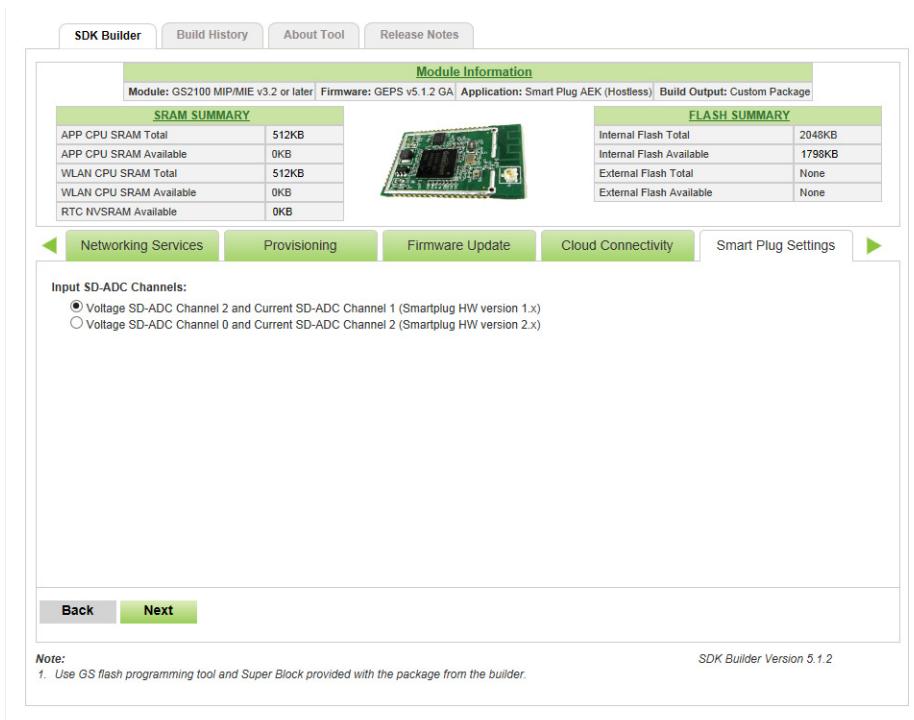


**NOTE:** When building Firmware Binary for EVK or AEK Package, it is recommended that you use the Default Evaluation Build. Otherwise, you can build Custom Packages for your environment.

## 4.8.1 Smart Plug Settings

The Smart Plug settings allows different voltage ADC channel selections for different hardware versions of the Smart Plug (see [Figure 58, page 132](#)).

**Figure 58 Smart Plug Settings**



These are the settings for Smart Plug input SD-ADC channels (see [Table 30, page 132](#)).

**Table 30 Smart Plug Settings**

Settings	Options	Description
Input SD-ADC Channels	Smart Plug Hardware version 1.x	Input voltage SD-ADC Channel 2 and current SD-ADC Channel 1
	Smart Plug Hardware version 2.x	Input voltage SD-ADC Channel 0 and Current SD-ADC Channel 2

## 4.8.2 Smart Plug AEK Build Configuration Summary

Once you have completed selecting the options and features for building the Smart Plug AEK (Hostless) firmware, click the Next button or select the Summary tab. The Build Configuration Summary screen will display a summary of the configuration options you selected (e.g., Module Configuration, 802.11 WLAN, Networking Services, Provisioning, Firmware Update, Cloud Connectivity, etc.). See [1.7 Build Configuration Summary, page 37](#) for a sample Build Configuration Summary.

## 4.9 Building Default EVK and AEK Applications

The following applications can be selected to build a default EVK or AEK:

- EVK Package
  - S2W/TLS/TLS Low Power
  - IP to WiFi (Hosted)
- AEK Package
  - TLS (Hostless, Web Server)
  - TLS Low Power (Hostless, Web/CoAp Client)
  - Audio (Hostless)
  - Music (Hostless)
  - VGA Video (Hostless)
  - HD720p Video (Hostless)
  - HD720p Video Geo (Hostless)
  - Smart Plug (Hostless)

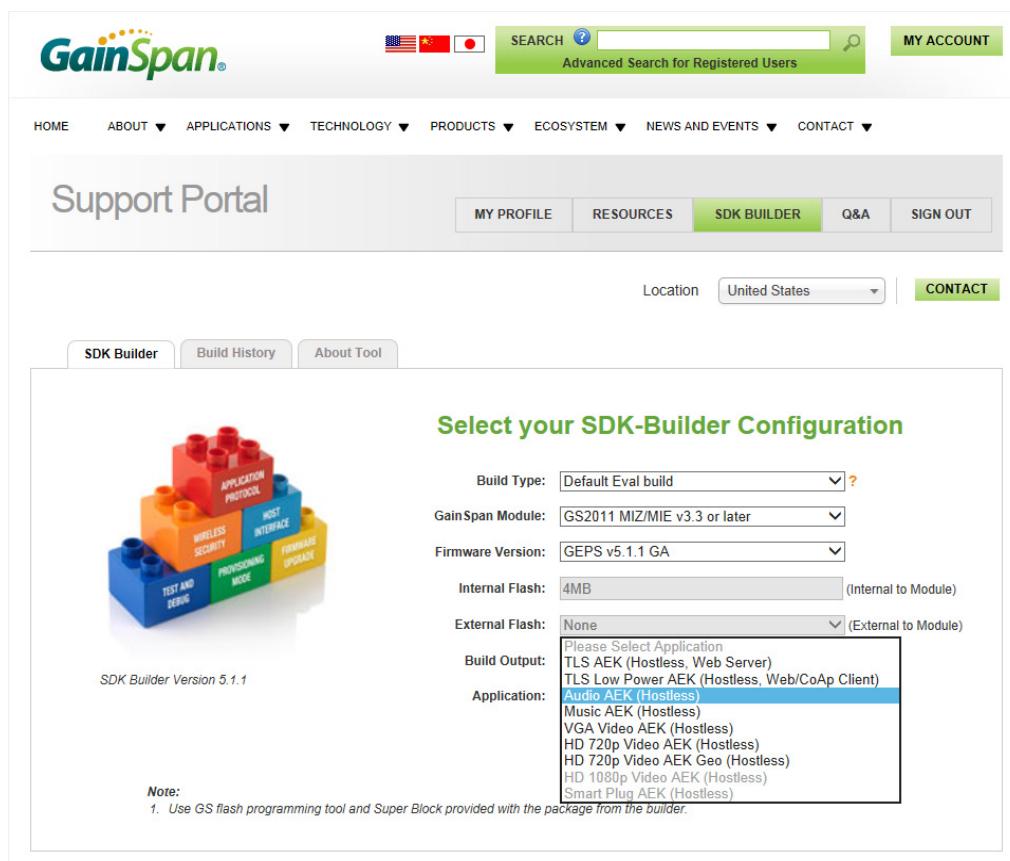
The EVK or AEK package generated may contain one or more of the following files that support the application being built:

- Read Me file
- Mobile applications (Android and iOS)
- Pre-built binaries
- User applications and libraries
- Quick Start Guide
- Documentation
- Release Notes

When building a default EVK or AEK package, there are a few simple steps to complete.

1. Login to your registered account using your Email and password.
2. Follow the instructions outlined in [Chapter 1 Using the SDK Builder, page 21](#).
3. Select a **Default Eval Build** from the SDK Builder Configuration screen.
4. Select the GainSpan Module, Firmware Version, Build Output. This will be the EVK or AEK Package, and the Application. See [Figure 59, page 134](#).

**Figure 59 Building Default EVK or AEK Package**



5. Click the **Build** button. This will build the EVK or AEK package.
6. Once the build is complete you will receive an Email notifying you with a link to download the EVK or AEK under the Build History tab of the SDK Builder tool (see [Figure 60, page 135](#)).

**Figure 60 Email Notification of EVK or AEK Package Build**

Dear Customer,

Your submitted build is completed and ready for download under the Build History tab of the SDK Builder tool. Please login to your GainSpan SDK Builder account and download the files from [https://www.gainspan.com/sdk2k/build\\_history](https://www.gainspan.com/sdk2k/build_history).

Product Name: GS2011

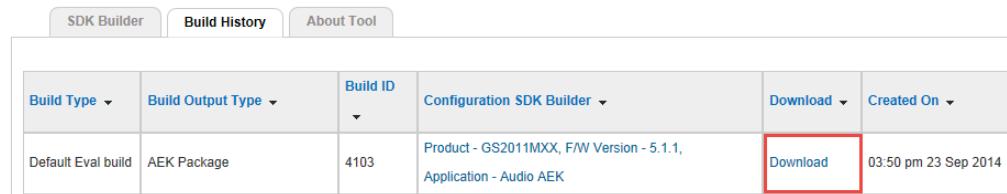
Firmware Version: GEPS v5.1.1

Application: Audio AEK (Hostless)

Thank you for using GainSpan SDK Builder. The SDK builder package includes documentation and the gs\_flashprogram utility. This utility must be used to program the binaries.

Regards,  
GainSpan Support

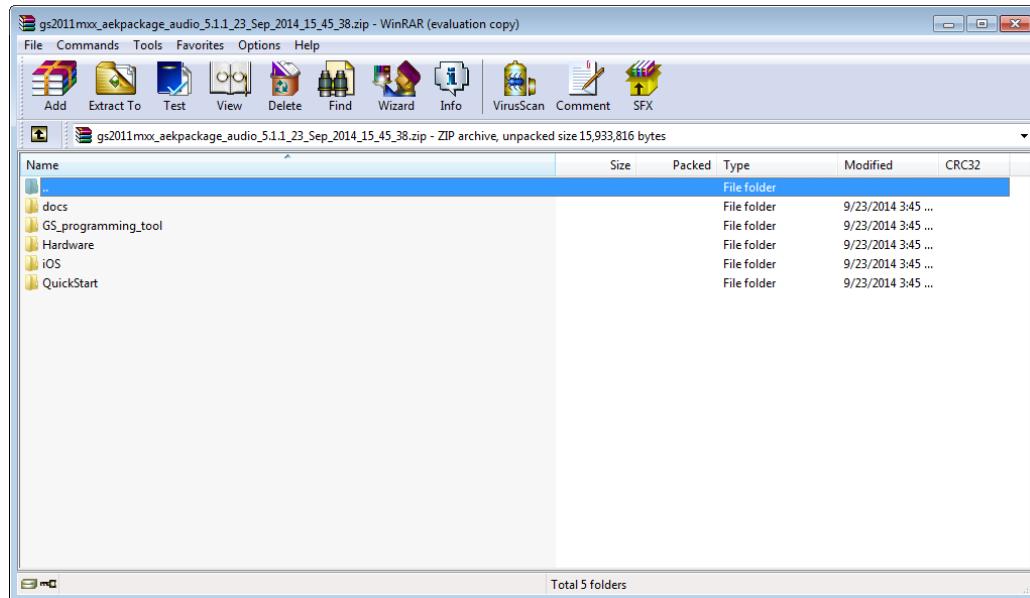
7. Click the **Download** link under the Build History tab to open or save the Configuration SDK Builder zip file to your computer (see [Figure 61, page 135](#)).

**Figure 61 Download EVK or AEK Application**

Build Type	Build Output Type	Build ID	Configuration	Download	Created On
Default Eval build	AEK Package	4103	Product - GS2011MXX, F/W Version - 5.1.1, Application - Audio AEK	<a href="#">Download</a>	03:50 pm 23 Sep 2014

8. Once downloaded, the zip file will display the EVK or AEK package that contains the application build selected, binaries, and documentation (see [Figure 62, page 136](#)).

**Figure 62 Zip File Containing the EVK or AEK Package**



For additional information and instructions on how to configure the GainSpan devices for other EVK or AEK applications listed, refer to the application documentation.

# Chapter 5 Building SDK Packages

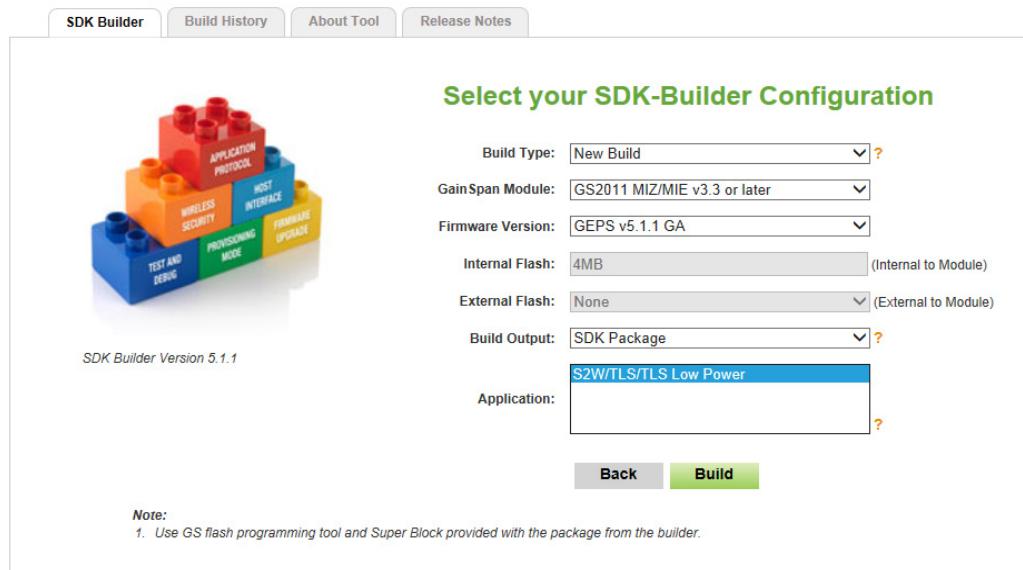
This chapter provides instructions on how to use the GainSpan® SDK Builder to generate an SDK Package for Serial-to-WiFi, Temperature and Light Sensor (TLS), and TLS Low Power application. The SDK package consists of documentation, Android and iOS mobile applications, Web application sources and pre-built binaries. It also consists of an SDK package with embedded source code for the ADK.

## 5.1 Building SDK Applications

To build a new SDK package, perform the following:

1. Login to your registered account using your Email and password.
2. Follow the instructions outlined in [Chapter 1 Using the SDK Builder, page 21](#).
3. Select a **New Build** from the SDK Builder Configuration screen.
4. Select the GainSpan Module, Firmware Version, Build Output. This will be the SDK Package. See [Figure 63, page 137](#).

**Figure 63 Building SDK Package**



5. Click the **Build** button. This will build the SDK package.

6. Once the build is complete you will receive an Email notifying you with a link to download the S2W/TLS/TLS Low Power SDK under the Build History tab of the SDK Builder tool. There is also a link to the flash programmer utility to program the modules with the recently built binary files (see [Figure 64, page 138](#)).

**Figure 64 Email Notification of S2W/TLS/TLS Low Power SDK Build**

Dear Customer,

Your submitted build is completed and ready for download under the Build History tab of the SDK Builder tool. Please login to your GainSpan SDK Builder account and download the files from [https://www.gainspan.com/sdk2k/build\\_history](https://www.gainspan.com/sdk2k/build_history).

Product Name: GS2011  
Firmware Version: GEPS v5.1.1  
Application: S2W/TLS/TLS Low Power

Thank you for using GainSpan SDK Builder. The SDK builder package includes documentation and the gs\_flashprogram utility. This utility must be used to program the binaries.

Regards,  
GainSpan Support

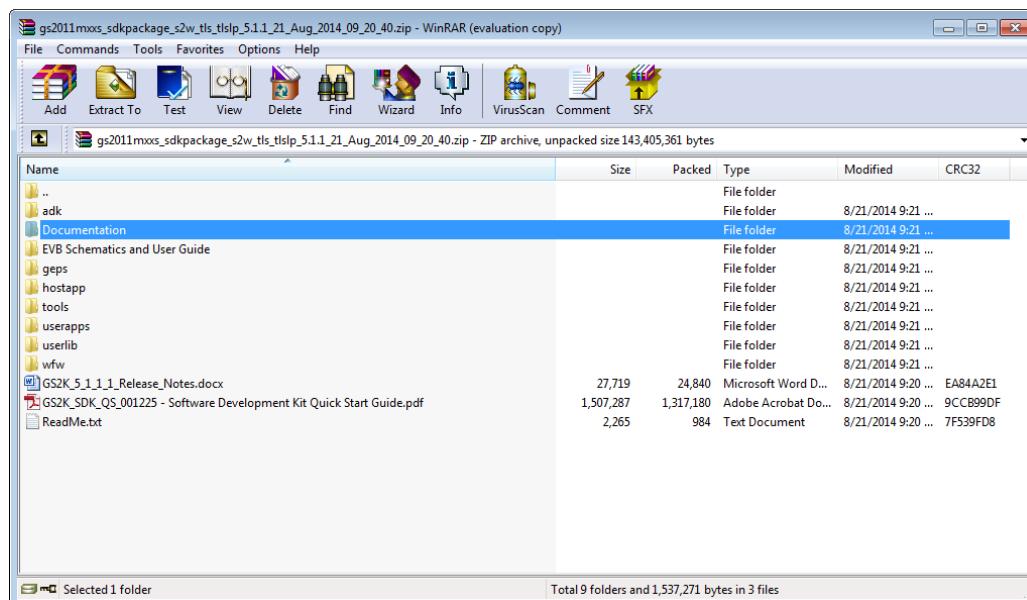
7. Click the **Download** link under the Build History tab to open or save the Configuration SDK Builder zip file to your computer (see [Figure 65, page 138](#)).

**Figure 65 Download S2W/TLS/TLS Low Power SDK Application**

Build Type	Build Output Type	Build ID	Configuration SDK Builder	Download	Created On
New Build	SDK Package	4390	Product - GS2011MXX, F/W Version - 5.1.1, Application - Serial to Wi-Fi/TLS/TLS Low Power	<a href="#">Download</a>	07:09 am 14 Oct 2014

8. Once downloaded, the zip file will display the S2W/TLS/TLS Low Power SDK package that contains the application build selected, binaries, libraries, schematics, and documentation (see [Figure 66, page 139](#)).

**Figure 66 SDK Build Package (S2W/TLS/TLS Low Power)**



For additional information and instructions on how to provision and configure the GainSpan devices using Serial-to-WiFi, TLS, and TLS Low Power, refer to the application documentation.

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# Chapter 6 Building ADK Including SDK Packages

This chapter provides instructions on how to use the GainSpan® SDK Builder to generate ADK Packages (including SDK) for Provisioning.

To build additional applications listed below, follow the same procedures as building the Provisioning ADK (see [6.1 Building Provisioning ADK Application, page 142](#)).

- Provisioning
- Over The Air Firmware Update (OTAFU)
- TLS (Hostless, Web Server)
- Audio (Hostless)
- Music (Hostless)
- VGA Video (Hostless)
- HD 720p Video (Hostless)
- HD 720p Video Geo (Hostless)
- Smart Plug (Hostless)
- WiFi Adapter Card (WAC) ADK

The ADK (including SDK) generated may contain one or more of the following files that support the application being built:

- Read Me file
- Mobile applications (Android and iOS)
- Board Schematics
- Pre-built binaries
- User applications and libraries
- Quick Start Guide
- Documentation
- Release Notes

## 6.1 Building Provisioning ADK Application

This section provides instructions on how to use the GainSpan® SDK Builder to build a Provisioning ADK application that consists of documentation, Android and iOS mobile applications, Web application sources and pre-built binaries. It also consists of an SDK package with embedded source code for the ADK.

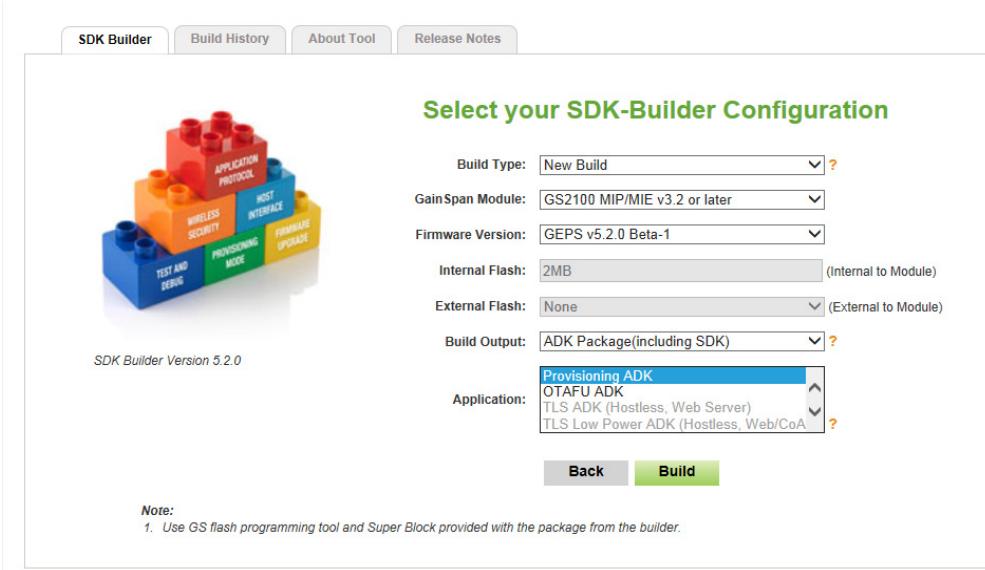


**NOTE:** To build an ADK package (including SDK), the ADK and SDK package needs to be purchased.

To build a new Provisioning ADK package, perform the following:

1. Login to your registered account using your Email and password.
2. Follow the instructions outlined in [Chapter 1 Using the SDK Builder](#), page 21.
3. Select a **New Build** from the SDK Builder Configuration screen.
4. Select the GainSpan Module, Firmware Version, Build Output. This will be the ADK Package (including SDK). See [Figure 67](#), page 142.

**Figure 67 Building Provisioning ADK (including SDK) Package**



5. Click the **Build** button. This will build the Provisioning ADK (including SDK) package.
6. Once the build is complete you will receive an Email notifying you with a link to download the Provisioning ADK (including SDK) under the Build History tab of the SDK Builder tool. There is also a link to the flash programmer utility to program the modules with the recently built binary files (see [Figure 68](#), page 143).

**Figure 68 Email Notification of Provisioning ADK Build**

Dear Customer,

Your submitted build is completed and ready for download under the Build History tab of the SDK Builder tool. Please login to your GainSpan SDK Builder account and download the files from [https://dev.gainspan.com/sdk2k/build\\_history](https://dev.gainspan.com/sdk2k/build_history).

Product Name: GS2011  
Firmware Version: GEPS v5.1.1  
Application: Provisioning ADK

Thank you for using GainSpan SDK Builder. To program the modules with these binary files, please download the [flash programmer utility zip](#) from the GainSpan Support Portal under the Software section.

Regards,  
GainSpan Support

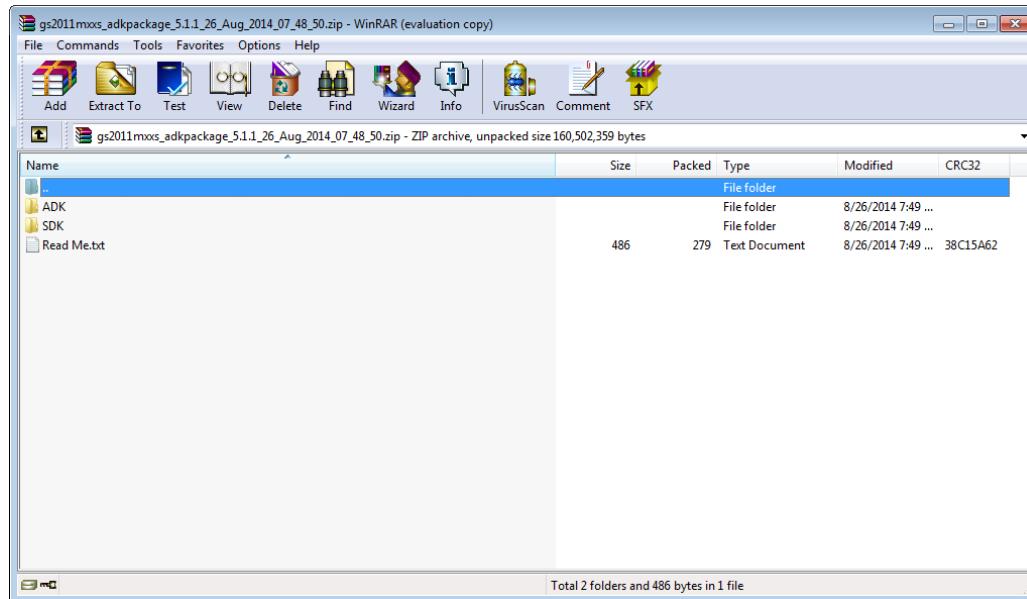
7. Click the **Download** link under the Build History tab to open or save the Configuration SDK Builder zip file to your computer (see **Figure 69**, page 143).

**Figure 69 Download Provisioning ADK (including SDK) Application**

Build Type	Build Output Type	Build ID	Configuration SDK Builder	Download	Created On
New Build	ADK Package(including SDK)	3886	Product - GS2011MXS, F/W Version - 5.1.1, Application - Provisioning ADK	<a href="#">Download</a>	07:52 am 26 Aug 2014

8. Once downloaded, the zip file will display the ADK and SDK packages that contains the application build selected, binaries, and documentation (see [Figure 70, page 144](#)).

**Figure 70 Zip File Containing the Provisioning ADK (including SDK) Package**



For additional information and instructions on how to configure the GainSpan devices for other ADK and SDK applications listed, refer to the application documentation.

# Chapter 7 Building ADK Packages

This chapter provides instructions on how to use the GainSpan® SDK Builder to generate ADK Packages.

To build ADK packages for additional applications listed below, follow the same procedures as building the OTAFU ADK (see [7.1 Building OTAFU ADK Application, page 146](#)).

- Provisioning
- TLS (Hostless, Web Server)

The ADK package generated may contain one or more of the following files that support the application being built:

- Read Me file
- Mobile applications (Android and iOS)
- Pre-built binaries
- User applications and libraries
- Quick Start Guide
- Documentation
- Release Notes

## 7.1 Building OTAFU ADK Application

This section provides instructions on how to use the GainSpan® SDK Builder to build a OTAFU ADK application that consists of documentation, Android and iOS mobile applications, Web application sources and pre-built binaries.

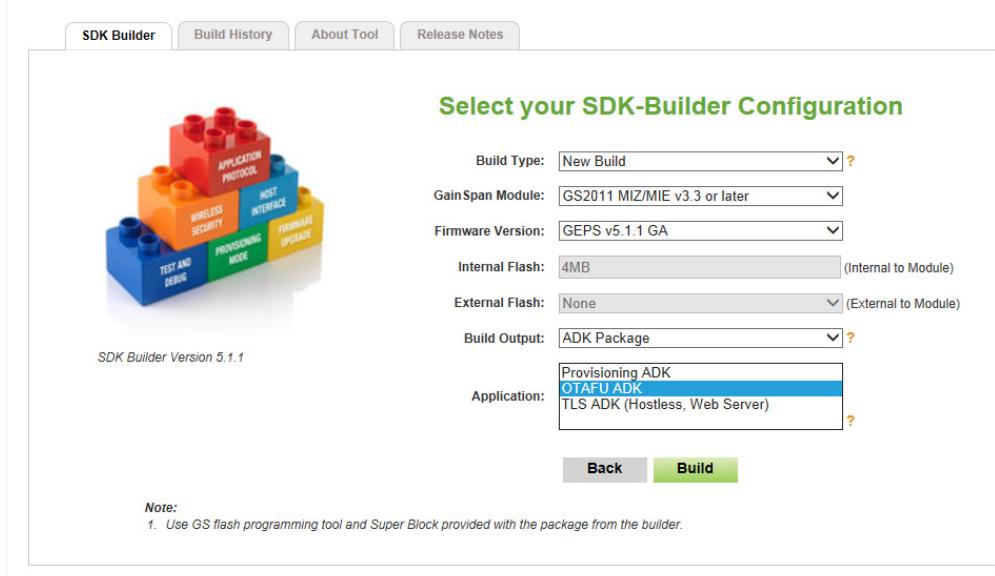


**NOTE:** To build an ADK package, the ADK package needs to be purchased.

To build a new OTAFU ADK package, perform the following:

1. Login to your registered account using your Email and password.
2. Follow the instructions outlined in [Chapter 1 Using the SDK Builder, page 21](#).
3. Select a **New Build** from the SDK Builder Configuration screen.
4. Select the GainSpan Module, Firmware Version, Build Output. This will be the ADK Package. See [Figure 71, page 146](#).

**Figure 71 Building OTAFU ADK Package**



5. Click the **Build** button. This will build the OTAFU ADK package.
6. Once the build is complete you will receive an Email notifying you with a link to download the OTAFU ADK under the Build History tab of the SDK Builder tool. There is also a link to the flash programmer utility to program the modules with the recently built binary files (see [Figure 72, page 147](#)).

**Figure 72 Email Notification of OTAFU ADK Build**

Dear Customer,

Your submitted build is completed and ready for download under the Build History tab of the SDK Builder tool. Please login to your GainSpan SDK Builder account and download the files from [https://dev.gainspan.com/sdk2k/build\\_history](https://dev.gainspan.com/sdk2k/build_history).

Product Name: GS2011  
Firmware Version: GEPS v5.1.1  
Application: OTAFU ADK

Thank you for using GainSpan SDK Builder. To program the modules with these binary files, please download the [flash programmer utility zip](#) from the GainSpan Support Portal under the Software section.

Regards,  
GainSpan Support

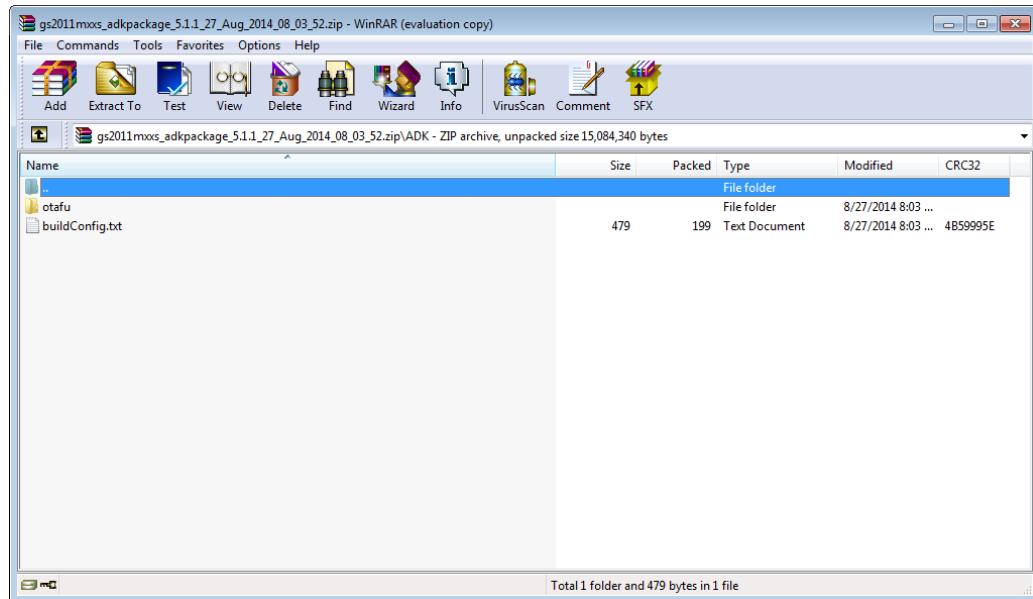
7. Click the **Download** link under the Build History tab to open or save the Configuration SDK Builder zip file to your computer (see [Figure 73, page 147](#)).

**Figure 73 Download OTFU ADK Application**

Build Type	Build Output Type	Build ID	Configuration SDK Builder	Download	Created On
New Build	ADK Package	3907	Product - GS2011MXX, F/W Version - 5.1.1, Application - OTAFU ADK	<a href="#">Download</a>	08:01 am 27 Aug 2014

8. Once downloaded, the zip file will display the ADK package that contains the application build selected, binaries, and documentation (see [Figure 74, page 148](#)).

**Figure 74 Zip File Containing the OTAFU ADK Package**



For additional information and instructions on how to configure the GainSpan devices for other ADK applications listed, refer to the application documentation.

# Chapter 8 Re-Building Packages

This chapter provides instructions on how to use the GainSpan® SDK Builder to re-build previously generated firmware builds using the Build ID.

## 8.1 Re-Building Packages

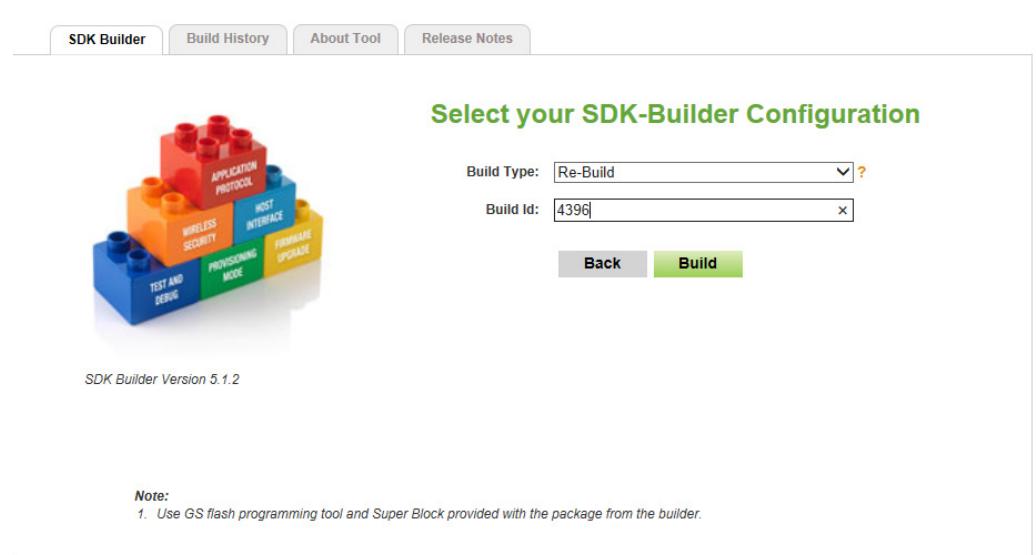
Selecting the Re-Build option under the Build Type will allow you to re-build previously generated Custom, EVK, AEK, ADK, and ADK (with SDK package) packages using the Build ID (see [Figure 75, page 149](#)). This feature allows previous firmware builds to be further edited or modified and re-submitted for build.

**Figure 75 Select Build ID**



Select the SDK Builder tab to open the SDK Builder Configuration tool. Select Re-Build as the Build Type, and enter the Build ID (see [Figure 76, page 149](#)). For this example the Build ID will be the one shown in [Figure 75, page 149](#) above. Select the Build button to start the re-build process.

**Figure 76 Re-Build Previous Firmware Builds Using Build Identifier**



To download the Re-Build package, select the Build History tab. Under the Build Type, Re-Build will display. The SDK Builder will issue a new Build ID (see [Figure 77, page 150](#)). Select Download to open or save the re-build package to your C:\drive.

**Figure 77 SDK Builder Re-Build Package**

Build Type	Build Output Type	Build ID	Configuration	Download	Created On
Re-Build	AEK Package	4851	Product - GS2011MXX, F/W Version - 5.1.1, Application - Music AEK	Download	10:09 am 25 Nov 2014

The Build Configuration Summary screen will display the original Build Id and additional build summary information (see [Figure 78, page 150](#)).

**Figure 78 Build Configuration Summary Re-Build**

Module Configuration	
Build Type	Re-Build
Re-Build Id	4396
Product Name	GS2011 MIZ/MIE v3.3 or later
Firmware Version	GEPS v5.1.1 GA
Internal Flash	4MB
External Flash	None
Application	Music AEK (Hostless)
Build Output	AEK Package

802.11 WLAN	
Wi-Fi Station	-----
Wi-Fi (Limited) AP	-----

Networking Services	
Core Network Services	IPv4
Core Network Services IPv4	DHCP Server DNS Server Discovery mDNS,DNS-SD HTTP 1.1 Client HTTPS 1.1 Server

**OK**