



# GainSpan Over-The-Air Firmware Upgrade Application Development Kit

## PRODUCT OVERVIEW

The GainSpan Over-the-Air Firmware Upgrade (OTAFU) Application Development Kit (ADK) enables wireless upgrades of the embedded firmware on GainSpan GS1011 SoC based GS1011M and GS1500M Wi-Fi modules using either a web browser (PC) or a mobile application (iOS or Android based smartphone). Upgrade of the embedded firmware can be done while the GainSpan Wi-Fi module is operating in Limited AP or Infrastructure Client Mode. Smartphones and PC web browsers use mDNS/DNS-SD based methods to discover devices and services on the network that are advertising the firmware upgrade application profile.

## OPERATIONAL MODES AND DEPLOYMENT CASES

In the Limited AP mode, the GainSpan Wi-Fi module has the ability to form connections with up to eight smart phones (or PCs) and the smartphone (or PC) connects to it as a client/station. To accomplish this connection, the embedded application allows configuration of a unique SSID (infrastructure network) with open or WPA/2 Personal security and utilizes a DHCP Server that provides a temporary IP address to the associated smartphone/ PC. In addition, the module provides a DNS Server. For the OTAFU application in Limited AP mode, the smartphone or a PC (web browser) connects to the Limited AP as a client, navigates its local file system for the firmware binary images and initiates the OTAFU procedure to upgrade the firmware binaries on the GainSpan Wi-Fi module. The firmware upgrade is a two-step procedure – the binary images are first uploaded to the external flash on the GainSpan Wi-Fi module, and then moved to the internal flash of the GainSpan Wi-Fi SoC. Users have the option of selecting either the WLAN binaries or the Application binaries, or both, for firmware upgrade. Option is also provided to replace the existing factory backup firmware version with the current version of the firmware binaries.

In infrastructure client mode, the OTAFU embedded application includes a DHCP and DNS client, supports Open, WPA2 Personal and Enterprise security modes, and can also act as a SSL client creating a secure connection to the smartphone/PC or internet server at the HTTP application layer. In this mode, the GainSpan Wi-Fi module and the smartphone (or PC), connect to an AP as clients. The smartphone (or PC) now discovers the OTAFU embedded application profile and service advertised by the GainSpan Wi-Fi module, selects the new firmware binaries on its local file system and then initiates the firmware upgrade of the module.



## BENEFITS:

- **Over-the-Air Firmware Upgrade (OTAFU) utility for the GainSpan Wi-Fi modules communicate with either web browsers or iOS/Android based smartphones.**
- **Support for firmware upgrade on a local network - the firmware upgrade is pushed to the GainSpan embedded device from the web browser or smartphone.**
- **Firmware upgrade mechanism is built on top of HTTP, allowing for easy integration with applications and web services.**
- **mDNS/DNS-SD methods support discovery of devices and services available on the network without additional configuration.**

## FEATURES:

- **OTAFU Software Suite includes embedded firmware, web, iOS and Android applications.**
- **Supports firmware upgrades in both Limited AP and Infrastructure Client modes.**
- **Supports IEEE Power save mechanism while in Infrastructure Client mode.**
- **Firmware images are pushed to the node via an HTTP client (web browser or smartphone).**
- **Advertises firmware upgrade service advertises itself and allows automatic discovery by clients using mDNS/DNS-SD discovery methods.**
- **Uses external flash as a staging area and to store the backup firmware.**
- **Supports upgrade of the Factory Restore backup area at the time of upgrade.**

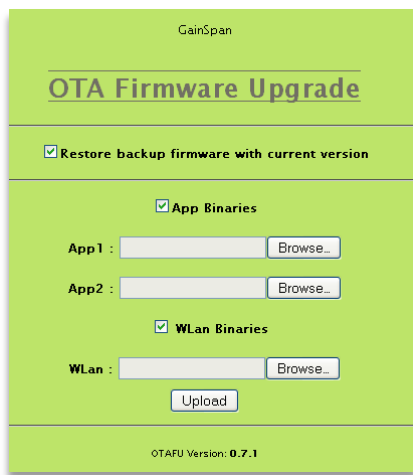
In both Limited AP and client mode, the GainSpan Wi-Fi module uses the embedded HTTP server functionality to receive the firmware images from the smartphone/PC. Hence, the firmware upgrade process requires the HTTP server to be running. Embedded web application pages are provided to work with a browser. Source code for native mobile applications is provided for iOS and Android platforms.

mDNS/DNS-SD based discovery is supported in both Limited AP and client modes. The OTAFU embedded application advertises its availability and services using this technique. The OTAFU web and mobile applications discover the OTAFU embedded application profile and connect to it. Discovery makes it easier to locate and connect to individual applications on a network and eliminates the need to know the URL. This is compatible with the Bonjour add-in for Microsoft Internet Explorer.

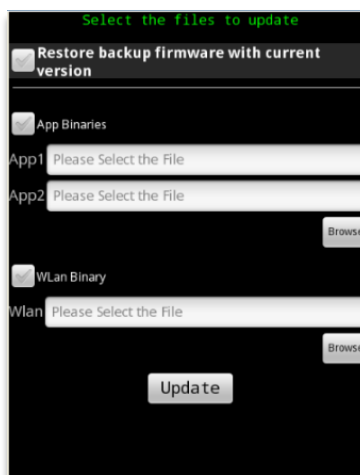
Provisioning of GainSpan WiFi modules in Limited AP and client/station modes can be handled by any number of easy to use techniques. Web Application pages and native mobile applications for this are provided in the GainSpan Provisioning ADK.

**OTAFU MOBILE APPLICATIONS**

The OTAFU mobile applications allow users to upgrade firmware using iOS and Android based smartphones. The OTAFU ADK consists of firmware upgrade reference applications for both types of smart devices.



Web Application



Mobile Application (Android)

**OTAFU ADK CONTENTS**

ADK Components	Type
OTAFU Embedded Firmware Application	HTTP APIs & Firmware Binary/Source
OTAFU Web Application Software	Source & Binary
OTAFU Mobile Application Software for iOS/Android Smartphones	Source & Binary

**OTAFU ADK MINIMUM REQUIREMENTS**

Requirements	Type
GainSpan EVB II (or SDK II)	Hardware
PC with web browser or iOS or Android Based Smart Device	Client Device

**OTAFU ADK SOFTWARE COMPONENTS**

**OTAFU EMBEDDED APPLICATION SOFTWARE**

The OTAFU embedded application software provides HTTP server functionality and enabling APIs.

- Advertises OTAFU profile and allows automatic discovery by client applications using mDNS/DNS-SD discovery methods
- Both web and mobile applications use mDNS/DNS-SD discovery to interact with the GainSpan Wi-Fi module

The OTAFU embedded application allows a user to browse to the firmware images on the local file system, select the firmware images and then initiate the upgrade. The GainSpan Wi-Fi module needs to have a HTTP server running, so that it can receive the firmware binary images sent to it by the smart phone or PC. The firmware is first stored in external flash and then moved into the internal flash of the GainSpan Wi-Fi module. The OTAFU embedded application also allows user to restore the factory or backup firmware with current version.

**OTAFU EMBEDDED WEB APPLICATION**

The OTAFU embedded web application uses a web browser to initiate upgrade of the firmware. The OTAFU ADK includes a web page for this purpose. This web page is part of the embedded application that resides in the GainSpan Wi-Fi module and can be accessed from any standard web browser. This application is built using JavaScript/AJAX.

**GAINSPAN OTAFU ADK ORDERING INFORMATION**

ITEM	PART NUMBER	Description
GainSpan OTAFU ADK	GS-ADK-OTAFU-WEB	GainSpan OTAFU ADK based on GainSpan GS1011M/GS1500M Wi-Fi Modules

