Flash Guide

AirPrime WP Series

2174127
1.0
November 23, 2016

Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless modem are used in a normal manner with a well-constructed network, the Sierra Wireless modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless modem, or for failure of the Sierra Wireless modem to transmit or receive such data.

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Consult our website for up-to-date product descriptions, documentation, application notes, firmware upgrades, troubleshooting tips, and press releases: www.sierrawireless.com

Document History

Version	Date	Updates
1.0	November 23, 2016	First version

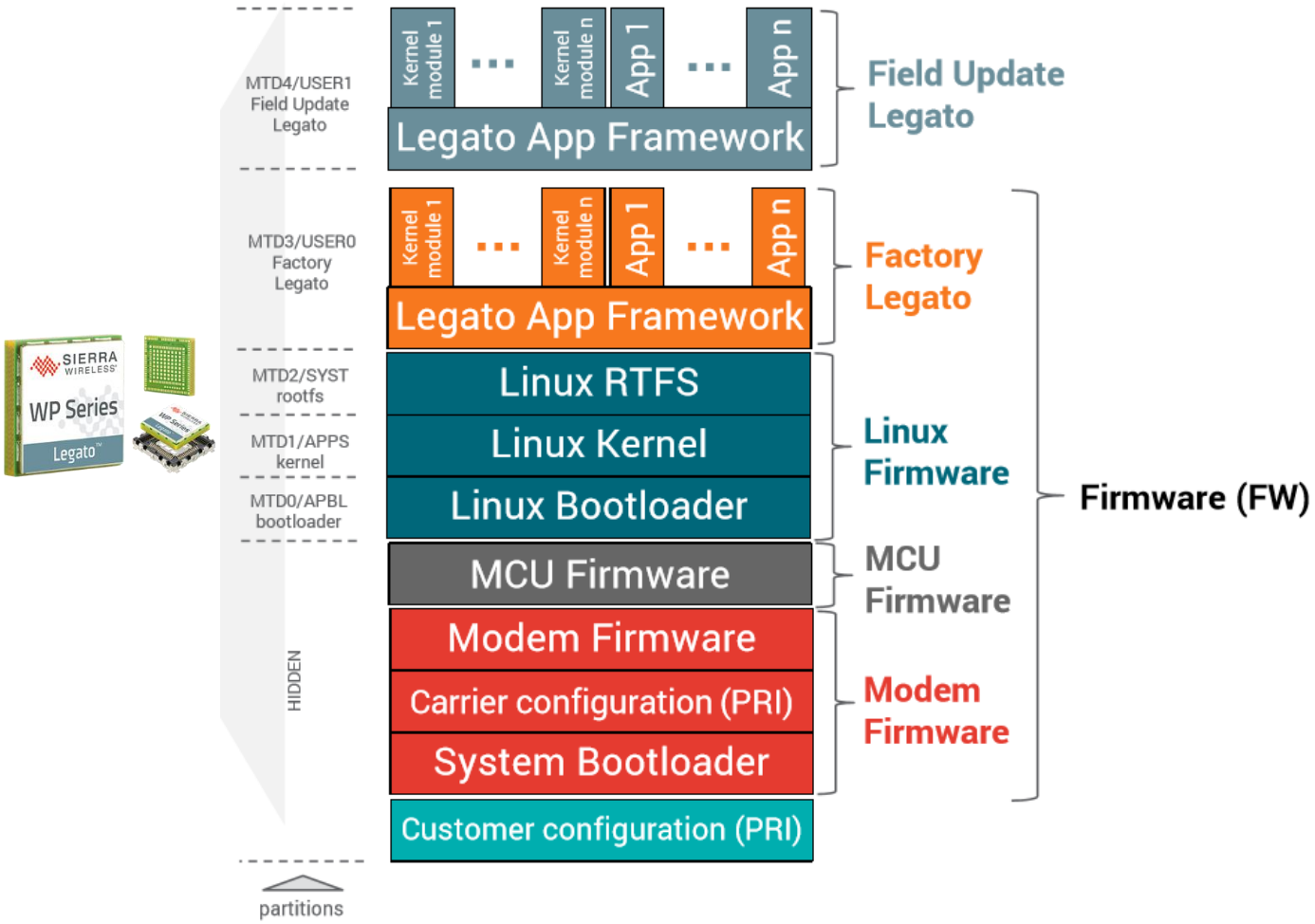
Contents

1. Overview

This document provides details about the tools and the process workflows to flash WP series modules, and to build your own update packages.

1.1. Software Components

The following graphic shows the Firmware and Legato software components that are involved in flashing updates:



Sierra Wireless® AirPrime® WP Series modules ship from the factory with Legato and Linux LTS embedded software.

The Modem Firmware and Carrier configuration update files are now available in one file ready to be bundled with factory manufacturing and field updates.

2. Download Packages

You can download all required packages through a single access point: WP Firmware Packages

The firmware update process uses **Combined Images** that include all required firmware packages in a single file: Carrier PRI, Modem Firmware, MCU Firmware, Linux Firmware, and Legato App Framework. The combined image is the only file needed if you're **not** rebuilding Yocto or the Legato framework.

The **Combined Images** are provided in both Windows .EXE and Linux .SPK format, and are applicable to all SKUs.

We also provide the individual **Component** files so you can use the `swicwe` tool to build your own custom combined images. A custom combined image could also be used to incorporate Customer PRI changes for a specific SKU.

Go to the WP Firmware Packages page to download the files.

3. Build Own Packages

3.1. Command Line Build Own Packages

You run Legato's make tool (`$ make`) from the command line to create a new Legato system that can be used for a field update or to set to factory install. See Legato on GitHub for details on how to clone Legato and run make.

Tool	**make**
Package Type	Field Update and Factory Legato
Purpose	Create a Legato system
	{framework + apps + kernel modules} to update the field user partition or set factory install.
Host PC	Linux
User Interface	Linux command line
Description	Legato Framework tool. Device agnostic.

3.2. Developer Studio Build Own Packages

Developer Studio has an available Wizard in both Windows and Linux to build your own packages. See Developer Studio docs for details.

	System Wizard	System Wizard
Package Type	Field Update Legato	Firmware
Purpose	Create a Legato system {framework + apps + kernel modules} to update the field user partition or to set the factory user partition *	Create one firmware from several FW components {Modem FW + Linux FW + Factory Legato*}
Host PC	Windows / Linux	
User Interface	Wizard	
Description	Device specific (chipset dependent).	

3.3. Create One Firmware File

The swicwe tool is available from the Linux command line to concatenate several component files into one package.

The combined file can include apps, the Linux kernel, and modem firmware or configuration files.

See Sierra Wireless Source swicwe tool page.

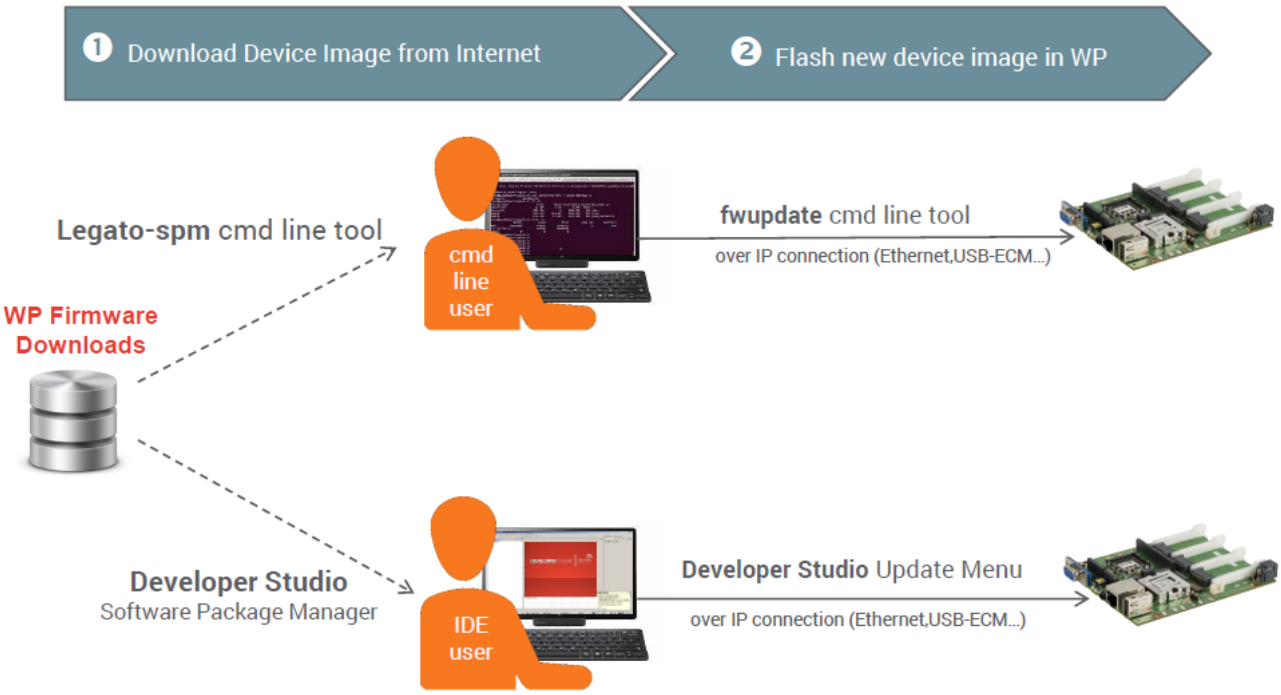
	swicwe
Package Type	Firmware
Purpose	Create one firmware from several FW components {Modem FW + Linux FW + Factory Legato}
Host PC	Linux
User Interface	Linux command line
Description	Device specific (chipset dependent).

4. Developer Process

This section outlines suggested developer workflows for different flash needs.

4.1. Standard SWI FW (modem+linux+factorylegato)

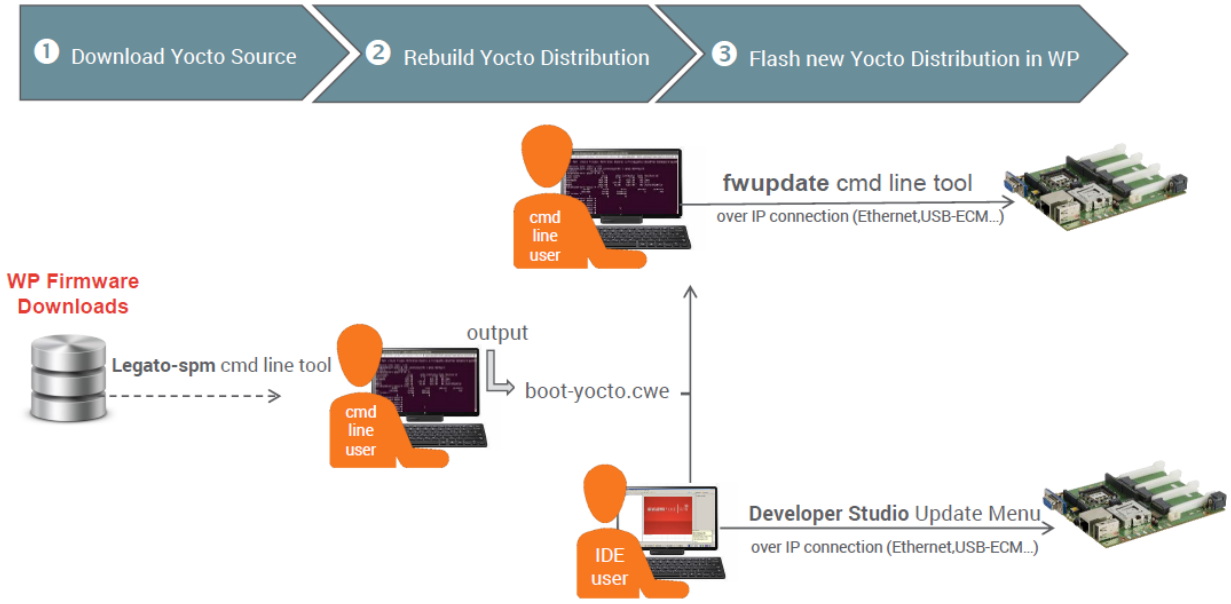
This shows the process for a developer flashing a standard device image with a factory installed Legato system and Linux kernel.*



*except for devices equipped with Release 9 or older.

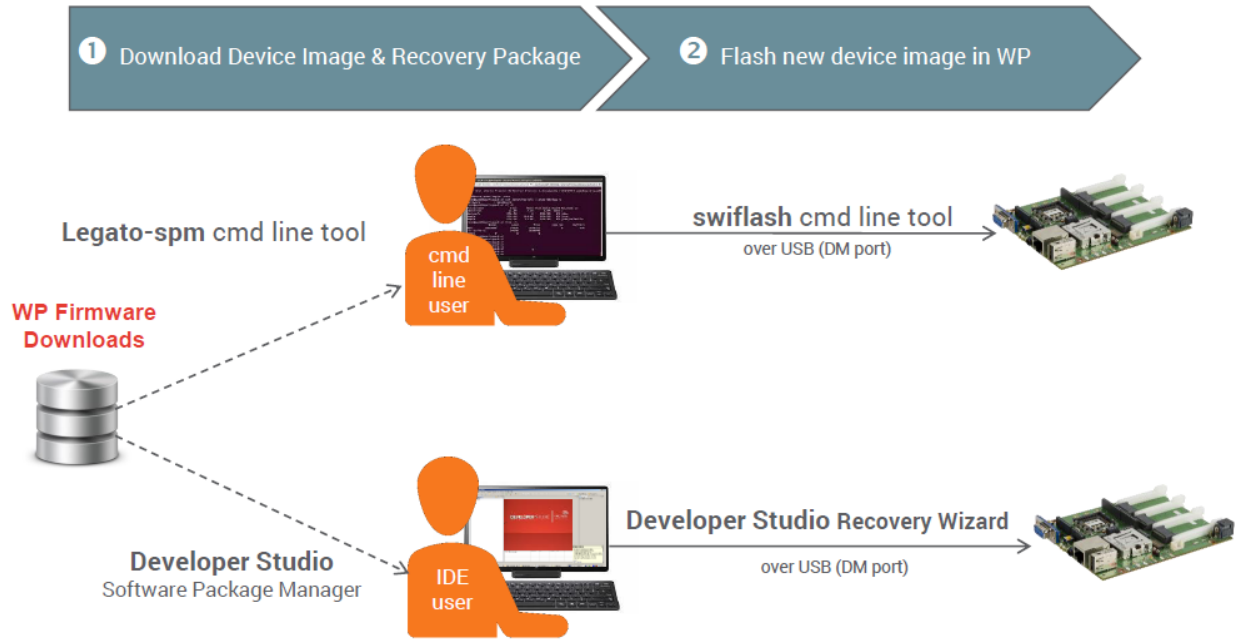
4.2. Custom Linux

This shows the process for a developer flashing a custom Linux kernel.



4.3. Recovering Broken Device

This shows the process for a developer recovering a broken device (due to kernel panic mode, broken Legato framework. etc.).



5. Customer Factory Process

This section outlines suggested customer factory workflow .

5.1. Prerequisites

To create a factory manufacturing package, these prerequisites apply:

- Manufacturing Equipment based on Linux OS
- IP connection between the manufacturing equipment and the WP: USB (USB-ECM port), Ethernet.

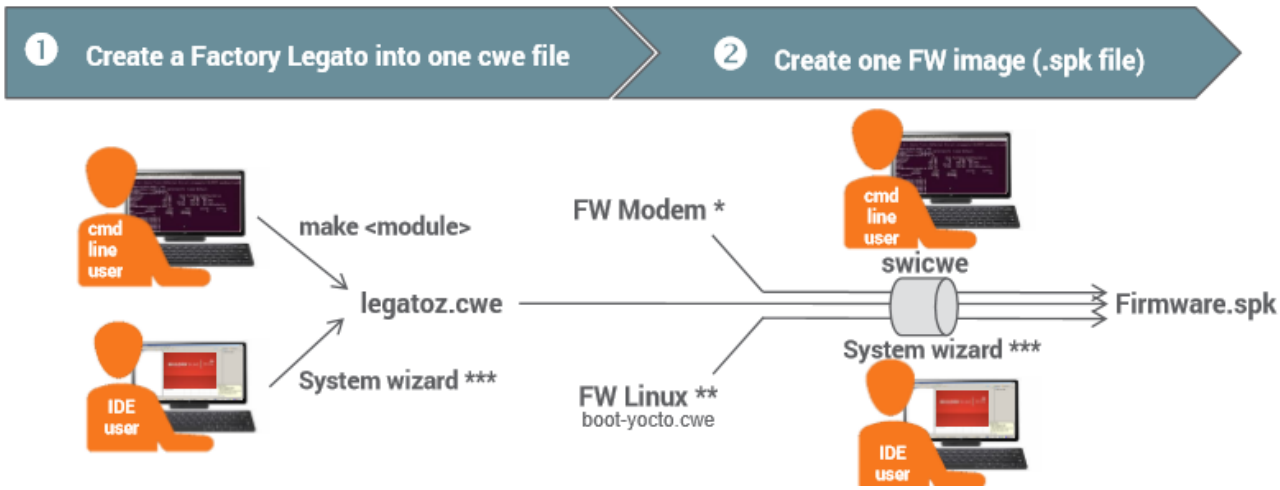
5.2. Before manufacturing

You need to ensure these steps have been completed prior to flashing for factory manufacturing:

- Use a WP with standard SWI FW (Modem + Linux + Legato) pre-loaded.
- Create one or more Factory Legato systems (framework + apps + kernel modules) using make <module> cmd line tool or Developer Studio
- Create single FW image based on standard SWI FW Modem* + SWI FW Linux** from Device Image WP Firmware Packages and the new Legato system

5.3. Create Single Package

This shows the process for a customer manufacturer creating a single update package.

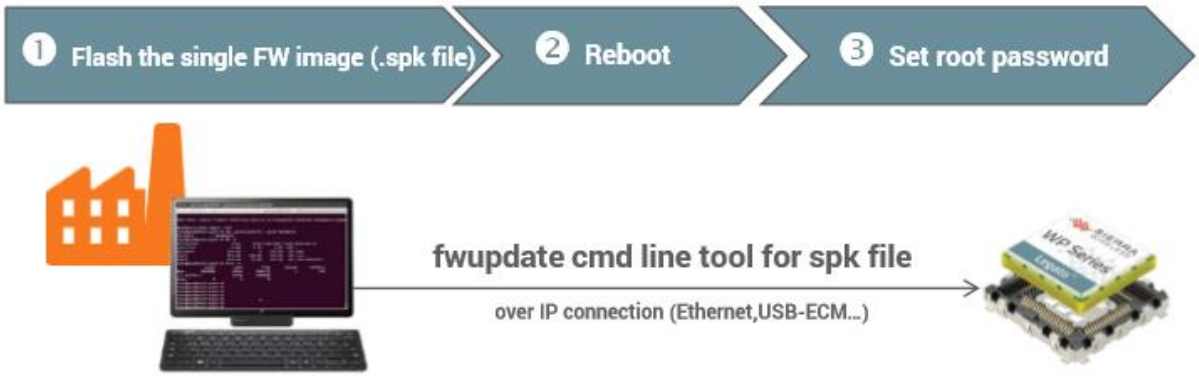


* = except for SKUs already with needed FW modem

** = except for SKUs already with needed FW Linux

5.4. Flash Single Package

This shows the process for a customer manufacturer to flash the single update file to the device.



5.5. SWI FW modem, new partition and customer Linux + apps

pending availability

6. Flash WP

This section provides details on the tools available to flash software in the different, available user interfaces.

You can flash software from either of these interfaces:

- Command Line
- Developer Studio IDE

6.1. Command Line Tools

Working from the Legato command line, there are two available target tools to update software:

- *app update* - install, update, and remove software on the target device. See update target tool and the mksys build tool docs for details.
- *firmware update* - download image files directly to the target. See firmware update target tool and swicwe docs for details.

	update	fwupdate
Type	App Update	FW Update
Purpose	Flash App (and 'Field Update Legato') in customer development phase or field update phase	Flash FW in customer manufacturing phase and in development phase
Host PC	Linux	
Connection	Any IP connection (over Ethernet, USB…)	
User Interface	Linux command line	
Description	Legato Framework tool. Run only with a working Legato preloaded on target. Device agnostic.	
Tool distribution	ADK full-installer (or legato-spm or GitHub for advanced usage)	
Tool Input Files	*.UPDATE	*.SPK, *.CWE
Tool Files from Sierra Wireless	None	Included in 'WP Device Image Packages' from WP Firmware Packages
Tool Files built by Customer	UPDATE files are built by customers using Legato's build tool **mksys**	CWE files are built by customers using **yocto** tools and could be concatenated in one single SPK file using **swicwe** tool

6.2. Developer Studio Tools

You can flash WP modules from Developer Studio in both Windows and Linux:

- update menu - update firmware and apps through menu-driven IDE.
- recovery wizard - recovery a device using a Wizard.

See Developer Studio docs for details.

	Update Menu	**Recovery Wizard**
Type	FW & App Update	FW Recovery
Purpose	Flash FW & App (and 'Field Update Legato') in customer development phase	Flash FW in customer development phase on a broken device
Host PC	Windows / Linux	Native Windows (not VM) / Native Linux *
Host/Target connection	Any IP connection (over Ethernet, USB…)	USB (through DM port)
User Interface	Menu	Wizard
Description	Legato Framework tool. Run only with a working Legato preloaded on target. Device agnostic.	Low level module bootloader tool. Run even if Legato is not preloaded on target or if the kernel is in 'panic mode'. Device specific (chipset dependent).
Tool distribution	ADK full-installer	
Tool Input Files	FW: *.SPK, *.CWE App: *.UPDATE	*.SPK, *.CWE
Tool Files from Sierra Wireless	None	Included in 'WP Device Image Packages' from WP Firmware Packages
Tool Files built by Customer	UPDATE files are built by customers using **DevStudio system wizard**	N/A

* = VM usage is strongly not recommended

6.3. FDT

There are two low-level bootloader protocol Firmware Download Tools (FDT) tools for device recovery:

- `swiflash` - Linux command line tool to flash images or reset user partition through USB port. See swiflash docs for details.
- one-click `.exe` - Windows executable to flash images on a device through USB DM port. You just need to connect to your device and then double-click the .exe.

	swiflash	**One-Click Tool**
Type	FW Recovery	FW Recovery
Purpose	Flash FW in customer development phase on broken device** and Repartition flash mapping in customer manufacturing phase***	Flash FW in customer development phase on a broken device **
Host PC	Native Linux *	Native Windows *
Connection	USB (through DM port)	
User Interface	Linux command line	Windows EXE
Description	Low level module bootloader tool. Run even if Legato is not preloaded on the target or if the kernel is in 'panic mode'. Device specific (chipset dependent).	
Tool distribution	apt-get	the tool and the firmware are packaged together in one single EXE on WP Firmware Packages
Tool Input Files	*.SPK, *.CWE	*.EXE
Tool Files from Sierra Wireless	Included in 'WP Device Image Packages' from WP Firmware Packages	the tool and the firmware are packaged together in one single EXE on WP Firmware Packages
Tool Files built by Customer	CWE files are built by customers using **yocto** tools and could be concatenated in one single SPK file using **swicwe** tool	N/A

* = VM usage is strongly not recommended