Aquila AP/Client 9.2.0_U11.14 RC

Update 11 Release Notes, Basic/Spectral Analysis Package

80-Y0868-1 Rev. A

December 7, 2012

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Revision history

Revision	Date	Description
A	December 2012	Initial release. Revised for Update 11. Previous document number was MKG-17132, Version 4.0.

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Contents

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1 Purpose

This is the release candidate (RC) for Update 11 of the Aquila baseline. The Aquila baseline is a consolidated driver that supports both Client and AP modes, depending on configuration. This is a full release for Linux Client and AP support in that baseline. Update 11 serves as an update release for 9.2 software release.

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2 Identification

The build number for this release is LSDK 9.2.0_U11.14.

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3 Features

3.1 Standard Features

This driver includes the features of the previous released drivers, and conforms to the following specifications.

IEEE 802.11	General requirements for 802.11 network interoperability
IEEE 802.11a **IEEE 802.11b** **IEEE 802.11g**	The driver supports the PHY requirements and protocols specified in the 2.4 GHz Normal and High Speed, and the 5.0 GHz band requirements.
IEEE 802.11d **IEEE 802.11h** **IEEE 802.11j**	This driver conforms to the various regulatory requirements for DFS, International operation, and Japan requirements.
IEEE 802.11n	This driver conforms to the requirements defined for the Increased Throughput specification and additional OFDM rates. Note HCCA functionality not included
IEEE 802.11e	Conforms to QoS station requirements, with the exception of optional Admission Control and HCF functions
IEEE 802.11i **IEEE 802.1x**	Conforms to the security requirements for WPA support with either personal shared key (PSK) or Enterprise mode (EAP mode)
Wi-Fi Approved 11n	Passes the Wi-Fi Approved 11n
WMM	This driver supports the WMM certification as specified by the Wi-Fi Alliance
WFA WPS	This driver conforms to the requirements specified by the Wi-Fi Alliance for WPA Protected Setup (WPS) implementation.
IQUE	This supports the Qualcomm Atheros proprietary QoS extensions known as IQUE, including Video transmission improvement, Multicast improvements, and better retry processing.
mBSSID	This driver supports the Qualcomm Atheros proprietary implementation of Virtual Access Points (VAP) that operates in either Client mode or Infrastructure mode.
3 Address WDS mode	Provides a forwarding client that can be used as a bridge between a LAN with up to 8 clients, and a standard AP. The AP will not need any special software.
Enhanced Auto Channel Select	Carrier feature that is used to select the “best” 2.4 GHz channel based on signal strength and noise floor
Spectral Analysis	Provides a mechanism for retrieving spectral data from the radio/baseband, and processing the data to determine interference sources. Implemented as an application on top of the driver, also provides a socket interface for any GUI that may want to display the spectral data
ANI Upgrades	Updates to ANI (noise immunity) have been included
Performance Improvements	Performance improvements including CPU utilization
UAPSD Improvements	Higher rate UAPSD responses

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DFS	Certain DFS improvements have been included in this release
Support for UB94 in Client and AP mode	This is the support for the UB94 USB dongle. This can run in either station or AP mode.
Green AP	Provides for power utilization reduction when in idle mode, waiting for a connection.
Linux 2.6.31 Kernel	Certain boards (AP99, AP101, AP111) have upgraded the driver to the 2.6.31 kernel. This kernel is included in the LSDK.
Video over Wireless	Additional features to ensure smooth video transmission over the Wireless link.
Quick Station Kickout	Provides for elimination of "blocking" station nodes that are no longer responsive, eliminating a bottleneck in multiple station scenarios
NAWDS	Support for connectionless WDS implementation. This is equivalent to the capability in the Carrier code bases.
Carrier/CE 2.0 Merge	Additional features for USB support in carrier/CE markets, including support for AR927x/AR70xx.
Linux AP 2x8 Memory Footprint	Specific reference designs will support operations in a constrained environment that supports 2 MB of flash and 8 MB DDR.
AR93xx Support	Support for operating AR93xx based reference designs (XB112, XB113, CUS152) in conjunction with PB92/DB120 reference platforms.

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4 New Features and Hardware

The following table lists new features and hardware that were added with each update of version 9.2.

Update	HW/SW	SW Mode	Description
11	SW	AP	Bug Fixes
10.5	SW	AP	Wi-Fi WPS2.0 Enhancement
10	SW	AP	MI124+HB97 ART2
10	HW		CUS191/PB92 STA RC, CUS191/DB120 Enterprise RC, DB120-73 Enterprise RC2, MI124+HB97
9	SW	AP	Retail Router Stack in Router release package
9	HW		AP121/123 Retail Router Stack RC.
8	SW	AP	Enterprise Beta support of CUS191
			Carrier mode support of Beta VoW for CUS191
8	SW	STA	WPS, 11n certification, P2P
8	HW		CUS191/PB92 (STA) Beta, CUS191/DB120 (AP mode-Enterprise) Beta, AP121/123 Retail Router Stack Beta, MI-124 Standalone/Full Offload RC.
7	SW	AP	Enterprise features:
			Enable hardware encryption for Management frames
			Provide an option to specify RTS/CTS mode per frame
			LMAC API changes to support queue limits
			Link test API for per-node fixed rate setting
			New argument for set_channel API to flush the Tx Queues
			Off-channel scanning during normal AP operation
			VoW ▪ 4.9GHz Enterprise support ▪ 90 Byte Full packet rate
7	HW		AP123 RC, DB120 73x Enterprise RC, AP113 RC
6	SW	AP	WAPI
6	HW		AP113 Beta, AP121/123 Masterd Alpha, UB124-8M RC.
5	SW	AP	Wi-Fi WPS2.0(hostapd 0.8)
			Enterprise layering
			Powercloud integration
5	HW		DB120 Full Offload RC, DB120 Standalone STA RC, MI-124 Full Offload/Standalone Beta, and DB120 Enterprise Alpha.
4	SW	AP	Adhoc WPA2
			Adhoc DFS

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Update	HW/SW	SW Mode	Description
4	HW		PB92 + XB112 Standalone RC, DB120 Full Offload Beta, UB124 Beta.
3	SW	AP	Kernel pre-emption
			SMP safe support
2	SW	STA	Unified WLAN and BT driver
1	SW	AP	Transmit Beamforming
			Ad-Hoc support
1	HW		AP121 RC
RC	HW		AP98 combined PLC/WLAN communication platform RC.

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5 Supported Hardware

The following hardware is supported.

5.1 AP Reference Platforms

AP91, AP96, AP101, AP111, AP113, AP121, AP123, DB120, MI124
PB44 with MB81, MB82, MB91, MB92, MB97, MB55, MB105
PB47 with MI50 or MX96
PB47/PB92 Offload with MI124 or DB120
PB92 platform boards supporting the PCIe modules listed below.

5.2 XB/HB Reference Modules

AR92xx Modules: XB91, XB92, HB93, HB95, HB97
AR93xx Modules: CUS152, HB112, HB116, XB112, XB113, XB114
AR95xx Module: CUS191

5.3 USB Modules

UB91, UB94, UB95

5.4 Tested Hardware

This release has been tested on the DB120+XB112 platform.

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6 Restrictions

The following sections outline restrictions on the software operation that must be considered when using the software for testing.

6.1 AP Restrictions

6.1.1 Enhanced Multicast Support

The enhanced multicast mechanism does not work properly in WDS tunneling mode. Running the Enhanced Multicast support directly to clients does work correctly.

6.1.2 DFS/Regulatory

Due to changes in FCC policy, the following rules now apply:

1. For all AP devices, UNI-II extension band channels between 5.6 to 5.65 GHz are not allowed. These devices CANNOT operate in the three channels in the radar bands.
2. For AP devices used outdoors and located < 35 km to a TDWR location, operation across 5.570 to 5.68 GHz must also be disabled.

These changes were not defined in time for this release. It is up to customers/users of this software to ensure they do NOT use the above channels for AP operations.

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7 Packaging and Installation

7.1 Linux Installations

For the Linux installation, the package has been split into 3 main packages.

LSDK-9.2.0_U11.14.tgz	This contains the basic Open Source Linux support required for the basic and extended builds. Includes cross compilers, bootloaders, file system images, and script files
LSDK-WLAN-9.2.0_U11.14.tgz	This contains the WLAN driver files that are released under TLA. All HAL/LMAC/UMAC files required to build the driver.
LSDK-SPECTRAL-9.2.0_U11.14.tgz	This contains the files for the Spectral Analysis components. These are packaged separately since they will be released to customers on an as requested basis.

7.1.1 Basic Installation and Build

To install the basic system, create a directory where the build should take place. Copy the basic and WLAN LSDK files to the directory, and untar using the following commands:

```
# tar –xzvf LSDK-9.2.0_U11.14.tgz
# tar –xzvf LSDK-WLAN-9.2.0_U11.14.tgz
```

After the builds are untarred, do a first build for the reference platform of choice. To make the ap91-small build, use the following commands:

```
# cd build
# make BOARD_TYPE=ap91-small
```

See section 7.1.4 for a list of all build targets.

To make the db12x build use the following commands:

```
# cd build
# make BOARD_TYPE=db12x  BUILD_TYPE=jffs2
```

To make the db12x build for S17 GE use the following commands:

```
# cd build
# make BOARD_TYPE=db12x  ETH_CONFIG=_s17 BUILD_TYPE=jffs2
```

To make the mi124 standalone build use the following commands:

```
# cd build
# make BOARD_TYPE=db12x  ETH_CONFIG=_f1e BUILD_CONFIG=_mi124
BUILD_TYPE=jffs2
```

To make the db12x-offload-gmac-flash build use the following commands:

```
# cd build
# make BOARD_TYPE=db12x-offload-gmac-flash
```

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To make the db12x-offload-gmac build use the following commands:

```
# cd build
# make BOARD_TYPE=db12x-offload-gmac
```

To make the ap123 build use the following commands

```
# cd build
# make BOARD_TYPE=db12x  BUILD_TYPE=jffs2 BUILD_CONFIG=_ap123
```

To make the db12x-offload-gmac-flash_mi124 build use the following commands:

```
# cd build
# make BOARD_TYPE=db12x-offload-gmac-flash_mi124
```

NOTE: When using a newer version of Linux distribution to build the target platform and the GCC version is gcc-4.3.3 or above, the following error message may appear:

```
/usr/include/bits/fcntl2.h:51: error: call to '__open_missing_mode'
declared with attribute error: open with O_CREAT in second argument needs 3
arguments
```

Add `CPPFLAGS+=-D_FORTIFY_SOURCE=0` before "make" to avoid the error. The build command will look like:

```
CPPFLAGS+=-D_FORTIFY_SOURCE=0 make BOARD_TYPE=ap91-small
```

7.1.2 Spectral Analysis Build

The default builds are set up to NOT build spectral analysis. To build with spectral analysis included, perform the following steps after the instructions for the basic build in section 7.1.1, as follows:

1. Untar an additional file
   ```
   # cd (top directory)
   # tar –xzvf LSDK-SPECTRAL-9.2.0_U11.14.tgz
   ```
2. Modify the configuration file for the board in question
   a. Go to the board directory (AP96 in this example)
      ```
      # cd build/scripts/ap96-small
      ```
   b. Edit the configuration file
      ```
      # vi config.ap96-small
      ```
   c. Add the following line at the bottom of the file
      ```
      export ATH_SUPPORT_SPECTRAL=1
      ```
3. Make the build
   ```
   # make BOARD_TYPE=ap96-small
   ```

7.1.3 XMII Build

To build the support for PB47 using the XMII interface, install the firmware package in addition to the base and WLAN packages. The following steps are required:

1. Untar an additional file

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```
# cd (top directory)
# tar –xzvf LSDK-FW-9.2.0_U11.14.tgz
```

2. Build the PB47 board:

```
# cd build
# make BOARD_TYPE=pb47-xmii-2.6.31
```

7.1.4 Build Targets

The following Linux build targets are available. Each of these builds can support various features.

Please refer to the following table for details:

Board	Build Target	Build Type	Features
AP91	ap91-small	Basic	Basic only
AP96	ap96-small	Basic/Spectral	Spectral Analysis
AP101	ap101-2.6.31	Basic	Linux 2.6.31 kernel
AP113	ap113	Basic	Linux 2.6.31 kernel
AP121	ap121-2.6.31	Basic	Spectral analysis not available on this board.
AP121	ap121-2.6.31-2MB	Basic	Spectral analysis not available on this board.
AP123	ap123	Basic	Linux 2.6.31 kernel
PB44	pb44-small	Basic/Spectral	Spectral Analysis
PB47	pb47	Basic	Spectral Analysis not tested on this board.
PB92	pb9x	Basic/Spectral	Spectral Analysis
PB92	pb9x-2.6.31	Basic	Linux 2.6.31 kernel
DB120-02x DB120-03x	db12x db12x_s17 db12x_nand	Basic	Linux 2.6.31 kernel , Spectral Analysis
DB12x-02x DB12x-03x	db12x-offload-gmac-flash	Basic	Full offload GMAC based target build for flash mode db12x
DB12x-02x DB12x-03x	db12x-offload-gmac	Basic	Full offload GMAC based target build for rom mode db12x
DB120-73x DB120-74x	db12x-enterprise	Basic	Linux 2.6.31 kernel, Spectral Analysis
MI124	db12x-offload-gmac-flash_mi124	Basic	Full offload GMAC based target build for flash mode mi124
PB47	pb47-xmii-2.6.31	Basic	Full offload GMAC based host build for rom mode target
PB92	pb9x-offload-gmac-flash	Basic	Full offload GMAC based host build for flash mode target

Also, please note that the PB47 and PB9x builds are not called “small” builds, but they are the basic builds only. There is no current plan to build the Gateway for these boards.

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8 Linux AP Software Upgrade

8.1 Update Requirements

To perform a software update on the AP reference designs, the following are required

- Serial port module (TB-39 or equivalent) for the JP1 connector
- A server system with a TFTP server
- A terminal system with terminal emulation software, such as HyperTerminal or Minicom.
- A straight through serial cable, male to female.
- An Ethernet cable between the server system and the board

8.2 Standard Update

Software update is performed using either U-Boot or RedBoot boot monitor, commands through the serial console, and TFTP file transfers.

Connect the Ethernet ports on the server system to the WAN Port of board. Connect the serial cable between the Terminal system and the AP, using the adaptor board. Ensure that Pin 1 on the adaptor board is aligned with Pin 1 on the AP (Pin 1 has a square pad). The serial port should be set to 115200 Baud, 8 Data Bits, No Parity, 1 Stop bit, No handshake.

8.2.1 Basic/Spectral Images Flash Update

8.2.1.1 AP91/AP99/AP101 Flash Update

The following procedure is used to update the AP91, AP99, or AP101 board. It is assumed that the files **u-boot.bin**, **vmlinux.lzma.uImage** and the **file system image** are located on a TFTP server.

The file system image for each platform is:

- **ap91-small-jffs2** for AP91
- **ap99-2.6.31-jffs2** for AP99 with 2.6.31 Kernel
- **ap101-2.6.31-jffs2** for AP101 with 2.6.31 Kernel

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:

```
setenv serverip <server ip>
setenv ipaddr <AP ip>
saveenv
```

2. Flash the new U-Boot with following sequence of commands:

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```
tftp 0x80060000 u-boot.bin
erase 0x9f000000 +0x40000
cp.b $fileaddr 0x9f000000 $filesize
```

Type “reset” to reboot the board.

3. Flash the JFFS2 file system using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 ap91-small-jffs2 (or use correct name, see above)
erase 0x9f050000 +0x2b0000
cp.b $fileaddr 0x9f050000 $filesize
```

4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 vmlinux.lzma.uImage
erase 0x9f300000 +0xe0000
cp.b $fileaddr 0x9f300000 $filesize
```

Type “reset” to reboot the board.

8.2.1.2 AP111 Flash Update

The following procedure is used to update the AP111 board. It is assumed that the files **uboot.bin**, **vmlinux.lzma.uImage** and the **ap111-2.6.31-jffs2 image** are located on a TFTP server.

1. Set the IP addresses of TFTP server and the board under the U-Boot prompt:

```
setenv serverip <server ip>
setenv ipaddr <AP ip>
saveenv
```

2. Flash the new U-Boot with following sequence of commands:

```
tftp 0x80060000 u-boot.bin
erase 0x9f000000 +0x50000
cp.b $fileaddr 0x9f000000 $filesize
```

Type “reset” to reboot the board.

3. Flash the JFFS2 file system using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 ap111-2.6.31-jffs2
erase 0x9f050000 +0x630000
cp.b $fileaddr 0x9f050000 $filesize
```

4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 vmlinux.lzma.uImage
erase 0x9f680000 +$filesize
cp.b $fileaddr 0x9f680000 $filesize
```

Type “reset” to reboot the board.

8.2.1.3 AP113 Flash Update

The following procedure is used to update the AP113 board. This procedure uses a compressed U-Boot (tuboot.bin) image that takes less than 1 sector of flash. It is assumed that the files **tuboot.bin**, **vmlinux.lzma.uImage** and the **ap113-jffs2** file system image are located on a TFTP server. Note that if the board is rebooted, any updated IP addresses or server IP addresses in

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tuboot will not be saved. Part of the compressed nature of the bootloader is non-support of the environmental parameter system in U-Boot, only defaults are used.

The file system image for each platform is:

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:
```
setenv serverip <server ip>
setenv ipaddr <AP ip>
```
2. Flash the new tuboot with following sequence of commands:
```
tftp 0x80060000 tuboot.bin
erase 0x9f000000 +0x10000
cp.b $fileaddr 0x9f000000 $filesize
```
   Type “boot” to reboot the board.
3. Flash the JFFS2 file system using the following sequence of commands at U-Boot prompt:
```
tftp 0x80060000 ap113-jffs2
erase 0x9f010000 +0x2f0000
cp.b $fileaddr 0x9f010000 $filesize
```
4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:
```
tftp 0x80060000 vmlinux.lzma.uImage
erase 0x9f300000 +0xd0000
cp.b $fileaddr 0x9f300000 $filesize
```
   Type “boot” to reboot the board

8.2.1.4 PB92 Flash Update

The following procedure is used to update the PB92 board. This procedure uses a compressed U-Boot (tuboot.bin) image that takes less than 1 sector of flash. It is assumed that the files **tuboot.bin**, **vmlinux.lzma.uImage** and the **file system image** are located on a TFTP server. Note that if the board is rebooted, any updated IP addresses or server IP addresses in U-Boot will not be saved. Part of the compressed nature of the bootloader is non-support of the environmental parameter system in U-Boot, only defaults are used.

The file system image for each platform is:

- **pb9x-jffs2** for PB92
- **pb9x-2.6.31-jffs2** for PB92 with 2.6.31 Kernel

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:
```
setenv serverip <server ip>
setenv ipaddr <AP ip>
```
2. Flash the new U-Boot with following sequence of commands:
```
tftp 0x80060000 tuboot.bin
erase 0x9f000000 +0x10000
cp.b $fileaddr 0x9f000000 $filesize
```
   Type “boot” to reboot the board.
3. Flash the JFFS2 file system using the following sequence of commands at U-Boot prompt:

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```
tftp 0x80060000 pb9x-jffs2 (or use correct name, see above)
erase 0x9f010000 +0x2f0000
cp.b $fileaddr 0x9f010000 $filesize
```

4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 vmlinux.lzma.uImage
erase 0x9f300000 +0xd0000
cp.b $fileaddr 0x9f300000 $filesize
```

Type “boot” to reboot the board

8.2.1.5 AP96 Flash Update

The following procedure is used to update the AP96. It is assumed that the files **u-boot.bin**, **vmlinux.gz.uImage** and **ap96-small-jffs2** are located on a TFTP server.

The file system image for each platform is:

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:

```
setenv serverip <server ip>
setenv ipaddr <AP ip>
saveenv
```

2. Flash the new U-Boot with following sequence of commands:

```
tftp 0x80010000 u-boot.bin
erase 0xbf000000 +0x30000
cp.b $fileaddr 0xbf000000 $filesize
```

Type “reset” to reboot the board.

3. Flash the JFFS2 file system using the following sequence of commands at U-Boot prompt:

```
tftp 0x80010000 ap96-small-jffs2
erase 0xbf040000 +0x600000
cp.b $fileaddr 0xbf040000 $filesize
```

4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:

```
tftp 0x80010000 vmlinux.gz.uImage
erase 0xbf640000 +0x1b0000
cp.b $fileaddr 0xbf640000 $filesize
```

Type “reset” to reboot the board.

8.2.1.6 PB44 + MBxx Flash Update

Please note that the –e argument in the following sequence depends on the options build with the board. The images directory will have a file called “vmlinux.info” which will have the correct entry address value for the kernel that was built. The default of “-e 0x8029e000” included here is an example.

1. Flash the new RedBoot with following sequence of commands:

```
ip_addr -l  < AP ip>  -h <server ip>
load -r -v -b 0x80500000  redboot.rom
fis erase -f 0xbf000000 -l 0x40000
fis write -f 0xbf000000 -b 0x80500000 -l 0x40000
```

Type “reset” to reboot the board.

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2. Flash the Linux kernel using the following sequence of commands at RedBoot prompt:
```
load -r -v -b 0x80500000 vmlinux.bin.gz
fis create -b 0x80500000 -l 0x120000 -e 0x802a0000 –r 0x80060000
vmlinux.bin.gz
```
3. Flash the JFFS2 file system using the following sequence of commands at RedBoot prompt:
```
load -r -v -b 0x80500000 pb44-small-jffs2
fis create -b 0x80500000 -l 0x600000 -e 0x0 filesystem
```
4. Create a 64K bytes partition for storing cfg commands:
```
fis create -b 0x80500000 -l 0x10000 cfg_data
```
Type “reset” to reboot the board.

8.2.1.7 PB47 Flash Update

The following procedure is used to update the PB47 builds. It is assumed that the files **uboot.bin**, **vmlinux.gz.uImage** and the **file system image** are located on a TFTP server.

The file system image for each platform is:

- **pb47-jffs2** for PB47 using PCI interface
- **pb47-xmii-jffs2** for PB47 using XMII interface

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:
```
setenv serverip <server ip>
setenv ipaddr <AP ip>
saveenv
```
2. Flash the new U-Boot with following sequence of commands:
```
tftp 0x80010000 u-boot.bin
erase 0xbf000000 +0x30000
cp.b $fileaddr 0xbf000000 $filesize
```
Type “reset” to reboot the board.
3. Flash the JFFS2 file system using the following sequence of commands at U-Boot prompt:
```
tftp 0x80010000 pb47-jffs2 (or pb47-xmii-jffs2)
erase 0xbf040000 +0x600000
cp.b $fileaddr 0xbf040000 $filesize
```
4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:
```
tftp 0x80010000 vmlinux.gz.uImage
erase 0xbf640000 +0x1b0000
cp.b $fileaddr 0xbf640000 $filesize
```
Type “reset” to reboot the board.

8.2.1.8 AP121 Flash Update (2 MB Flash)

The following procedure is used to update the AP121. It is assumed that the files t**uboot.bin**, **vmlinux.lzma.uImage** and **ap121-2.6.31-2MB-squashfs** are located on a TFTP server.

The file system image for each platform is:

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:

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```
setenv serverip <server ip>
setenv ipaddr <AP ip>
```

2. Flash the new U-Boot with following sequence of commands:

```
tftp 0x80060000 tuboot.bin
erase 0x9f000000 +0x10000
cp.b $fileaddr 0x9f000000 $filesize
```

   Type “boot” to reboot the board.

3. Flash the squashfs file system using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 ap121-2.6.31-2MB-squashfs
erase 0x9f010000 +0x130000
cp.b $fileaddr 0x9f010000 $filesize
```

4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 vmlinux.lzma.uImage
erase 0x9f140000 +0xa0000
cp.b $fileaddr 0x9f140000 $filesize
```

   Type “boot” to reboot the board.

8.2.1.9 AP121 Flash Update (4 MB Flash)

The following procedure is used to update the AP121. It is assumed that the files **tuboot.bin**, **vmlinux.lzma.uImage** and **ap121-2.6.31-squashfs** are located on a TFTP server.

The file system image for each platform is:

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:

```
setenv serverip <server ip>
setenv ipaddr <AP ip>
```

2. Flash the new U-Boot with following sequence of commands:

```
tftp 0x80060000 tuboot.bin
erase 0x9f000000 +0x40000
cp.b $fileaddr 0x9f000000 $filesize
```

   Type “boot” to reboot the board.

3. Flash the squashfs file system using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 ap121-2.6.31-squashfs
erase 0x9f050000 +$filesize
cp.b $fileaddr 0x9f050000 $filesize
```

4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:

```
tftp 0x80060000 vmlinux.lzma.uImage
erase 0x9f300000 +0xe0000
cp.b $fileaddr 0x9f300000 $filesize
```

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8.2.1.10 DB120/AP123/MI124 Flash Update

The following procedure is used to upgrade the DB120/AP123/MI124 board. The following table lists the kernel and file system binaries of the various reference platforms.

db12x (Build target for Fast Ethernet ports)	vmlinux.lzma.uImage db12x-jffs2
db12x_s17 (Build target for GE ports)	vmlinux_s17.lzma.uImage db12x_s17-jffs2
ap123	vmlinux_ap123.lzma.uImage ap123-jffs2
mi124	vmlinux_mi124_f1e.lzma.uImage mi124_f1e-jffs2

1. Ensure that the files **uboot.bin**, **vmlinux.lzma.uImage** and respective JFFS2 file system images are located on a TFTP server.
2. Apply power to the board, and boot into the existing U-Boot.
3. Press any key before the script is executesd; the U-Boot prompt should appear.
4. Set the IP addresses of TFTP server and the board:
   ```
   setenv serverip <server ip>
   setenv ipaddr <AP ip>
   saveenv
   ```
5. Flash the new U-Boot with following sequence of commands for db12x:
   ```
   erase 0x9f000000 +0x50000
   tftp 0x80060000 u-boot.bin
   cp.b $fileaddr 0x9f000000 $filesize
   ```
   Type “reset” to reboot the board.

   For ap123 and mi124 use the following sequence of commands
   ```
   erase 0x9f000000 +0x10000
   tftp 0x80060000 tuboot.bin
   cp.b $fileaddr 0x9f000000 $filesize
   ```
   Type “boot” to reboot the board.
6. Flash the JFFS2 file system using the following sequence of commands at U-Boot prompt:

   A couple of convenience macros to U-Boot are supported to ease flashing images on the boards. Please use the following to update kernel/filesystem on the boards.

   The macros are:

   `lf` to load file system

   `lk` to load kernel

   In U-Boot prompt, set the 'dir' environment variable to the TFTP directory. Then use, the following scripts to flash U-Boot, fs or kernel as appropriate.

   An example to load the kernel and filesystem of db12x or ap123 from FTP location /tftpboot/myroot

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```
ar934x> set dir myroot/
ar934x> run lk
ar934x> run lf
```

An example to load the kernel and filesystem of db12x_s17 from FTP location /tftpboot/myroot

```
ar934x> set dir myroot/
ar934x> set bc _s17
ar934x> run lk
ar934x> run lf
```

Note that the trailing '/' to the dir variable is mandatory.

7. Type “boot” (or “reset” if uncompressed U-Boot is being used) to reboot the board.

8.2.1.11 Enterprise DB120-730 Flash Update

The following procedure is used to upgrade the DB120-730 board. **vmlinux.lzma.uImage** is the kernel binary and **db12x-enterprise-jffs2** the file system binary.

1. Ensure that the files `uboot.bin, vmlinux.lzma.uImage` and respective jffs2 file system images are located on a TFTP server.
2. Apply power to the board, and boot into the existing U-boot.
3. Hit any key before the script is executed; the U-boot prompt should appear.
4. Set the IP addresses of TFTP server and the board:
   ```
   setenv serverip <server ip>
   setenv ipaddr <AP ip>
   saveenv
   ```
5. Flash the new u-boot with following sequence of commands for db12x:
   ```
   erase 0x9f000000 +0x50000
   tftp 0x80060000 u-boot.bin
   cp.b $fileaddr 0x9f000000 $filesize
   ```
   Type “reset” to reboot the board.
6. Flash the JFFS2 file system using the following sequence of commands at u-boot prompt:
   ```
   erase 0x9f050000 +0x630000
   tftp 0x80060000 db12x-enterprise-jffs2
   cp.b $fileaddr 0x9f050000 $filesize
   ```
7. Flash the Linux kernel using the following sequence of commands at u-boot prompt:
   ```
   tftp 0x80060000 vmlinux.lzma.uImage
   erase 0x9f680000 +$filesize
   cp.b $fileaddr 0x9f680000 $filesize
   ```
8. Type “`boot`” (or “`reset`” if uncompressed u-boot is being used) to reboot the board.

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8.2.1.12 MI124 Full Offload Flash Update

1. Set the IP addresses of TFTP server and the board under U-Boot prompt:

   ```
   setenv serverip <server ip>
   setenv ipaddr <AP ip>
   saveenv
   ```

2. Flash the new U-Boot with following sequence of commands:

   ```
   tftp 0x80060000 u-boot.bin
   erase 0xbf000000 +$filesize
   cp.b $fileaddr 0xbf000000 $filesize
   ```

   Type “reset” to reboot the board.

3. Flash the file system using the following sequence of commands at U-Boot prompt:

   ```
   tftp 0x80060000 db12x-offload-gmac-flash_mi124-jffs2
   erase 0xbf050000 +$filesize
   cp.b $fileaddr 0xbf050000 $filesize
   ```

4. Flash the Linux kernel using the following sequence of commands at U-Boot prompt:

   ```
   tftp 0x80060000 vmlinux_mi124.lzma.uImage
   erase 0xbf300000 +$filesize
   cp.b $fileaddr 0xbf300000 $filesize
   ```

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9 Setup Development Environment

In order to build the basic and extended systems, a Linux build system is required. This can be a desktop system, server, or even a laptop with sufficient disk space (about 2 GBytes) to store the created files. For Linux distribution, Fedora 7.0 and Ubuntu with versions 8.0.4 or later has been tested.

9.1 Installing Ubuntu Desktop Edition

1. Go to **http://www.ubuntu.com/getubuntu/download** and follow the instruction to install it on the workstation.
2. Installing additional packages:

   Once Ubuntu is successfully installed, download additional packages that are required to build toolchain for Qualcomm Atheros reference design.

```
$ sudo apt-get install build-essential
$ sudo apt-get install bison
$ sudo apt-get install flex
$ sudo apt-get install gettext
$ sudo apt-get install tcl
$ sudo apt-get install sharutils
$ sudo apt-get install libncurses-dev
$ sudo apt-get install zlib1g-dev
$ sudo apt-get install exuberant-ctags
```

9.2 Installing Fedora Linux distribution

- Install Fedora 7.0 and choose to install everything.
- Use the following command to install tcl package.

```
# yum install tcl
```

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10 Relevant Documentation

Relevant documentation is available from the AE/FAE team.

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11 Certifications

DB120

- 11n Wi-Fi - Certifiable
- uAPSD - Certifiable
- DFS - Certifiable

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12 Test Coverage

Build used: 9.2.0.U11.7

DB120/PB92 + XB112

Test Plan	Status
Security MAT	100% Completed
Extended Security	100% Completed
GreenAP	100% Completed
Performance	100% Completed
DualBandDualConcurrent	100% Completed
mBSSID	100% Completed
WDS	100% Completed
NAWDS	100% Completed
QSKO	100% Completed
Stress	100% Completed
Multicast Enhancement	100% Completed
11n Wi-Fi	100% Completed
11n Func AP	100% Completed
DFS	100% Completed
uAPSD	100% Completed
TxBF	100% Completed
VMAT	100% Completed
Extended DFS	100% Completed
WPS over WDS	100% Completed
WPS	100% Completed
Interference Mitigation	100% Completed
Enterprise AP	100% Completed
ExtendedSTA	100% Completed
IOT	100% Completed
Retail-AP	100% Completed
Regulatory	100% Completed
Hotspot	100% Completed
Switch	100% Completed

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13 Issues Fixed

	Title
1	[WDS] Connectivity with fixed rate in Legacy mode fails in WDS-Bridge mode.
2	[DFS-Cert][10.2.5,10.2.6]: Radar Detection during CAC fails for Fixed Pulse-1 waveform in Japan W53 HT20 and HT40 mode
3	[DFS-Cert][10.2.5,10.2.6]: Radar Detection during CAC fails for many waveforms in Japan W56 HT20 and HT40 mode
4	[DFS-Cert][10.2.4]: Radar Detection during CAC fails for only Type-5 waveform in ETSI 1.5.1 HT40 and ETSI 1.6.1 HT40 mode
5	Enabling and disabling coext for ath0 on various instances causes AP crash (kernel panic).
6	[Cert-11nWifi]Test case 4.2.6 fails Ref_Atheros station getting disconnected repeatedly
7	[DFS-Cert][10.4.5]]: Observing Poor Detection percentage in ETSI.1.6.1 HT40PLUS mode.
8	Ready Status LED is not functioning.
9	MCS7 data rate issue in 11NGHT20 and 40PLUS with ShortGI ON.

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