AMI Aptio AFU User Guide

Aptio AFU User Guide

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Document Information

Purpose

This document provides information to use the Aptio AFU to update the system BIOS.

Audience

Generic BIOS Engineers, OEM Engineers, and Aptio Customers.

Change History

Date	Revision	Description
2007-03-30	0.10	Initial draft
2007-08-23	0.11	Updated document format
2007-09-12	0.12	Added product version number to page 1
2007-09-18	0.13	Updated for version 2.19 release
2009-07-09	0.14	Updated version, Legal, and Title page.
2009-08-13	0.15	1. Update Title and content to latest release of AFU. 2. Update usage to latest release of AFU.
2009-10-08	0.16	Correct spelling errors.
2009-10-14	0.17	Correct document properties and title.
2010-02-11	0.18	Add caution comment for option /N.
2010-02-22	0.19	Add more comments for option /N and /SP.
2010-07-02	0.20	Add the comment for option /R.
2010-08-10	0.21	Update content to latest release of AFU
2010-08-26	0.22	Correct document properties and title.
2010-09-14	0.23	Add error code definition.
2010-11-25	0.24	Add Windows PE in support list.
2011-01-13	0.25	Update content to latest release of AFU.
2011-07-08	0.26	Update content to latest release of AFU.
2011-12-09	0.27	Update content to latest release of AFU.
2012-01-06	0.28	Update content to latest AFU version 3.00.
2012-04-20	0.29	Update content to latest AFU version 3.01
2012-07-06	0.30	Update content to latest AFU version 3.02
2012-08-17	0.31	Update content to latest AFU version 3.03
2012-08-29	0.32	Add comment for secure flash options
2012-11-15	0.33	Update content to latest AFU version 3.04

Chapter 1 Introduction

Overview

AFU (AMI Firmware Update) is a package of utilities used to update the system BIOS under various operating systems. AFU only works for APTIO with SMI FLASH support.

AFUAPTIO Features

This list of features is supported from command line, command prompt, EFI Shell, or BSD/Linux shell.

- Read system ROM image
- Flash ROM image
- Command line operating

Requirements

Supported Operating System

AFU is supported by the following operating systems:

- Microsoft® Windows® 2000
- Microsoft® Windows® XP
- Microsoft® Windows® 2003
- Microsoft® Windows® Vista (32 bit)
- Microsoft® Windows® Vista (64 bit)
- Microsoft® Windows® 7 (32 bit)
- Microsoft® Windows® 7 (64 bit)
- Microsoft® Windows® PE (32 bit)
- Microsoft® Windows® PE (64 bit).
- EFI Shell
- DOS
- BSD
- Linux

Firmware Requirements

- Compatible with Aptio 3, 4, 4.5 and later.
- Requires that the current installed firmware has SMI flashing support enabled.
- For supporting Secure Flash, the following eModules are required:
  - Secure Flash Pkg (4.6.5.1_SECMOD_003 or later)
  - CryptoPkg (4.6.5_CRYPTOAPI_0003 or later)
  - Capsule (4.5.6_Capsule_00 or later)
  - SMIFlash (4.6.3.6_SMIFLASH_23 or later)
  - OFBD (4.6.3.2_OFBD_1.0.2 or later)
  - OFBD Secure Flash (4.6.5.0_OFBD_SECURE_FLASH_0.0.5 or later)

Chapter 2 Getting Started

Installation

To run, extract all of the files from the folder with the name corresponding to the desired operating system.

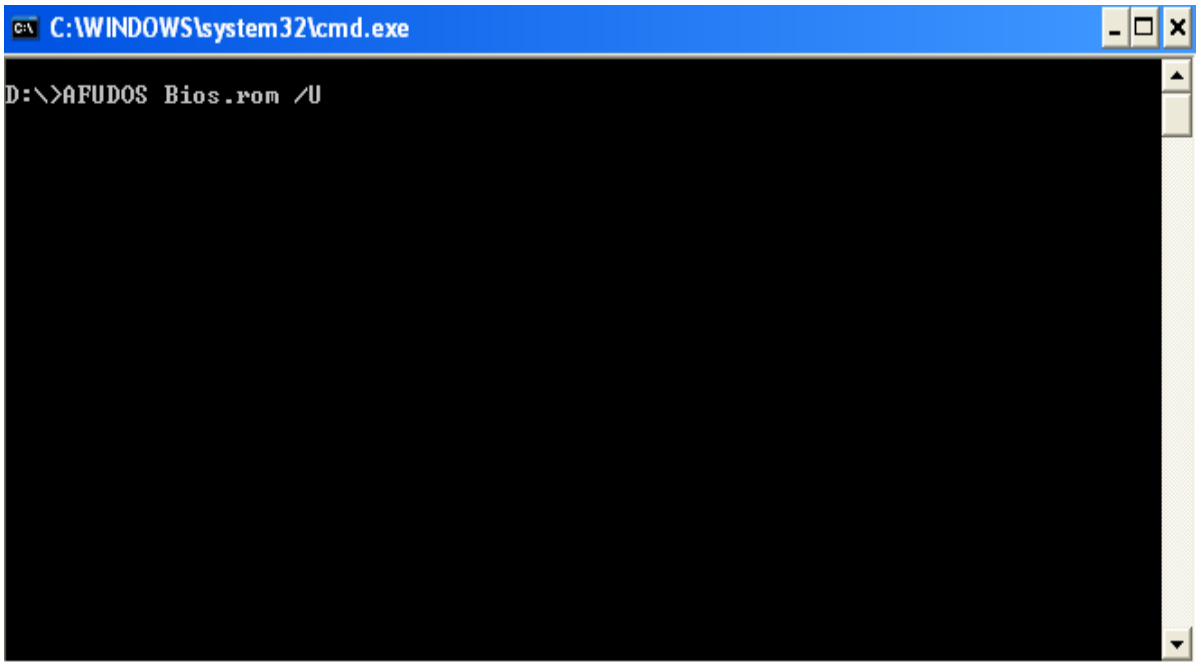
Chapter 3 AFUAPTIO Operation

Overview

This mostly involves documenting all the SDL tokens and eLinks. This chapter explains the operation of AFUAPTIO.

The AFUAPTIO operation mode includes all of the AFUAPTIO features such as saving current ROM image to file, Get and display ROM ID from BIOS ROM file

An example of AFUDOS that Get and display ROM ID from BIOS ROM file command screen is shown below:



Chapter 4 Features and Functions

Overview

The AFUAPTIO offers the following features:

- Save current ROM image to file
- Get and display ROM ID from BIOS ROM file

These features are explained in more detail in this chapter.

Save current ROM image to file

The following command saves the current ROM image to a file:

AFUDOS <Output BIOS ROM File Name> /O

Where BIOS ROM File Name, the mandatory field is used to specify path/filename of the BIOS ROM file with extension.

Get and display ROM ID from BIOS ROM file

The following command gets and displays the ROM ID from the BIOS ROM file:

AFUDOS <Output BIOS ROM File Name> /U

Where BIOS ROM File Name, the mandatory field is used to specify path/filename of the BIOS ROM file with extension.

Secure Flash Case

The following command overrides Secure Flash policy and programs the bios image in Capsule Mode:

AFUDOS <Output BIOS ROM File Name> /CAPSULE /P /B /N /E

And the following command overrides Secure Flash policy and programs the bios image in Recovery Mode:

AFUDOS <Output BIOS ROM File Name> /RECOVERY /P /B /N /E

Where BIOS ROM File Name, the mandatory field is used to specify path/filename of the BIOS ROM file with extension.

Under runtime mode, all the commands are supported.

Options

AFUDOS <BIOS ROM File Name> [Option 1] [Option 2]

Or

AFUDOS <BIOS ROM File Name> <Command>

BIOS ROM File Name

The mandatory field is used to specify path/filename of the BIOS ROM file with extension.

Commands

The mandatory field is used to select an operation mode.

- /O Save current ROM image to file
- /U Get and display ROM ID from BIOS ROM file

- /S	Refer to Option: /S
- /D	Verification test of given ROM File without flashing BIOS.
- /A	Refer to Option: /A
- /OAD	Refer to Option: /OAD
- /CLNEVNLOG	Refer to Option: /CLNEVNLOG

Options

The optional field used to supply more information for flashing BIOS ROM. Following lists the supported optional parameters and format:

- /Q	Silent execution
- /X	Do not check ROM ID
- /CAF	Compare ROM file's data with Systems is different or not, if not then cancel related update.
- /S	Display current system's ROMID
- /HOLEOUT:	Save specific ROM Hole according to given RomHole GUID.
- /SP	Preserve Setup setting. (*1)
- /R	Preserve all SMBIOS structures during programming. (*2)
- /Rn	Preserve SMBIOS type N during programming.(n=0-255)
- /B	Program Boot Block
- /P	Program main bios image
- /N	Program NVRAM (*3)
- /K	Program all non-critical blocks
- /Kn	Program n'th non-critical block (n=0-15)
- /HOLE:	Upate sepcific ROM Hole according to RomHole GUID.
- /L	Program all ROM Holes
- /Ln	Program n'th ROM Hole only (n=0-15)
- /ECUF	Update EC BIOS when newer version is detected.
- /E	Program Embedded Controller block
- /ME	Program ME Entire Firmware Block.
- /MEUF	Program ME Ignition Firmware Block.
- /A	Oem Activation file.
- /OAD	Delete OEM Activation Key
- /CLNEVNLOG	Clear Event Log.

- /CAPSULE Override Secure Flash policy by Capsule
- /RECOVERY Override Secure Flash policy by Recovery
- /EC Program Embedded Controller Block. (Flash Type)
- /REBOOT Reboot after programming.
- /SHUTDOWN Shutdown after programming.

* 1: The /SP command is just for “OEM NVRAM/Setup Variable Preserve” module part of OFBD to use. The AFU will call the SMI 0x26 into this module twice, when start/finish updates the NVRAM. Customer can port their code in this module, to preserve the NVRAM data which they want to reserve, when AFU flash the NVRAM area.

For example: (Preserve Setup Password has two methods)

Method 01: Enable the PRESERVE_PASSWORDS token which means the BIOS will preserve the Setup password when AFU call into the SMIFlash module.

Method 02: Through the /SP command to control which means customer can port the PreserveSetupPassword call in OFBDSETUPStoreHandle, RestoreSetupPassword call in OFBDSETUPRestoreHandle. And customer can use /SP command to control the Setup Password is need to keep or not.

Ex:

AFUDOS xxx.ROM /N /SP ←- keep Setup password

AFUDOS xxx.ROM /N ←- don’t keep Setup password.

This function needs BIOS’ cooperation. To know more about the detail of preserved data, please consult with your BIOS provider.

* 2: If the SMBIOS data is stored in FV_MAIN or FV_BB, that AFU will take the responsible to preserve its data. If the SMBIOS data is stored in NVRAM and BIOS project’s SMBIOS_PRESERVE_NVRAM token = 0. This mean the preserve action is needs BIOS’ cooperation. To know more about the detail of preserved data, please consult with your BIOS provider.

* 3: Erasing NVRAM may cause important variables lose.

Rules:

- Any parameter enclosed by < > is a mandatory field.
- Any parameter enclosed by [ ] is an optional field.
- <Commands> cannot co-exist with any [Options].
- Main BIOS image is default flashing area if no any option present.
- [/REBOOT], [/X], and [/S] will enable [/P] function automatically.

- If [/B] present alone, there is only the Boot Block area to be updated.
- If [/N] present alone, there is only the NVRAM area to be updated.
- If [/E] present alone, there is only the Embedded Controller block to be updated.

Error Code Definition

CODE	Definition
0x01	Error: Unknown command.
0x02	Error: BIOS has no flash information available.
0x03	Error: ROM file size does not match existing BIOS size.
0x04	Error: ROM file ROMID is not compatible with existing BIOS ROMID.
0x05	Error: Bootblock error.
0x06	Error: This BIOS version has more Non-Critical blocks than supported.
0x07	Error: BIOS checksum error.
0x08	Error: Invalid option
0x09	Error: Size of ROM file does not match the size of system ROM
0x0A	Error: Unable to update ROM hole
0x0B	Error: ROMHOLE not exist
0x0C	Error: BIOS update cancelled by user.
0x0D	<Reserved for system>
0x0E	Error: Kernel source files cannot be found.
0x10	Error: Unable to load driver.
0x11	Error: Unable to unload driver.
0x12	Error: No non-critical blocks found in ROM file.
0x13	Error: Requested non-critical block not available in ROM file.
0x14	Error: Non-critical blocks in ROM image file do not match those in the system.
0x15	Error: Secure Flash function is not supported on this platform.
0x16	Error: Unable to get Secure Flash policy from BIOS.
0x17	Error: Unsupported Secure Flash policy.
0x18	Error: Unable to start a Secure Flash session.
0x19	Error: Failed to erase flash chip (at Runtime Secure Flash).
0x1A	Error: Failed to update flash chip (at Runtime Secure Flash).
0x1B	Error: Failed to read flash chip (at Runtime Secure Flash).
0x1C	Error: Failed to verify flash chip (at Runtime Secure Flash).
0x1D	Error: Failed to load image into memory.
0x1E	Error: Secure Flash function is not supported on this file.
0x1F	Error: Reserved for Secure Flash.
0x20	Error: Unable to initialize memory manager.
0x21	Error: Unable to close memory manager.
0x22	Error: Problem allocating memory.
0x23	Error: Problem freeing memory.
0x24	Error: Problem allocating BIOS buffer.
0x25	Error: Problem freeing BIOS buffer.
0x26	Error: Problem freeing mapping BIOS.
0x27	Error: Problem freeing unmapping BIOS.
0x28	Error: Problem mapping BIOS data.
0x29	Error: Problem unmapping BIOS data.
0x30	Error: Problem opening file for reading.
CODE	**Definition**
0x31	Error: Problem reading file.

0x32	Error: Problem opening file to write.
0x33	Error: Problem writing file.
0x40	Error: BIOS is write-protected.
0x41	Error: Can not close flash interface.
0x42	Error: Problem reading flash.
0x43	Error: Problem erasing flash.
0x44	Error: Problem writing flash.
0x45	Error: Problem verifying flash.
0x46	Error: Problem getting flash information.
0x47	Error: No firmware id.
0x48	Error: Power cord not connected. Plug in power cord to flash.
0x49	Error: A platform condition has prevented flashing.
0x50	Error: This program must be run in MS-DOS mode.
0x60	Error: Accessing registry.
0x61	Error: Program already running.
0x70	Error: BSD access IO.
0x80	Error: Size of system ROM mismatches size of ROM file
0x81	Error: ROM ID mismatch
0x82	Error: Bootblock checksum error
0x90	Error: Error to shutdown
0x91	Error: Error to restart...
0x92	Error: Can't open ROM ID file
0x93	Error: ROM ID file is not a ROM file.
0x94	Error: Invalid MAC address
0x95	Error: Invalid load current CMOS option
0x96	Error: Invalid retry count
0x97	Error: Invalid defined ROM ID length
0x98	Error: Invalid SMI
0x99	Error: ROM File ID don't exist
0x9A	Error: System ROM ID don't exist
0x9B	Error: Password Retry count exceeded.
0x9C	Error: BIOS don't support NVRAM/SETUP preserve function
0x9D	Error: Store SETUP setting error
0x9E	Error: Restore SETUP setting error
0x9F	Error: Cannot analyze ROM file. ROM file may be corrupted
0xA0	Error: Cannot analyze the ME Data. ROM file may be corrupted
0xA1	Error: BIOS does not support ME Entire Firmware update
0xA2	Error: BIOS does not support ME Ignition Firmware update
0xA3	Error: Invalid EC ROM file
0xA4	Error: EC ROM file checksum error
0xA5	Error: Can't enter EC flash mode
0xA6	Error: Erasing EC flash memory fail
0xA7	Error: Initial EC programming fail
0xA8	Error: EC flash data transmit error
0xA9	Error: Writing EC flash memory fail
0xAA	Error: Exit EC programming mode fail
CODE	**Definition**
0xAB	Error: ROM Chip ID mismatch

0xAC	Error: Invalid EC Header Table
0xAD	Error: EC does not permit BIOS update
0xAE	Error: BIOS doesn't support OEMCMD function
0xAF	Error: Store DMI Data error
0xB0	Error: Restore DMI Data error
0xB1	Error: Invalid Activation Key file.
0xB2	Error: File Size is greater than image activation key length.
0xB3	Error: Image activation key larger than BIOS activation key.
0xB4	Error: Activation Key checksum error.
0xB5	Error: No Support Activation Key error.
0xB6	Error: OA Key is not NULL at all.
0xB7	Error: OA Key is NULL at all already.
0xB8	Error: OA key region incorrect.
0xB9	Error: BIOS doesn't support Clear event log function.
0xBA	Error: Clear event log error.
0xBB	Error: Rom image layout detected RomHole is redesigned.
0xBC	Error: BIOS have more than one RomHole's GUID is the same.
0xBD	Error: Requested Rom Hole not available in ROM file.
0xBE	Error: Romholes in ROM image file do not match those in the system.
0xBF	Error: OA key is not NULL at all. And OA Key is the same as Bin File in system.
0xC0	Error: BIOS doesn't support process ME information
0xC1	Error: BIOS return error, when trying to re-flash ME Firmware data.
0xC2	Error: Region is write-protected
0xC6	Error: No EC blocks found in system ROM.
0xC7	Error: BIOS doesn't support all ROM flashing function.
0xD0	Error: OA Data invalid.
0xD1	Error: BIOS has already updated OA.
0xD2	Error: BIOS does not allow updating OA.
0xD3	Error: BIOS doesn't support updating OA.
0xD4	Error: The DMI data size of system is greater than File's DMI data length.
0xD5	Error: BIOS doesn't support EC Battery Check function.