

AMI BIOS PROGRAMMING USING AFU

Revision History

Revision	Date	Author	Changes
1.0	22 th January 2018	G.G.	First Release
1.1	3 rd May 2018	G.G.	Updated document template
1.2	11 th December 2018	M.B.	Minimal update
1.3	28 th March 2019	G.G.	Minimal update
1.4	28 th June 2019	G.G.	Instructions to change PCI flavor

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1 Introduction

Some SECO boards and modules are supplied with an AMI UEFI BIOS.

It is possible to access to the Setup Utility by pressing <ESC> key after System power Up, during the POST phase; the “Aptio Setup Utility” Menu will appear.

The System BIOS version is shown on “Main” page, in “BIOS Version” item.

In case of new releases, the last one is always present on SECO websites. The BIOS update package will always contain the latest BIOS image file and the programming tools AFU (AMI Firmware Update); this program is distributed in the following versions:

- **AfuEfix64.efi** EFI Shell programming utility
- **EtaAfuOemLnx32** Linux 32-bit programmer
- **EtaAfuOemLnx64** Linux 64-bit programmer
- **AFUWIN.EXE** Windows 32-bit BIOS programmer
- **AFUWINx64.EXE** Windows 64-bit BIOS programmer

NOTE: Please be aware that using Linux or Windows BIOS programmer, they must be run with root/admin privileges.

WARNING: Reprogramming the board's BIOS is a critical operation.

DO NOT reset or turn off the system or remove AC power while BIOS update operation is in progress, otherwise this may lead to a not working board!

It is also worth noting that the first reboot after reprogramming may be slower due to some other operation as flash re-initialization or embedded controller reprogramming, so it is necessary to wait for the complete boot with this new bios (Boot to setup menu or to a OS image) before considering the operation as completed!

WARNING: AFU is a very powerful tool which allows a wide range of operations in addition to BIOS reprogramming and most of them could not be supported by the platform. **SECO cannot be responsible for any change made to the original BIOS with an improper and undocumented use of this tool.**

Please, be aware that any operation rather than reprogramming BIOS as documented in this manual may lead to a not working board.

WARNING: Only official SECO BIOS are supported for a BIOS update operation; custom homemade images obtained as example with a dump of the content of a BIOS flash from another system are not supported and must not be used! **Any attempt to program a different image rather than the ones available on the SECO website or provided by SECO itself may lead to a not working board!**

WARNING: **Downgrade operation is not supported by AMI AFU tools.**

A downgrade operation occurs when the programming tools are used to switch from the current BIOS version to a previous and older one.

A new BIOS version may contain updates to critical parts, as the TXE or the microcode and there could be some critical issues when AFU tries to revert these components to a previous version, issues that may lead to a not working board!

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2 System BIOS update using EFI Shell

This procedure requires a USB drive formatted to FAT32.

- 1) Copy the updater tool and the BIOS binary file inside the USB drive
- 2) Turn on the system for entering in the “Aptio Setup Utility” by pressing the ESC key
- 3) From the “Save & Exit” page select the Boot Override option “UEFI: Built-in EFI Shell”
- 4) From the Device mapping table identify the filesystem of the USB drive fs* (it will be marked as a “Removable HardDisk”)

```
EFI Shell version 2.50 [5.12]
Current running mode 1.1.2
Device mapping table
fs0 :HardDisk - Alias hd25d blk0
      PciRoot(0x0)/Pci(0x1C,0x0)/SD(0x0)/HD(3,GPT,FECD6C41-9C21-4066-95A8-DCA486648EE4,0x121800,0x32000)
fs1 :Removable HardDisk - Alias hd18d0b0a0b blk1
      PciRoot(0x0)/Pci(0x15,0x0)/USB(0x3,0x0)/USB(0x1,0x0)/USB(0x0,0x0)/HD(1,MBR,0x58E5FC01,0x800,0x1D4B800)
blk0 :HardDisk - Alias hd25d fs0
      PciRoot(0x0)/Pci(0x1C,0x0)/SD(0x0)/HD(3,GPT,FECD6C41-9C21-4066-95A8-DCA486648EE4,0x121800,0x32000)
blk1 :Removable HardDisk - Alias hd18d0b0a0b fs1
      PciRoot(0x0)/Pci(0x15,0x0)/USB(0x3,0x0)/USB(0x1,0x0)/USB(0x0,0x0)/HD(1,MBR,0x58E5FC01,0x800,0x1D4B800)
blk2 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1C,0x0)/SD(0x0)/HD(1,GPT,D72B4D49-1723-4187-952D-5D377ABB01B7,0x22,0x40000)
blk3 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1C,0x0)/SD(0x0)/HD(2,GPT,7BC74D0E-EDFB-4850-AEC3-DAA69E296AD5,0x40800,0xE1000)
blk4 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1C,0x0)/SD(0x0)/HD(4,GPT,5B6F0DEF-658C-4AC2-AC92-D9D5DC6C49F0,0x153800,0x35AC000)
blk5 :BlockDevice - Alias (null)
      PciRoot(0x0)/Pci(0x1C,0x0)/SD(0x0)
blk6 :Removable BlockDevice - Alias (null)
      PciRoot(0x0)/Pci(0x15,0x0)/USB(0x3,0x0)/USB(0x1,0x0)/USB(0x0,0x0)

Press ESC in 1 seconds to skip startup.nsh, any other key to continue.

Shell>
```

Example of device mapping table. The USB drive file system is identified as “fs1”

- 5) Enter in the USB drive file system fs*:
For the example above where USB drive is fs1 the command will be fs1:
- 6) Move to the folder where AFU utility and the firmware file are placed and launch the command:
bios_update <biosName.xxx>
Where <biosName.xxx> is the name of the new BIOS that must be loaded inside the flash.
- 7) After the program advises the correctness of operation, the board can be rebooted

```
-----
      AMI Firmware Update Utility v5.09.04.1503
      APL Normal Mode
      Copyright (C)2017 American Megatrends Inc. All Rights Reserved.
-----
Reading flash ..... done
Secure Flash enabled, recalculate ROM size with signature... Enable.
- FFS checksums ..... ok
Loading capsule to secure memory buffer ... done
Erasing Main Block ..... done
Updating Main Block ..... done
Verifying Main Block ..... done
Erasing NVRAM Block ..... done
Updating NVRAM Block ..... done
Verifying NVRAM Block ..... done
Erasing RomHole Block ..... done
Updating RomHole Block ..... done
Verifying RomHole Block ..... done
Please reboot the system
```

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3 System BIOS update using Linux

- 1) Copy the updater tool and the BIOS binary file in a folder of the Linux Disk.
- 2) Open a Linux Terminal
- 3) Move to the folder where AFU utility and the firmware file are placed
- 4) Make the script executable launching the following command:
`chmod +x bios_updater_x32.sh` for 32-bit versions of Linux
`chmod +x bios_updater_x64.sh` for 64-bit versions of Linux
- 5) Launch the command for the BIOS update (must have root/administrator privileges)
`./bios_updater_x86 <biosName.xxx>` for 32-bit versions of Linux
`./bios_updater_x64 <biosName.xxx>` for 64-bit versions of Linux
Where <biosName.xxx> is the name of the new BIOS that must be loaded inside the flash.
- 6) After the program advises the correctness of operation, the board can be rebooted

```
+-----+
|               AMI Firmware Update Utility Manufacture for Secov5.09.04.1503               |
|               APL Normal Mode                                                         |
|               Copyright (C)2017 American Megatrends Inc. All Rights Reserved.         |
+-----+
Reading flash ..... done
Secure Flash enabled, recalculate ROM size with signature... Enable.
- FFS checksums ..... ok
Loading capsule to secure memory buffer ... done
Erasing Main Block ..... done
Updating Main Block ..... done
Verifying Main Block ..... done
Erasing NVRAM Block ..... done
Updating NVRAM Block ..... done
Verifying NVRAM Block ..... done
Erasing RomHole Block ..... done
Updating RomHole Block ..... done
Verifying RomHole Block ..... done

Please reboot the system
```

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4 System BIOS update using Windows

- 1) Copy the updater tool and the BIOS binary file in a folder of the Windows Disk.
- 2) Run the “cmd” shell with Administrator privileges
- 3) Move to the folder where AFU utility and the firmware file are placed and launch the command:
bios_updater_x86 <biosName.xxx> for 32-bit versions of Windows
bios_updater_x64 <biosName.xxx> for 64-bit versions of Windows
 Where <biosName.xxx> is the name of the new BIOS that must be loaded inside the flash.
- 4) After the program advises the correctness of operation, the board can be rebooted

```

+-----+
|               AMI Firmware Update Utility  v5.09.04.1503               |
|               APL Normal Mode                                         |
|       Copyright (C)2017 American Megatrends Inc. All Rights Reserved. |
+-----+
Reading flash ..... done
Secure Flash enabled, recalculate ROM size with signature... Enable.
- FFS checksums ..... ok
Loading capsule to secure memory buffer ... done
Erasing Main Block ..... done
Updating Main Block ..... done
Verifying Main Block ..... done
Erasing NVRAM Block ..... done
Updating NVRAM Block ..... done
Verifying NVRAM Block ..... done
Erasing RomHole Block ..... done
Updating RomHole Block ..... done
Verifying RomHole Block ..... done
Please reboot the system
  
```

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5 Change PCIe configuration with AFU tool

Some SECO AMI BIOS are compiled with different PCIe aggregation configurations.

AFU tool allows to flash the bios with a new binary configured with a different PCIe aggregation

NOTE: this operation is supported only in BIOS 1.06 and newer!

To use this feature is possible to use any of the available versions of the AFU tool (EFI, Linux or Windows). All the related instructions for the chosen tool version reported in this manual must be followed as usual but, before launching the update routine a little change to the updater script is needed:

- 1) Open the script file with a text editor
- 2) Search the line where the AFU tool is launched; it will be:

AfuEfix64.efi %1 /P /N /L	for the EFI version of the tool
./EtaAfuOemLnx32 \$1 /P /N /L /X	for the Linux 32b version of the tool
./EtaAfuOemLnx64 \$1 /P /N /L /X	for the Linux 64b version of the tool
AFUWIN.exe %1 /P /N /L /X	for the Windows 32b version of the tool
AFUWINx64.exe %1 /P /N /L /X	for the Windows 64b version of the tool
- 3) Add the option **/FDR** at the end of the line
- 4) Save the file and close

Now the updater routine could be launched as usual, using as a source binary the one with the PCIe aggregation desired.

NOTE: At the end of the operation a full power off of the system (Mechanical off, G3 state) is needed. It's important to perform this final step instead of rebooting the system, otherwise strap will not be reloaded and PCIe configuration will not be changed!

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