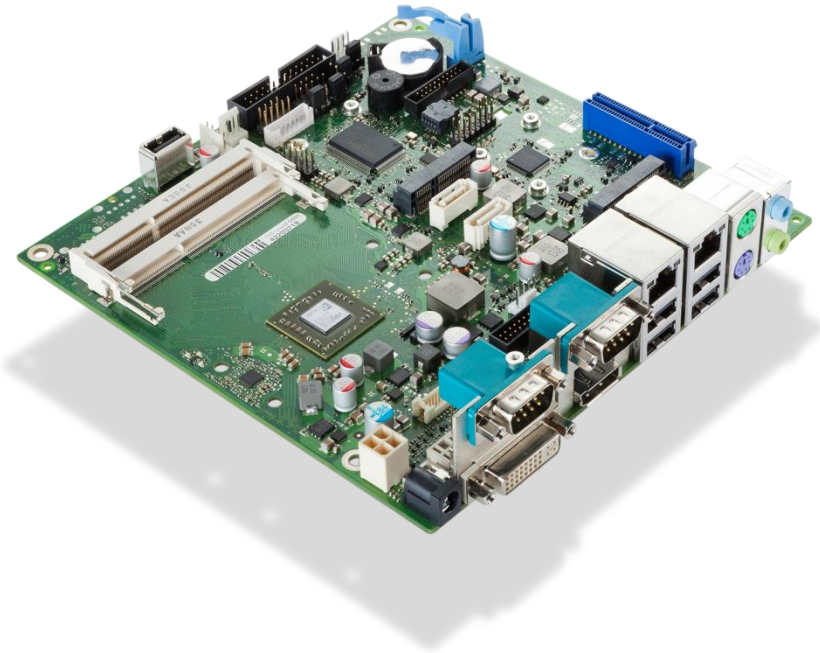
Fujitsu Mainboards

EFIFlash Tool

“HowTo”-Document



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Revision History:

10/2014 (V1.0) First version
10/27/2014 (V1.1) Corrected chapter 6 “log” command line option information
11/30/2014 (V1.2) Added chapter 11 Troubleshooting

EFIFlash

1 General Description

EFIFlash is a DOS-based BIOS flash tool. It is included with the BIOS AdminPack and offers the following functions:

- Upgrade/downgrade ("flash") the BIOS
- Recover a corrupted BIOS
- Transfer BIOS Setup settings, defaults and other BIOS customizations (Archive)
- Exchange the BIOS Boot Logo
- Read information about which BIOS updates have been done on a mainboard previously

2 General Notes and Warnings

- Please always use the newest available version of EFIFlash

- Never use third-party (Intel, AMI, ...) tools to update or modify your Fujitsu mainboard's BIOS, it's settings or DMI data! Use only Fujitsu provided tools!
  Even though some third-party tools might look like they work, they will destroy Fujitsu customized features and functionalities.

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3 Technical Background

- Strictly speaking, all recent (since the D3003/D306x series) Fujitsu mainboards use an UEFI firmware, not a Legacy "BIOS". Still, since the term BIOS is well established, it is generally used to refer to the UEFI firmware, and both terms are used interchangeably.

- On Legacy BIOS systems, BIOS Setup settings used to be saved in a battery buffered memory region of the main chipset commonly referred to as "CMOS". With UEFI, these Setup settings are saved in the same flash memory chip as the main BIOS, in an area called NVRAM. Thus, on UEFI systems, clearing the CMOS, for example by removing the CMOS Battery for a while, will not reset the Setup settings (exception: D3003). Please refer to the BIOS Recovery procedure description for how to reset the Setup settings on UEFI systems.

- During a BIOS upgrade or downgrade, all BIOS Setup settings, as well as all customizations (like custom boot logo, MS licensing data, ...) are kept. It is not necessary to load setup defaults afterwards.

- You can update the BIOS versions in any sequence. So when going for example from 1.1.0 to 1.3.0, you do not need to flash 1.2.0. before flashing 1.3.0.

- In very rare cases a new BIOS version might require a certain minimum BIOS version to be present. Occasionally the changes in new BIOS versions are so huge that downgrading to very old BIOS versions is not possible any more. The BIOS Update's description text file will explain such requirements and limitations. EFIFlash will give a warning and will not flash the BIOS in such cases.

- After upgrading/downgrading the BIOS, the mainboard MUST be restarted before additional BIOS changes or settings can be applied. EFIFlash will automatically issue a reset or power cycle at the end of the flash procedure. If you want to minimize the number of resets in the production cycle, first apply all changes that are necessary to the current BIOS version, and then finally update the BIOS itself. This way no reset is necessary in between.

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4 Preparing the DOS bootable USB stick

EFIFlash is meant to be used with FreeDOS, but most recent Legacy MS-DOS versions should work fine most of the time.

Note: DOS memory managers like HIMEM or EMM386 might interfere with EFIFlash. Please use plain DOS without such programs.

1) The easiest way to create a DOS bootable USB stick is using this Windows based Tool:
   ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/USB-FreeDOS-Bootstick/
   Caution: All data on the USB stick will be deleted!

2) Copy the files from the BIOS admin pack's DOS directory to any directory on the USB stick. You may omit the *.UPC file.

3) In case you want to use the USB stick for BIOS recovery, please copy all *,ROM and *.<Number> files into the USB stick root directory.

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5 Upgrading/Downgrading the BIOS

To flash the BIOS using the provided batch file:

1) Boot DOS from the USB stick
2) Run `dosflash.bat`
3) Check the BIOS version information shown and start the flash procedure by pressing the "Y" key to confirm.
4) Wait until the flash update is completely done. It may take up to a few minutes, in certain cases even without visible progress. Do not restart, turn off or remove power.

To flash the BIOS manually:

1) Boot DOS from the USB stick
2) Run `EFIFlash .exe /AUTO /NOMCU`
3) Check the BIOS version information shown and start the flash procedure by pressing the "Y" key to confirm.
4) Wait until the flash update is completely done. It may take up to a few minutes, in certain cases even without visible progress. Do not restart, turn off or remove power.

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6 Command line options

The command line for EFIFlash is: `EFIFLASH filename <options>`

Here are explanations for the most commonly used EFIFlash command line options:

1) / AUTO
   This option automatically choses a file name based on the mainboard it detects. Don't give a file name in the command line.
   For example on a D3313-S23 GS1 mainboard it would look for a file called D3313-S2.UPD and flash it.

2) /NOMCU
   Tells EFIFlash not to search for CPU Microcode Patch Updates from additional files on the flash USB stick. CPU Microcode Patch Updates included in the BIOS update UPD files themselves (see BIOS release notes) are not affected by this switch.
   Note: This option is used by the batch file included in the BIOS AdminPack, because so far the CPU Microcode Patch Updates were always small enough to be included in the flash update files themselves. Thus, so far no additional files were used.

3) /Y
   This makes EFIFlash not ask for confirmation, but automatically assume an answer "Yes" for all user prompts.

4) /U
   Update only if file contains a newer BIOS version than the one that is currently active

5) /D
   Update only if file contains a different BIOS version than the one that is currently active

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Command line options (continued)

6) /LOG
   Displays the history of previous BIOS flash operations, listing the BIOS version used, the type of flash update, and the date/time of these BIOSes' creation. Please note that the date/time when the BIOS was flashed is NOT shown because it is not logged. The type of flash update can be one of the following:
   TOTAL = This BIOS had been programmed at the Fujitsu factory
   UPDATE = normal flash update
   ARCHIVE = Archive flash update

7) /ARCHIVE
   This creates a BIOS archive file. Please see the chapter "Transferring BIOS Setup settings, defaults and other BIOS customizations (Archive)" for details.

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7 Transferring BIOS Setup settings, defaults and other BIOS customizations (Archive)

The Archive function of EFIFlash can be used to transfer several customizations from a source mainboard to target mainboards.
This is useful for example for setting up each mainboard during system mass production, instead of applying all customization one by one on each system.

Caution: The BIOS version on the source and destination mainboard must be the same! If necessary, update the BIOS and reboot before applying an Archive!

The following Items are transferred if they are different from the target mainboard:

1) The whole NVRAM (this contains the BIOS Setup Defaults customizable by EditCMOS, current BIOS Setup settings, Boot order, BIOS passwords)
2) The BIOS Boot Logo (created with UEFIModL and applied with EFIFlash)
3) Customized fan control and temperature limits data (created with SilentFanConfig and applied with SMCO)
4) Customized EDID data for LVDS attached flat panel displays (created with Phoenix and applied with LVDS)
5) Customized DMI data „System Manufacturer" = DMI Type 1 Offset 4 and Type 3 Offset 4 (Set by OEMIDENT)
6) Some parts of the main system BIOS

The following Items are not transferred

1) Customized DMI data except for „System Manufacturer" (see above)
2) Customized flags (set with OEMIDENT, like „TPM disabled")
3) Microsoft SLP and OA Data (Windows activation data, set with OEMIDENT)
4) MAC Addresses of the LAN chips (set at factory, not editable)
5) Management Engine (ME) Firmware (can only be updated during normal BIOS flash, not Archive)
6) Several other parts of the BIOS like Ethernet controller firmware, flash descriptor, etc. (can only be updated during normal BIOS flash, not Archive)

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Transferring BIOS Setup settings, defaults and other BIOS customizations (continued)

Creating a BIOS archive file from a source mainboard

Note: Steps 1) and 2) can be done in any order, 1 then 2 or 2 then 1.

1) If necessary: Upgrade/Downgrade the BIOS to the version you intend to use in mass production, reboot to activate this BIOS version
2) Apply all customizations that you wish to use (Defaults, settings, logo, …).
3) Use a bootable USB stick with EFIFLASH .EXE to boot DOS
4) Create a BIOS archive file with the command: `EFIFlash /archive`

The created file will be named automatically according to the mainboard version (D3236-S1.ARC), but you may change the name and extension.

Applying a BIOS archive file to a target mainboard

1) If necessary: Upgrade/downgrade the BIOS to the same version as was used to create the archive, reboot to activate this BIOS version
2) Use a bootable USB stick with EFIFLASH .EXE and the archive file you wish to apply to boot DOS
3) Apply the BIOS Archive file with the command: `EFIFlash filename`, for example `EFIFlash D3236-S1.ARC`
4) If desired, apply other customizations that are specific to each piece of system, like SLP/OA activation data, system serial number, etc.

Note: When later Upgrading/downgrading the BIOS to any other version, all customizations and settings will be preserved

Caution: Do NOT apply an archive file to a mainboard with a different BIOS version than was used to create the archive! As described above, some parts of the BIOS are not updated during applying an archive, only during normal BIOS update. This could result in the BIOS version shown as the one used to create the BIOS archive, but not all parts of the BIOS would actually match this version.

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8 BIOS Recovery flash

In case there was a power failure during a BIOS update, the contents of the BIOS flash chip might be corrupted. If a small very first part of the BIOS, the boot loader, is undamaged, a recovery procedure can restore the BIOS to normal working order. Please see your mainboard's manual or Tech Notes for the location of the Recovery Jumper. When you set the Recovery Jumper and then turn on the mainboard, the following will happen:

1) If no USB stick with all necessary files for BIOS recovery (see Chapter 4) is present, and the mainboard's BIOS is intact: the defaults are loaded for all BIOS Setup settings.

2) If a USB stick with all necessary files for BIOS recovery (see Chapter 4) is present, the BIOS boot loader will load the main BIOS and all settings from the appropriate BIOS recovery *.ROM or *.<Number> file in the root directory of the USB stick. Then, depending on the Mainboard model and BIOS version:

   a) DOS is booted from the BIOS update USB stick. Once DOS is booted, you need to flash the BIOS using the normal AdminPack BIOS flash procedure (dosflash.bat). EFIFlash will then detect being in recovery mode and completely restore the BIOS from the *.UPD file.

   b) The BIOS starts an immediate recovery and restore its contents from the ROM file. There will be no video output, but repeating short beeps every few seconds will indicate that the recovery is running. Then a repeating sequence of short and long beeps will signal success of the recovery procedure. Remove the power and set the recovery jumper back to its normal position.

Note: Depending on the mainboard and BIOS version, video output or keyboard input may not be available during the BIOS recovery procedure. If this is the case, you need to prepare the BIOS update USB stick to automatically flash the BIOS without user interaction. You can do so by putting EFIFlash .exe and the BIOS update UPD file in the BIOS update USB stick's root directory. Then create an `AUTOEXEC.BAT` file with the following content: `EFIFLASH /AUTO /NOMCU /Y`

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9 Overview: Flash File types

In general (except for the recovery files) it is possible to rename the files, both name and extension. The function of the files is embedded in the contents, not dependent on the file name or extension.

File extension	Type	Source	Usage
***.UPD**	DOS update file	Admin Pack DOS subdirectory	For use with EFIFLASH .exe under DOS. Also used for the logo file creation.
***.UPC**	Compressed UPD file	Admin Pack DOS subdirectory	For use with BIOS update over LAN
***.ARC**	Archive file	Created by “EFIFLASH /ARCHIVE”	See chapter “Archive”
***.ROM or Numbers eg. "*.101"**	For BIOS recovery	Admin Pack Root directory	See chapter “BIOS Recovery”
***.BUP**	Windows update file	Admin Pack Windows subdirectory	For use with DskFlash.exe under Windows
***.DFI.exe**	Windows standalone updater	FTP	Windows DeskFlash instant flash

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10 DOS Errorlevels (Return Codes)

Errorlevel	Meaning
0	Terminated normally, everything went OK
1	EFIFlash .exe generated error
2	BIOS generated error
3	Hardware error detected
4	Service not supported
5	File read/write error
6	Error parsing User Options
55	Bios Interface not found (not an Fujitsu mainboard with UEFI firmware)

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11 Troubleshooting

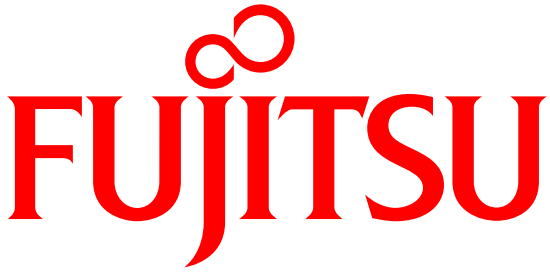
- If EFIFlash crashes with an error message right after running it, most probably a DOS memory manager like HIMEM or EMM386 is active. Please use plain FreeDOS without such programs.

- If a certain minimum BIOS version is required for a BIOS update, the release notes will list the details. Trying to flash a BIOS version that does not meet the requirements will result in an error message.

- If a certain BIOS version cannot be downgraded below a certain version, the release notes will list the details. Trying to flash an older BIOS version will result in an error message.

- With older versions of UEFIModL it was possible to create BIOS Boot Logos with > 16kB packed size. If a new BIOS version needs more space than a previous one, then with a large BIOS logo the space might not be enough – flashing will fail with an error message. In such a case, try replacing the boot logo with the default Fujitsu one, which is included with UEFIModL.

- If „Secure Boot Mode“ is set to “Custom“, it is possible to delete the „Authorized Signature / DB“. If you do so, Secure Flash is not possible any more – updating the BIOS will fail with an error message. To fix this, under „Key Management“ select „Authorized Signatures“ and then „Set new DB”.



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