NVFLASH

NVIDIA Firmware Update Utility

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Table of Contents

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Introduction

The NVIDIA Firmware Update Utility (NVFLASH) is used to update the firmware stored in the EEPROM of an NVIDIA display adapter. It can also be used to perform other tasks on the adapter such as saving a copy of the current firmware image to a file, displaying the version of the firmware image, or determining the EEPROM part present on a display adapter.

Supported Operating Systems

NVFLASH is currently available for DOS, EFI, Linux, Mac OS X, and Win32 platforms. The Mac OS X version requires that a NVIDIA driver be running on any cards that will be accessed by the utility. The Win32 version includes its own kernel mode driver to allow it to access the hardware.

General Usage

NVFLASH has a set of primary commands that specify what operation it should perform. In addition there are options that can be specified with each of these commands to control how these commands operate.

NVFLASH is a command line utility that can be run stand alone from the command prompt, run from batch files, or spawned from other programs.

Warning

There is a real danger of a display adapter becoming unbootable and thus preventing the entire system from booting if the update process is interrupted due to a software fault, power failure, the operator manually resetting the computer (for example via a reset switch), or the operator updating an adapter with the wrong firmware image. For this reason, care should be taken when using this utility.

Primary Commands

This section describes the main commands that are available with NVFLASH. Each command has options available to use with it, but only one primary command can be used at a time.

Most commands and options have both a long (English readable) version and a short version. The long version is invoked by prefixing with a double dash ("--"). The short version can be used with a single dash ("-").

Note that for both long and short versions of command and options, case is significant. The operator can not type "--Version" for example, it must be "--version".

<update>

The update command is the default command if no other primary command is specified.   The update command installs the specified firmware image or images onto one or more display adapters. By default, the update command scans the system to update all display adapters that match the specified firmware image or images.

Usage

```
nvflash [ <options> ] <filename>
```

<filename> filename of firmware image or firmware image bundle

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Only attempt an update of the display adapter with the given index. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--fwindex=<index>	-F <index>	Specify index of which firmware image to use from a firmware bundle. If "--fwindex=ask" is specified, the user will be prompted to pick which image to use.
--overridetype	-5	Allow firmware and adapter PCI device ID to mismatch.
--overridesub	-6	Allow firmware and adapter PCI subsystem ID to mismatch.
--keepstraps	-g	Keep the soft straps already present in the EEPROM after flashing the new image.

Long Form	Short Form	Description
--romstrap	-j	Override the ROM strap setting to allow flashing an image when grounding the STRAP_SUB_VENDOR pin. This allows flashing a corrupted or erased EEPROM. Note: Make sure there is a physical EEPROM present when using this option.
--auto	-A	When possible, run without user intervention.
--reboot	-y	Reboot the PC after other tasks completed.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--silence	-s	Prevent NVFLASH for beeping during various stages of the update process.
--beep	-!	Beep during the update process to signal progress.
--nolight	-l	Do not light keyboard LED's (only applicable with the DOS version of NVFLASH).
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

The override options (--overridesub, --overridetype) can only be used when there is a single display adapter to be updated with a single firmware image. A single display adapter can be specified with the "--index" option. If there is only one NVIDIA display adapter in the system, then the use of "--index" is not needed. A single firmware image is specified by either just supplying the filename of a single firmware image (which will have a *.ROM extension) or by using the "--fwindex" option when a firmware bundle is specified (which will have a *.NVR extension).

It is important that the update process not be interrupted due to power failure or by a forced reset. If an error occurs during the flash process, it is advisable not to reboot the computer until the problem can be determined. The card may be unable to be restarted if a failed update has occurred (and thus the system as a whole may not reboot).

If the original firmware image contains an IEEE 1394 GUID, the update command will preserve it and NOT use the GUID of the new image.

Example

```
nvflash --index=3 --fwindex=2 nv17.nvr
nvflash p77.rom
nvflash --index=ask --fwindex=ask nv28.nvr
```

--save

The save command saves the current firmware image of a display adapter to a file. This file can be used to restore the firmware later if a different image is uploaded.

Usage

```
nvflash [ <options> ] --save <filename>
```

<filename> filename to save the firmware image to

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--override=<level>	-o <level>	Override the display adapter type and EEPROM part checks. Without this option, NVFLASH will abort if it detects an NVIDIA display adapter or EEPROM part that it is not familiar with (such as when using a newer display adapter with an older version of NVFLASH). The possible levels that can be used are:

1	Unknown EEPROM acceptable for read operations.
2	Unknown NV adapter acceptable for read operations.
3	Combined effect of 1, 2 (cannot write to unknown EEPROM or adapter).

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

The save command is mainly useful for backups of a firmware image and for diagnostic purposes.

Example

```
nvflash --index=3 --save nv17.nvr
nvflash p77.rom --save
```

--compare

The compare command compares the current firmware image on a display adapter with a firmware image in a file. This is useful to verify if a firmware image in a file is truly the image that is currently installed on the display adapter.

Usage

```
nvflash [ <options> ] --compare <filename>
```

<filename> filename of firmware image or firmware image bundle

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--fwindex=<index>	-F <index>	Specify index of which firmware image to use from a firmware bundle. If "--fwindex=ask" is specified, the user will be prompted to pick which image to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.

Long Form	Short Form	Description
--override=<level>	-o <level>	Override the display adapter type and EEPROM part checks. Without this option, NVFLASH will abort if it detects an NVIDIA display adapter or EEPROM part that it is not familiar with (such as when using a newer display adapter with an older version of NVFLASH). The possible levels that can be used are:
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

1	Unknown EEPROM acceptable for read operations.
2	Unknown NV adapter acceptable for read operations.
3	Combined effect of 1, 2 (cannot write to unknown EEPROM or adapter).

Remarks

The compare command is mainly useful for diagnostic purposes. The update command already performs a compare after it has completed its reprogramming to verify that all the bytes of the image have been set correctly.

Example

```
nvflash --index=3 --fwindex=2 --compare nv17.nvr
nvflash p77.rom --compare
```

--version

The version command causes NVFLASH to list the version of a firmware image.

Usage

```
nvflash [ <options> ] --version [ <filename> ]
```

<filename> filename of firmware image or firmware image bundle

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--fwindex=<index>	-F <index>	Specify index of which firmware image to use from a firmware bundle. If "--fwindex=ask" is specified, the user will be prompted to pick which image to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--override=<level>	-o <level>	Override the display adapter type and EEPROM part checks. Without this option, NVFLASH will abort if it detects an NVIDIA display adapter or EEPROM part that it is not familiar with (such as when using a newer display adapter with an older version of NVFLASH). The possible levels that can be used are:

1	Unknown EEPROM acceptable for read operations.
2	Unknown NV adapter acceptable for read operations.
3	Combined effect of 1, 2 (cannot write to unknown EEPROM or adapter).

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

If the filename of a firmware file or firmware bundle is specified, NVFLASH will list the version of the firmware image or images in the specified file. If no filename is specified, NVFLASH will read the image on a display adapter and report its version. In the case of no file name being given, NVFLASH will list the versions of the firmware images found on all NVIDIA display adapters it locates, unless the --index option is used to force the selection of a specific display adapter.

Example

```
nvflash --index=3 --version
nvflash --fwindex=2 --version nv17.nvr
nvflash --version
```

--list

The list command lists all the NVIDIA display adapters that NVFLASH is able to locate on the various PCI buses. This command can be used to find what indexes to specify with the "--index" option with other commands.

Usage

```
nvflash [ <options> ] --list
```

Options

Long Form	Short Form	Description
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

Under some operating systems such as Win32, only display adapters with a currently running driver are listed.

Example

```
nvflash --list
```

--pciblocks

The pciblocks command causes NVFLASH to list all the PCI firmware blocks that are present in an EEPROM of an adapter.

Usage

```
nvflash [ <options> ] --pciblocks
```

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--override=<level>	-o <level>	Override the display adapter type and EEPROM part checks. Without this option, NVFLASH will abort if it detects an NVIDIA display adapter or EEPROM part that it is not familiar with (such as when using a newer display adapter with an older version of NVFLASH). The possible levels that can be used are:

1	Unknown EEPROM acceptable for read operations.
2	Unknown NV adapter acceptable for read operations.
3	Combined effect of 1, 2 (cannot write to unknown EEPROM or adapter).

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

The PCI specification allows multiple firmware blocks to exist in the same physical EEPROM of a device. One example of this is a GPU EEPROM that contains both a standard x86 VGA BIOS and an EFI GPU driver.

Example

```
nvflash --pciblocks
```

--display

The display command causes NVFLASH to displays bytes of the firmware image installed on a display adapter.

Usage

```
nvflash [ <options> ] --display [ <bytes> ]
```

<bytes> number of bytes to display (default is 256 if not specified)

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--override=<level>	-o <level>	Override the display adapter type and EEPROM part checks. Without this option, NVFLASH will abort if it detects an NVIDIA display adapter or EEPROM part that it is not familiar with (such as when using a newer display adapter with an older version of NVFLASH). The possible levels that can be used are:

1	Unknown EEPROM acceptable for read operations.
2	Unknown NV adapter acceptable for read operations.
3	Combined effect of 1, 2 (cannot write to unknown EEPROM or adapter).

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

If the number of bytes to display is not specified, NVFLASH will default to 256 bytes.

The number of bytes can be specified in decimal or in hex if prefixed with a "0x".

Example

```
nvflash --index=3 --display 512
nvflash --display 0x400
nvflash --display
```

--check

The check command will attempt to identify the EEPROM part on a display adapter.

Usage

```
nvflash [ <options> ] --check
```

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--override=<level>	-o <level>	Override the display adapter type and EEPROM part checks. Without this option, NVFLASH will abort if it detects an NVIDIA display adapter or EEPROM part that it is not familiar with (such as when using a newer display adapter with an older version of NVFLASH). The possible levels that can be used are:

1	Unknown EEPROM acceptable for read operations.
2	Unknown NV adapter acceptable for read operations.
3	Combined effect of 1, 2 (cannot write to unknown EEPROM or adapter).

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

This command is mainly useful for diagnostic purposes. The user does not usually need to know the type of EEPROM part present on a display adapter.

The display adapter must be strapped corrected for the general type of EEPROM (serial or parallel) for this or any other nvflash command to work properly. NVFLASH can only detect the specific EEPROM part if it knows the general type of part from the hardware straps.

Example

```
nvflash --index=3 --check
nvflash --check
```

--protectionon

The protection on command turns on write protection on the EEPROM part of a display adapter. This prevents any changes to the EEPROM image from occurring, unless protection is later turned off.

Usage

```
nvflash [ <options> ] --protectionon
```

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

There is usually no reason to use this command.

This command is only supported for some EEPROM parts.

Example

```
nvflash --index=3 --protectionon
nvflash --protectionon
```

--protectionoff

The protection off command turns off write protection on the EEPROM part of a display adapter. This reverses the effects of the protection on command and allows the EEPROM image to be modified with subsequent commands.

Usage

```
nvflash [ <options> ] --protectionoff
```

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

There is usually no reason to use this command.

This command is only supported for some EEPROM parts.

Example

```
nvflash --index=3 --protectionoff
nvflash --protectionoff
```

--straps

The straps command changes the soft straps on the display adapter. Newer NVIDIA chips read values from the EEPROM image at reset that override the physical resister straps on the board. This command allows changing those override values without changing the rest of the firmware image.

Usage

```
nvflash [ <options> ] --straps <AND Mask 0> <OR Mask 0>
        <AND Mask 1> <OR Mask 1>
```

<AND Mask 0> NV_PEXTDEV_BOOT_1_STRAP_0_ANDMASK
<OR Mask 0> NV_PEXTDEV_BOOT_1_STRAP_0_ORMASK
<AND Mask 1> NV_PEXTDEV_BOOT_4_STRAP_1_ANDMASK
<OR Mask 1> NV_PEXTDEV_BOOT_5_STRAP_1_ORMASK

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--reboot	-y	Reboot the PC after other tasks completed.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--silence	-s	Prevent NVFLASH for beeping during various stages of the update process.
--beep	-!	Beep during the update process to signal progress.
--nolight	-l	Do not light keyboard LED's (only applicable with the DOS version of NVFLASH)

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

Great care should be exercised when using this option. It's possible to put the display adapter into a state where it is not only inoperable, but also cannot be updated to fix the problem without resorting to grounding the STRAP_SUB_VENDOR pin (see --romstrap option under <update>).

All values must be less than or equal to 0x7FFFFFFF.

A leading "0x" IS necessary; otherwise the number will be interpreted as a decimal number.

Example

```
nvflash --index=3 --strap 0x7FFFFFFF 0x1234578 0x55AAAA55 0x87654321
```

--guid

The GUID command changes the GUID in the firmware image that is used as the GUID for the IEEE 1394 (firewire) connector which is present on some display adapters.

Usage

```
nvflash [ <options> ] --guid <GUID>
```

<GUID> GUID specified as 16 hex digits (with or without leading "0x")

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--reboot	-y	Reboot the PC after other tasks completed.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--silence	-s	Prevent NVFLASH for beeping during various stages of the update process.
--beep	-!	Beep during the update process to signal progress.
--nolight	-l	Do not light keyboard LED's (only applicable with the DOS version of NVFLASH)

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

A leading "0x" is NOT necessary; the digits will be interpreted as hex digits either way.

Example

```
nvflash --index=3 --guid 0x0123456789ABCDEF
nvflash --guid FEDCBA9876543210
```

--guidsource

The GUID source command will change the soft straps to control where the chip will retrieve its IEEE 1394 GUID.

Usage

```
nvflash [ <options> ] --guidsource <source>
```

<source> indicates where the chip should retrieve its IEEE 1394 GUID from.
    main   - main EEPROM image
    dedicated   - separate serial EEPROM part

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--reboot	-y	Reboot the PC after other tasks completed.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--silence	-s	Prevent NVFLASH for beeping during various stages of the update process.
--beep	-!	Beep during the update process to signal progress.
--nolight	-l	Do not light keyboard LED's (only applicable with the DOS version of NVFLASH)

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

Some boards with an IEEE 1394 connector have a dedicated serial EEPROM for storing personal cinema configuration such as the IEEE 1394 GUID. Other boards need to obtain the GUID from the main VGA BIOS image.   This command controls where the chip will retrieve the GUID from. Its main use is for diagnostic purposes.

This command is basically a shortcut for using the "—straps" command with a specific set of values that control the IEEE 1394 GUID source straps.

Example

```
nvflash --index=3 --guidsource main
nvflash --guidsource dedicated
```

--tv

The TV command updates a block of data in the firmware image that controls the default TV format for the display adapter. The use of this feature has been depreciated and use of this command is strongly discouraged.

Usage

```
nvflash [ <options> ] --tv <filename>
```

<filename> filename of firmware image or TV binary block.

Options

Long Form	Short Form	Description
--index=<index>	-i <index>	Specify which display adapter to use. If "--index=ask" is specified, the user will be prompted to pick which display adapter to use.
--reboot	-y	Reboot the PC after other tasks completed.
--log=<file>	-L <file>	Generate a text log file of the session, where <file> is the file name of the log file.
--silence	-s	Prevent NVFLASH for beeping during various stages of the update process.
--beep	-!	Beep during the update process to signal progress.
--nolight	-l	Do not light keyboard LED's (only applicable with the DOS version of NVFLASH)

Long Form	Short Form	Description
--directpci	-n	Force NVFLASH to bypass the PCI BIOS and access the PCI configuration space directly. This option is only available in the DOS version of NVFLASH. This command should usually not be used and may not work correctly on all systems. It is only meant to work around issues with some systems.

Remarks

The file used for a TV update can either be another complete firmware image from which just the TV block will be retrieved, or a small binary file that just contains the bytes of the TV block.

This command will read the current firmware image on the display adapter, overwrite the TV block with the block from the specified file, and upload the modified image back to the display adapter.

This command is only supported on some EEPROM parts.

On some parts that can be erased and programmed in pages, only the single page (or the two adjacent pages) that contain the TV block will be reprogrammed.

Example

```
nvflash --index=3 --tv tvpal.bin
nvflash --tv p77pal.rom
```

Return Codes

The return value of the NVFLASH executable can be used in batch files and other environments to determine the success or failure of the NVFLASH session. The following table lists the possible codes NVFLASH can return.

Code	Value	Description
RETURN_ERROR_NONE	0	No error occurred
RETURN_ERROR_NO_CARDS	1	No cards found NOTE: ONLY generated by the end-user version of NVFLASH.
RETURN_ERROR_HARDWARE	2	Hardware error
RETURN_ERROR_IO	3	File I/O error
RETURN_ERROR_PROGRAMMING	4	Programming error
RETURN_ERROR_USER	5	User error (abort, etc)
RETURN_ERROR_ENVIRONMENT	6	Error with the operating environment/OS

Related Utilities

Besides the command line version of nvflash, there are other NVIDIA utilities available for firmware upgrades.

Mac OS GUI Versions

There are GUI versions of NVFLASH for Mac OS 9 and Mac OS X that are designed to allow end users to upgrade their firmware.

Win32 GUI Versions

A Win32 GUI version of NVFLASH exists that will search through a directory of firmware images to find the correct image to upload. This version is also designed to allow end users to upgrade their firmware.

NVIDIA Firmware Update Utility

A DOS based version of nvflash also exists that is designed to allow an end user to upgrade their firmware. The utility is designed to be a self contained executable file. The firmware image to be distributed is embedded into the executable file which is then made available for customers. The program will search for any adapters that are the correct type for the embedded image and update them. A separate document called "nvuflash.doc" describes the end user utility.