



SAS2Flash Utility

Quick Reference Guide

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Quick Reference Guide

SAS2Flash Utility

This document describes the SAS2Flash utility and its non advanced and advanced commands.

1.0 Introduction

The SAS2Flash utility provides the ability to flash the Fusion-MPT™ firmware and the OptionROM image. The utility can program an LSI SAS2 controller and also support the updating of LSI SAS2 controllers.

This document has multiple audiences, each with its own requirements.

- Engineers who work in manufacturing environment
- System engineers, test engineers, and firmware engineers
- OEMs, LSI, and end users

The manufacturing and engineering needs are very similar, but the end-user requirements are very different. Hence, the SAS2Flash utility suppresses some of its more powerful capabilities.

This document provides the command line option syntax and functionality of the SAS2Flash utility commands. This document also explains the limitations of different platform builds of the SAS2Flash utility. For more information about limitations, see [Limitations of Operating Systems including Windows, Linux, and Solaris](#).

2.0 Hardware and Software Compatibility

The SAS2Flash utility is compatible with the following hardware and software:

- Proprietary I/O Protocol Device

The SAS2Flash utility supports all SAS/SATA Fusion-MPT architecture controllers and host bus adapters (HBAs) based on these controllers, implemented to message passing interface (MPI) V 2.0. Currently, the SAS2Flash utility includes the following controllers:

- LSI SAS2004
- LSI SAS2008
- LSI SAS2108
- LSI SAS2116

MPI defines the host interface used by all LSI common architecture chipsets and allows the speedy development of host-based drivers and applications.

- Hardware Platforms
 - Unified Extensible Firmware Interface (UEFI) version 2.1
 - Intel EM64T/Advanced Micro Devices AMD64
 - Intel IA-64

- Intel x86 (i386/i486 processor family) or compatible
- Sun SPARC V9
- IBM PowerPC
- Operating Systems
 - FreeDOS 1.0
 - Linux 2.6 Kernel based OS: Red Hat Enterprise Linux 4, Red Hat Enterprise Linux 5, SUSE Linux Enterprise Server 9, and SUSE Linux Enterprise Server 10
 - Microsoft MS-DOS 6.22
 - Windows XP, Windows 2000, Vista, Server 2003, and Server 2008
 - WinPE 1.x (Server 2003/ XP), WinPE 2.0 (Vista), WinPE 2.1 (Server 2008)
 - UEFI version 2.1
 - Sun OpenSolaris build 118 and above, Sun Solaris Oct 10, 2009 Release
- OS Architecture
 - Windows/WinPE – x86, x64 (AMD64), IA64
 - Linux – x86 compatible
 - EFI – EFI Byte Code (EBC)
 - Linux – x86 compatible, PPC64
 - Solaris – x86 or compatible, SPARC
- Other Software
 - Fusion-MPT firmware – MPI Version 2.02 (Revision J)
 - DOS – BIOS32 services in System BIOS for DOS version
 - Linux driver – Version 00.255.04 (2.6 kernel) or greater
 - PCI firmware – PCI 2.x and PCI 3.0
 - Windows driver version 2.00.00.19 or greater
 - Solaris driver version 00.00.15.00 or greater

NOTE: The SAS2Flash utility requires a memory size equal to the sum of the flash memory size of the SAS2 controller and 0.5 MB. To program most controllers, the utility requires a memory of 2.5 MB.

3.0 Interfaces

The SAS2Flash utility supports the following four interfaces. Use the `SAS2Flash` command, or the `sas2flash` command in DOS, to invoke the utility.

■ Command Line Interface

Most command line parameters run the SAS2Flash utility in the command line mode. This mode receives most of its input from the command line parameters. It attempts to run without prompting you for input. However, if it needs input to complete a command, it prompts you.

If you invoke the SAS2Flash utility in silent mode, the utility does not prompt you for input. If input is required, it logs an error that indicates the input required.

■ User Interface

The SAS2Flash utility uses a standard 80x25 text mode interface to give you an overview of an operation. The user interface contains advanced and standard modes, which you select using the command line.

- **Command File Interface**

The SAS2Flash utility supports a command file, because command lines can be very long and many operating systems place a limit on their length. A command file, which is an ASCII text file, contains the parameters that would be on the command line. When a command file is provided, other command line parameters are not used.

- **Firmware Interface**

The SAS2Flash utility supports MPI V2.0, but not any of its previous versions.

4.0 Functional Partitioning

Internal to the code, the SAS2Flash utility has a platform abstraction layer (PAL) that is separate from the rest of the program. The PAL contains the platform-specific information, which eases the process of porting from one platform to another.

5.0 Commands

This section describes the commands supported by the SAS2Flash utility.

5.1 Command Line Format

The command line has the following generic format:

```
switch space filename
```

Example:

```
SAS2Flash -o -f filename
```

The first option, `-o`, is a switch. It does not take a parameter. The second option, `-f`, takes a parameter. Space is required because there can be multiple command line options that start with the same letters.

5.2 Command Line Ordering

The structure of the command line determines the order in which the SAS2Flash utility runs the commands, following this two-step process.

1. All commands have a preassigned order level based on the following six categories. The SAS2Flash utility sorts the options according to this order and runs the commands in that sequence.
 - a. Order 0 – Flags
 - b. Order 1– All controller commands
 - c. Order 2 – Choose adapter
 - d. Order 3 – BIOS and firmware flash
 - e. Order 4 – Programming and testing
 - f. Order 5 – Display and list
2. Within each order level, the SAS2Flash utility runs the commands in the order in which they appear on the command line (from left to right), with the following exceptions.
 - Order 0 commands are reserved for the command file, which is run separately and cannot be run simultaneously with other commands.

- Order 2 commands (for example, the command to flash firmware on controllers), cannot run simultaneously with other commands. After running Order 2 commands, the SAS2Flash utility exits and reports all other commands as not run. If there are no Order 2 commands, the SAS2Flash utility proceeds to Order 3 and so on, and then runs all commands.

5.3 Command Line Rules

Follow these syntax rules for constructing command lines:

- Whenever a command line option takes a value, use a space to separate the option and the value.
- File names and paths must conform to the fundamental rules of the operating system. If the operating system allows spaces in file names, enclose the file name and the path within double quotations.
- Duplicate command line options are not supported. If duplicates are used, a failure with an appropriate error message results.

5.4 Command Line Parameters

The following table lists the command line parameters of the SAS2Flash utility. This section also provides descriptions of command line option syntax and functionality for some selected commands.

Table 1: Command Line Parameters

Command	Parameter	Order	Advanced Command	Argument	Description
Primary Commands					
Firmware Update	-f	3	Y/N	filename1	Flash firmware from <i>filename1</i> .
Reset	-reset	3	Y	None	Perform a reset on the selected controller.
BIOS Update	-b	4	Y/N	filename1	Flash a BIOS from <i>filename1</i> .
Program Vital Product Data (VPD)	-vpd	5	Y	filename1	Program the selected controller with the vital product data (VPD) file in <i>filename1</i> .
Program SAS Address	-sasadd	5	Y	Num1	Program the selected controller with SAS address from <i>num1</i> .
Program Board Tracer	-tracer	5	Y	string1	Program the selected controller with a board tracer of <i>string1</i> .
Program Assembly	-assem	5	Y	string1	Program the selected controller with an assembly value of <i>string1</i> .
List	-list	6	N	None	List information about the selected adapter.
List All	-listall	6	N	None	List information about all adapters.
Firmware All	-fwall	7	N	filename1	Try to flash all controllers with firmware in <i>filename1</i> .
BIOS All	-biosall	7	N	filename1	Try to flash all controllers with BIOS in <i>filename1</i> .
Reset All	-resetall	7	Y	None	Reset all controllers.
Secondary Commands					
Command File Directive	@	0	N	filename1	Command file from <i>filename1</i> .
Log File	-l	1	N	filename1	Log to the file in <i>filename1</i> .
Advanced command mode	-o	1		None	Enable advanced command mode.
Silent Flag	-s	1	N	None	Enable silent mode.

Table 1: Command Line Parameters (Continued)

Command	Parameter	Order	Advanced Command	Argument	Description
Help	-? or -h	1	N	None	Display command line options help information.
Debug Flag.	-debug	1	N	None	Turn on debug output.
Controller Number Flag	-c	2	N	num1	Select a controller by <i>num1</i> .
Controller Address Flag	-cpci	2	N	num1:num2:num3:num4	Select a controller by PCI bus:device:function, or optionally by bus:device:function:segment.
Erase	-e	4	Y	num1	Erase a region specified by <i>num1</i> .
Test BIOS Version	-testbios	4	Y	string1	Test BIOS version against <i>string1</i> in format major.minor.unit.dev
Test Firmware Version	-testfw	4	Y	string1	Test firmware version against <i>string1</i> in format major.minor.unit.dev
Test Link State	-testls	4	Y	Num1 num2	Test PHY <i>num1</i> on selected controller for link state specified in <i>num2</i> .
Test Link State All	-testlsall	4	Y	None	Show link state on all PHYs.
Test Product ID	-testprodid	4	Y	Num1	Test the selected controller's product ID against <i>num1</i> .
Upload BIOS	-ubios	5	N	filename1	Upload the boot services (BIOS) to <i>filename1</i> .
Upload Firmware	-ufirmware	5	N	filename1	Upload the firmware image to <i>filename1</i> .
Upload Firmware Backup	-ufwbackup	5	Y	filename1	Upload the firmware backup location to <i>filename1</i> .
Upload NVDATA	-unvdata	5	Y	filename1	Upload the NVDATA to <i>filename1</i> .
Upload Flash	-uflash	5	Y	filename1	Upload entire flash image to <i>filename1</i> .
Program SAS Address High	-sasaddhi	5	Y	Num1	Use <i>num1</i> for the high 28 bits of the SAS address. You will be prompted for the remainder.
Scan Character Flag	-scanchar	5	Y	string1	Look for character in <i>string1</i> as the first character when scanning a SAS address.
Show VPD	-showvpd	5	Y	None	Show the VPD file.
Test Subsystem Identification	-testssid	6	Y	num1:num2	Test the selected controller's SSVID against <i>num1</i> and SSDID against <i>num2</i> .
List SAS Address	-listsasadd	6	Y	None	Show the SAS address of the selected controller.
Display Version	-ver	8	N	None	Show the version of this instance of SAS2Flash.

5.4.1 The @ (Command File) Directive

Use the command file directive to specify a command file for execution. When you specify a command file option as a command line option, in any order, all other command line parameters are ignored. The command file contains command line items. Carriage return and line feed characters are allowed in the file, and are ignored.

Syntax:

```
SAS2Flash @command.txt
```

The following are the sample commands in the **command.txt** file:

- -c 2
- -b mptsas2.rom
- -f ir1068.fw
- -reset

5.4.2 Advanced Command Mode

The advanced command mode enables many commands. For any advanced command, use the advanced mode switch or the SAS2Flash utility rejects the command as *unrecognized*.

These commands are intended for system engineers, test engineers, firmware engineers, and engineers who work in manufacturing environment. An end user does not use this command set.

Syntax:

```
SAS2Flash -o
```

5.4.3 BIOS All Command

Use the BIOS All command to update the BIOS on all supported controllers. It only updates to a later version of the BIOS image. It does not allow downgrading in a version. This process includes the following operations:

1. Opens the specified file.
2. Checks whether or not the file is a valid BIOS image.

The image validity check includes a basic check for a valid PCI ROM header and a checksum of the core BIOS image.

3. Performs a series of safety checks.

The safety checks ensure that the provided BIOS supports the specified controller family within the limits of the ability of the program. If any of the safety checks fail, the controller is skipped and the process continues with the next supported controller.

4. Updates the controller if the file passes through all of the checks.

If the BIOS image is downloaded successfully, the SAS2Flash utility uploads the BIOS image and compares it with the downloaded image. If the comparison fails, it logs a failure.

Syntax:

```
SAS2Flash -biosall mptsas.rom
```

5.4.4 BIOS Update Command

Use the BIOS Update command to download a new x86 BIOS image EFI boot services driver (BSD), or FCODE. This process includes the following operations:

1. Opens the specified file.
2. Checks whether or not the file is a valid BIOS image.

The image validity check includes a basic check for a valid PCI ROM header and a checksum of the core BIOS image.

3. Performs a series of safety checks on each controller.

The safety checks ensure that the provided BIOS supports the specified controller family within the limits of the ability of the program. If any of the checks fail, a failure report is sent to you.

4. Updates the controller if the file passes through all of the checks.

The BIOS update command supports the duplicate command line option, allowing you to flash x86 BIOS/FCODE/EFI BSD in a single command line invocation.

The SAS2Flash utility performs a read, modify, and write operation on the BIOS region of the flash. The utility reads the BIOS region, finds the type of image being updated (x86 BIOS, EFI or FCODE) in the block, and replaces it with the new image. The utility writes the modified image to the boot region in the flash.

If the BIOS image downloads successfully, the SAS2Flash utility uploads the BIOS image and compares it with the downloaded image. If the comparison fails, it logs a failure.

Syntax:

```
SAS2Flash -b mptsas.rom
```

5.4.5 Controller Address Flag

The SAS2Flash utility can operate on a specified controller. Using a PCI address is one method for specifying the controller. The address is specified as the bus, device, and function number, and is based on the current mapping of the PCI bus. The operating system and PAL support multidomain PCI addressing, which uses a PCI segment, bus, device, and function number.

Syntax:

```
SAS2Flash -cpci 5:3:0
```

```
SAS2Flash -cpci 1:3:2:0
```

5.4.6 Controller Number Flag

The SAS2Flash utility can operate on a specified controller. Using a controller number is one method for specifying the controller. The controller number, the index of the controller, is arbitrary because it is based on the order in which the controllers were discovered. The number is a one-based index, therefore, 1 is the first controller found.

Syntax:

```
SAS2Flash -c 1
```

5.4.7 Erase Command

Use the Erase command, which is available only in the advanced command set, to erase an entire region, as specified by a number. You cannot undo an erase operation.

Syntax:

```
SAS2Flash -o -e 1
```

The following table shows the parameters for this command and the region that each parameter erases.

Parameter	Region
1	NVSRAM
2	Backup firmware
3	Persistent configuration pages
4	Manufacturing area (MPB)
5	Boot services
6	Clean flash (erase everything except manufacturing area)
7	Erase complete flash
8	MegaRAID firmware

5.4.8 Firmware All Command

Use the Firmware All command to update the firmware on all supported controllers. It only updates to a later version of firmware image and does not allow downgrading in a version. This process includes the following operations:

1. Opens the specified file.
2. Checks whether the file is a valid firmware image, and runs through all supported controllers.

Firmware image validation involves the steps for updating firmware as defined in the [Firmware Update Command](#).

3. Performs a series of safety checks on each controller, and updates the controller if all of the checks are validated. This command relies on the SAS2Flash utility to determine which controllers need to be updated. Therefore, do not override any safety checks.
4. If any safety check for a given controller fails, the controller is skipped and the process continues with the next supported controller.

If the firmware download operation is successful, the SAS2Flash utility uploads the firmware image and compares it with the downloaded image. If the comparison fails, the utility erases the firmware image and the command fails. If a firmware image already is loaded in the flash memory, all firmware update operations download the new firmware image to a backup area.

If both the firmware download operation and the comparison of the uploaded firmware image with the downloaded firmware image are successful, this command issues the adapter reset. The adapter reset copies the new firmware image from the backup area to the running firmware location.

Syntax:

```
SAS2Flash -fwall image.fw
```

5.4.9 Firmware Update Command

Use the Firmware Update command to download a new firmware image. This process includes the following operations:

1. Opens the specified file.

2. Checks whether the file is a valid firmware image, and runs through all supported controllers.

The firmware image validation involves the following steps:

- a. Checks for valid firmware header signature as defined by MPI V2.0 specification.
- b. Checks for zero checksum on the firmware image.
- c. Checks whether the firmware image is valid for the controller being flashed. The validation involves comparing the PCI device and revision ID information from the controller's PCI configuration space and from the list of devices in Supported Devices Firmware Extended Image Data.
 - Checks for valid NVDATA extended image in the firmware image.
 - Checks for NVDATA compatibility. Checks the signature of the CFGI Directory Header and CFGI Product ID for validity on the firmware image from the file and on the firmware image from the controller (if the controller already has Firmware on it). If the checks pass and the controller already has firmware on it, checks the NVDATA Product ID and NVDATA Vendor IDs from the NVDATA from the file with the corresponding IDs from the NVDATA from the controller.
 - Verifies that the firmware image has a valid INIT image.
 - Verifies that the firmware image has a valid BOOTLOADER image.
3. Performs a series of safety checks on each controller.
4. Logs any firmware validation check failures for a given controller to the screen and to the log file.
5. Updates the controller if it passes all safety checks.

The advanced mode version of this command offers an override if the NVDATA vendor field does not match the NVDATA product ID field.

If the firmware download operation is successful, the SAS2Flash utility uploads the firmware image and compares it with the downloaded image. If the comparison fails, the utility erases the image and the command fails. If a firmware image is already loaded in the flash memory, all firmware update operations download the new firmware image to a backup area.

If both the firmware download operation and the comparison of the uploaded firmware image with the downloaded firmware image are successful, this command issues the adapter reset. The adapter reset copies the new firmware image from the backup area to the running firmware location.

Syntax:

```
SAS2Flash -f image.fw
```

5.4.10 Help Command

Use the Help command to list the command line options that the SAS2Flash utility recognizes. The `-o` enables advanced help and allows the display of the advanced option help.

Syntax:

```
SAS2Flash -h
SAS2Flash -?
SAS2Flash -o -h
```

```
SAS2Flash -o -?
```

5.4.11 List All Command

Use the List All command to list information about all controllers supported by the SAS2Flash utility on the screen. You also can output the information to a log file and pipe it to another destination.

Syntax:

```
SAS2Flash -listall
```

5.4.12 List Command

Use the List command to list information about the controller specified in the command on the screen. You also can output the information to a log file and pipe it to another destination.

Syntax:

```
SAS2Flash -list
SAS2Flash -c 2 -list
```

5.4.13 List SAS Address Command

Use the List SAS Address command to list the SAS address of the specified controller on the screen. You also can output the information to a log file and pipe it to another destination.

Syntax:

```
SAS2Flash -o -listsasadd
SAS2Flash -c 2 -o -listsasadd
```

5.4.14 Log File Command

Use the Log File command to specify a file for logging output. The SAS2Flash utility creates the file with the name you specify. If this file name already exists, the utility opens the file and deletes all its contents.

Syntax:

```
SAS2Flash -l logfilename.log
```

5.4.15 Program Assembly Command

Use the Program Assembly command to program the specified controller with an assembly value. You must provide the complete assembly value, which is programmed directly to the controller. The value is 16 characters long and is truncated or padded with termination characters.

NOTE: The utility programs the Assembly, Tracer, and SAS Address directly to the Manufacturing Page 5.

Syntax:

```
SAS2Flash -o -assem "12AB"
```

5.4.16 Program SAS Address Command

Use the Program SAS Address command to program the specified controller with a SAS address. You must provide the complete SAS address, which is programmed directly to the controller. This command recognizes the input format of the SAS address, and the format can be with or without the preceding hexadecimal characters 0x.

Syntax:

```
SAS2Flash -o -sasadd 50062b0000000000
SAS2Flash -o -sasadd 0x50062b0000000000
```

5.4.17 Program SAS Address High Command

Use the Program SAS Address High command to program the specified controller with the first 28 bits of the SAS address, which are specified at the command line. When you specify the first seven characters at the command line, the utility prompts you to provide the rest of the nine characters. The utility then generates the complete SASAddress and programs it to the controller. Use this command with a barcode reader.

Syntax:

```
SAS2Flash -o -sasaddhi 50062b0
```

5.4.18 Program Board Tracer Command

Use the Program Board Tracer command to program the specified controller with a board tracer value. The board tracer value is provided on the command line and is programmed directly to the controller. The board tracer value is 16 characters long and is truncated or padded with termination characters.

Syntax:

```
SAS2Flash -o -tracer "12AB"
```

5.4.19 Program VPD Command

Use the Program VPD command to program the specified controller with a VPD file. The file is provided on the command line. It is parsed, and the data is programmed to the appropriate location in nonvolatile storage. Individual field length, not the value, is verified.

Syntax:

```
SAS2Flash -o -vpd file.vpd
```

5.4.20 Reset All Command

Use the Reset All command to issue a diagnostic reset to all controllers supported in the system, which resets the chip hardware, where complete chip information is reinitialized. This process includes the following operations:

- Moves a new firmware image from the firmware backup location to the current firmware location
- Migrates the NVDATA changes
- Runs the new firmware

Syntax:

```
SAS2Flash -o -resetall
```

5.4.21 Reset Command

Use the Reset command to issue a diagnostic reset to the specified controller, which resets the chip hardware, where complete chip information is reinitialized. This process includes the following operations:

- Moves a new firmware image from the firmware backup location to the current firmware location
- Migrates the NVDATA changes
- Runs the new firmware

Syntax:

```
SAS2Flash -o -reset
```

5.4.22 Scan Character Flag

Use the scan character flag to specify a scan character before accepting SAS address input. It specifies the scan character that a barcode scanner sends to indicate the beginning of a valid string. Use the scan character flag only when programming a SAS address. In the order of command line options, it appears before the option to program SAS address.

Syntax:

```
SAS2Flash -o -scanchar " " -sasadd 50062b000000000
```

5.4.23 Show VPD Command

Use the Show VPD command to display the contents of the VPD file for the specified controller.

Syntax:

```
SAS2Flash -o -showvpd
```

5.4.24 Silent Flag

Use the silent flag to enable the silent operation mode in which the SAS2Flash utility does not solicit your feedback. The SAS2Flash utility logs the output to the screen and to any log file if specified. If an error occurs, the SAS2Flash utility does not prompt you for input to correct an error or for permission to override a safety check.

Syntax:

```
SAS2Flash -s
```

5.4.25 Test BIOS Version Command

Use the Test BIOS Version command to test the current BIOS version against a version provided on the command line in the format *AA.BB.CC.DD*. The utility checks all four parts of the version number and outputs the result of the checks through the return codes.

NOTE: This command is supported only in the x86 BIOS.

Syntax:

```
SAS2Flash -o -testbios 6.08.00.00
```

5.4.26 Test Firmware Version Command

Use the Test Firmware Version command to test the current firmware version against a version provided on the command line in the format *AA.BB.CC.DD*. The utility checks all four parts of the version number and outputs the result of the checks through the return codes.

Syntax:

```
SAS2Flash -o -testfw 1.11.00.00
```

5.4.27 Test Link State All Command

When you use the Test Link State All command, it does not directly test the link state, but lists the state of all links on the selected adapter. If a PHY does not have a device connected to it, its link state is *Link Down*.

Syntax:

```
as2flash -o -testlsall
```

5.4.28 Test Link State Command

Use the Test Link State command to test the link state of a specific PHY on a specific controller against a provided value. It outputs the test results through the return codes.

The valid values for testing the link state are as follows:

Value	Link State
0	Link Down
1	1.5 Gb/s
2	3.0 Gb/s
3	6.0 Gb/s

Syntax:

```
SAS2Flash -o -testls 4 2
```

5.4.29 Test Product ID Command

Use the Test Product ID command to test the product ID of the current firmware against a product ID provided on the command line in hexadecimal and outputs the test results through the return codes.

Syntax:

```
SAS2Flash -o -testprodid 0x2713
```

5.4.30 Test Subsystem Identification (SSID) Command

Use the TEST Subsystem Identification (SSID) command to receive the Subsystem Vendor ID (SSVID) and Subsystem Device ID (SSDID), and match them with the appropriate PCI information for the selected controller. The output displays any discrepancies in either SSVID or SSDID, or a success message if both values match the selected controller.

Syntax:

```
SAS2Flash -o -testssid 1000:3020
```

5.4.31 Upload BIOS Command

Use the Upload BIOS command to upload the boot block (BIOS, EFI, and FCODE) to a file. If the file already exists, the command overwrites the file. If there is not enough free disk space to hold the block, the command fails. This command is useful in manufacturing environments when you want to compare the uploaded image after an update.

Syntax:

```
SAS2Flash -ubios image.rom
```

5.4.32 Upload Firmware Command

Use the Upload Firmware command to upload the current firmware image to a file. If the file already exists, then the command overwrites the file. If there is not enough free disk space to hold the firmware image, the command fails. This command is useful in manufacturing environments when you want to compare the uploaded image after an update.

Syntax:

```
SAS2Flash -ufirmware image.fw
```

5.4.33 Upload Firmware Backup Command

Use the Upload Firmware Backup command to upload the firmware backup image to a file. If the file already exists, the command overwrites the file. If there is not enough free disk space to hold the firmware backup image, the command fails. This command is useful in manufacturing environments when you want to compare the uploaded image after an update.

Syntax:

```
SAS2Flash -o -ufwbackup image.fw
```

5.4.34 Upload NVDATA Command

Use the Upload NVDATA command to upload the current binary NVDATA image to a file. If the file already exists, the command overwrites the file. If there is not enough free disk space to hold the binary NVDATA image, the command fails. This command is useful in manufacturing environments when you want to compare the uploaded images after an update.

Syntax:

```
SAS2Flash -o -unvdata nvdata.img
```

5.4.35 Display Version Command

Use the Display Version command to print the SAS2Flash LSI banner and the SAS2Flash utility version.

Syntax:

```
SAS2Flash -ver
```

6.0 Performance

The SAS2Flash utility does not cause unnecessary delays and runs in an efficient manner. Memory utilization, which depends on the selected operation, can be as high as 20 MB.

The SAS2Flash utility supports the following exit codes.

Table 2: Exit Codes

Code	Description
0	Success
1	Failure

7.0 Limitations of Operating Systems including Windows, Linux, and Solaris

Certain operating systems do not support all functionalities of the SAS2Flash utility due to limitations in their controller interface. The PAL operates as a gate in this area. If an operating system does not support a command, the PAL returns a code of invalid function.

The Windows, Linux, and Solaris operating systems do not support commands that require the controller to be taken offline or require a firmware download of the boot loader. In addition, these operating system cannot flash any part that does not already have valid firmware loaded and running.

