



## SAS Firmware Update Instructions



### Enterprise Capacity 3.5 HDD 7200.5 SAS STD 5xxE firmware update version **E004**

This firmware update is for the Seagate [Enterprise Capacity 3.5 HDD 7200.5 SAS](#) family only.

Backup all data contained on the drive prior to running the update.

See the End User License Agreement below for specific information about these software tools.

Note: Beginning with firmware E004 the new product marketing name is **Exos 7E8**.

This firmware release only supports the following models:

#### Enterprise Capacity 3.5 HDD 7200.5 SAS STD 5xxE (MakaraPlus)

Models	Part number	Firmware File
ST6000NM0085	1RM21C	MakaraPlusEntCapSAS-STD-5xxE-E004.LOD
ST8000NM0075	1RM212	MakaraPlusEntCapSAS-STD-5xxE-E004.LOD

**Note:** The firmware above does NOT support SATA, SED, 4kN or any other default sector size other than 5xxE. It is only for the two models in the list above.

STD      Standard  
SED      Self Encrypting Drive  
4kN      4k Native sector size  
5xxE      Advanced Format (512 byte emulation from 4k physical)

If your current [Enterprise Capacity 3.5 HDD 7200.5 SAS](#) firmware does not begin with the digits **"E001"** or **"E002"** then you have a configuration which is not compatible with

**E004.** Otherwise, you might have a unique OEM version in which case please contact your OEM for firmware updates for these drives.

**WARNING: Drives that have been flashed to E002 code will not be able to be flashed back to E001 code.**

**Warning, possible loss of data if this firmware is downloaded to unsupported models!**

DO NOT run this firmware update on RAID systems.  
DO NOT turn the power off during the firmware update procedure.

**BEFORE YOU BEGIN:**

1. Make sure you have backed up all of your important files and critical data.
2. Save any work in progress.
3. Close all other open applications.
4. Disconnect all external storage devices.

Always handle the drive carefully so you do not cause internal damage to the heads and media inside the drives. Drives are sensitive devices.

**A warning about RAID**

RAID systems are extremely sensitive to disruptions to individual drives. It is not uncommon for low level disk drive diagnostics to cause RAID management software to fault a drive that is slowed down by testing or firmware download. For this reason, we highly recommend that you use disk management tools provided by your RAID controller manufacturer if they are available. If these tools are not available, you might consider taking the RAID offline to a maintenance mode or rebooting the system to temporary bootable media and running diagnostics from there. Seagate recommends that you use disk utility tools provided by your RAID controller manufacturer.

Among others, RAID management software is available from 3Ware, Adaptec and LSI.

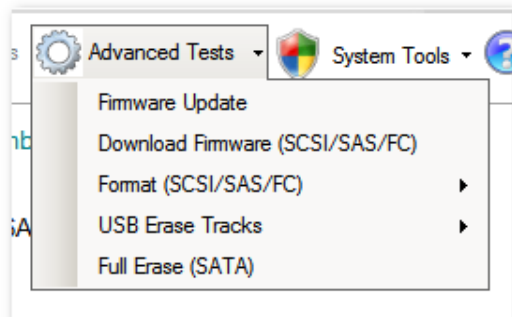
**Here are the instructions for updating SAS firmware:**

The method you choose to update the firmware on the drive will depend on your operating system, system utilities or work bench environment.

Windows Tool

Windows operating systems tolerate firmware downloads to SAS disk drives in JBOD mode. Drives in RAID configurations should not be given new firmware unless a special tool is provided by the RAID controller manufacturer.

Seagate's SeaTools for Windows may be used to download firmware to SAS disk drives in JBOD mode. You will find SeaTools for Windows at [www.seagate.com/support/seatools](http://www.seagate.com/support/seatools) and select the Downloads tab. After SeaTools is installed on the system, you will find *Download Firmware (SCSI/SAS/FC)* on the Advanced Tests menu.



The firmware files will be either .LOD or .SEA file types.

**Important:** These files must be copied to the SeaTools for Windows folder.

## Command Line Interface Tools

Two command line interface tools are available for firmware download. Seaflashlin is for Linux only, and is the precursor to SeaChest\_Firmware. SeaChest\_Firmware is available for both Linux and Windows and they share the same command line structure. Therefore, there are two command line choices for Linux and one for Windows. All of these tools have extensive documentation available.

Note: Windows operating systems do NOT allow firmware download to SATA drives unless the drives support the Deferred Download mode.

**SeaChest\_Firmware** is our most current tool. The Linux version is shown below. The Windows version does not reference devices as "/dev/sg" but rather as PDx. Please see the SeaChest\_Firmware for Windows documentation for specific examples.

```
=====
SeaChest_Firmware for Linux - Seagate drive utilities
Copyright (c) 2017 Seagate Technology LLC and/or its Affiliates, All Rights Reserved
SeaChest_Firmware Version: 2.5.2
Build Date: Nov 02 2017
=====

Usage
=====
    SeaChest_Firmware [-d <sg_device>] {arguments} {options}

Examples
=====
    SeaChest_Firmware --scan
    SeaChest_Firmware -d /dev/sg2 -i
    SeaChest_Firmware -d /dev/sg2 --fwdlInfo
    SeaChest_Firmware -d /dev/sg2 --downloadFW fwfilename
    SeaChest_Firmware -d /dev/sg2 --fwdlConfig configfile.cfs

Utility arguments    (partial listing)
=====
    -s, --scan
    -F, --scanFlags [option list]
```

```

-d, --device <device handle>
-i, --deviceInfo
--SATInfo
--testUnitReady
--fwdlInfo
--downloadFW [fwfilename]
--downloadMode [full | segmented | deferred]
--activateFW
--fwdlConfig [config file]
--fwdlDryRun
--fwdlSegSize [segment size in 512B blocks]

```

Utility Options (partial listing)

=====

```

-h, --help
-V, --version
--license

```

First, run the `--scan` option to determine what `/dev/sg#` assignment lines up to your disk drive. This option also will show you other details about the drive including the current firmware revision. Like this:

Vendor	Handle	Model Number	Serial Number	FwRev
ATA	/dev/sg0	ST94813AS	3AA043KP	3.03
SEAGATE	/dev/sg1	ST1000NM0011	ZAA15VAS	SN03

The typical ordinary command line looks something like this:

```
SeaChest_Firmware -d /dev/sg2 --downloadFW fwfilename
```

`--modelMatch` is a model number verification based on the device Inquiry response. `--modelMatch` scans all sg devices on the system.

The tool has two batch modes, which can be used thusly:

```
SeaChest_Firmware -d all --modelMatch <model_number> --downloadFW fwfilename
```

Note: Use of `-d all --modelMatch` mode is preferred for batch processing of sg (SCSI generic) SAS disk drives. The `--modelMatch` mode may also be used on Enterprise SATA disk drives. Desktop and notebook SATA drives firmware is usually combined with a Seagate-prepared CFS firmware configuration file.

The `<cfs_file>` noted above is a Seagate-prepared compatible firmware selector file which is used to match up the right firmware for a particular SATA drive.

```
SeaChest_Firmware -d /dev/sg2 --fwdlConfig configfile.cfs
```

Note: Batch processing of SATA drives should use a Seagate prepared CFS file.

Both of these modes assume that the relevant firmware files are located in the current working directory.

See the `SeaChest_Firmware.-Lin.txt` file for a complete description of the software.

**seaflashlin** firmware loader supports compatible Seagate disk drives listed on /dev/sg devices. The command line instructions for this tool are:

```
=====
Seagate Firmware Download Utility.
Copyright (c) 2016 Seagate Technology LLC, All Rights Reserved
SeaFlashLin Version: 0.4.8
=====

Usage
=====
    seaflashlin -f <fw_file> -d <sg_device>
    seaflashlin {-m <model_number> -f <fw_file> | -c <cfs_file>} [-d <sg_device>]

Example
=====
Specific drive:
    seaflashlin -f test.lod -d /dev/sg0
    (defaults to segment size = 64 and timeout = 5 seconds)

Multiple drives:
    seaflashlin -c barracuda.cfs
    seaflashlin -m ST600MP0005

Control options
=====
    -i          Display identification information (list sg_devices)

    -d, --device deviceHandle
                Use this option to specify the sg device handle on which to
                perform an operation. Multiple device handles can be given.

                Example: -d /dev/sg5

    -f <fw_file>
                The name of the firmware file.

    -x <path>
                To designate alternate location of the firmware files. Default
                is the current working directory.

    -c <cfs_file> (SATA only)
                A Seagate-prepared compatible firmware selector file. All
                drives in the system will be reviewed for new firmware based on
                this CFS file.

    -k <cfs_file> (SATA only)
                "dry run" test to determine which files and drives are
                supported by a given CFS file.

    -m <model_number>
                The model number of the drive to download firmware. All drives
                in the system with this model number will be selected. Use a
                CFS first if you have one instead of using this choice.

    Not recommended for batch updates to multiple SATA notebook or
    desktop drives because the model numbers are not exclusively
    defined for just one family. In other words, two similar
    drives with the same model number may have different part
    numbers and will not share the same firmware file.
```

#### Modes and Controls

=====

```
-e      Deferred download. Not common. (ATA only)
-s      Segment size (1 segment = 512 bytes) Default is 64 (32KiB)
-p      Force ATA passthrough (for SATA)
-w      Force Write Buffer CMD (for SAS)
-u      Non-segmented
-o      Timeout value (seconds). Default without this option is 5
        seconds.
```

#### Utility Options

=====

```
-v      Display version and exit (overrides all other arguments)
-l      Show license agreement
```

#### Return codes

=====

```
0       No error found
1       Fatal error in command line options
2       FW Download Failed
3       Invalid device
4       No match in CFS file (SATA only)
5       FW up to date (SATA only)
6       Model number mismatch
7       FW mismatch
4x      Hexadecimal number count of Seagate sg devices in the
        system. This response code is only returned by the -i
        system scan argument. Beginning with 41 where x is the
        beginning of the count of the number of devices.
Anything else = unknown error
```

See the `seafashlin.txt` file for a complete description of the software.

First, run the `-i` option to determine what `/dev/sg#` assignment lines up to your disk drive. This option also will show you other details about the drive including the current firmware revision. Like this:

```
/dev/sg0  MN: ST94813AS      SN: 3EE043KP   FW: 3.03
/dev/sg1  MN: ST1000NM0011   SN: Z1M15VAS  FW: SN03
```

`-m` is a model number verification based on the device Inquiry response. `-m` mode scans all sg devices on the system, so it is -- in itself -- a batch mode. The `-d` switch may be used with `-m` to select a specific device.

The raw tool has two batch modes, which can be used thusly:

```
seafashlin -m <model_number> -f <fw_file>
```

Note: Use of `-m` mode is preferred for batch processing of sg (SCSI generic) SAS disk drives. The `-m` mode may also be used on Enterprise SATA disk drives. Desktop and notebook SATA drives firmware is usually combined with a Seagate-prepared CFS firmware configuration file.

The <cfs\_file> noted above is a Seagate-prepared compatible firmware selector file which is used to match up the right firmware for a particular SATA drive.

```
seaflashlin -c <cfs_file>
```

Note: Batch processing of SATA drives should use a Seagate prepared CFS file.

Both of these modes assume that the relevant firmware files are located in the current working directory.

Alternately, these two batch modes may be targeted to a specific device like so:

```
seaflashlin -m <model_number> -f <fw_file> -d </dev/sg#>
```

```
seaflashlin -c <cfs_file> -d </dev/sg#>
```

By specifying -f and -d, without the benefit of requiring a model match with -m or utilizing a Seagate .CFS file, a user may still force a SATA download attempt on any /dev/sg device regardless of type or suitability. Obviously, this use is not recommended for most situations, but is available if needed. Multiple devices can be defined like this:

```
seaflashlin -f <fw_file> -d </dev/sg#> -d </dev/sg#> -d </dev/sg#>
```

### Raw Firmware Data Files

You will need the Seagate firmware file to run the simple command line Linux tool. This file will have the .LOD filename extension and should be located in the current working directory. This firmware file should never be used outside of the specific product family models and part numbers listed with the firmware release. Incorrect usage of the .LOD may result in data loss or even product failure. Seagate Technology is not responsible for lost user data. See the End User License Agreement below for specific information about these software tools.

### Using Traditional Linux Firmware Tools

For SAS drive firmware downloads you might use the Linux "sg\_write\_buffer" command. The sg command stands for the (SCSI Generic driver) and is an off-the-shelf Linux command that is kept updated by the Linux community. It may be able to work with various RAID cards and see the individual drives. You will need to load the "sg3\_utils" package if not already in your Linux kernel.

For Ubuntu \_ apt-get sg3\_utils

For Fedora/redhat/centros yum install sg3\_utils

=====  
SAS Drive FW Download - use sg\_write\_buffer

example loads "ST9600205SS\_0002.lod" firmware

=====

1. Be in the directory where the .lod files is located then run the sg\_write\_buffer cmd.

More details below.

2. On larger code files you must specify --length=file size. Use ls -l command to get the file size of the code (to use in the sg\_write\_buffer command string

```
# ls -l ST9600205SS_0002_servo-x106.lod
-rw-r--r-- 1 root root 1238016 2011-08-17 10:46 ST9600205SS_0002.lod
```

3. Identify the /dev/sgx device. Run the lsscsi -g command to see target devices  
/dev/sg#

4. Run sg\_write\_buffer command to the target device. Here is an example of a firmware download to a Seagate Constellation ES.1 model ST9600205SS:

```
# sg_write_buffer -v --in=/var/tmp/ST9600205SS_0002.lod --length=1238016 --mode=5
/dev/sg3
Write buffer cmd: 3b 05 00 00 00 00 12 e4 00 00
```

Or `sg_write_buffer -v --in=<fw file name> -l=<file size> -m=5`

5. Then use Linux SMARTCTL to verify what code is on the disk

```
# smartctl -i /dev/sdc
http://smartmontools.sourceforge.net
Device: SEAGATE ST9600205SS Version: 0002
Serial number: 6XR1xxxx
```

## Support

Seagate offers technical support for disk drive installation. If you have any questions related to Seagate products and technologies, feel free to submit your request on our web site. See the web site for a list of world-wide telephone numbers.

Seagate Support: <http://www.seagate.com/support-home/>

Contact Us: <http://www.seagate.com/contacts/>

This software uses open source packages obtained with permission from the relevant parties. For a complete list of open source components, sources and licenses, please see our Linux USB Boot Maker Utility FAQ for additional information.

Linux USB Boot Maker FAQ:

[http://support.seagate.com/firmware/usbbootmaker\\_faq.html](http://support.seagate.com/firmware/usbbootmaker_faq.html)

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Version 3, 29 June 2007

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