



SAS Firmware Update Instructions

Exos X16 SAS STD 512E firmware update version **E004**



This firmware update is for the Seagate Exos X16 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.

This firmware release only supports the following models:

Exos X16 SAS STD 512E (Evans)

Format	Security	Model	Part Number	New FW	Firmware File
512E	STD	ST16000NM002G	2KH203	E004	EvansExosX16SAS-STD-512E-E004.LOD
		ST14000NM002G	2KG203		
		ST12000NM002G	2MT203		
		ST10000NM002G	2MU203		

Note: The firmware above does NOT support SATA, SED. It is only for the four 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 [Exos X16 SAS HDD](#) firmware does not begin with the digits “E001”, “E002” or “E003” 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, 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 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:

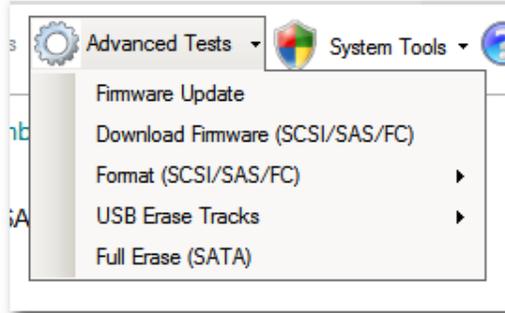
The method you choose to update the firmware on the drive will depend on your operating system, system utilities or workbench environment.

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 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

SeaChest_Firmware is available for firmware download. SeaChest_Firmware is available for both Linux and Windows and they share the same command line structure. 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 - Seagate drive utilities - NVMe Enabled
Copyright (c) 2014-2021 Seagate Technology LLC and/or its Affiliates, All Rights Reserved
SeaChest_Firmware Version: 3.0.0-2_2_1 X86_64
Build Date: Apr 27 2021
Today: Tue Apr 27 15:11:15 2021      User: tyler
=====
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
=====
-d, --device deviceHandle
-F, --scanFlags [option list]
-i, --deviceInfo
-s, --scan
-S, --Scan
--SATInfo
--testUnitReady
--activateFW      (Seagate Only)
--calculateFileHash [file]
--downloadFW [firmware_filename] (Seagate Only)
```

```

--downloadMode [ full | segmented | deferred ] (Seagate Only)
--firmwareSlot/--fwBufferID slot# (Seagate Only)
--fwdlConfig [config file] (Seagate Only)
--fwdlDryRun
--fwdlSegSize [segment size in 512B blocks] (Seagate Only)
--fwdlInfo
--switchFW (NVMe Only) (Seagate Only)

```

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

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/seachest/SeaChest_Combos_UserGuides.html

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