



Application Note

SSD Firmware Update Manual

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Introduction

1 Introduction

There are two common ways to upgrade SSD firmware.

1.1 Updating SSD Firmware using SATA commands

A field firmware upgrade for an SSD can be performed by using the standard SATA commands. Refer to section 2 below for details.

1.2 Updating SSD Firmware using Linux-based hdparm utility

A field firmware upgrade for an SSD in a Linux OS can be performed by using the standard Linux utility “hdparm”. Refer to section 3 below for details.

2 Using Firmware Download commands

2.1 Before getting started

Please provide SMART with the part number/serial number(s) of the drive(s), so that the latest firmware package is used to match the existing configuration of the SSD(s).

Also as a precaution, the drive(s) being updated should be backed-up and all other applications closed prior to downloading the firmware package.

2.2 SATA SSD ATA “DOWNLOAD MICROCODE” Command

The SSD Firmware download procedure for a fully functional SATA SSD is as follows.

1. Power on the drive
2. Issue the ATA “IDENTIFY DEVICE” command
3. Issue the ATA “DOWNLOAD MICROCODE” command
 - Load FW (Firmware) code
 - Specify Feature Register = 7
4. Boot the drive with the new firmware. The drive is now ready for data access.

3 The “hdparm” Utility Tool for a Linux OS

3.1 Before getting started

Please provide SMART with the part number/serial number(s) of the drive(s) so that the latest firmware package is used to match the existing configuration of the SSD(s). The operating system used is Linux (with root access) and the utility used is hdparm.

3.2 Instructions for Linux

NOTE: The sections on using the Linux utility “hdparm is for advanced users and the instructions on how to update the SSD firmware under Fedora 14 Linux will be fairly similar to other Linux builds.

After you receive the FW files (firmwarefile.bin) from SMART, all drive(s) being updated should be backed-up and all other applications closed prior to downloading the firmware package. Shown below is the recommended update procedure:

- BACKUP all user data
- Download hdparm (.i.e. hdparm- 9.48)
- Extract tar to home directory
- Compile hdparm
- Copy SMART SSD firmware file to hdparm directory. example: firmwarefile.bin
- Identify SSD device path. Use such utilities as “Disk Utility” example “/dev/sdb”
- Take note of current firmware revision before upgrade
- Open terminal window and type su command for super user access
- Change directory to hdparm directory

NOTE: hdparm MUST use mode 7 to download firmware.

- Type exactly: `hdparm --fwdownload-mode7 fw_file.pad --yes-i-know-what-i-am- doing --please-destroy-my-drive / dev/sdb`
- Make sure to put the correct filename and device path for your system
- hdparm requires the user to type both --yes-i-know-what-i-am-doing and --please-destroy-my-drive messages when doing a FW download
- Verify new firmware revision using the Disk Utility application.

Usage Example in Linux:

1. Check Firmware version

hdparm -i /dev/sdx (sdx=target device)

```
root@test-BM1AF-BP1AF-BM6AF:/home/test/Desktop/TY# hdparm -i /dev/sdb
/dev/sdb:
Model=SmartModular ME2, FwRev=910108C0, SerialNo=
Config={ Fixed }
RawCHS=16383/16/63, TrkSize=0, SectSize=0, ECCbytes=0
BuffType=unknown, BuffSize=unknown, MaxMultSect=1, MultSect=off
CurCHS=16383/16/63, CurSects=16514064, LBA=yes, LBAsects=125045424
IORDY=on/off, tPIO={min:120,w/IORDY:120}, tDMA={min:120,rec:120}
PIO modes: pio0 pio3 pio4
DMA modes: mdma0 mdma1 mdma2
UDMA modes: udma0 udma1 udma2 udma3 udma4 udma5 *udma6
AdvancedPM=yes: disabled (255) WriteCache=enabled
Drive conforms to: unknown: ATA/ATAPI-1,2,3,4,5,6,7

* signifies the current active mode
```

FW version here is "910108C0"

2. Perform the Download Microcode(DLMC) function

hdparm --fwdownload-mode7 FW_bin_file --yes-i-know-what-i-am-doing --please-destroy-my-drive /dev/sdx (sdx=target device)

```
root@test-BM1AF-BP1AF-BM6AF:/home/test/Desktop/TY# hdparm --fwdownload-mode7 M10
80-smartmodular_release_B27B_910108C1.bin.sign --yes-i-know-what-i-am-doing --pl
ease-destroy-my-drive /dev/sdb
/dev/sdb:
fwdownload: xfer_mode=7 min=1 max=65535 size=629248
Done.
```

After "fwdownload" is complete (marked in yellow above), please power cycle the drive and check the firmware version again

The Firmware version changes to FW1372 as shown in the red box below.

```

root@test-BM1AF-BP1AF-BM6AF:/home/test/Desktop/TY# hdparm --fwdownload-mode7 M10
80-smartmodular_release_B27B_910108C1.bin.sign --yes-i-know-what-i-am-doing --pl
ease-destroy-my-drive /dev/sdb

/dev/sdb:
fwdownload: xfer_mode=7 min=1 max=65535 size=629248
Done.
root@test-BM1AF-BP1AF-BM6AF:/home/test/Desktop/TY# hdparm -i /dev/sdb

/dev/sdb:
Model=SmartModular ME2, FwRev=FW1372, SerialNo=
Config={ Fixed }
RawCHS=16383/16/63, TrkSize=0, SectSize=0, ECCbytes=0
BuffType=unknown, BuffSize=unknown, MaxMultSect=1, MultSect=off
CurCHS=16383/16/63, CurSects=16514064, LBA=yes, LBASects=125045424
IORDY=on/off, tPIO={min:120,w/IORDY:120}, tDMA={min:120,rec:120}
PIO modes: pio0 pio3 pio4
DMA modes: mdma0 mdma1 mdma2
UDMA modes: udma0 udma1 udma2 udma3 udma4 udma5 *udma6
AdvancedPM=yes: disabled (255) WriteCache=enabled
Drive conforms to: unknown: ATA/ATAPI-1,2,3,4,5,6,7

```

A. Note

The SSD firmware update utility provided by SMART supports all SMART Modular SSDs. SMART may offer a new firmware to improve the performance and user experience of its SSDs.

B. Cautions

1. We recommend that you store all data stored on an existing SSD on a different storage device. This is to prevent possible SSD initialization during firmware updates and damage caused by partial or total data loss.
2. Update with a stable power supply. Always connect the SSD to the system during firmware update. If the power is lost or the cable is disconnected during the update, the SSD will revert to the original firmware.



For more information, please visit: www.smartm.com

Headquarters/North America

T: (+1) 800-956-7627 • T: (+1) 510-623-1231
F: (+1) 510-623-1434 • E: info@smartm.com

Latin America

T: (+55) 11 4417-7200 • E: sales.br@smartm.com

Asia/Pacific

T: (+65) 6678-7670 • E: sales.asia@smartm.com

EMEA

T: (+44) 0 7826-064-745 • E: sales.euro@smartm.com

Customer Service

T: (+1) 978-303-8500 • E: customers@smartm.com