PROMISE®
TECHNOLOGY, INC.

SMARTSTOR
DS4600
Product Manual

Version 1.0

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Chapter 1: Introduction to SmartStor

This chapter covers the following topics:

- About this manual (below)
- Architecture (page 2)
- Protocol Support (page 2)
- Key Benefits (page 2)
- Specifications (page 3)
- Client OS Support (page 4)

Promise Technology's SmartStor DS4600 is a direct attached storage (DAS) solution for external storage targeted for small and medium business (SMB) users and small office/home office (SOHO) users.

With a DAS product, users can save their work and have access to files without having to carry around a disk drive or access a network connection. Multiple backup and synchronization functions protect your data.

About This Manual

This *Product Manual* describes how to setup, use, and maintain the SmartStor DS4600. It also describes how to use the SmartNAVI software that you install and run on your Windows or Mac.

This manual includes a full table of contents, chapter task lists, and numerous cross-references to help you find the specific information you are looking for.

Also included are four levels of notices:

Note

A *Note* provides helpful information such as hints or alternative ways of doing a task.

Important

An *Important* calls attention to an essential step or point required to complete a task. Important items include things often missed.

Caution

A *Caution* informs you of possible equipment damage or loss of data and how to avoid them.

Warning

A *Warning* notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

Architecture

The SmartStor DS4600's architecture is based on the Oxford Semiconductor OXUFS936QSE, a universal interface SATA RAID Controller. The SmartStor is a plug-and-play device with no drivers to load.

Protocol Support

SmartStor DS4600 supports:

- eSATA host interface – Up to 300 Mb/s
- FireWire 800 host interface – Up to 800 Mb/s
- FireWire 400 host interface – Up to 400 Mb/s
- USB 2.0 host interface – Up to 480 Mb/s

Key Benefits

- Driver-free, plug-and-play
- SmartNAVI management tool
- One-touch configuration
- One-touch backup
- Client-to-DAS backup
- Compatible with Apple Time Machine
- Media Player for playback of music and videos stored on SmartStor
- Photo Album to create flash based Photo Albums

Specifications

- Disk drive support:
  - Four 1.5 Gb/s or 3 Gb/s SATA 3.5-inch disk drives
  - Conforms to Serial ATA 1.0 specification and Serial ATA II: Extensions to Serial ATA 1.0 specification (SATA II, phase I specification)
  - SATA specification of 3 Gb/s transfers with CRC error-checking
  - FireWire 800 (IEEE 1394-2000) host interface x2
  - FireWire 400 (IEEE 1394-1995) host interface x1
  - USB 2.0 host interface x1
  - eSATA host interface x1
  - Hot-swapping of disk drives
  - Tagged command queuing
  - Native command queuing
  - Drive roaming among channels
  - S.M.A.R.T. status polled every 15 minutes
  - Hot spare drive
  - RAID Volume rebuilding
  - Background rebuilding
  - Spin-down in system Standby mode
- RAID level support: RAID 0, 1, 5, and 10
- Unicode file name support
- SATA RAID Controller: Oxford Semiconductor OXUFS936QSE
- USB port: USB 2.0, up to 480 Mb/s, Type-B connector
- Power Supply: 90-100W with PFC, 100-230V auto-ranging, 50-60Hz AC
- Error logging
- Hardware monitoring of:
  - Fan
  - Temperature
  - Power
  - Disk status
  - One-Touch button
  - Enclosure status
- Temperature, Operating: 5° to 35°C (41° to 95°F)
- Humidity, Operating: 10 to 85 percent
- Dimensions (H x W x D): 188.2 x 152.5 x 229.6 mm (7.4 x 6.0 x 9.0 in)
- Weight: 2.5 kg (5.5 lbs) without drives

Client OS Support

The following client operating systems support SmartStor:

- Windows XP 32BIT Professional with SP3
- Windows XP 64BIT XP 64 with SP2
- Windows Vista 32BIT Enterprise With SP2
- Windows Vista 64BIT Enterprise with SP2
- Windows Server 2003 R2 32BIT With SP2
- Windows Server 2003 R2 64BIT with SP2
- Windows Server 2008 32BIT enterprise With SP2
- Windows Server 2008 64BIT enterprise With SP2
- Windows 7 32BIT
- Windows 7 64BIT
- RedHat Enterprise Linux 4
- RedHat Enterprise Linux 5
- SuSE Enterprise Linux 9
- SuSE Enterprise Linux 10, 10.1
- Mac OS 10.4 (Power G4)
- Mac OS 10.4.x and above

Utility OS Support

The following client operating systems support SmartNAVI:

- Windows XP 32BIT Professional with SP3
- Windows XP 64BIT XP 64 with SP2
- Windows Vista 32BIT Enterprise With SP2
- Windows Vista 64BIT Enterprise with SP2
- Windows Server 2003 R2 32BIT With SP2
- Windows Server 2003 R2 64BIT with SP2
- Windows Server 2008 32BIT enterprise With SP2
- Windows Server 2008 64BIT enterprise With SP2
- Windows 7 32BIT
- Windows 7 64BIT
- Mac OS 10.4 (Power G4)
- Mac OS 10.4.x and above

Chapter 2: Installation and Setup

This chapter covers the following topics:

- Unpacking the SmartStor (below)
- Installing Disk Drives (page 7)
- Connecting to Your PC (page 8)
- Connecting the Power (page 9)
- Installing the Software (page 9)
- Setting Up the SmartStor (page 16)

Unpacking the SmartStor

The SmartStor DS4600 box contains the following items:

- SmartStor DS4600 Unit
- Screws for disk drives (1 package)
- eSATA bracket
- USB 2.0 cable, A to B, 1m
- eSATA cable, 1.5m
- FireWire 800 (1394b) cable, 1m
- Power cord, 1.5m
- CD with SmartNAVI software, *Product Manual* and *Quick Start Guide*

Warning

The electronic components within the SmartStor are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the SmartStor or its subassemblies.

Warning

The fan contains hazardous moving parts. Keep fingers and other body parts away.

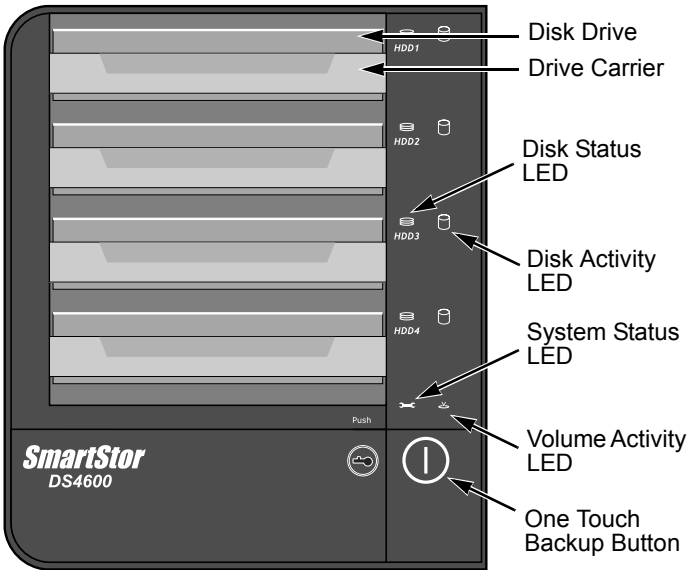
Caution

Use of USB or FireWire cables longer than those supplied with the SmartStor is not recommended.

Important

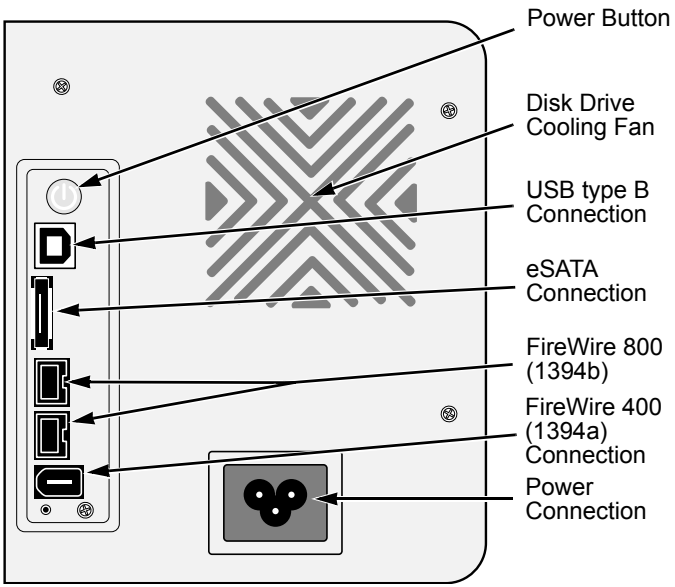
To configure the SmartStor, you must install SmartNAVI.
See “Installing the Software” on page 9.

Figure 1. SmartStor DS4600 Front View



Note: This SmartStor is shown without the front door.

Figure 2. SmartStor DS4600 Rear View



Installing Disk Drives

You can populate the SmartStor DS4600 with SATA 1.5 Gb/s or 3.0 Gb/s disk drives. For optimal performance, install disk drives of the same model and capacity. Your disk drives will become a RAID Volume on the SmartStor.

To install disk drives:

1. Open the door on the front of the SmartStor enclosure.
2. Pull a disk drive carrier from the enclosure. See page 6, Figure 1.
3. Carefully lay the disk drive into the drive carrier, so that the screw holes on the sides of the carrier align with the screw holes in the drive. See Figure 3.

Figure 3. Disk drive installed in a drive carrier

4. Insert the screws through the holes in the drive carrier and into the sides of the disk drive.
   - Install only the counter-sink screws supplied with the SmartStor.
   - Install four screws per drive.
   - Snug each screw. Be careful not to over-tighten.
5. Reinstall the drive carrier into the SmartStor enclosure.

   Repeat steps 2 through 5 until all of your disk drives are installed.
6. Close the door on the front of the SmartStor.

Connecting to Your PC

SmartStor DS4600 has three data connection options:

- **eSATA** – Up to 300 MB/s
- **FireWire 800** – Also IEEE 1394b. Up to 800 Mb/s
- **FireWire 400** – Also IEEE 1394a. Up to 400 Mb/s
- **USB 2.0** – Up to 480 Mb/s

USB

Be sure your USB connection is to a USB 2.0 port on your PC. The older USB 1.1 ports have a data transfer rate of only 12 Mb/s.

To connect the SmartStor to your PC via USB 2.0:

1. Attach the B connector of the USB cable to the USB connection on the SmartStor. See page 6, Figure 2.
2. Attach the other end of the USB cable to PC.

eSATA

To use this option, your PC must have an eSATA connector on the motherboard or an eSATA HBA card installed.

To connect the SmartStor to your PC via eSATA:

1. Attach one end of the eSATA cable to eSATA connection on the SmartStor. See page 6, Figure 2.
2. Attach the other end of the eSATA cable to PC.

FireWire

To use this option, your PC must have an FireWire connector on the motherboard or an FireWire HBA card installed. FireWire 800 and 400 cables have different connectors. Otherwise, the procedure is the same.

To connect the SmartStor to your PC via FireWire:

1. Attach the B connector of the FireWire cable to the FireWire connection on the SmartStor. See page 6, Figure 2.
2. Attach the other end of the FireWire cable to PC.

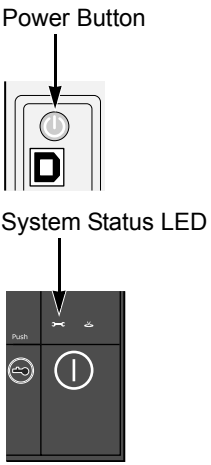
Connecting the Power

To power the SmartStor:

1. Attach the power cord on the back of the SmartStor enclosure and plug the other end into the power source.
2. On the back of the SmartStor, press the power button.

   It takes about a minute to boot the SmartStor. When fully booted:

   - The buzzer beeps one time.
   - The System Status LED turns blue.



Installing the Software

The SmartNAVI software connects your PC to the SmartStor, sets up the SmartStor, sets up network drives on your PC, and performs backups.

- Installation: Windows (page 10)
- Installation: Mac (page 13)

OS Support

The following operating systems support SmartNAVI:

- Windows XP 32BIT Professional with SP3
- Windows XP 64BIT XP 64 with SP2
- Windows Vista 32BIT Enterprise With SP2
- Windows Vista 64BIT Enterprise with SP2
- Windows Server 2003 R2 32BIT With SP2
- Windows Server 2003 R2 64BIT with SP2
- Windows Server2008 32BIT enterprise With SP2
- Windows Server2008 64BIT enterprise With SP2
- Windows 7 32BIT
- Windows 7 64BIT
- Mac OS 10.4 (Power G4)
- Mac OS 10.4.x and above

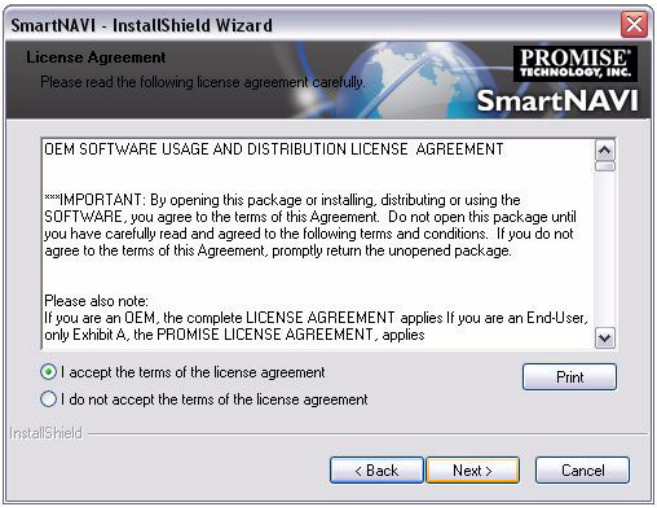
Installation: Windows

To install the SmartNAVI on a Windows PC:

1. Insert the CD into your PC's CD-ROM.
2. Double-click the **SmartNAVI** installer icon (right).
3. Click the **Next** button to begin installation.

The License Agreement screen appears.

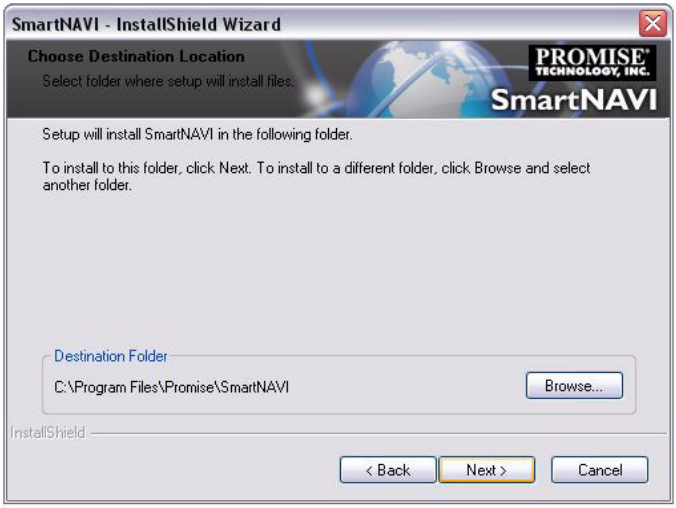
4. Click the “I accept the terms...” option, then click the **Next** button.



The Choose Destination Location screen appears.

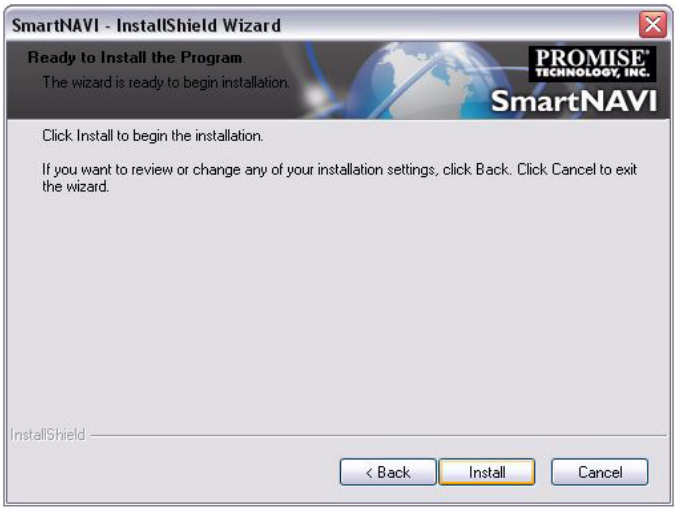
5. Optional. Click the **Browse...** button to choose a new install location for the software.

   Click the **Next** button.



The Ready to Install screen appears.

6. Click the **Install** button to proceed with installation.



When the installation is finished, the final installation screen appears.

7. Click to **Finish** button to close the installer.

With the Online Registration box checked, your browser will open and go directly to the Promise product registration website. Thank you for taking the time to register.

8. With the “Yes, I want to restart my...” box checked, then click Finish button to restart the PC.

The installer adds a SmartNAVI icon to the:

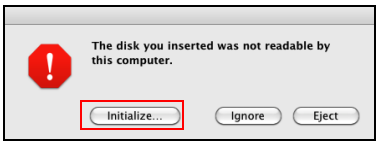
- Start menu
- Application tray

SmartNAVI loads automatically every time your Windows OS starts.

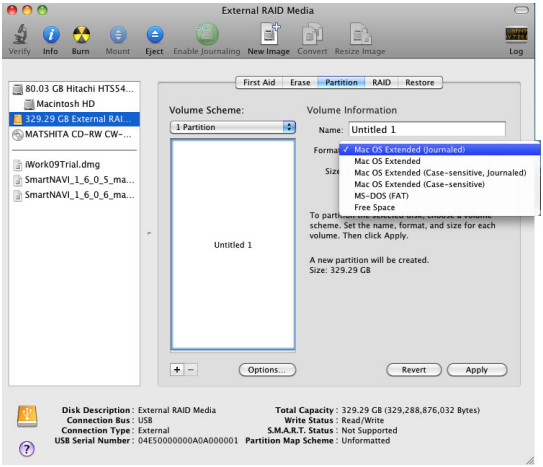
Installation: Mac

Set up the file system before installation.

1. The MAC warning window appears if there is no file system on your MAC. Click **Initialize** button to set up the file system.



2. Choose a file system format from the dropdown menu. (The HFS+ file system is recommended for MAC users.)

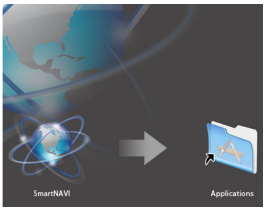


Starting installation

1. Please double-click the SmartNAVI.dmg file to open and install the disk of SmartNAVI Image.

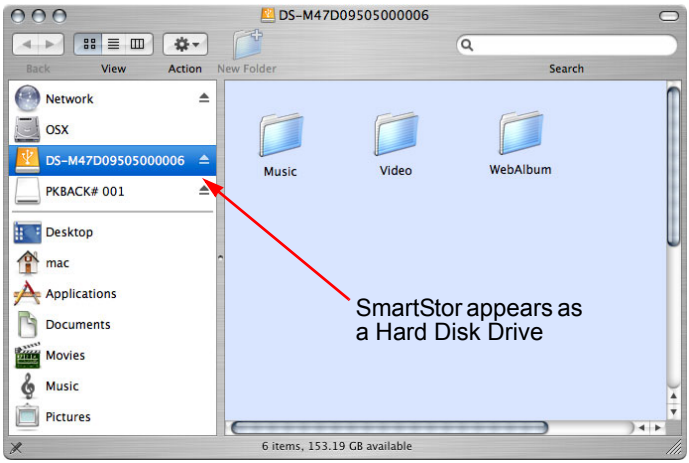
2. Click the SmartNAVI Image to open the folder.

3. Drag the SmartNAVI.app icon to the right side Applications folder.



The SmartStor appears on your MAC as a hard disk drive. See Figure 4.

Figure 4. SmartStor on a MAC



Setting Up the SmartStor

SmartStor has three setup options:

- One Touch Configuration (page 16)
- One Click Setup (see page 38 for further information)
- Advanced Setup (see page 39 for further information)

One Touch Configuration

Important

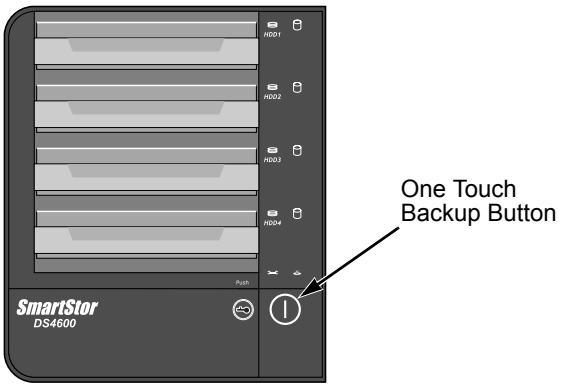
To use One Touch Configuration, all of your disk drives must be free of any RAID configuration. They can be either free or spare drives. Only previously used drives are affected.

One Touch Configuration requires a FireWire 800 or 400 or USB 2.0 connection to your PC. See “Connecting to Your PC” on page 8.

One Touch Configuration creates and formats a RAID volume according to the number of disk drives installed in the SmartStor. This setup option is recommended for most users.

Number of disk drives	Configuration created by One Touch
1	Single Disk
2	RAID 1
3	RAID 5
4	RAID 5

Press and hold the **One Touch Backup** button for two seconds.



The DAS beeps and reboots. Then your RAID volume is ready.

On a Windows PC, the SmartStor appears as a hard disk drive. See page 46, Figure 4.

On a MAC, the SmartStor appears as a removable disk drive. See page 47, Figure 6.

Chapter 3: SmartNAVI

This chapter covers the following topics:

- Working with SmartNAVI (below)
- Making Management Settings (page 25)
- Setting Up the SmartStor (Advanced) (page 38)
- Managing RAID Volumes (page 49)
- Managing Backups (page 51)
- Using Media Center (page 81)
- Managing Photo Albums (page 87)

Working with SmartNAVI

The SmartNAVI software connects your PC to the SmartStor, performs backups, changes the network settings, create RAID volumes, add and mounts folders, and manages file downloads from the Internet.

This category includes the following topics:

- Opening the Main Window (page 19)
- Choosing a SmartNAVI Language (page 21)
- Viewing SmartNAVI Information (page 21)
- Closing SmartNAVI (page 23)

Opening the Main Window

To open the Main Window, do one of the following actions:

- If no Window is open - Double-click the **SmartNAVI** icon in the Windows application tray or MacOS Dock (right).

  This action opens the **Main Window**.

- If the **SmartNAVI Window** is open, click the DS4600 in the **Device List**.

The Main Windowopens.

Choosing a SmartNAVI Language

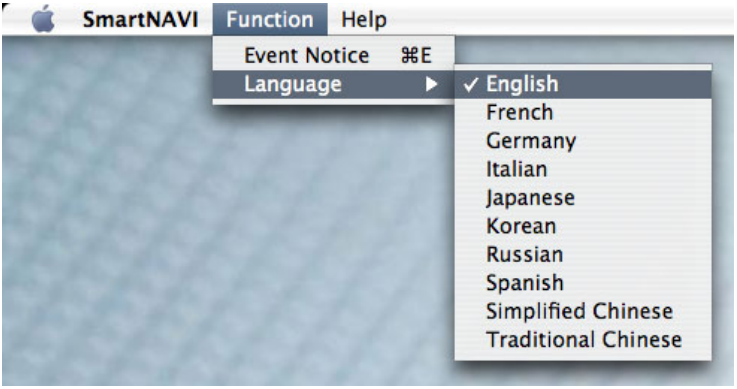
On Windows PCs, SmartNAVI chooses the display language automatically based on your OS language setting.

On MAC, you choose the display language.

To choose a language:

1. Open the **Main Window**.
2. From the dropdown menus, choose **Function > Language**, then choose the the language you prefer.

Figure 1. SmartNAVI Function menu on the Mac OS desktop



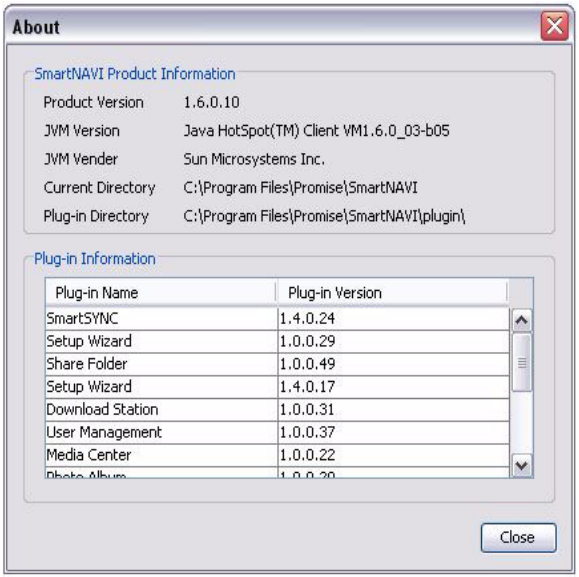
Viewing SmartNAVI Information

SmartNAVI is the software application that connects your PC with the SmartStor DAS system.

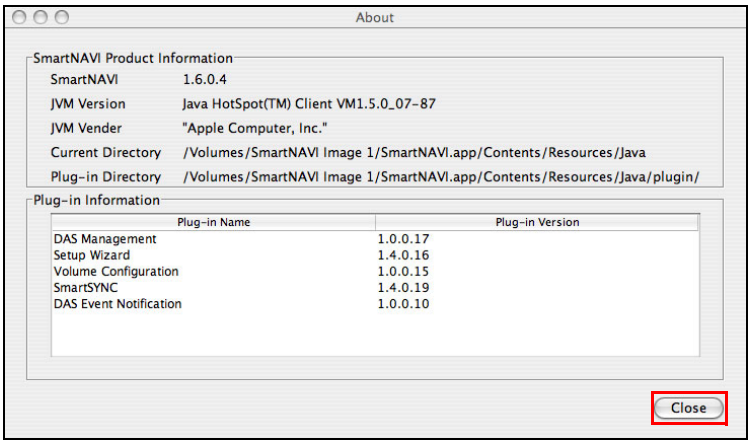
To view information about SmartNAVI on Windows:

1. Right-click the **SmartNAVI** icon in the application tray.

2. Choose **About** from the popup menu.



To view information about SmartNAVI on Mac, from the dropdown menus at the top of the screen, choose **Help > About**.



The About window appears and lists the following information:

- SmartNAVI Version number
- Java Virtual Machine (JVM) Version number
- JVM Vendor name

- SmartNAVI installation directory on your PC
- SmartNAVI Plug-in directory on your PC
- Names of installed Plug-ins
- Version numbers of installed Plug-ins

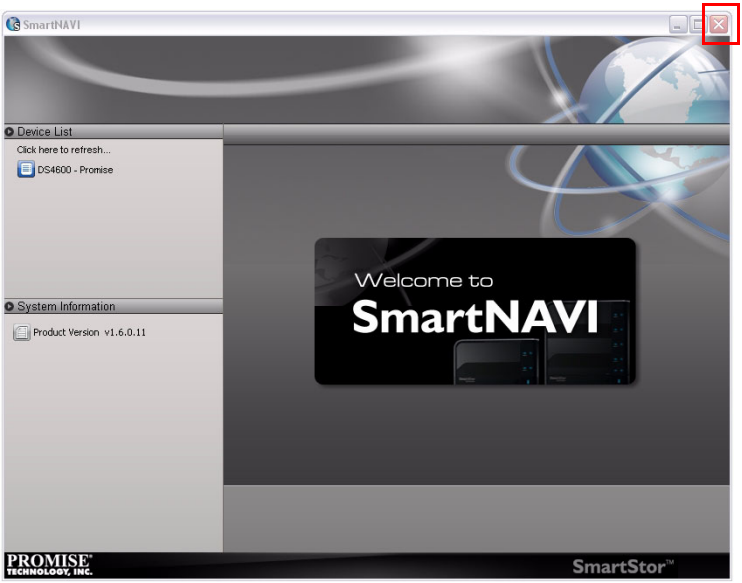
When you are done with the About window, click the **Close** button.

Closing SmartNAVI

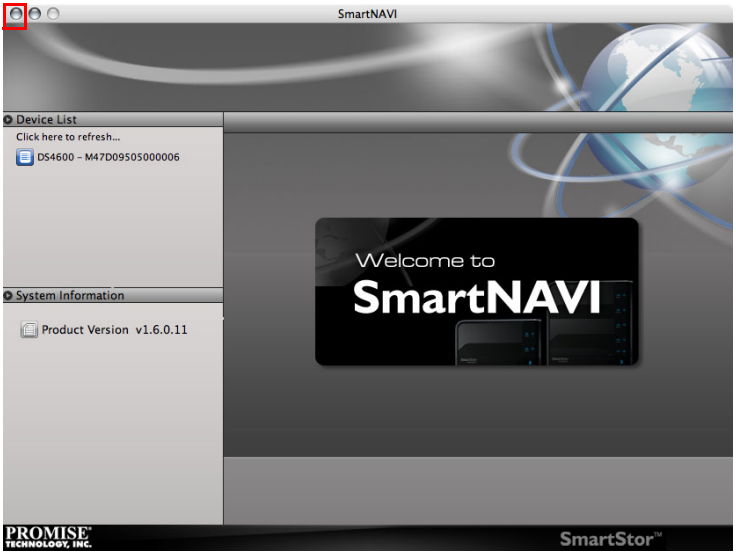
To close SmartNAVI on your PC, do one of the following actions:

- Windows - Click the close icon at the top right corner of the SmartNAVI Main Window.

For Windows PCs, if you close SmartNAVI this way, you can open it from the application tray icon.



- Mac - Click the close icon at the top left corner of the **SmartNAVI Main Window**.



On Macs, you can always open SmartNAVI from the Dock icon. With SmartNAVI as the active application, press Command-Q.

Making Management Settings

This category includes the following topics:

- Configuring a DAS System (below)
- Locating the SmartStor (page 28)
- Editing the Node Name of SmartStor (page 29)
- Viewing the System Event Log (page 31)
- Making Mail Event Log Settings (page 32)
- Sending a Test Email Message (page 33)
- Upgrading the Firmware (page 33)
- Making Enclosure Settings (page 34)
- Shutting Down the SmartStor (page 35)
- Restarting the SmartStor (page 37)

Configuring a DAS System

SmartStor has two modes:

- **One Click Setup** – Loads a collection of default settings. Recommended for most users.
- **Advanced Setup** – Enables you to make your own settings. Recommended for advanced users.

Caution

Do NOT run One Click Setup or Automatic Setup on a DAS system that is already configured! Those actions will delete your data and folders!

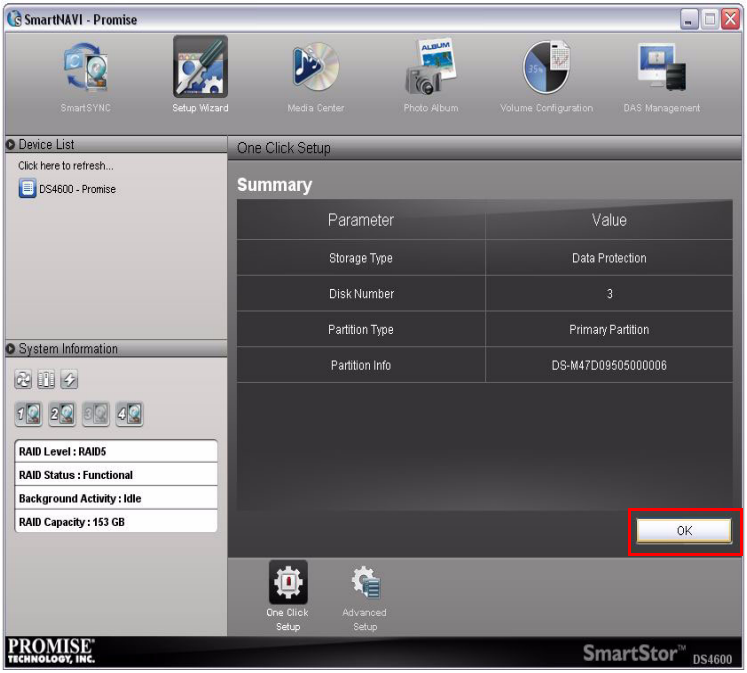
One Click Setup

To configure your DAS system using One Click Setup:

1. Open the SmartNAVI Main Window.

   See “Opening the Main Window” on page 19.
2. Click the **Setup Wizard** icon and click the **One Click Setup** button.

3. Click the **OK** button to continue.

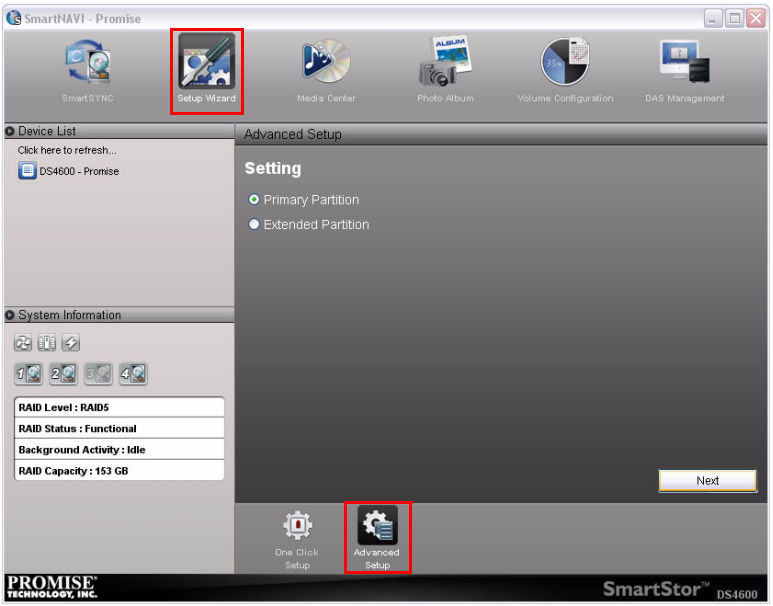


Advanced Setup

To configure your DAS system using Advanced Setup:

1. Open the SmartNAVI Main Window.
   See “Opening the Main Window” on page 19.

2. Click the **Setup Wizard** icon and click the **Advanced Setup** button.



3. Choose the Partition Scheme you want for your RAID volume.
   - SmartNAVI running on a Windows PC:
     - Primary partition
     - Extended partition
   - SmartNAVI running on a Mac:
     - GUID Partitioning Table
     - Apple Partition Map
     - Master Boot Record Scheme

   Click the **Next** button to continue.
4. Choose the Create Volume setting you want.
   - Automatic
   - Manual

   Click the **Next** button to continue.
5. If you chose Manual under Create Volume, choose the type of volume you want.
   - Maximum Capacity – RAID 0, using all disk drives
   - Data Protection – Your choice of RAID level, based on the number of disk drives installed:

- RAID 1 – 2 drives
- RAID 5 – 3 or 4 drives
- RAID 10 – 4 drives

Click the **Next** button to continue.

6. Under Partition Setting:
   - Type a volume name in the field provided.
   - Choose a file system format from the dropdown menu.
   - Check the Volumes support over 2.2TB capacity box if the volumes are over 2.2TB capacity.

   Click the **Next** button to continue.
7. Review your parameters.

   To make changes, click the **Previous** button.

   To accept the parameters and configure your DAS system, click the **OK** button.
8. In the Final Confirm popup window, click the **Yes** button.
9. In the Warning popup window, type **YES** into the field and click the **OK** button.

   See “Advanced Setup” on page 39.

Locating the SmartStor

This feature helps you to physically locate a DAS system.

To locate a SmartStor:

1. Go to the **Main Window**.

   See “Opening the Main Window” on page 19.
2. Click the system in the **Device List** that you want to locate.

3. Right click and choose the **Locate DAS** item.

The Activity LED blinks blue for several seconds (right).

Disk Activity LED

Editing the Node Name of SmartStor

This feature helps you to edit a node name.

To edit a SmartStor:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the system in the **Device List** that you want to edit.

3. Right click and choose the **Edit** item.

4. Change the node name that you want, and press the Enter key on your keyboard.

Viewing the System Event Log

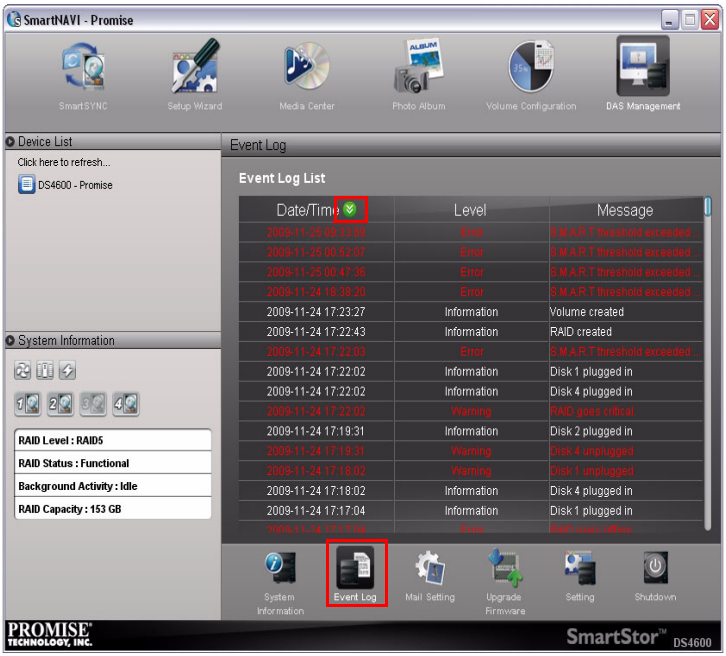
DAS events report functions and status of the DAS system. The Event Log displays the 27 most recent events.

Events are reported by date, time, severity (information or warning) and description.

To view the DAS system's Event Log:

1. Go to the **Main Window**.
   See "Opening the Main Window" on page 19.
2. Click the **DAS Management** icon.
3. Click the **Event Log** button.
   Click the arrow on the **Date/Time** header to reverse the chronological order.

   Up to 500 events are reported. There is no Save or Clear feature.



Note

For backup system events, see "Viewing the Backup Event Log" on page 76.

Making Mail Event Log Settings

The SmartStor can send email messages to notify you of critical events. You must input the required information for this function to work.

To make Mail Event Log settings:

1. Go to the **Main Window**.

   See “Opening the Main Window” on page 19.
2. Click the **DAS Management** icon *(A)* and click the **Mail Setting** button *(B)*.
3. Click the **Enable** *(C)* option to enable email notification.
4. Enter the requested information in the fields provided:
   - Mail server name
   - Mail server port number
   - Email sender address (From)
   - Email receiver address (To)
   - Optional click the **Enable** *(D)* option to enable authentication.
   - User Name
   - Password
   - Password Confirmation
5. Click the **Confirm** button *(E)* to save your settings.

Sending a Test Email Message

To use this function, the Mail Event Log must be enabled and properly set up.

To sent a test message:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **DAS Management** icon and click the **Mail Setting** button.
3. Click the **Verify Mail** button.
   A test message is sent to the designated receiver address.

Upgrading the Firmware

Follow this procedure to upgrade the firmware on your SmartStor.

Downloading the Firmware Upgrade File

To download the upgrade file:

1. Point your browser to http://www.promise.com.
   The firmware was placed in “Support” > “Download” > “DS4600”
2. Download the DS4600 firmware upgrade file to your PC.
   The firmware upgrade filename will be similar to ds4600_xxxxxx_xx.upg

Installing the Firmware Upgrade File

Warning

Do not disconnect the power or shut down the SmartStor while the upgrade is running!

To install the firmware upgrade file:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **DAS Management** icon and click the **Upgrade Firmware** button.
3. Click the folder icon.
4. Click the folder icon, navigate to the firmware upgrade file, click the file, and click the **Open** button.
   The path and firmware upgrade file appear in the field.
5. Click the **Upgrade** button.
   The upgrade takes about two or three minutes.
6. In the Upgrade Success popup message, click the **OK** button.

The firmware upgrade is proceeding.

When the upgrade is done, the SmartStor reboots automatically. When the SmartStor beeps once, it is ready for use.

Please click the **System Information** button to confirm the firmware version successfully upgraded.

Making Enclosure Settings

Note

An enabled buzzer warns you of any problems with the DAS system.

An enabled fan saves energy and reduces noise.

To make enclosure settings:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **DAS Management** icon *(A)* and click the **Settings** button *(B)*.
3. Click the **Enable** or **Disable** options for:
   - Buzzer *(C)*
   - Smart Fan *(D)*
   - Auto Boot *(E)*

4. Click the **OK** button *(F)* to save your settings.

Shutting Down the SmartStor

The only time you need to shut down the SmartStor is to replace the disk drive cooling fan or the power supply. See “Appendix A: Maintenance” on page 123.

During and after the shutdown, none of your folders are accessible from your PC.

Using SmartNAVI

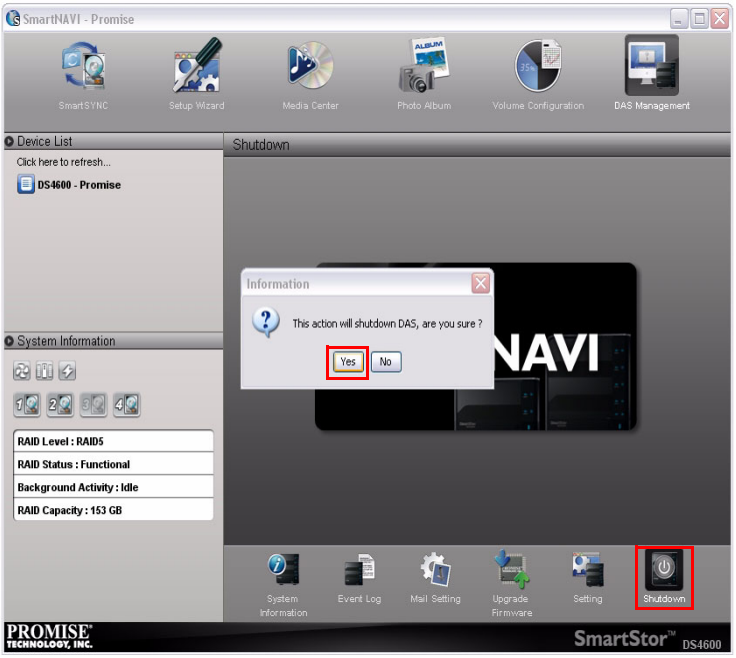
To shut down the SmartStor:

1. Go to the **Main Window**.

   See “Opening the Main Window” on page 19.

2. Click the **DAS Management** icon and click the **Shutdown** button.

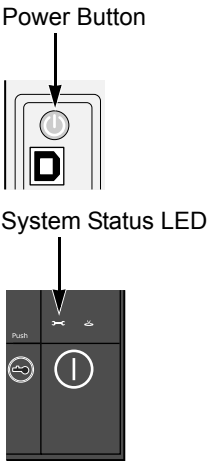
3. In the confirmation box, click the **Yes** button.



Directly

To shut down the SmartStor, press and hold the power button on the back of the SmartStor enclosure for five seconds (top, right).

The system status LED turns red and then goes dark (bottom, right).



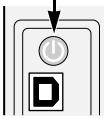
Restarting the SmartStor

To restart the SmartStor after a shutdown, press the power button on the back of the SmartStor enclosure (top, right).

When the SmartStor is fully booted:

- The buzzer beeps one time.
- The system status LED turns blue (bottom, right)

Power Button



System Status LED

Setting Up the SmartStor (Advanced)

SmartStor has three setup options:

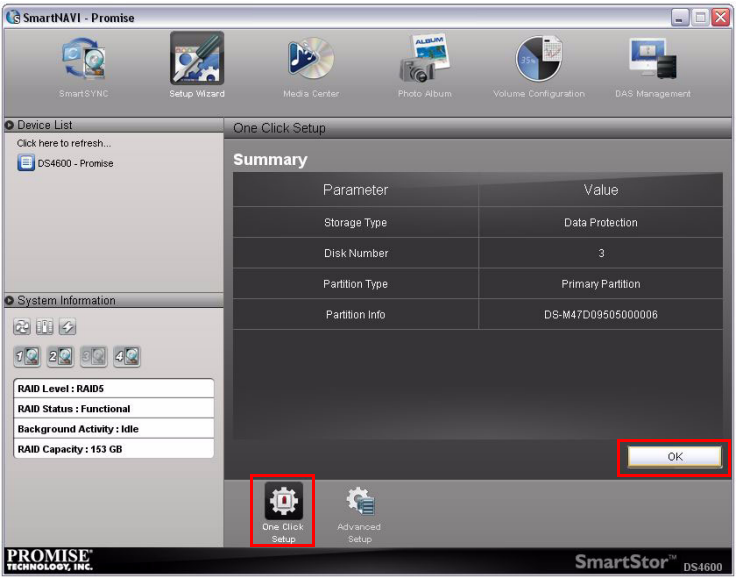
- One Click Setup (below)
- Advanced Setup (page 39)

One Click Setup

One Click Setup loads a collection of default settings. Recommended for most users. The Setup Wizard creates and formats your RAID volume automatically.

To perform a one-click setup:

1. Open the SmartNAVI Main Window.
   See “Opening the Main Window” on page 19.
2. Click the **Setup Wizard** icon and click the **One Click Setup** button:
3. Click the **OK** button to continue.
   The DAS reboots. Then your RAID volume is ready.



On a Windows PC, the SmartStor appears as a hard disk drive. See page 46, Figure 4.

On a MAC, the SmartStor appears as a removable disk drive. See page 47, Figure 6.

Advanced Setup

Advanced Setup enables you to make your own settings. Recommended for advanced users.

To perform an advanced setup:

1. Open the SmartNAVI Main Window.

   See “Opening the Main Window” on page 19.
2. Click the **Setup Wizard** icon *(A)* and click the **Advanced Setup** button *(B)*.
3. Choose the Partition Scheme you want for your RAID volume *(C)*.
   - SmartNAVI running on a Windows PC:
     - Primary partition
     - Extended partition
   - SmartNAVI running on a Mac:
     - GUID Partitioning Table
     - Apple Partition Map
     - Master Boot Record Scheme

   Click the **Next** button *(D)* to continue.

Figure 2. Advanced Setup viewed from a Windows PC

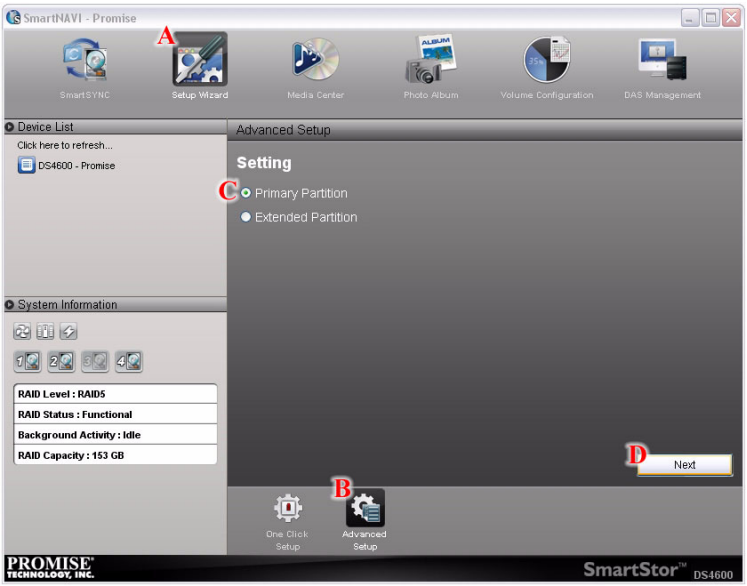
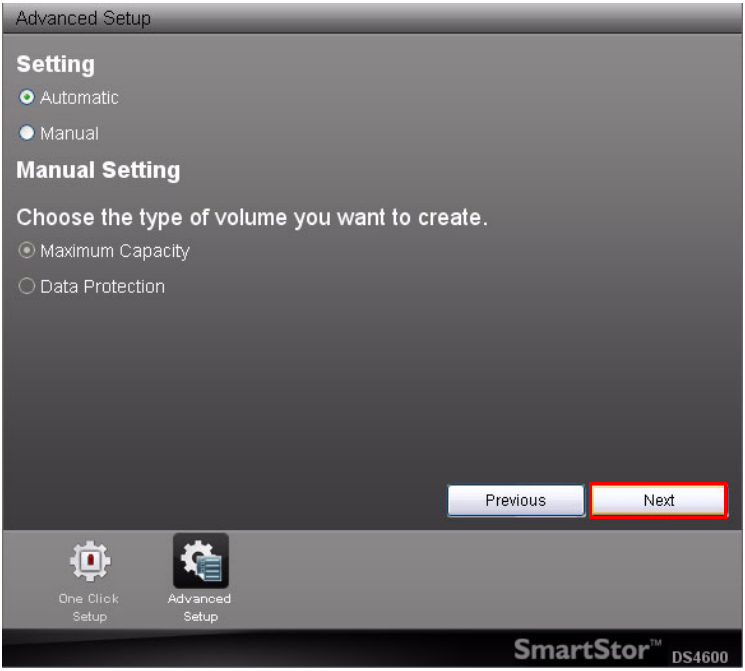


Figure 3. Advanced Setup viewed from a MAC

4. Choose the Create Volume setting you want.
   - Automatic
   - Manual

Click the **Next** button to continue.



5. If you chose Manual under Create Volume, choose the type of volume you want.
   - Maximum Capacity – RAID 0, using all disk drives
   - Data Protection – Your choice of RAID level, based on the number of disk drives installed:
     - RAID 1 – 2 drives
     - RAID 5 – 3 or 4 drives

- RAID 10 – 4 drives

Click the **Next** button to continue.

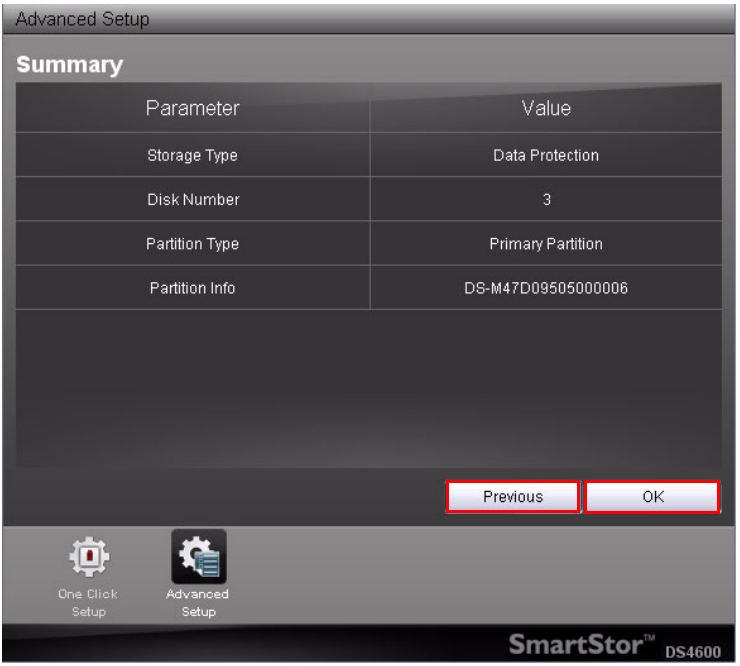
6. Under Partition Setting:
   - Type a volume name in the field provided *(A)*.
   - Choose a file system format from the dropdown menu *(B)*.
   - Check the Volumes support over 2.2TB capacity box *(C)* if the volumes are over 2.2TB capacity.

Click the **Next** button *(D)* to continue.

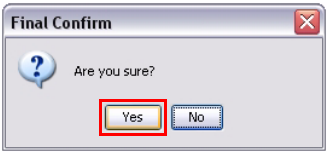
7. Review your parameters.

   To make changes, click the **Previous** button.

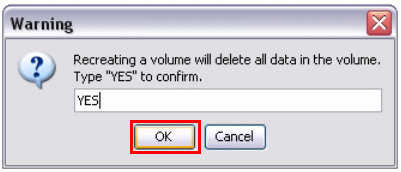
   To accept the parameters and configure your DAS system, click the **OK** button.



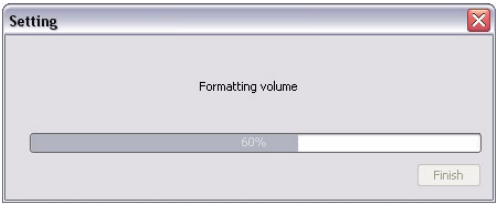
8. In the Final Confirm popup window, click the **Yes** button.



9. In the Warning popup window, type **YES** into the field and click the **OK** button.



The DAS reboots. Then your RAID volume is ready.



On a Windows PC, the SmartStor appears as a hard disk drive. See page 46, Figure 4.

On a MAC, the SmartStor appears as a removable disk drive. See page 47, Figure 6.

Figure 4. SmartStor on a Windows PC

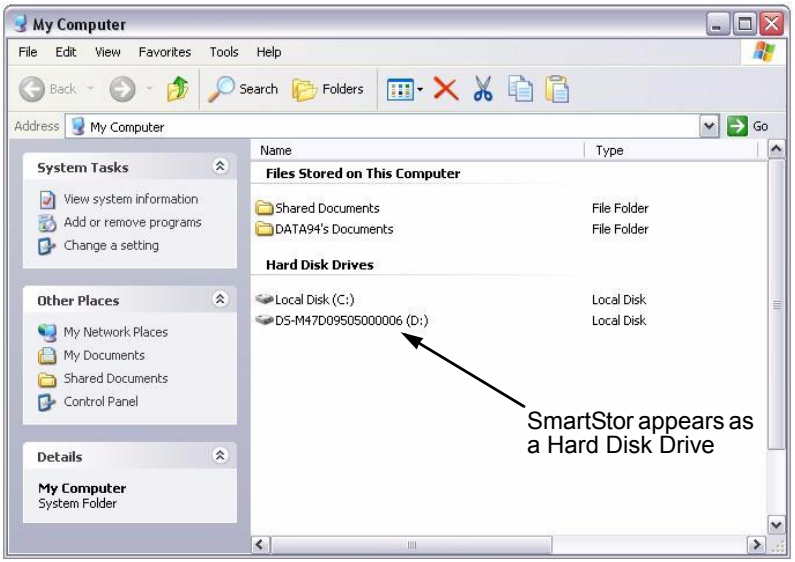


Figure 5. SmartStor file structure viewed from a Windows PC

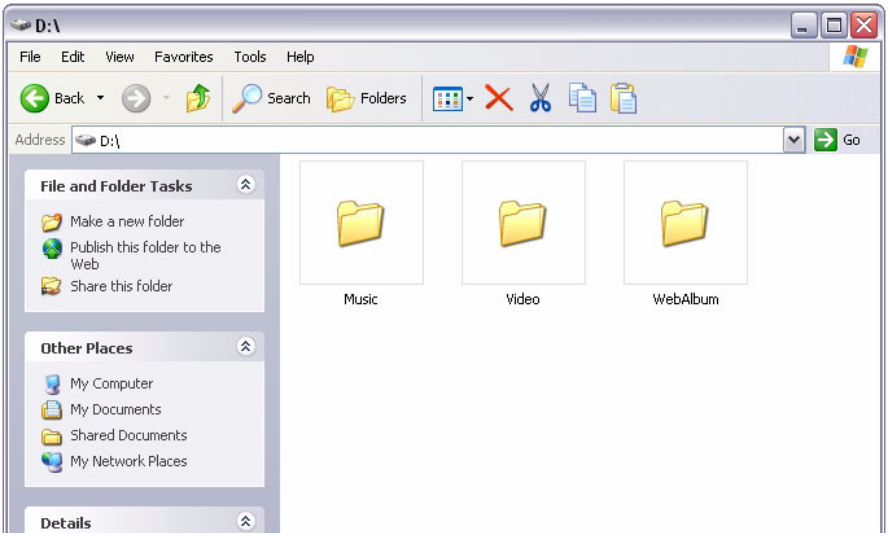


Figure 6. SmartStor icon on the Desktop of a MAC

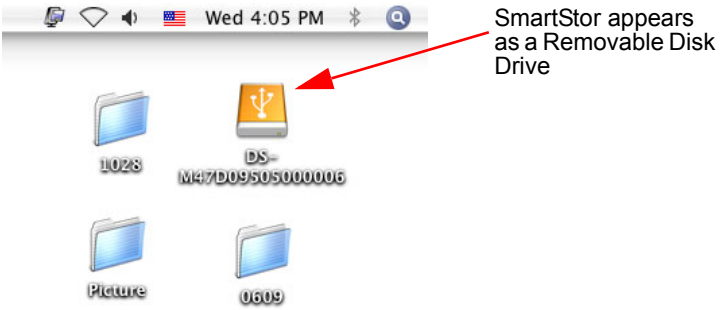
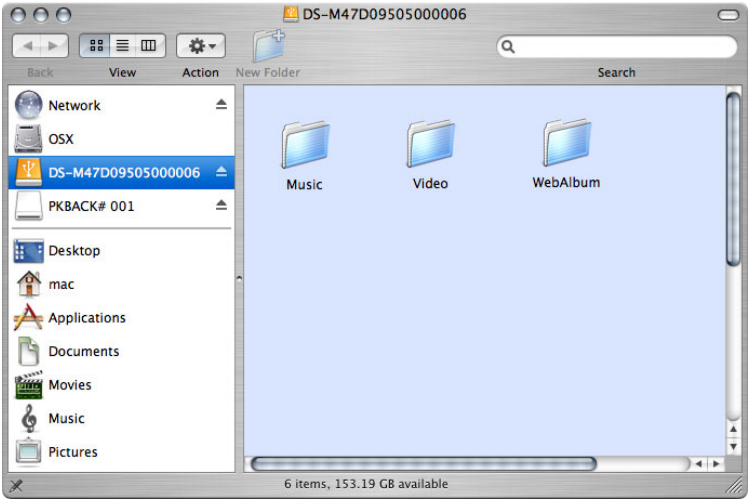


Figure 7. SmartStor file structure viewed from a MAC



Managing RAID Volumes

This category includes the following topics:

- Viewing a List of RAID Volumes (below)
- Viewing RAID Volume Status (page 50)

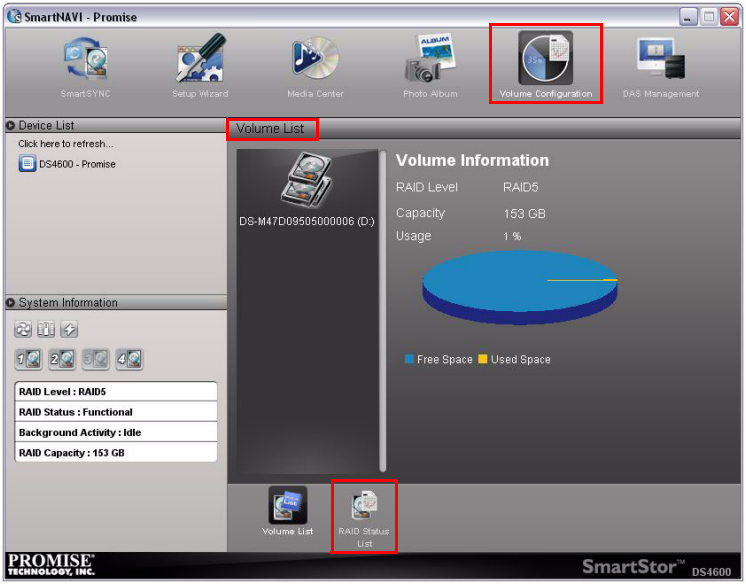
Viewing a List of RAID Volumes

To view a list of RAID Volumes:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **Volume Configuration** icon.
   The **Volume List** appears.

RAID Volume information includes:

- Volume name
- RAID level
- Capacity
- Usage - Percentage of capacity used



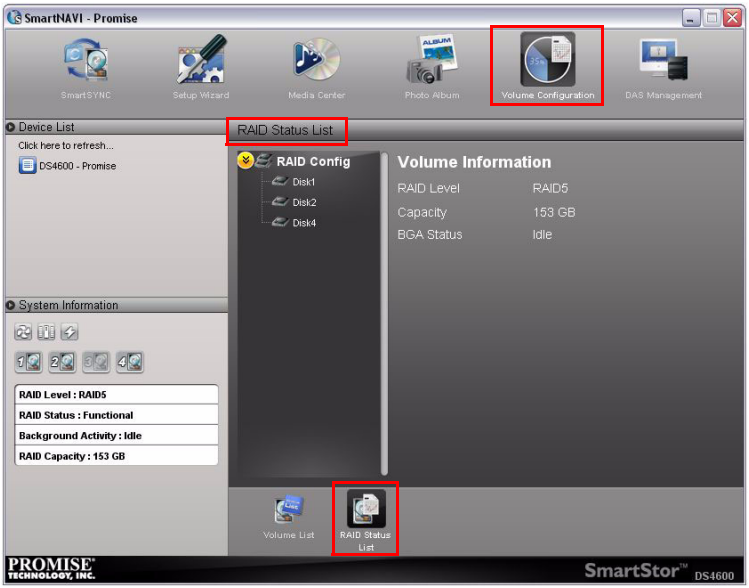
Viewing RAID Volume Status

To view the status of a RAID Volume:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **Volume Configuration** icon.
3. Click the **RAID Status List** button.
   The **RAID Status List** appears.

RAID Status List includes:

- Volume name
- RAID level
- Capacity
- Background Activity Status



Managing Backups

This category includes the following topics:

- One Touch Backup (below)
- Performing a One Touch Backup (page 52)
- Viewing Your Backup Files (page 52)
- Doing a Backup Now (page 54)
- Creating a Backup Schedule (page 59)
- Scheduling a Backup (page 65)
- Viewing Backup Schedules (page 68)
- Changing a Scheduled Backup (page 69)
- Deleting a Scheduled Backup (page 73)
- Restoring Backed-up Files (page 74)
- Viewing the Backup Event Log (page 76)
- Saving the Event Log (page 78)
- Clearing the Event Log (page 79)

One Touch Backup

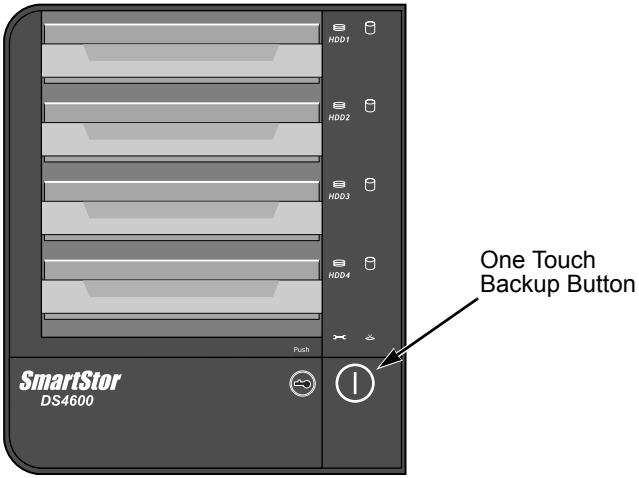
One Touch Backup enables you to make a quick, automated backup of a selected folder on your PC, at the touch of a button.

You can backup the files in a single folder, multiple folders, or your complete hard disk drive. This feature works on the PC where you installed the SmartStor software.

For One Touch Backup to work, you must first create a Backup Schedule using SmartNAVI. See “Creating a Backup Schedule” on page 59.

Performing a One Touch Backup

To perform a One Touch Backup, press the **One Touch Backup** button on the front of the SmartStor.



The SmartStor beeps five times to indicate that the backup has begun. If SmartNAVI is open, a message displays the progress of the backup.

The amount of time required depends on the size and number of files being backed up.

The One Touch Backup function backs up all of the folders on your PC that you chose in your backup schedule, except for any folders or files that are open or protected.

Viewing Your Backup Files

On the SmartStor, find the Backup folder. The Backup folder contains the results of the One Touch Backup:

- The subfolders inside the Backup folder match the file structure on your PC's hard disk drive.
- The PC Backup folder is named BACKUPDATA plus your user name.

See the example below.

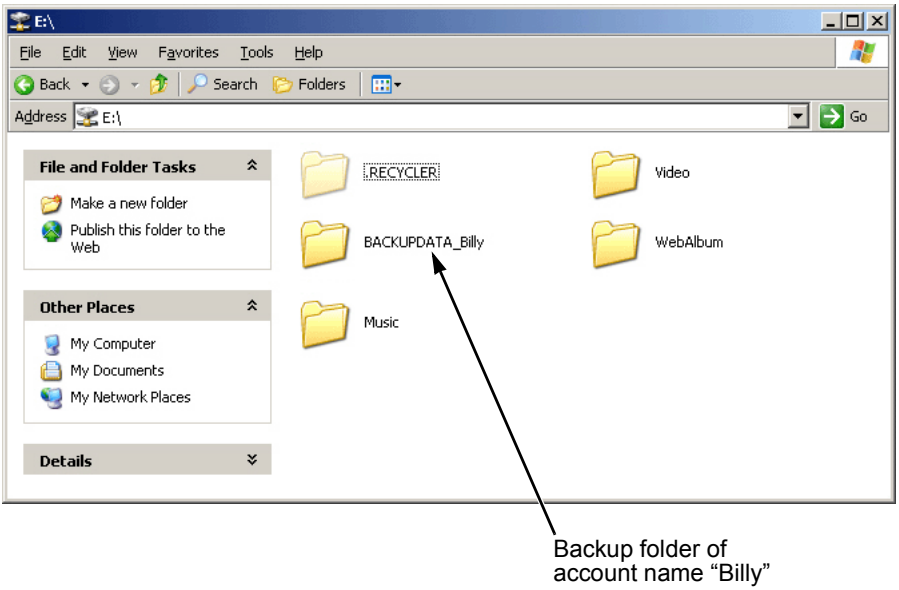
Windows PCs

To view your backup files from a Windows PC:

1. On the Windows PC desktop, double-click the My Computer icon.

2. Under Hard Disk Drives, double-click the SmartStor.

Figure 8. BACKUPDATA folder viewed on a Windows PC

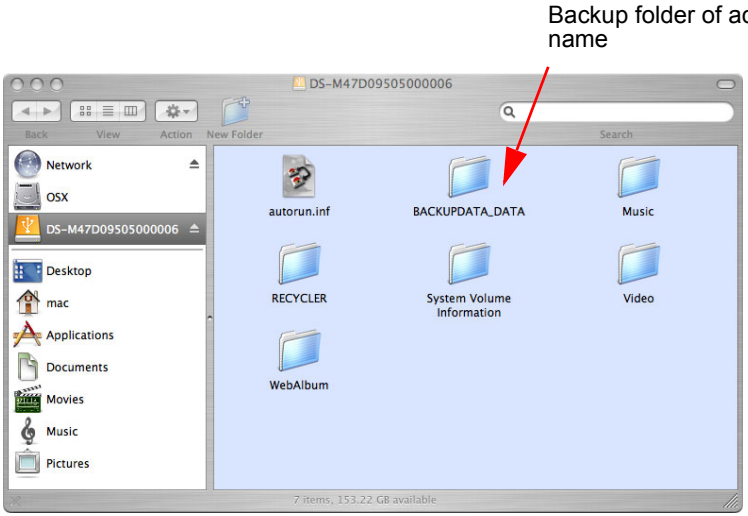


MAC Pcs

To view your backup files from a MAC:

- On the MAC desktop, double-click the SmartNAVI icon.
- Under Hard Disk Drives, double-click the SmartNAVI disk.

Figure 9. BACKUPDATA folder viewed on a MAC



Doing a Backup Now

This feature enables you to perform an immediate backup of your files from your PC to the DAS system (SmartStor).

Caution

The SmartStor and One Touch Backup cannot restore a failed boot drive in your PC.

Important

- Windows does not allow SmartNAVI to access protected folders and files. If you want to perform a backup, you must first disable protection on your folders and files.
- The SmartNAVI backup does not make a backup of any open files, such as Outlook. If you want a specific file to be backed-up, be sure that file is closed before the backup starts.

You can perform an immediate backup of your files from:

- SmartNAVI Main Window

- SmartNAVI Device List

The amount of time required depends on the size and number of files being backed up. The backed up files appear on the DAS system in a folder named **BACKUPDATA_your username**.

You can restore the backup files to your PC at any time. See “Restoring Backed-up Files” on page 74.

Main Window

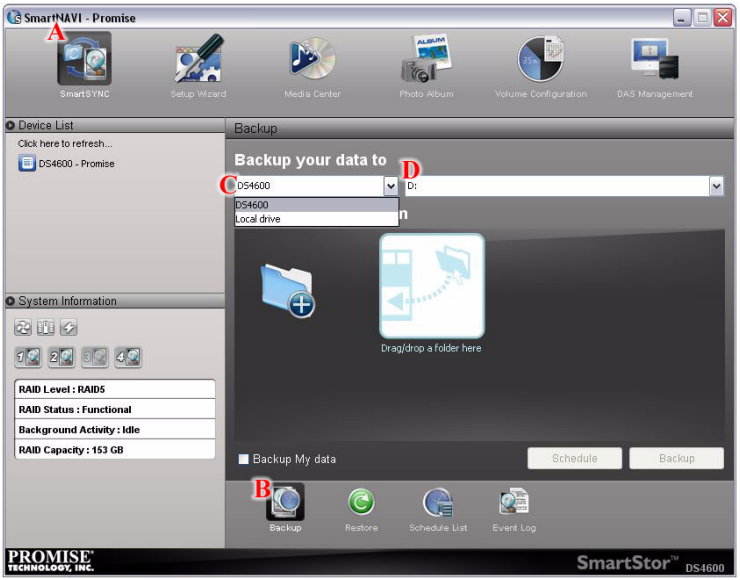
If you do not have a backup schedule for your PC, start your backup from the SmartNAVI Main Window.

To backup from the Main Window:

1. Go to the **Main Window**.

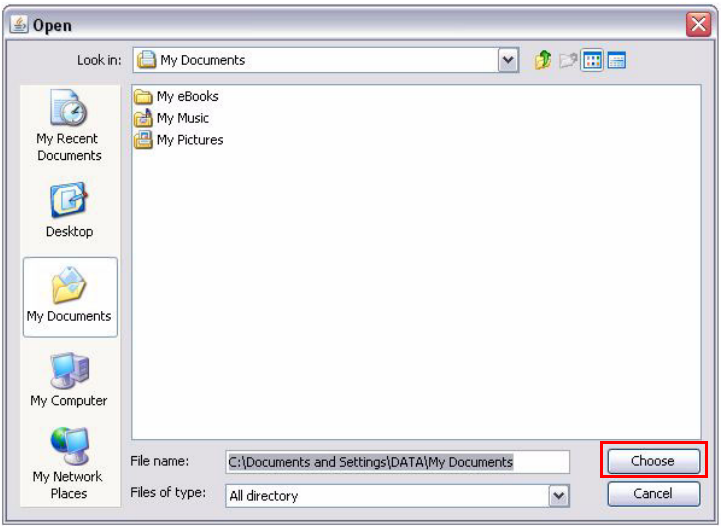
   See “Opening the Main Window” on page 19.

2. Click the **SmartSYNC** icon *(A)* and click the **Backup** button *(B)*.
3. Under Backup your data to, choose:
   - The DAS (DS4600) or Local drive (your PC) from the first dropdown menu *(C)*.
   - The letter designation of your PC drive under the second dropdown menu *(D)*.

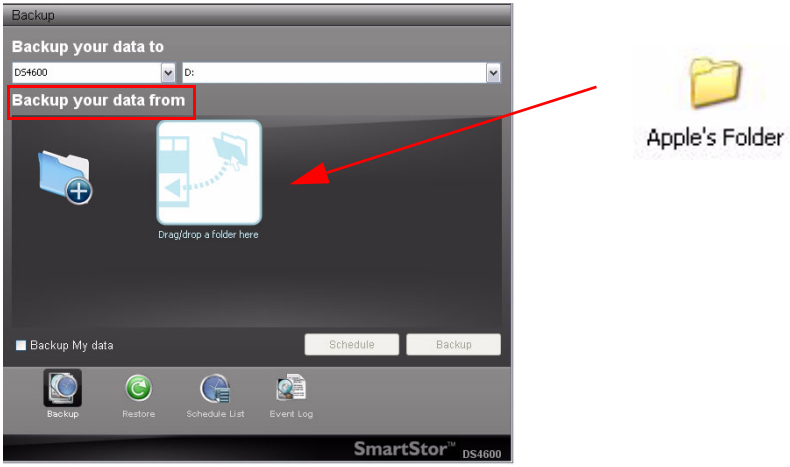


4. Do any of the following actions to choose your backup from folders:
   - Check the **Backup My Data** box - Chooses the My Documents, Favorites, and Desktop folders with all their contents.

- Click the **Add to Backup** icon - Opens the My Documents folder. Click a folder you want to backup, then click the **Choose** button. Repeat for additional folders.

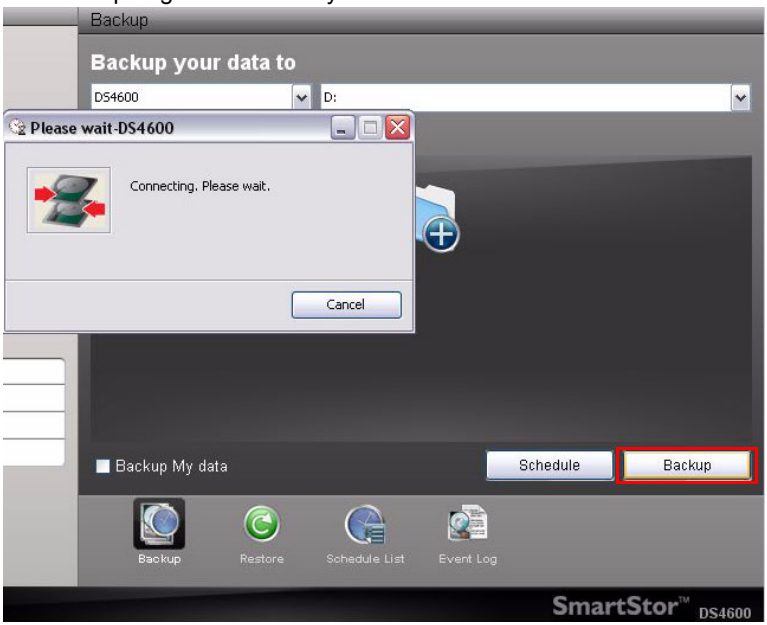


- Drag and drop the folders you want to backup to the **Backup your data from** window.



5. Click the **Backup** button.

   The backup begins immediately.



The amount of time required depends on the size and number of files being backed up.

The backed up files will appear on the SmartStor DAS system in a folder named **BACKUPDATA_your username**.

You can restore the backup files to your PC at any time.

Device List

Before you can do a backup now, you must create a backup schedule. See “Scheduling a Backup” on page 65.

To backup from the Main Window:

1. Go to the **Main Window**.

   See “Opening the Main Window” on page 19.

2. Click the system in the **Device List** whose backup you want to run.
3. Right click and choose the **Backup Now** icon.

The backup begins immediately.

Creating a Backup Schedule

To enable One Touch Backup on the SmartStor:

1. Double-click the **SmartNAVI** icon in the Windows application tray or Mac Dock (right).

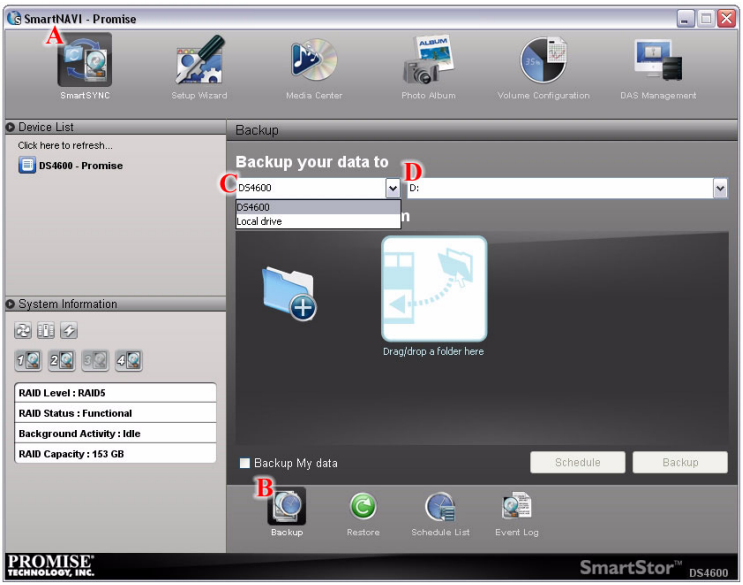
   The SmartNAVI Window opens.

2. Click the DS4600 in the Device List.

   The Main Window opens.

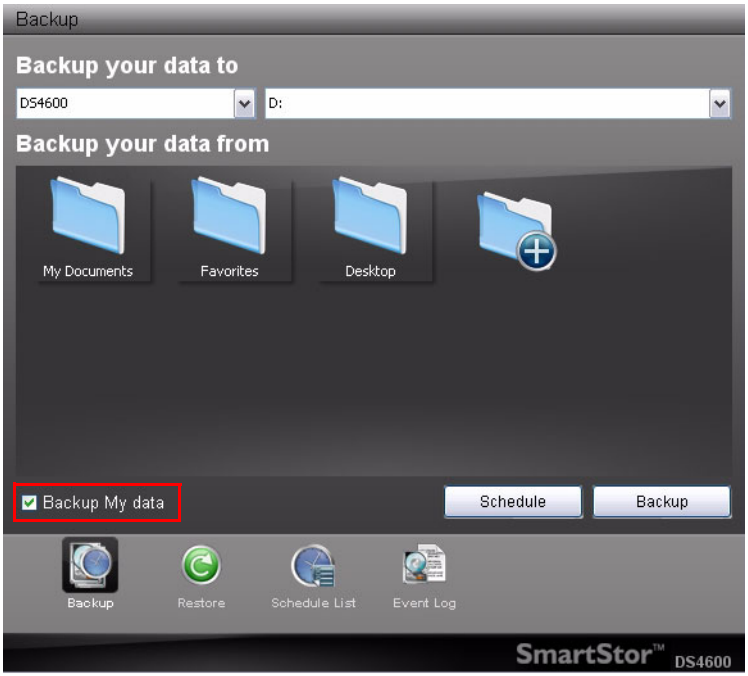
3. Click the **SmartSYNC** icon *(A)*.
4. Click the **Backup** button *(B)*.
5. Under Backup your data to, choose:
   - The DAS (DS4600) or Local drive (your PC) from the first dropdown menu *(C)*.

- The letter designation of your PC drive under the second dropdown menu *(D)*.

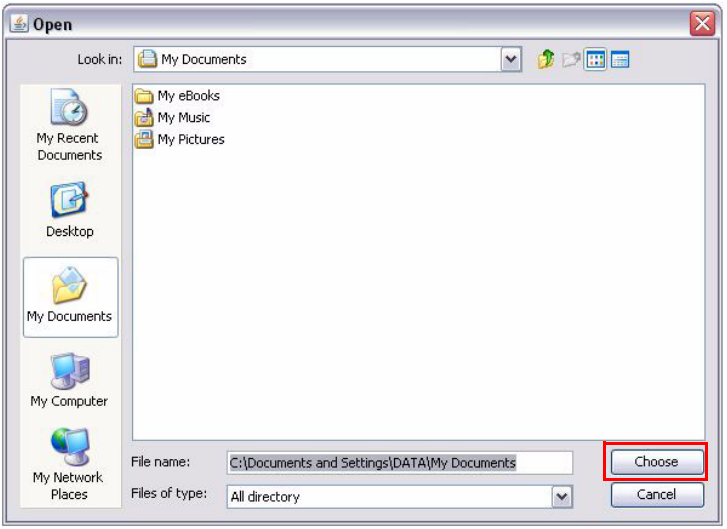


6. Do any of the following actions to choose your backup from folders:

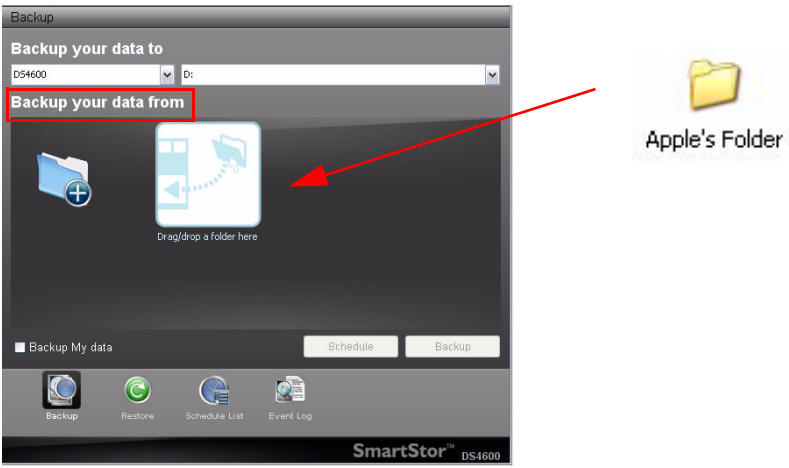
- Check the **Backup My Data** box - Chooses the My Documents, Favorites, and Desktop folders with all their contents.



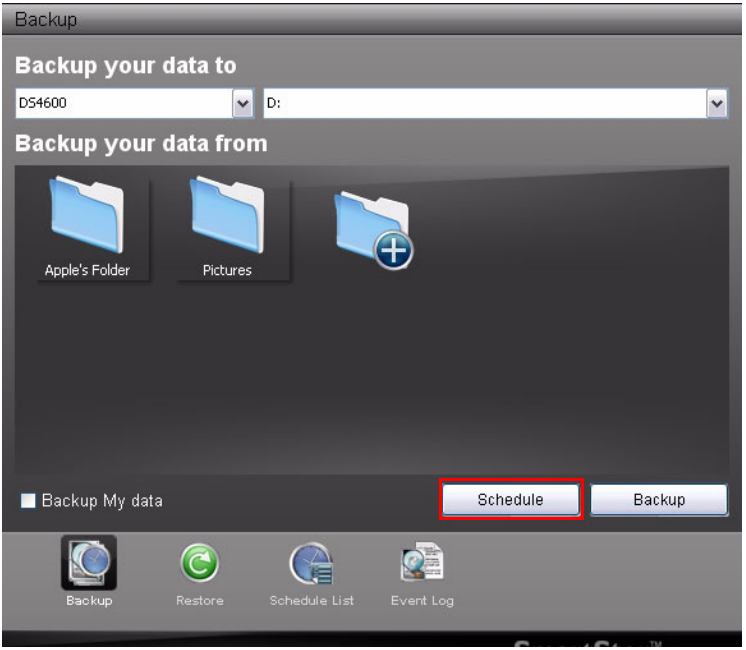
- icon - Opens the My Documents folder. Click a folder you want to backup, then click the **Choose** button. Repeat for additional folders.



- Drag and drop the folders you want to backup to the **Backup your data from** window.



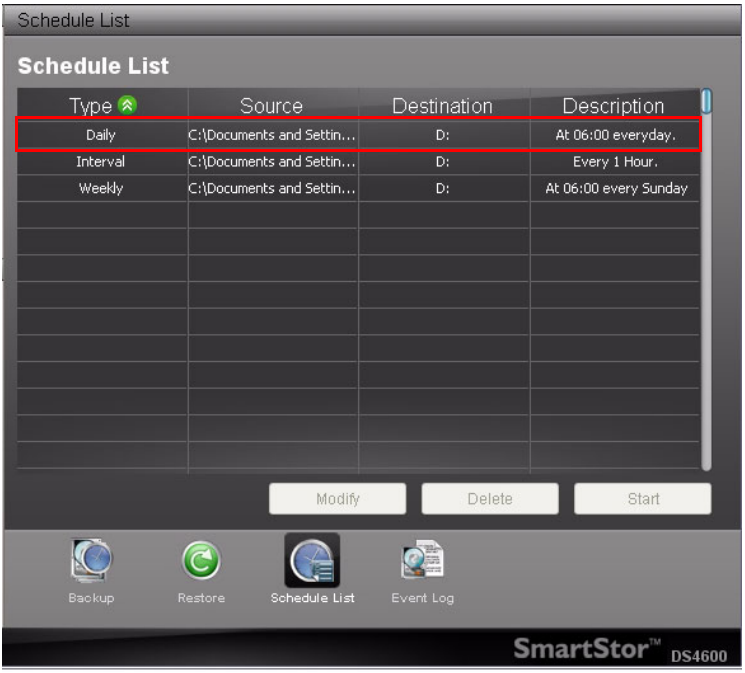
7. Click the **Schedule** button.



8. Click an option button for:
   - Hour
   - Day
   - Day of the week
9. Choose the corresponding values from the dropdown menus:
   - Number of hours
   - Time of day in hours and minutes
   - Time of day and day of the week

10. Click the **Add** button.

The newly created schedule appears in the Schedule List.



The backed up files will appear on the DAS in a folder named **BACKUPDATA_your username**.

You can also click the **Start** button to run a scheduled backup immediately.

Scheduling a Backup

You can schedule backups by the hour, day, or week.

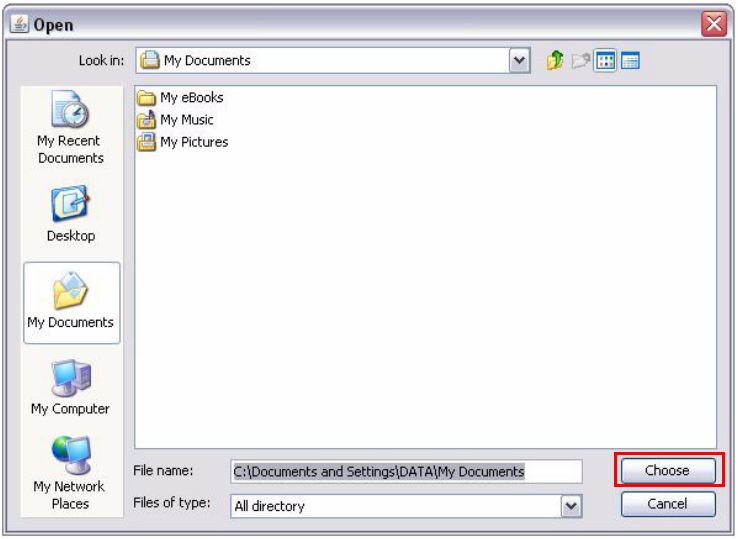
To set a schedule for backing up files from your PC to the DAS system (SmartStor):

1. Go to the **Main Window**.

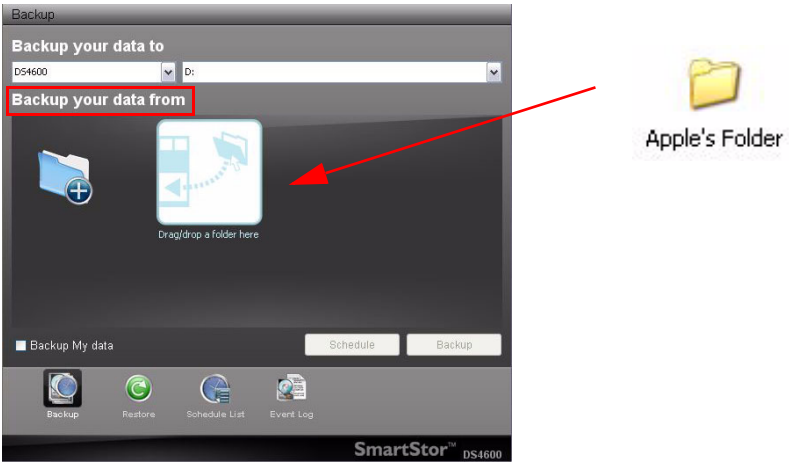
   See “Opening the Main Window” on page 19.
2. Click the **SmartSYNC** icon and click the **Backup** button.
3. Do any of the following actions to select your backup folders:

- Check the **Backup My Data** box – Selects the My Documents, Favorites, and Desktop folders with all their contents.

- Click the **Add to Backup** icon – Opens the My Documents folder. Click a folder you want to backup, then click the **Choose** button. Repeat for additional folders.



- Drag and drop the folders you want to backup to the **Backup your data from** window.



4. Click the **Schedule** button.
5. Click an option button for:

- Hour
- Day
- Day of the week

6. Choose the corresponding values from the dropdown menus:
   - Number of hours
   - Time of day in hours and minutes
   - Time of day and day of the week
7. Click the **Add** button.

The newly created schedule appears in the Schedule List.

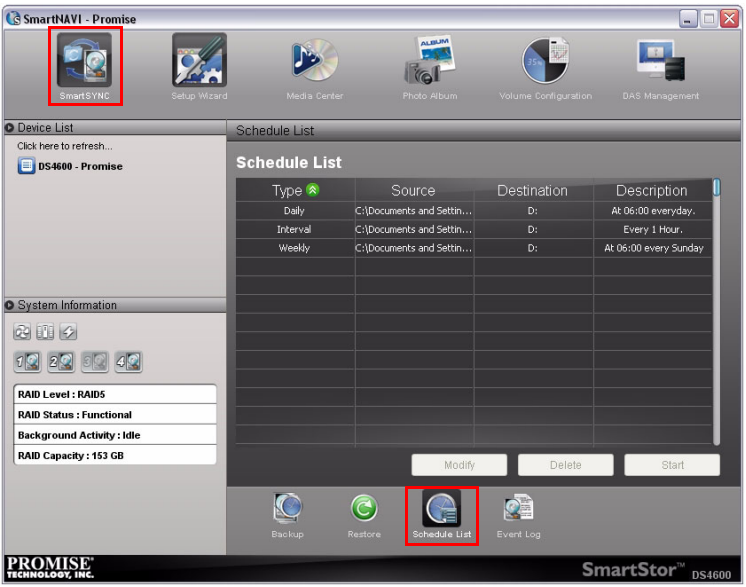
The backed up files will appear on the DAS in a folder named **BACKUPDATA_your username**.

See “Creating a Backup Schedule” on page 59.

Viewing Backup Schedules

To view the list of current schedules:

1. Go to the **Main Window**.
2. Click the **SmartSYNC** icon and click the **Schedule List** button.
   The list of all backup schedules appears.



Changing a Scheduled Backup

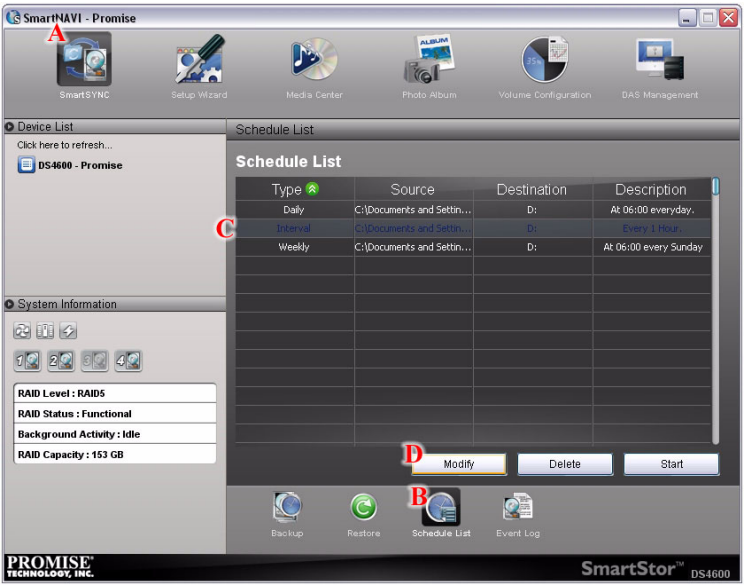
You can schedule backups by the hour, day, or week.

To change the scheduled backup of files from your PC to the DAS system (SmartStor):

1. Go to the **Main Window**.

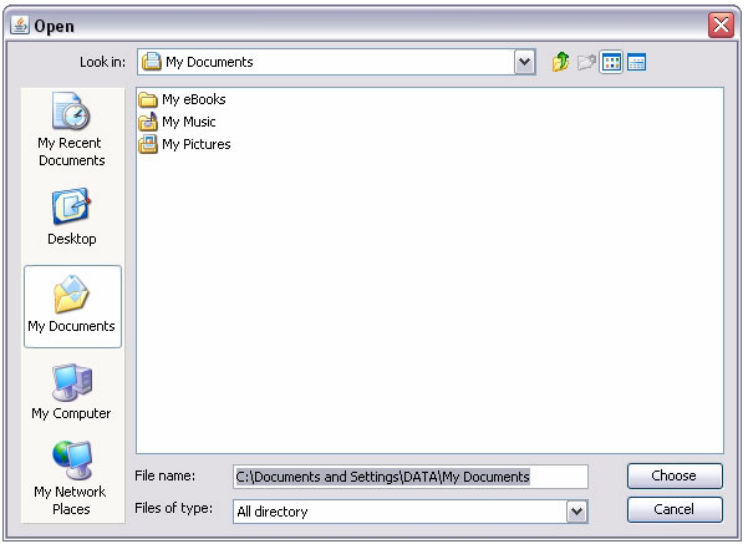
   See “Opening the Main Window” on page 19.

2. Click the **SmartSYNC** icon *(A)* and click the **Schedule List** button *(B)*.
3. Click the schedule *(C)* you want to change.
4. Click the **Modify** button *(D)*.



5. Click the folder whose contents you want to backup.

Click the **Add to Backup** icon to expand the tree and narrow your choices.

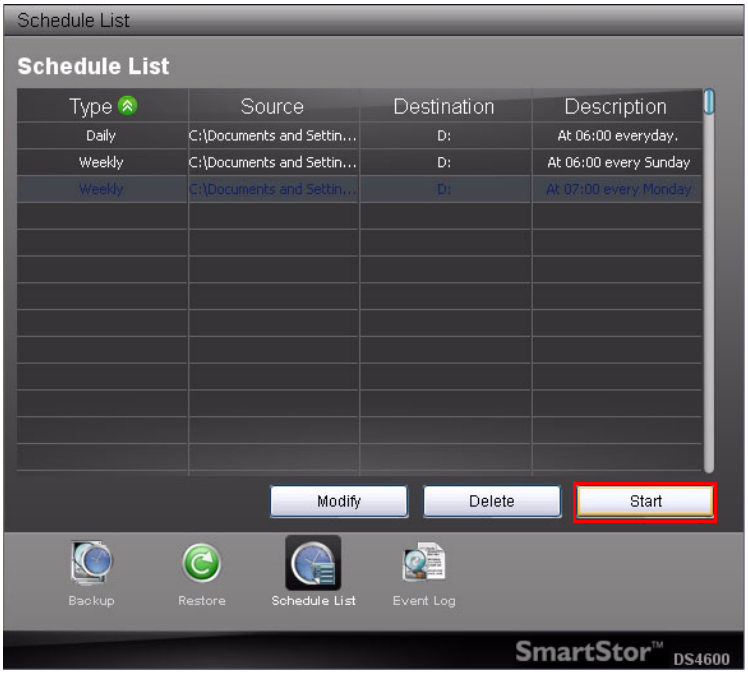


6. Click the **Schedule** button.
7. Click an option button for:
   - Hour
   - Day
   - Day of the week
8. Choose the corresponding values from the dropdown menus:
   - Number of hours
   - Time of day in hours and minutes
   - Time of day and day of the week

9. Click the **Add** button.

The modified schedule appears in the **Schedule List**.

You can also click the **Start** button to run a scheduled backup immediately.



Deleting a Scheduled Backup

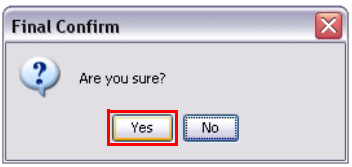
Deleting a scheduled backup has no effect upon any files previously backed-up to the DAS system (SmartStor).

To delete a scheduled backup:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **SmartSYNC** icon *(A)* and click the **Schedule List** button *(B)*.
3. Click the schedule *(C)* you want to delete.

4. Click the **Delete** button *(D)*.

5. Click the **Yes** button in the confirmation box.



Restoring Backed-up Files

You can restore all or any portion of the files in the **BACKUPDATA_your username** folder on the DAS system (SmartStor).

You can choose to restore the files to:

- Their original location on your PC
- An alternative location on your PC

The original file structure is maintained during the restoration.

Caution

If you restore to the original folders on your PC, the restore function will overwrite the files in those folders.

Be careful which files you restore and where on your PC you direct the backup files.

To restore your backed-up files from the DAS system to your PC:

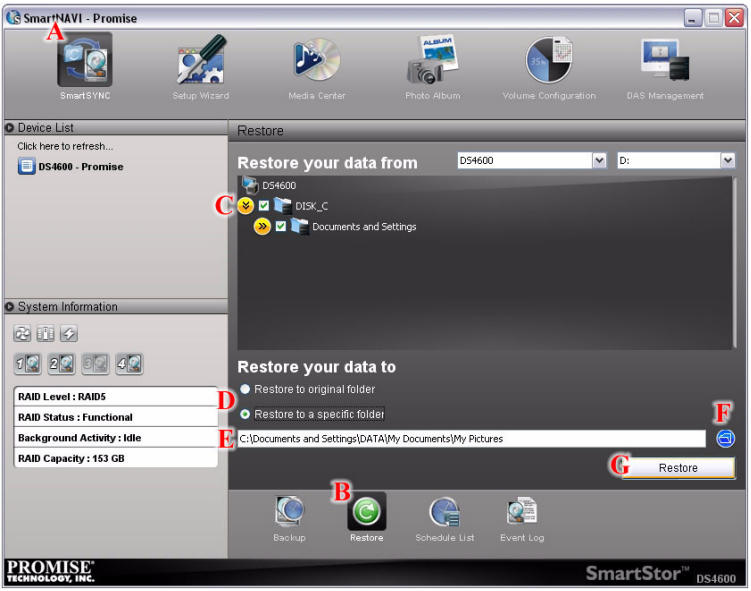
1. Go to the **Main Window**.

   See “Opening the Main Window” on page 19.
2. Click the **SmartSYNC** icon *(A)* and click the **Restore** button *(B)*.
3. Click the folder whose contents you want to restore.

   Click the » icons *(C)* to expand the tree and narrow your choices.
4. Click an option button for:
   - Restore to original folder *(D)* – The backup files will overwrite the files on your PC
   - Restore to a specific folder *(D)* – No files are overwritten on your PC
5. If you chose **Restore to a specific folder**, do one of the following actions:
   - Type the name of an existing folder in the field *(E)* provided
   - Type the name of an new folder in the field *(E)* provided
   - Click the Folder icon *(F)* – Opens the My Documents folder. Click a folder you want to use for a target, then click the **Open** button

6. Click the **Restore** button *(G)*.

   The restoration begins immediately. The amount of time required depends on the size and number of files being restored.



Viewing the Backup Event Log

Backup events report on backups, schedules, and file transfers.

Events are reported by date, time, severity (information or error) and description.

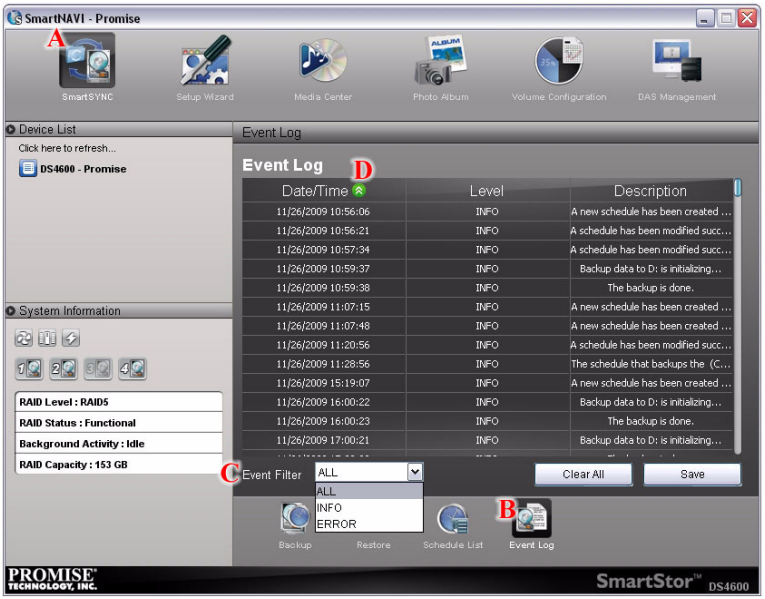
To view Backup Event Log:

1. Go to the **Main Window**.

   See “Opening the Main Window” on page 19.

2. Click the **SmartSYNC** icon *(A)* and click the **Event Log** button *(B)*.
3. Optional. Set the Event Filter dropdown menu *(C)* to display:
   - All events
   - Information events only
   - Error events only

4. Optional. Click the arrow on the **Date/Time** header *(D)* to reverse the chronological order.



Note

For DAS system events, see “Viewing the System Event Log” on page 31.

Saving the Event Log

This function saves a copy of the Backup Event Log as a text file onto your PC. The text file records the events displayed in the Event Log window.

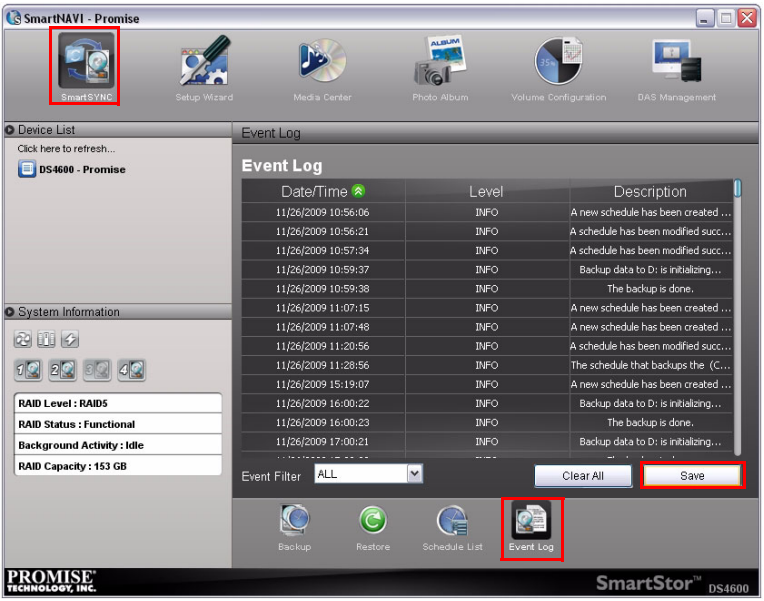
Set the Event Filter dropdown menu to display:

- All events
- Information events only
- Error events only

Click the arrow on the **Date/Time** header to reverse the chronological order.

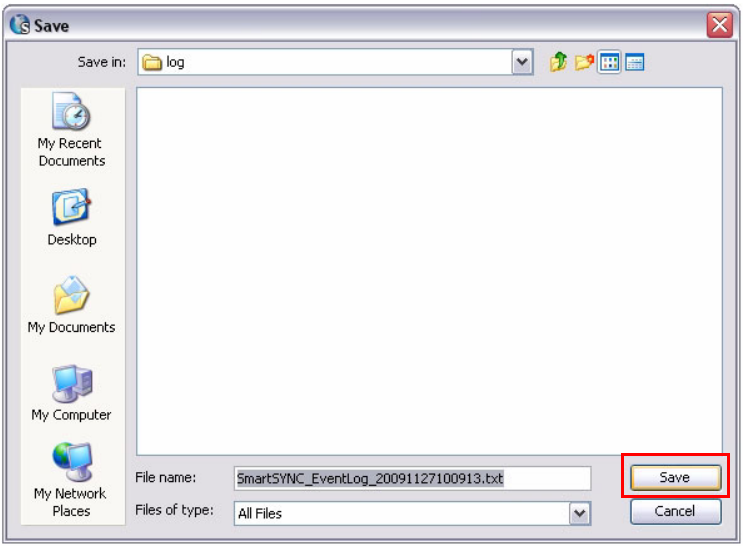
To save a copy of the Backup Event Log as a text file:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **SmartSYNC** icon and click the **Event Log** button.
3. Click the **Save** button.



4. Optional. Change the file name or save to a different location.

5. Click the **Save** button in the Save dialog box.



Clearing the Event Log

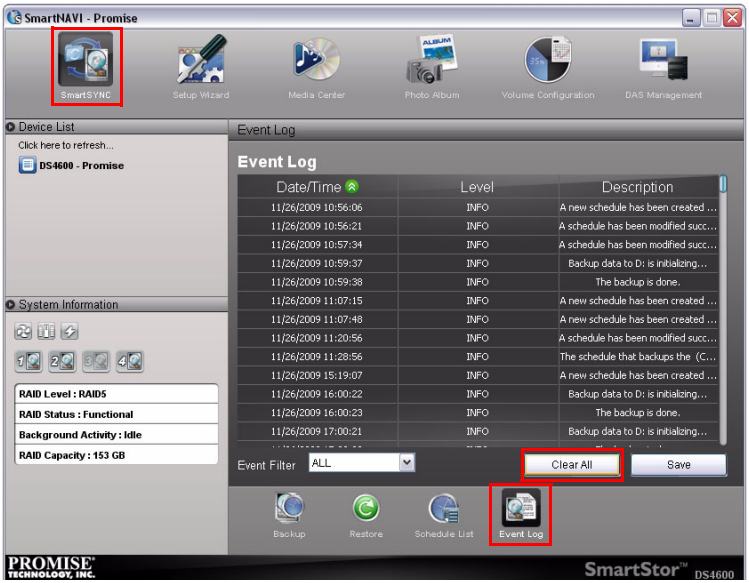
Note

Before you clear the Backup Event Log, consider saving a copy for future reference. See “Saving the Event Log” on page 78.

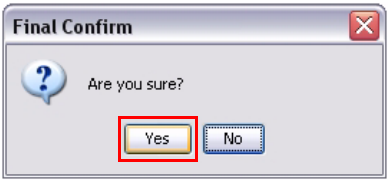
To clear the Backup Event Log:

1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **SmartSYNC** icon and click the **Event Log** button.

3. Click the **Clear All** button.



4. Click the **Yes** button in the confirmation box.



Using Media Center

Media Center contains the Media Library, which enables you to organize and play your music and video files that are saved on the DAS system.

Note that there are two features called Media Center. This section deals with Media Center in SmartNAVI.

The Media Library includes the following functions:

- Viewing Playlists (page 81)
- Creating a Playlist (page 82)
- Playing a Playlist (page 83)
- Renaming a Playlist (page 83)
- Deleting a Playlist (page 84)
- Playing a Single Music or Video File (page 84)

Important

This feature requires the DLNA plug-in to be installed and enabled on the DAS system.

Your music and video files must be saved in the MUSIC and VIDEO folders, respectively, on the DAS system.

Viewing Playlists

To view a Playlist:

1. Go to the **Main Window**.
2. Click the **Media Center** icon.

   The Media Library window appears with List highlighted.

   A list of playlists appears in the List Window.

Playlists are shown by name and the number of files in the playlist.

Creating a Playlist

This function requires a LAN connection to the DAS system.

To create a Playlist:

1. Go to the **Main Window**.
2. Click the **Media Center** icon.
   The Media Library window appears with List highlighted.
3. Click the **Create Playlist** icon.
4. Type a name for the playlist in the highlighted box and press Enter.

5. Click and drag files from the folder list to the Playlist icon.

The playlist is stored in the DLNA database on the DAS system.

Playing a Playlist

To play a Playlist:

1. Go to the **Main Window**.
2. Click the **Media Center** icon.

   The Media Library window appears with List highlighted.
3. Right-click the playlist in the List Tree or the List Window and choose **Play** from the dropdown menu.

The List Tree

The List Window

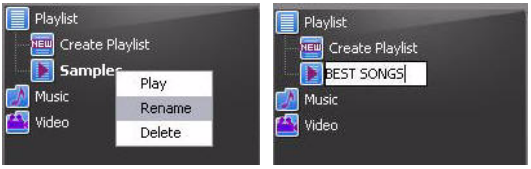
Renaming a Playlist

This function requires a LAN connection to the DAS system.

To rename a Playlist:

1. Go to the **Main Window**.
2. Click the **Media Center** icon.

   The Media Library window appears with List highlighted.
3. Right-click the playlist in the List Tree you want to rename and choose **Rename** from the dropdown menu.
4. Type a name for the playlist in the highlighted box and press Enter.



5. Right-click the playlist in the Window you want to rename and choose **Rename** from the dropdown menu.

Deleting a Playlist

This function requires a LAN connection to the DAS system.

To delete a Playlist:

1. Go to the **Main Window**.
2. Click the **Media Center** icon.

   The Media Library window appears with List highlighted.
3. Right-click the playlist in the List Tree or the List Window you want to delete and choose **Delete** from the dropdown menu.

4. Click the **Yes** button in the confirmation box.

The playlist is deleted.

Playing a Single Music or Video File

To play a single music or video file:

1. Go to the **Main Window**.
2. Click the **Media Center** icon.

   The Media Library window appears with List highlighted.
3. Click the Music or Video folder icon.

4. Right-click on the file you want to play and choose **Play** from the dropdown menu.

Using the Panel

1. Go to the **Main Window**.
2. Click the **Media Center** icon.

   The Media Library window appears with List highlighted.
3. Click the Music or Video folder icon.
4. Click the arrow on the list header to reverse the chronological order by Name, Artist, Genre and Length.

5. In the Media Library window, click these icons as desired to apply their effects:

Icon	Function
	Media Library

	Media Player
	Mute
	Volume
	Play
	Stop
	Previous
	Next
	No Repeat
	Shuffle
	Repeat One
	Repeat All

Managing Photo Albums

This category includes the following topics:

- Making an Album (page 87)
- Viewing an Album (page 96)
- Editing an Album (page 98)
- Deleting an Album (page 99)

Making an Album

An album is a collection of photo files that you can browse by means of Adobe Flash® and HTML technology. You can make any number of albums using photos in a variety of file formats. And you can use the same photos in multiple albums.

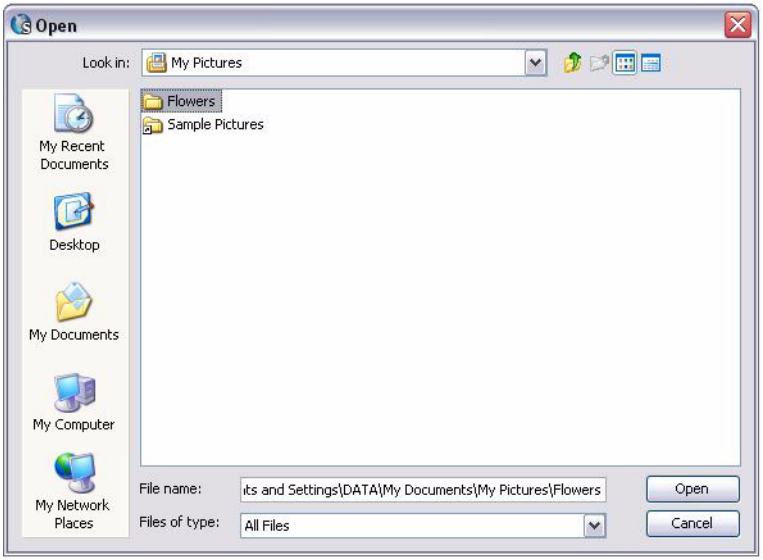
Part 1: Making your Album

To make a new album:

1. Go to the **Main Window**.
2. Click the **Photo Album** icon.

   The Make Album screen appears.
3. Click the **Select** button and choose **From folder** in the dropdown menu.

4. In the Open dialog box, navigate to the folder that contains the photo files you want to add to your album and click the **Open** button.



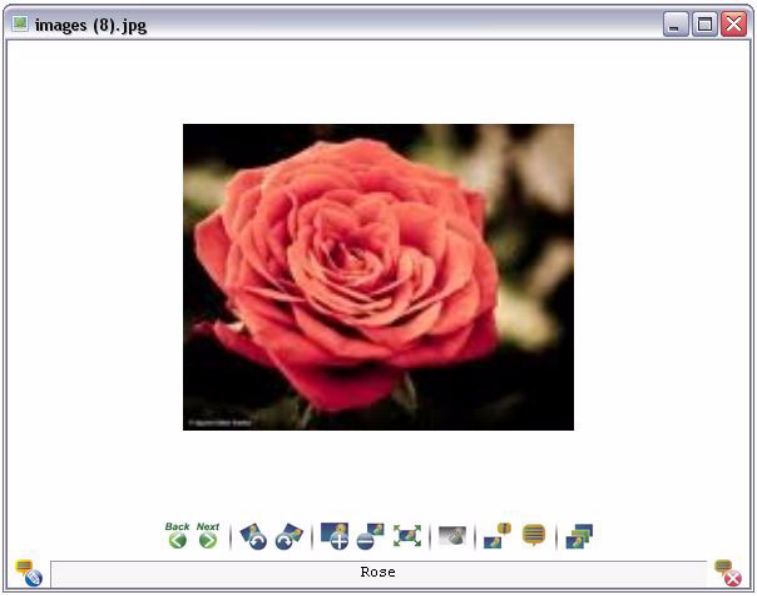
Thumbnails of the photos in the folder appear in the left window.

5. Click and drag the photos to the right window to add them to your album.

Optional:

SmartNAVI - Promise
SmartSYNC
Setup Wizard
Media Center
Photo Album
Volume Configuration
DAS Management
Device List
Click here to refresh...
DS4600 - Promise
System Information
RAID Level : RAID5
RAID Status : Functional
Background Activity : Idle
RAID Capacity : 153 GB
Make Album
Source
Select
Total : 6
Make Album
Manage Album
PROMISE TECHNOLOGY, INC.
SmartStor DS4600

- To view a photo, click the **View** icon.



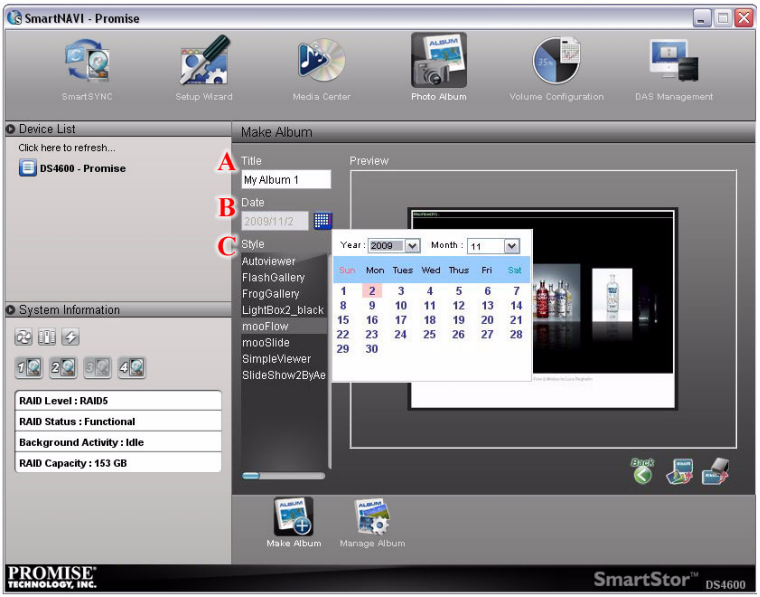
- To sort the photos, click the **Sort** icon and choose a sort method by name, size or data from the dropdown menu.

- To delete a photo, click the photo, then click the **Delete** icon.

6. When you finish your selection of photos, click the **Next** button.
   The Album Style Setting screen appears.
7. Type a **Title** for your album in the Title field. *(A)*
   Or accept the default title.
8. Choose the **Date** with year, month and day in the dropdown menus. *(B)*
9. Choose a **Style** from the list. *(C)*

An example of the highlighted Style appears in the Preview window.

Your photos do not appear in the Preview window.



Part 2: Exporting or Uploading your Album

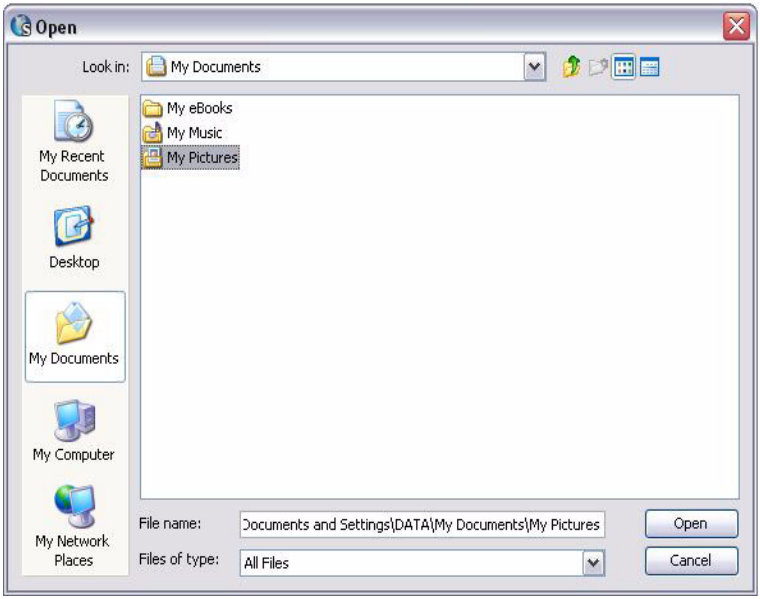
You now have the choice of:

- Exporting (saving) the album to your PC
- Uploading (saving) the album to the DAS system
- Both actions

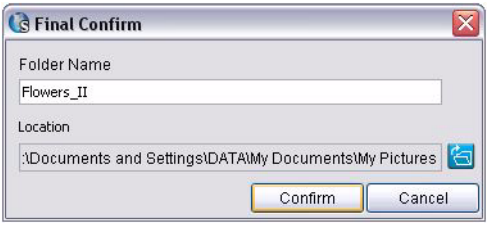
To export the album to your PC:

1. Click the **Export Album** icon.
2. In the Final Confirm box:
    - Type the name of the destination folder where you want the Album to be saved.

- Navigate to the place where you want the destination folder created.

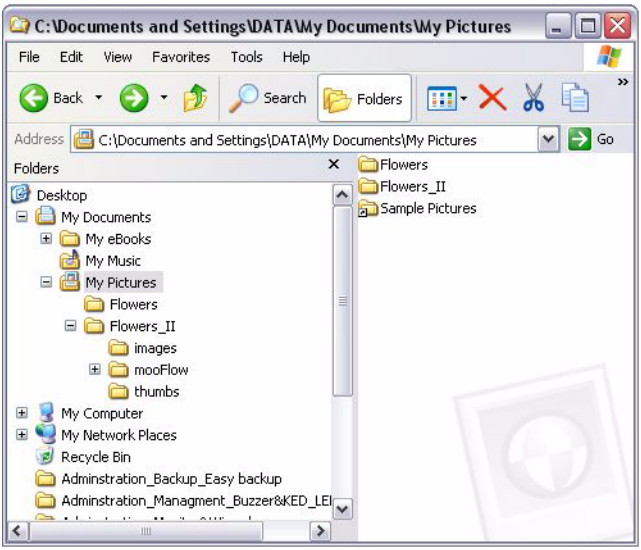


- Click the **Confirm** button.



3. When the album success message appears, click the **Confirm** button.

The album has been saved in the destination folder.



To upload the album to the DAS system:

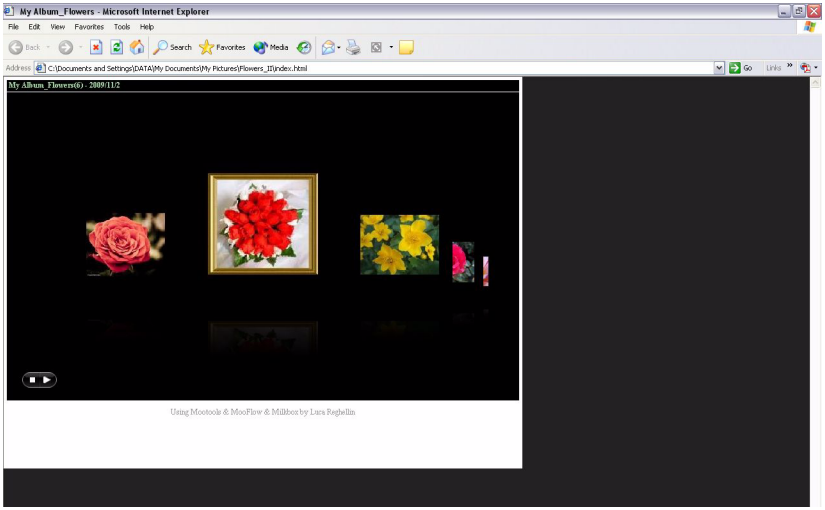
1. Click the **Upload Album** icon.
2. When the album success message appears, click the **Confirm** button.

The album has been uploaded to the **Album** folder on the DAS system.

Part 3: Viewing your Album

To view your album, open its folder and double-click the **index.html** file.

The album opens in your default browser.

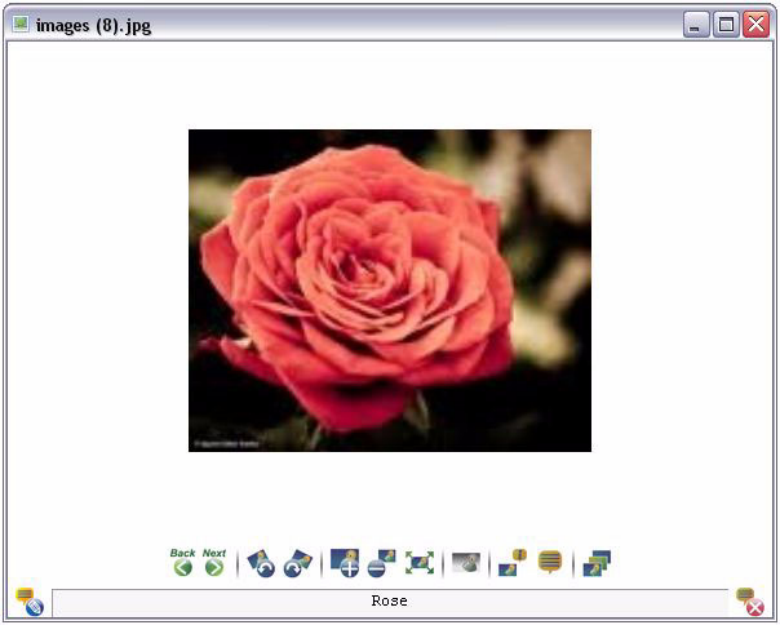


Viewing an Album

To view an album:

1. Go to the **Main Window**.
2. Click the **Photo Album** icon. *(A)*
3. Click the **Manage Album** button. *(B)*
   The Manage Album screen appears.
4. Choose the location, year, and month in the dropdown menus. *(C)*
   Local means on your PC. Other names apply to DAS systems.
   The albums matching the criteria appear in the Manage Album list. *(D)*
5. Click the album you want to view and click the **View** button. *(E)*

In the View window, click these icons as desired to apply their effects:



– Rotate left

– Rotate right

– Zoom in

– Zoom out

– Default size

– Color/grayscale toggle

– Photo metadata

– Add/view/delete comments

– Full screen view

Editing an Album

The album must be on saved your PC for editing.

To edit an album:

1. Go to the **Main Window**.
2. Click the **Photo Album** icon. *(A)*
3. Click the **Manage Album** button. *(B)*
   The Manage Album screen appears.
4. Choose **Local**, the year and month in the dropdown menus. *(C)*
   The albums matching the criteria appear in the Manage Album list. *(D)*
5. Click the album you want to edit and click the **Edit** button. *(E)*

The Make Album screen appears.

To continue, go to “Making an Album”.

Deleting an Album

Caution

Deleting an album deletes the photo files saved in the album itself.

Deleting an album does not delete the original photo files that you copied when you created the album or later added to it.

To delete an album:

1. Go to the **Main Window**.
2. Click the **Photo Album** icon. *(A)*
3. Click the **Manage Album** button. *(B)*

   The Manage Album screen appears.

   Choose the location, year, and month in the dropdown menus. *(C)*

   Local means on your PC. Other names apply to DAS systems.

   The albums matching the criteria appear in the Manage Album list. *(D)*

4. Click the album you want to delete and click the **Delete** button. *(E)*

5. In the Confirmation box, click the **Yes** button.

The album is deleted.

Chapter 4: Technology Background

- Introduction to RAID (below)
- Choosing a RAID Level (page 106)
- Spare Drive (page 107)
- Automatic Rebuilding (page 108)
- Partition and Format (page 108)

Introduction to RAID

RAID (Redundant Array of Independent Disks) allows multiple disk drives to be combined together into a RAID Volume. You create a RAID Volume on your SmartStor when you perform the setup procedure, in SmartNAVI.

The benefits of a RAID can include:

- Higher data transfer rates for increased server performance
- Increased overall storage capacity for a single Volume
- Data redundancy/fault tolerance for ensuring continuous system operation in the event of a disk drive failure

Different RAID levels use different organizational models and have varying benefits. Also see “Choosing a RAID Level” on page 106. The following outline breaks down the properties for each RAID level supported on the SmartStor:

RAID 0 – Stripe

When a RAID Volume is striped, the read and write blocks of data are interleaved between the sectors of multiple disk drives. Performance is increased, since the workload is balanced between drives or “members” that form the RAID Volume. Identical drives are recommended for performance as well as data storage efficiency.

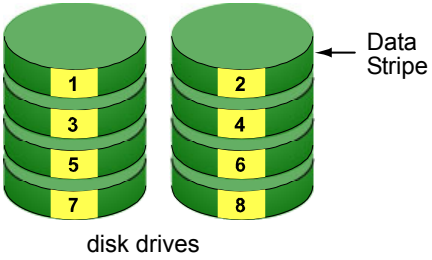


Figure 1. RAID 0 Striping interleaves data across multiple drives

The RAID Volume’s data capacity equals the capacity of the smallest disk drive times the number of disk drives. For example, one 100 GB and three 120 GB drives will form a 400 GB (4 x 100 GB) RAID Volume instead of 460 GB.

If disk drives of different capacities are used, there will also be unused capacity on the larger drives.

Because RAID 0 does not offer Fault Tolerance, meaning that you cannot recover your data after a disk drive failure, Promise does not recommend a RAID 0 Volume for your SmartStor.

RAID 0 Volumes on SmartStor consist of one or more disk drives.

RAID 1 – Mirror

When a RAID Volume is mirrored, identical data is written to a pair of disk drives, while reads are performed in parallel. The reads are performed using elevator seek and load balancing techniques where the workload is distributed in the most efficient manner. Whichever drive is not busy and is positioned closer to the data will be accessed first.

With RAID 1, if one disk drive fails or has errors, the other mirrored disk drive continues to function. This is called *Fault Tolerance*. Moreover, if a spare disk drive is present, the spare drive will be used as the replacement drive and data will begin to be mirrored to it from the remaining good drive.

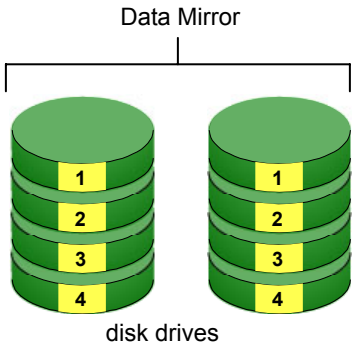


Figure 2. RAID 1 Mirrors identical data to two drives

The RAID Volume's data capacity equals the smaller disk drive. For example, a 100 GB disk drive and a 120 GB disk drive have a combined capacity of 100 GB in a mirrored RAID Volume.

If disk drives of different capacities are used, there will also be unused capacity on the larger drive.

RAID 1 Volumes on SmartStor consist of two disk drives.

If you want a mirrored RAID Volume with more than two disk drives, see "RAID 10 – Mirror / Stripe" on page 105.

RAID 5 – Block Striping with Distributed Parity

RAID 5 organizes block data and parity data across the disk drives. Generally, RAID level 5 tends to exhibit lower random write performance due to the heavy workload of parity recalculation for each I/O. RAID 5 works well for file, database, application and web servers.

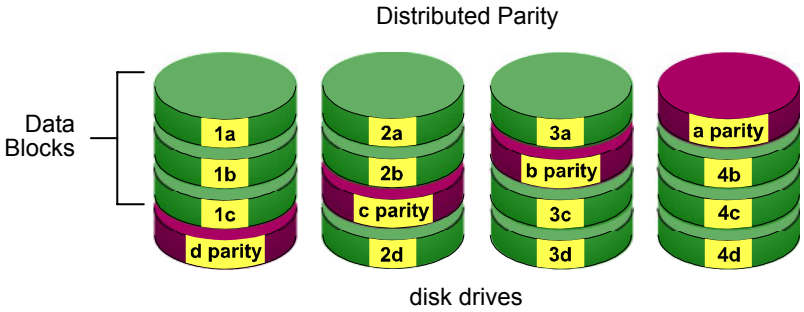


Figure 3. RAID 5 Stripes all drives with data and parity information

The capacity of a RAID 5 Volume equals the smallest disk drive times the number of disk drives, minus one. Hence, a RAID 5 Volume with four 100 GB disk drives will have a capacity of 300 GB. A RAID Volume with two 120 GB disk drives and one 100 GB disk drive will have a capacity of 200 GB.

RAID 5 is generally considered to be the most versatile RAID level.

RAID 5 requires a minimum of three disk drives.

RAID 10 – Mirror / Stripe

Mirror/Stripe combines both of the RAID 0 and RAID 1 types. RAID 10 can increase performance by reading and writing data in parallel while protecting data with duplication. At least four disk drives are needed for RAID 10 to be installed. With a four-disk-drive RAID Volume, one drive pair is mirrored together then striped over a second drive pair.

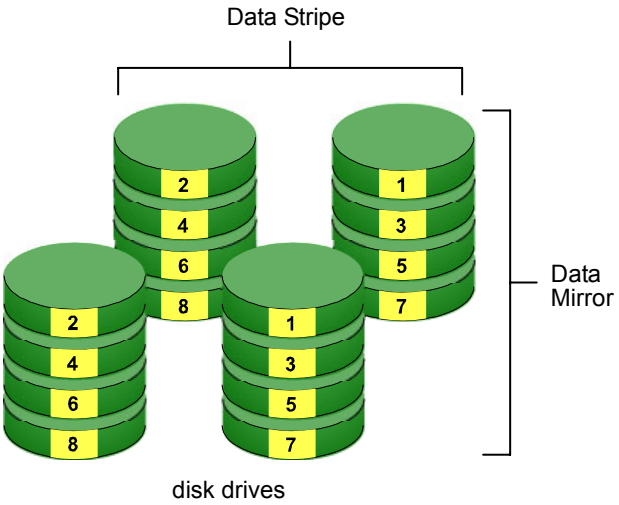


Figure 4. RAID 10 takes a data mirror on one drive pair and stripes it over two drive pairs

The data capacity RAID 10 Volume equals the capacity of the smallest disk drive times the number of disk drives, divided by two.

In some cases, RAID 10 offers double fault tolerance, depending on which disk drives fail.

RAID 10 Volumes on SmartStor consist of four disk drives.

Because all of the available disk drives are used for the RAID Volume, you cannot set up a spare drive with RAID 10.

Choosing a RAID Level

There are several issues to consider when choosing the RAID level for your Volume. The following discussion summarizes some advantages, disadvantages and applications for each choice.

RAID 0

Advantages	Disadvantages
Implements a striped disk RAID Volume, the data is broken down into blocks and each block is written to a separate disk drive I/O performance is greatly improved by spreading the I/O load across many channels and drives No parity calculation overhead is involved	Not a true RAID because it is not fault-tolerant The failure of just one drive will result in all data in an RAID Volume being lost Should not be used in mission critical environments

Recommended applications for RAID 0:

- Image Editing
- Pre-Press Applications
- Any application requiring high bandwidth

RAID 1

Advantages	Disadvantages
Simplest RAID storage subsystem design Can increase read performance by processing data requests in parallel since the same data resides on two different drives	Very high disk overhead - uses only 50% of total capacity

Recommended applications for RAID 1:

- Accounting/Financial
- Payroll
- Any application requiring very high availability

RAID 5

Advantages	Disadvantages
High Read data transaction rate Medium Write data transaction rate Good aggregate transfer rate Most versatile RAID level	Disk failure has a medium impact on throughput

Recommended applications for RAID 5:

- File and Application servers
- WWW, E-mail, and News servers
- Intranet servers

RAID 10

Advantages	Disadvantages
Implemented as a mirrored RAID Volume whose segments are RAID 0 RAID Volumes High I/O rates are achieved thanks to multiple stripe segments	Very high disk overhead – uses only 50% of total capacity

Recommended applications for RAID 10:

- Imaging applications
- Database servers
- General fileserver

Spare Drive

A spare is a disk drive that has been designated to replace a failed disk drive in a RAID Volume. In the event of the failure of a disk drive within a RAID 1 or three-drive RAID 5 Volume, the spare drive is activated as a member of the RAID Volume to replace a disk drive that has failed.

A spare drive cannot replace the failed drive in a RAID 0 Volume because of the way in which data is written to the disk drives under RAID 0.

A spare drive is not available for a RAID 10 Volume because RAID 10 requires all four disk drives in the SmartStor enclosure. However, when you replace the failed disk drive, the SmartStor will automatically rebuild the RAID Volume using the new disk drive.

You must designate a disk drive as a Spare. By default, and unassigned disk drive is Free. Use PASM to designate the Free disk drive as a Spare. See

Maintaining a spare drive is a good precaution to protect your RAID Volume integrity in the event of disk drive failure.

Automatic Rebuilding

When a disk drive in your RAID 1, 5, or 10 Volume fails, and a replacement disk drive becomes available, the RAID Volume will rebuild itself to the new disk drive automatically.

For RAID 1 and three-drive RAID 5 Volumes, you can designate a spare drive. If a spare drive is present when the RAID Volume experiences a disk drive failure, the rebuild will start automatically using the spare drive.

For RAID 1, RAID 5, and RAID 10 Volumes without a spare drive, the RAID Volume will begin to rebuild itself automatically when you remove the failed disk drive and install a new disk drive.

A RAID 0 Volume cannot be rebuilt because of the way in which data is written to the disk drives under RAID 0. Even if there is a designated spare drive, rebuilding is not possible for RAID 0 Volumes.

Partition and Format

When you create a RAID Volume on SmartStor, the RAID Volume is automatically partitioned and formatted for you.

To use your RAID Volume, you must create Folders on the RAID Volume and assign services to those Folders according to your requirements. SmartStor provides file services for Windows, UNIX/Linux and Mac, so all of those PCs can access the folders on the SmartStor, even though each PC might have a different file system.

Chapter 5: Troubleshooting

- Responding to an Audible Alarm (below)
- Checking the System Status LED (below)
- Checking Disk Status LEDs (page 110)
- Replacing a Failed Disk Drive (page 110)
- SmartStor Lockup (page 111)

This chapter deals problems you might encounter with your SmartStor and how to resolve them. Also see “Frequently Asked Questions” on page 115.

Responding to an Audible Alarm

The SmartStor has two beep patterns

- **Single beep, not repeated** – The SmartStor is online
- **Two beeps, continuously repeated** – The SmartStor reports a problem

When you boot or reboot the SmartStor, the buzzer sounds one time to indicate that the SmartStor is online.

If you hear the two-beep pattern, check the following items:

- System Status LED (below)
- Disc Status LEDs (see page 110)

Checking the System Status LED

The SmartStor system status LED (see page 110) reports the condition of the Enclosure fan and power supply:

- **Blue** – Normal Enclosure function
- **Amber** – There is a problem with the fan or power supply
- **Red** – The fan, power supply, or file system has failed.

If your SmartStor is configured to work with a UPS, it will continue to run after a power supply failure.

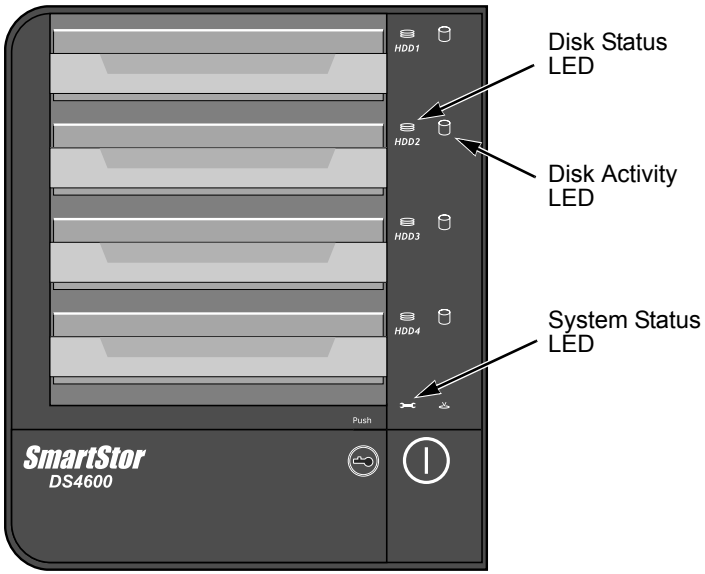
Checking Disk Status LEDs

The disk status LEDs report the condition of the disk drives:

- **Blue** – Normal disk drive function
- **Amber** – Rebuilding to this disk drive
- **Red** – Failed disk drive
- **Dark** – No disk drive is installed

The disk status LEDs are also dark when the drives are powered down during system stand-by.

Figure 1. SmartStor Disk and System Status LEDs



Replacing a Failed Disk Drive

If a disk drive fails, the Disk Status LED is red. See Figure 1. If the disk drive belongs to a RAID Volume, the Volume goes *Critical* or *Offline*.

Replace the failed disk drive with a new disk drive of the same or slightly greater capacity. You do not have to power down the SmartStor.

1. Open the SmartStor's front door.
2. Pull out the drive carrier with the failed drive.
3. Remove the failed disk drive from the drive carrier.
4. Install a new disk drive into the carrier.

5. Place the carrier with the new disk drive back into the open slot in the SmartStor.

If the failed drive belonged to a RAID Volume, the RAID Volume will begin rebuilding as soon as the new drive is installed.

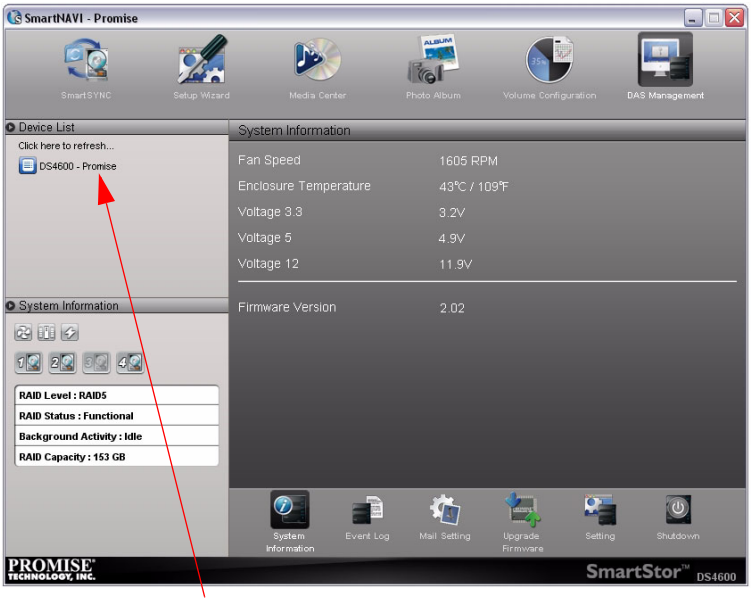
During the Rebuild, the Disk Status LED show amber. When the Rebuild is finished, the Disk Status LED turns blue.

If the replacement drive is free, that is, not assigned to a RAID Volume or as a spare, the Disk Status LED remains dark after you install the new drive.

SmartStor Lockup

On rare occasions, SmartNAVI becomes unresponsive to your inputs. If that happens, check the SmartNAVI Main Window on your PC. See Figure 2.

Figure 2. SmartNAVI Main Window



If the SmartStor used to appear in the Main Window previously but is no longer there, the SmartStor is probably locked up or frozen and requires a hard reboot.

Caution

This action is appropriate only when there are no data transfers or installations in progress.

Do not disconnect the power to reboot the SmartStor unless the proper shutdown procedure does not work.

Keep the SmartNAVI Main Window open during this procedure.

To hard reboot the SmartStor:

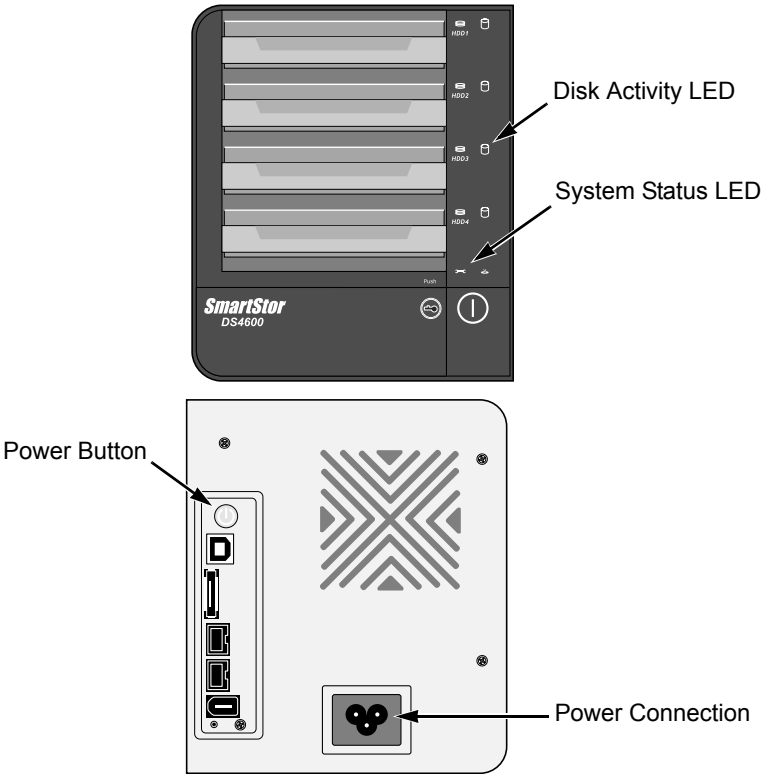
1. Press and hold the Power button for five seconds.

   During a proper shutdown, the System Status LED turns RED, then goes dark.

   If the System Status LED stays BLUE, the SmartStor is locked up.

   See Figure 3.

Figure 3. SmartStor front and back views



2. Disconnect the power cable from the SmartStor.
3. Wait 10 seconds, then reconnect the power cable.
4. Press the Power button.

   It takes about a minute to boot the SmartStor. When fully booted:

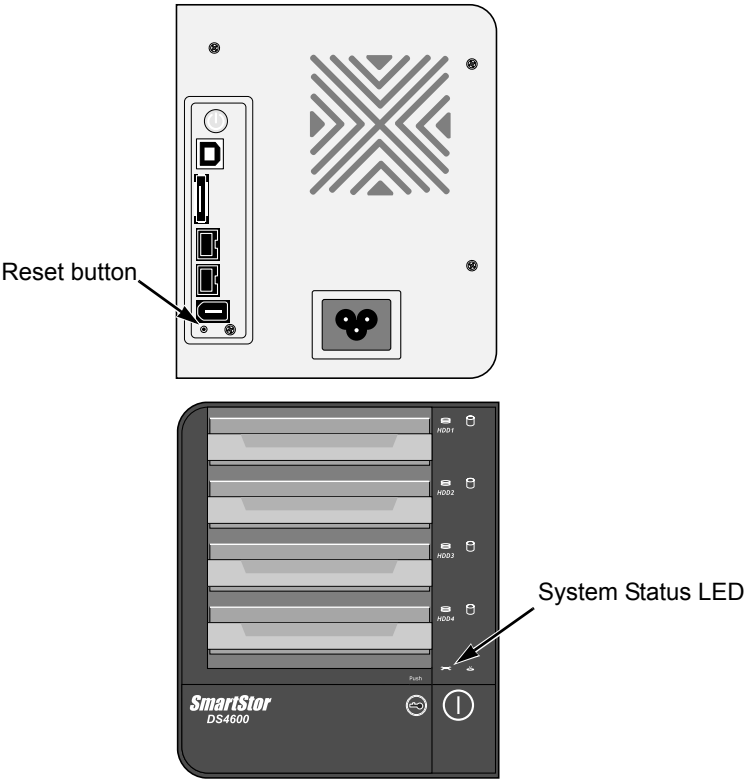
   - The buzzer beeps one time.
   - The System Status LED turns blue.

5. Verify that the SmartStor now appears in SmartNAVI Main Window.

   See Figure 2.

   The SmartStor automatically runs a File System Check due to the abnormal shutdown. During the File System Check, the System Status LED blinks amber and the Disk Activity LEDs blink blue.

Figure 4. Reset button and System Status LED



Chapter 6: Support

- Frequently Asked Questions (below)
- Contacting Technical Support (page 116)
- Limited Warranty (page 119)
- Returning Product For Repair (page 121)

Frequently Asked Questions

Also see “Chapter 5: Troubleshooting” on page 109.

I pressed the One Touch Backup button on the DS4600 but no files were backed up. What happened?

You must create a backup schedule using SmartNAVI. The backup schedule tells One Touch Backup which folders and files to backup from your PC onto the SmartStor.

How do I make the DS4600 quieter?

The loudest component on SmartStor is the cooling fan. With the *Smart Fan* feature, the fan can run at reduced speed or even stop when cooling is not required, reducing noise and saving energy at the same time.

The One Touch Configuration does not work on my system.

One Touch Configuration requires a FireWire 800 or 400 or USB 2.0 or eSATA connection to your PC. See “Connecting to Your PC” on page 8.

Contacting Technical Support

Promise Technical Support provides several support options for Promise users to access information and updates. We encourage you to use one of our electronic services, which provide product information updates for the most efficient service and support.

If you decide to contact us, please have the following information available:

- Product model and serial number
- BIOS, firmware, and driver version numbers
- A description of the problem / situation
- System configuration information, including: motherboard and CPU type, hard drive model(s), SAS/SATA/ATA/ATAPI drives & devices, and other controllers.

Technical Support Services

Promise Online™ Web Site	http://www.promise.com (technical documents, drivers, utilities, etc.)

United States

E-mail Support	e-Support On-Line
Fax Support	(408) 228-1100 Attn: Technical Support
Phone Support	(408) 228-1400 option 4
If you wish to write us for support:	Promise Technology, Inc. 580 Cottonwood Drive Milpitas, CA 95035, USA

The Netherlands

E-mail Support	e-Support On-Line
Fax Support	+31 (0) 40 256 9463 Attn: Technical Support
Phone Support	+31 (0) 40 235 2600
If you wish to write us for support:	Promise Technology Europe B.V. Science Park Eindhoven 5542 5692 EL Son, The Netherlands

Germany

E-mail Support	e-Support On-Line
Fax Technical Support	+49 (0) 2 31 56 76 48 - 29 Attn: Technical Support
Phone Technical Support	+49 (0) 2 31 56 76 48 - 10
If you wish to write us for support:	Promise Technology Germany Europaplatz 9 44269 Dortmund, Germany

Italy

E-mail Support	e-Support On-Line
Fax Support	0039 06 367 12400 Attn: Technical Support
Phone Support	0039 06 367 12626
If you wish to write us for support:	Promise Technology Italy Piazza del Popolo 18 00187 Roma, Italia

Taiwan

E-mail Support	e-Support On-Line
Fax Support	+886 3 578 2390 Attn: Technical Support
Phone Support	+886 3 578 2395 (ext. 8822, 8823)
If you wish to write us for support:	Promise Technology, Inc. 2F, No. 30, Industry E. Rd. IX Science-based Industrial Park Hsin-Chu 30075, Taiwan (R.O.C.)

China – Beijing

E-mail Support	e-Support On-Line
Fax Support	+86 10 8857 8015 Attn: Technical Support
Phone Support	+86 10 8857 8085 or 8095
If you wish to write us for support:	Promise Technology China – Beijing Room 1205, Tower C Webok Time Center, No.17 South Zhong Guan Cun Street Hai Dian District, Beijing 100081, China

China – Shanghai

E-mail Support	e-Support On-Line
Fax Support	+86 21 6249 4627 Attn: Technical Support
Phone Support	+86 21 6249 4192, 4193, or 4199
If you wish to write us for support:	Promise Technology China – Shanghai Room 508, Leader Tower 1189 West Wu Ding Road Jing An District, Shanghai 200042, China

Limited Warranty

Promise Technology, Inc. (“Promise”) warrants that this product, from the time of the delivery of the product to the original end user:

a) all components, for a period of two (2) years;

b) will conform to Promise’s specifications;

c) will be free from defects in material and workmanship under normal use and service.

This warranty:

a) applies only to products which are new and in cartons on the date of purchase;

b) is not transferable;

c) is valid only when accompanied by a copy of the original purchase invoice;

d) Is not valid on spare parts.

This warranty shall not apply to defects resulting from:

a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;

b) operation outside the environmental specifications for the product;

c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise-authorized service center.

Disclaimer of other warranties

This warranty covers only parts and labor, and excludes coverage on software items as expressly set above.

Except as expressly set forth above, Promise DISCLAIMS any warranties, expressed or implied, by statute or otherwise, regarding the product, including, without limitation, any warranties for fitness for any purpose, quality, merchantability, non-infringement, or otherwise. Promise makes no warranty or representation concerning the suitability of any product for use with any other item. You assume full responsibility for selecting products and for ensuring that the products selected are compatible and appropriate for use with other goods with which they will be used.

Promise DOES NOT WARRANT that any product is free from errors or that it will interface without problems with your computer system. It is your responsibility to back up or otherwise save important data before installing any product and continue to back up your important data regularly.

No other document, statement or representation may be relied on to vary the terms of this limited warranty.

Promise's sole responsibility with respect to any product is to do one of the following:

a) replace the product with a conforming unit of the same or superior product;

b) repair the product.

Promise shall not be liable for the cost of procuring substitute goods, services, lost profits, unrealized savings, equipment damage, costs of recovering, reprogramming, or reproducing of programs or data stored in or used with the products, or for any other general, special, consequential, indirect, incidental, or punitive damages, whether in contract, tort, or otherwise, notwithstanding the failure of the essential purpose of the foregoing remedy and regardless of whether Promise has been advised of the possibility of such damages. Promise is not an insurer. If you desire insurance against such damage, you must obtain insurance from another party.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so the above limitation may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state. This limited warranty is governed by the State of California.

Your Responsibilities

You are responsible for determining whether the product is appropriate for your use and will interface with your equipment without malfunction or damage. You are also responsible for backing up your data before installing any product and for regularly backing up your data after installing the product. Promise is not liable for any damage to equipment or data loss resulting from the use of any product.

Returning Product For Repair

If you suspect a product is not working properly, or if you have any questions about your product, contact our Technical Support Staff through one of our Technical Services, making sure to provide the following information:

- Product model and serial number (required)
- Return shipping address
- Daytime phone number
- Description of the problem
- Copy of the original purchase invoice

The technician will assist you in determining whether the product requires repair. If the product needs repair, the Technical Support Department will issue an RMA (Return Merchandise Authorization) number.

Important

Obtain an RMA number from Technical Support *before* you return the product and write the RMA number on the label. The RMA number is essential for tracking your product and providing the proper service.

Return ONLY the specific product covered by the warranty (do not ship cables, manuals, diskettes, etc.), with a copy of your proof of purchase to:

USA and Canada:	Promise Technology, Inc. Customer Service Dept. Attn.: RMA # _____ 47654 Kato Road Fremont, CA 94538
Other Countries:	Return the product to your dealer or retailer. Contact them for instructions before shipping the product.

You must follow the packaging guidelines for returning products:

- Use the original shipping carton and packaging
- Include a summary of the product's problem(s)
- Write an attention line on the box with the RMA number
- Include a copy of proof of purchase

You are responsible for the cost of insurance and shipment of the product to Promise. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.

When repairing returned product(s), Promise may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit will be under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

Promise will pay for standard return shipping charges only. You will be required to pay for any additional shipping options (such as express shipping).

Appendix A: Maintenance

- Upgrading the Firmware (below)
- Removing Disk Drives (page 130)
- Replacing the Power Supply (page 132)
- Replacing the Cooling Fan (page 134)

Upgrading the Firmware

Follow this procedure to upgrade the firmware on your SmartStor.

Downloading the Firmware Upgrade File

To download the upgrade file:

1. Point your browser to http://www.promise.com
   The firmware was placed in “Support” > “Download” > “DS4600”
2. Download the DS4600 firmware upgrade file to your PC.
   The firmware upgrade filename will be similar to ds4600_xxxxxx_xx.upg

Installing the Firmware Upgrade File

Warning

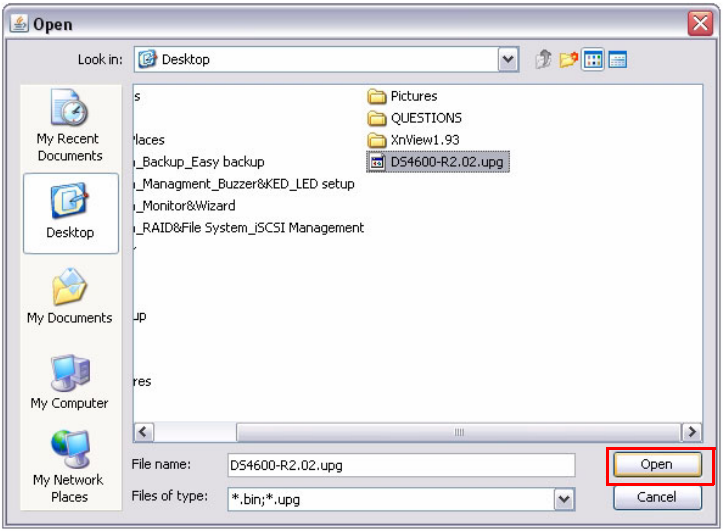
Do not disconnect the power or shut down the SmartStor while the upgrade is running!

To install the firmware upgrade file:

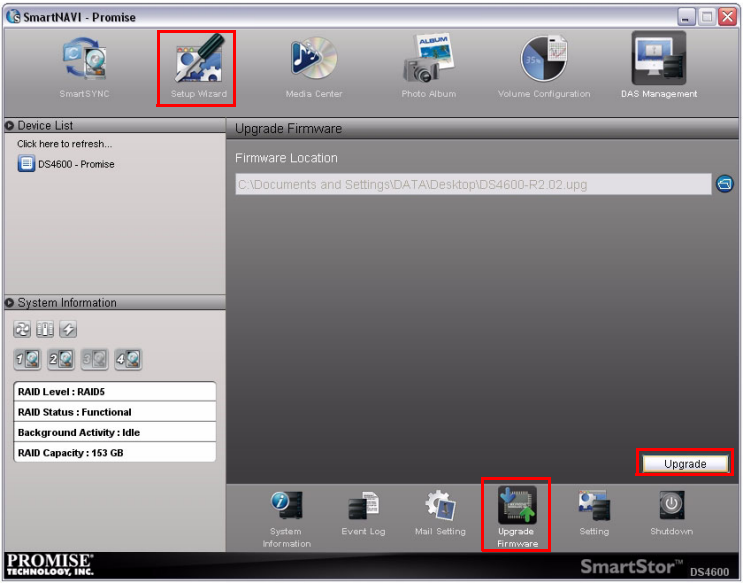
1. Go to the **Main Window**.
   See “Opening the Main Window” on page 19.
2. Click the **DAS Management** icon and click the **Upgrade Firmware** button.
3. Click the folder icon.

4. Click the folder icon, navigate to the firmware upgrade file, click the file, and click the **Open** button.

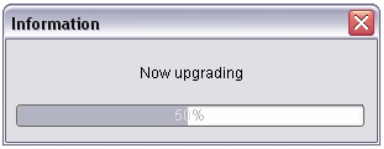
   The path and firmware upgrade file appear in the field.



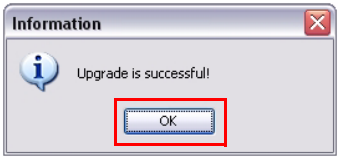
5. Click the **Upgrade** button.
   The upgrade takes about two or three minutes.



6. The firmware upgrade is proceeding.



7. In the Upgrade Success popup message, click the **OK** button.



When the upgrade is done, the SmartStor reboots automatically. When the SmartStor beeps once, it is ready for use.

Please click the **System Information** button to confirm the firmware version successfully upgraded.

Error During Upgrade

If an error occurs during the firmware upgrade, the SmartStor cannot reboot in normal mode. You must boot the SmartStor in Safe Mode and repeat the firmware installation. See “Booting the SmartStor in Safe Mode” below.

No Reboot After Upgrade

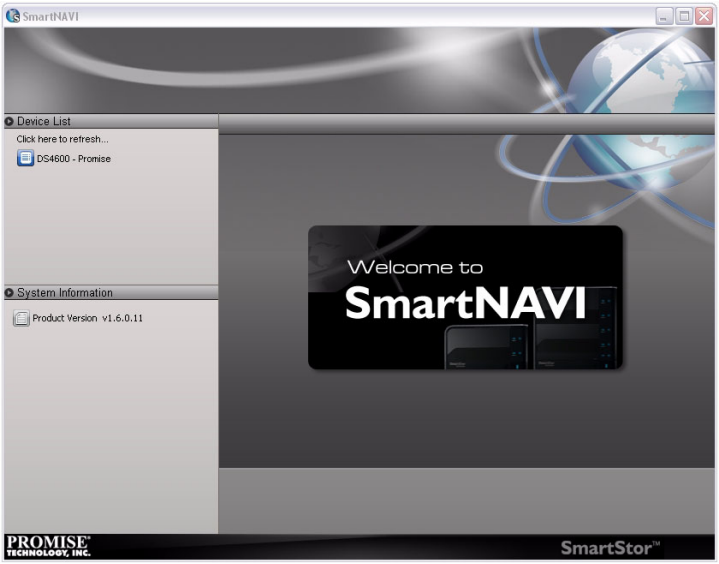
If the SmartStor does not reboot, there might be a service conflict that prevented the reboot. You must hard boot the SmartStor manually. See “Hard Booting the SmartStor” on page 129.

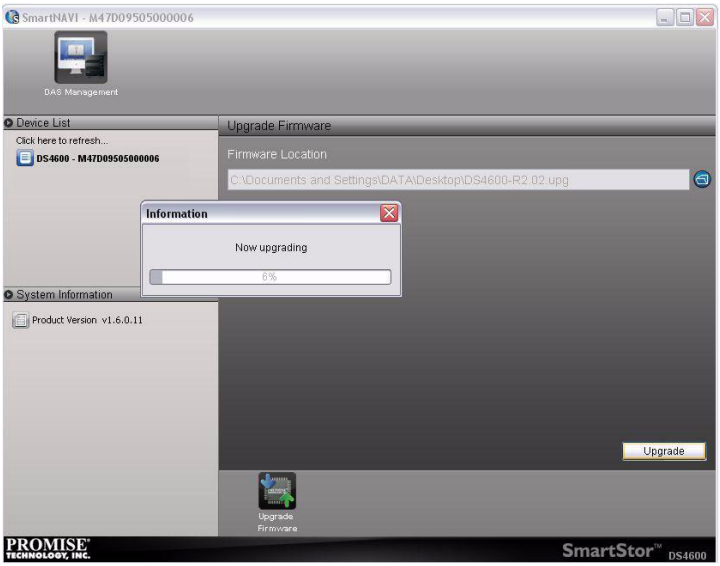
Booting the SmartStor in Safe Mode

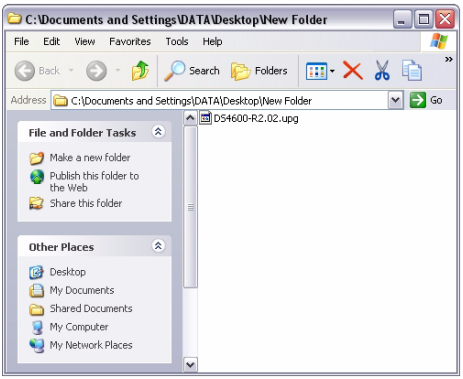
If an error occurs during firmware upgrade, the SmartStor will not reboot normally. You must reboot the SmartStor in Safe Mode and repeat the firmware upgrade

To boot the SmartStor in safe mode:

1. Press the Power button.
2. Use USB 2.0 cable to connect to your PC. Click the folder icon and choose the firmware upgrade file to boot the SmartStor in Safe Mode.







It takes about a minute to boot the SmartStor. When fully booted:

- The buzzer beeps one time.
- The System Status LED turns blue.

At this point, the SmartStor is in Safe Mode.

3. Repeat the procedure under “Installing the Firmware Upgrade File” on page 123.

Hard Booting the SmartStor

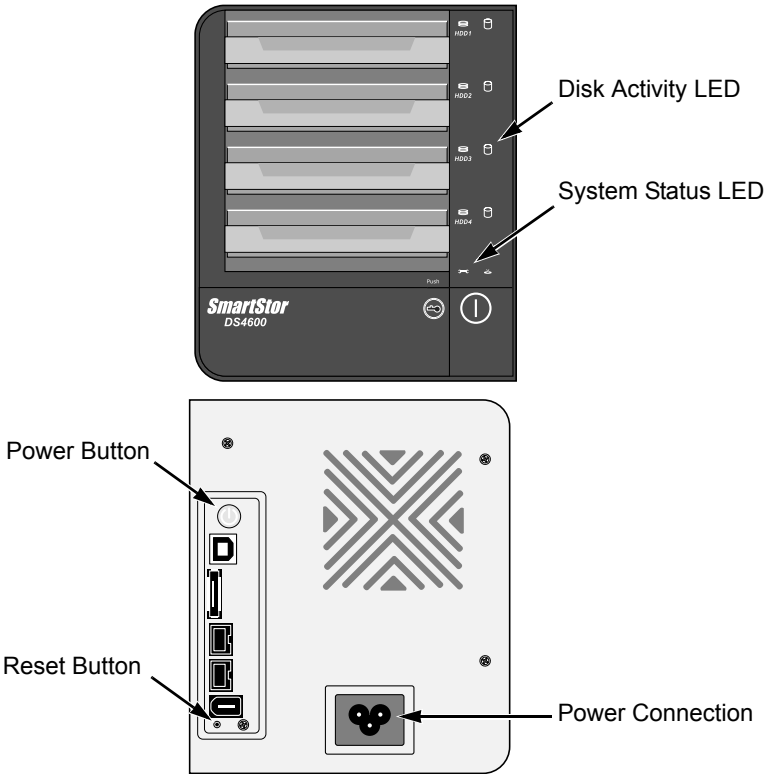
Caution

Do not disconnect the power to reboot the SmartStor unless the SmartStor failed to reboot itself after the firmware update.

To hard reboot the SmartStor:

1. Disconnect the power cable from the SmartStor.
   See page 130, Figure 1.
2. Wait 10 seconds, then reconnect the power cable.
3. Press the Power button.
   It takes about a minute to boot the SmartStor. When fully booted:
   - The buzzer beeps one time.
   - The System Status LED turns blue.
4. Verify that the SmartStor now appears in SmartNAVI Main Window.

Figure 1. SmartStor front and back views



Removing Disk Drives

To remove disk drives:

1. Open the SmartStor's front door.
2. Pull out the drive carrier from the enclosure.
3. Carefully remove the disk drive from the drive carrier, so that the screw holes on the sides of the carrier align with the screw holes in the drive. See page 131, Figure 2.
4. Remove the screws from the holes in the drive carrier and the sides of the disk drive.
5. Remove four screws per drive.

Figure 2. Remove the disk drive from the drive carrier

6. Repeat steps 2 through 5 until all of your disk drives are removed.
7. Close the door on the front of the SmartStor.

Replacing the Power Supply

Important

If your SmartStor is still under warranty, contact Technical Support for repair under RMA. See page 116.

The SmartStor DS4600 uses the following power supply:

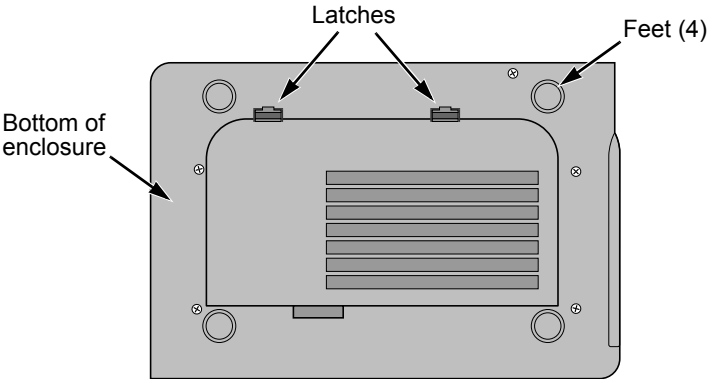
- Make and model: Edac EA11003E
- Input: 100 to 240 V, 2.5 A, 50-60 Hz
- Output: 12V, 8.33A max. through a DIN 22, 4-pin connector

Removing the Power Supply

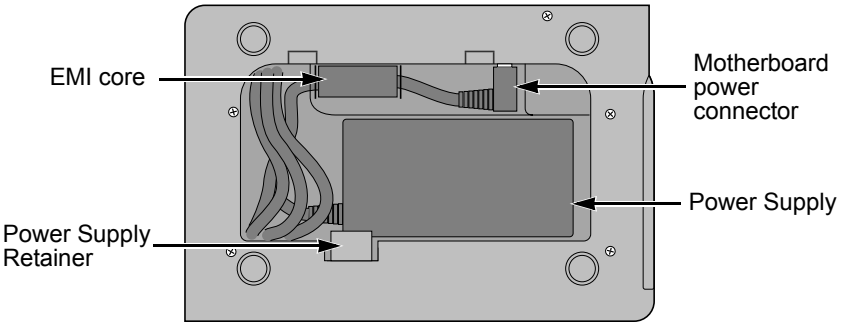
To remove the old power supply:

1. Shut down the SmartStor.

   See “Shutting Down the SmartStor” on page 35.
2. Unplug the power cord.
3. Turn the SmartStor enclosure upside down.
4. Press the two latches on the underside of the enclosure, release and remove the cover.



6. Press the power supply retainer back, slide the power supply forward and lift the power supply out of its cradle.
7. Unplug the motherboard power connector.



Installing the Power Supply

To install the new power supply:

1. Plug in the motherboard power connector.
2. Lay the power supply into its cradle and slide it back into position.

   Be sure the pads on the power supply are downward and the retainer is holding the power supply in place.
3. Lay the cover in position and press it down until the two latches snap shut.
4. Turn the SmartStor over and set it on its feet.
5. Plug in the power cord.
6. Boot the SmartStor.

   See “Connecting the Power” on page 9.

Replacing the Cooling Fan

Warning

The fan contains hazardous moving parts. Keep fingers and other body parts away.

Important

If your SmartStor is still under warranty, contact Technical Support for repair under RMA. See page 116.

The SmartStor DS4600 uses the following cooling fan:

- Make and model: NMB-MAT 3106KL-04W-B39-C50
- Dimensions: 80 x 80 x 15mm
- Input: 12V, 0.11A
- Output: 2200 RPM, 23.3 CFM, tachometer signal

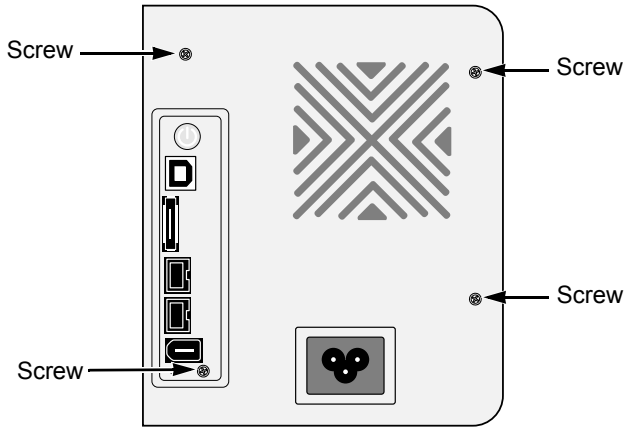
A replacement fan might be noisier in operation if the fan lacks a tachometer signal which SmartStor's management software uses to monitor and control fan speed.

Removing the Cooling Fan

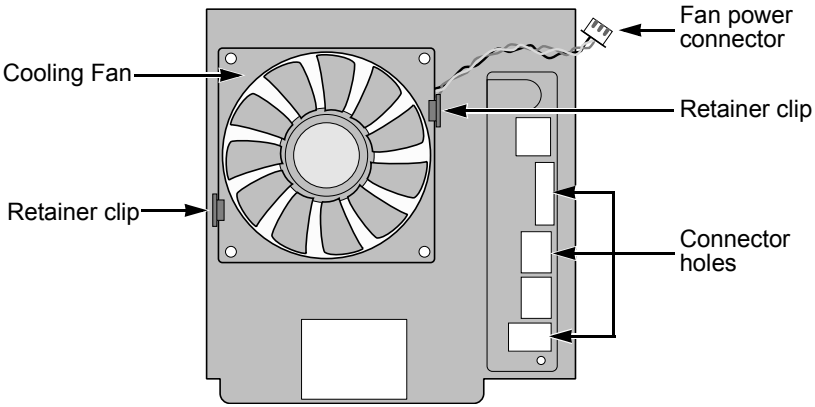
To remove the old cooling fan:

1. Shut down the SmartStor.

   See "Shutting Down the SmartStor" on page 35.
2. Unplug the power cord.
3. Remove the four screws from the back cover and remove the back cover.



4. Unplug the three-wire fan power connector at the motherboard.
5. Gently press outward on the two retainer clips to release the fan.



Installing the Cooling Fan

To install the new cooling fan:

1. Gently press the new fan into position between the retainer clips on the back cover.

   Be sure that the fan is positioned to blow outward and the wires extend toward the connector holes in the back panel.

2. Attach the three-wire fan power connector at the motherboard.
3. Place the back cover in position and install the four screws.
4. Plug in the power cord.

5. Boot the SmartStor.
   See “Connecting the Power” on page 9.

Appendix B: Important Information

GNU General Public License

This product includes copyrighted third-party software licensed under the terms of the GNU General Public License. Please see the GNU General Public License (“GPL”) for the exact terms and conditions of this license at www.gnu.org.

The GPL source code incorporated into the product is available for free download at our web site www.promise.com.

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