

IBM TotalStorage NAS Gateway 300 Model G02



# Installation and Initial Setup Guide

**Note**

Before using this information and the product it supports, read the safety information in Appendix C, "Safety notices", on page 43 and the general information in Appendix B, "Notices", on page 41.

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This edition applies to Release 2.7 of the IBM 5196 TotalStorage NAS Gateway 300, Model G02 (product number 5196-G02).

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## About this guide

This guide provides the steps required to install the hardware and initially configure the single-node Model G02. For procedures explaining how to replace components and change configuration settings, refer to the *IBM TotalStorage NAS Gateway 300 Model G27 Hardware Installation Guide* and the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.

The Model G02 does not support clustering. When you are following procedures in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*, any steps that address clustering are not applicable to the Model G02. For example, if the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference* instructs you to “power down the first node,” then you will power down your only node and ignore the sequence for “power down the second node.”

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## Who should read this guide

This guide is intended for anyone responsible for setting up the Model G02.

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## Publications

### Hardcopy publications shipped with the NAS Gateway 300 Model G02

The following publications are shipped in hardcopy and are also provided in softcopy form at [www.ibm.com/storage/support](http://www.ibm.com/storage/support):

- *IBM TotalStorage NAS Gateway 300 Model G02 Installation and Initial Setup Guide*  
This publication provides procedures for setting up, cabling, and replacing components of the Model G02.
- *Safety Information-Read this First*  
This publication contains general safety information translated into different languages.
- *IBM TotalStorage NAS Gateway 300 Model G27 Hardware Installation Guide*  
This publication contains some hardware installation and replacement procedures. This guide applies to the Model G27, but certain procedures also apply to the Model G02. Always consult this guide first.

### Related publications

The following publications are available on a CD-ROM shipped with this product and at [www.ibm.com/storage/support](http://www.ibm.com/storage/support):

- *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*  
This manual describes how to configure and use the software provided with the product.
- *IBM TotalStorage NAS Gateway 300 Model G27 Hardware Installation Guide*  
This guide describes the installation procedures for this product and is intended for the customer.
- *IBM TotalStorage NAS Gateway 300 Model G27 Hardware Service Guide*  
This guide describes the service procedures for this product and is intended for trained service personnel.
- *IBM TotalStorage NAS Gateway 300 Model G27 Quick-Start Instructions*

This publication does not apply to the Model G02, but is provided for informational purposes. It describes how to install the dual-node Model G27.

- *IBM TotalStorage NAS 100, 200, and Gateway 300 Planning Guide*

This guide explains how to plan for the installation and use of the NAS Gateway 300.

The following document is available only on the CD-ROM:

- *IBM TotalStorage NAS Translated Safety Notices*

This booklet contains translations of safety notices specific to this product.

## **Accessibility**

The softcopy version of this guide and the other related publications are accessibility-enabled for the IBM Home Page Reader.

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## Chapter 1. Introduction

### Note

This guide is the only document that is specific to the Model G02. The Model G02 is the single-node version of the dual-node Model G27. That being the case, most of the documentation for the Model G27 also applies to the Model G02. The hardware is identical for the two models, except that there is only one engine included with the Model G02 and two engines included with the Model G27. The major differences are that the Model G02 does not support clustering or domainlet configurations. All of the other information that applies to the primary node in the Model G27 documentation applies to the Model G02.

To take advantage of the similarities, the existing Model G27 documentation is also included with the Model G02. This document will refer to the Model G27 documentation when appropriate.

The NAS Gateway 300 connects clients and servers on an IP network to Fibre Channel storage, efficiently bridging the gap between local area network (LAN) storage needs and storage area network (SAN) storage capacities.

This appliance offers a storage solution for both Microsoft® Windows®, UNIX®, and UNIX-like environments, including mixed Windows-UNIX environments that enable Windows and UNIX clients and servers to share the same Fibre Channel storage.

The Model G02 replaces the Model G01. Enhancements provided by the new model include:

- More options in configuring Ethernet connections
- More options in configuring Fibre Channel connections
- More options for tape backup
- Faster processor
- Faster adapters

The single-node Model G02 features:

- One engine (IBM 5187 NAS Model 7RY), with:
  - Dual 2.4-GHz processors
  - 512 MB of ECC memory plus one upgrade of at least 1 GB (minimum memory is 1.5 GB); up to 4.5 GB available
  - Two redundant hot-swap 560-watt power supplies
  - Qlogic 2340 1-port Fibre Channel adapter for SAN connection
  - Six PCI adapter slots for plugging in optional adapters. Two slots are 133 MHz, three slots are 100 MHz, and one slot is reserved for the RSA card.
- Optional adapters:
  - Alacritech 100x4 Quad-Port Server Accelerated Adapter
  - IBM Gigabit Ethernet SX Server Adapter
  - IBM PCI Ultra160 SCSI adapter (LVD/SE)
  - Alacritech 1000x1 Single-Port Server and Storage Accelerated adapter
  - PRO/1000 XT Server Adapter by Intel
  - Qlogic 2340 1-port Fibre Channel adapter or Qlogic 2342 2-port Fibre Channel adapter (to replace single-port Fibre Channel SAN adapter)
  - Qlogic 2340 1-port Fibre Channel adapter for tape backup
  - Remote Supervisor Adapter

The preloaded software stack is based on the Windows Powered OS operating system, which is very similar to Microsoft Windows 2000 Advanced Server. Preloaded software includes:

**Microsoft Windows 2000 for Network Attached Storage**

Enables remote administration of the appliance using a Web-based graphical user interface (GUI).

**Microsoft Windows Terminal Services**

Enables remote administration of the appliance using its Windows desktop.

**Microsoft Services for UNIX**

Provides file access to UNIX and UNIX-based clients and servers through the Network File System (NFS) protocol. Note that the NAS Gateway 300 supports Linux and other platforms that employ NFS.

**IBM Director Agent and Universal Manageability Server Extensions**

Provides system management support based on industry standards (in conjunction with the IBM Director console application as well as other management software).

**IBM Advanced Appliance Configuration Utility agent**

Supports management through the IBM Advanced Appliance Configuration Utility console application (supports aggregate Web-based management of all of your IBM appliances).

**IBM FAST Management Suite Java (MSJ)**

Provides diagnostics for the Fibre Channel adapters.

**Intel® PROSet II**

Provides diagnostics for the Intel Ethernet adapters.

**Alacritech® SLICuser**

Provides diagnostics for the quad-port and accelerated Ethernet adapters.

**Columbia Data Products® Persistent Storage Manager (PSM)**

Provides 250 persistent images of customer data and enables full online backup of system with Microsoft backup applications.

**Tivoli® Storage Manager Client**

Provides data backup and archive support (in conjunction with Tivoli Storage Manager Server).

**Tivoli SANergy™**

Provides shared data access to the SAN storage at Fibre Channel speed.

**Services for NetWare**

Provides interoperability within the Novell environment and a complete set of new interoperability services and tools for integrating the Model G02 into existing NetWare environments. Only Netware V5.0 Print and File services are included in the preloaded code and is required for supporting Netware File system protocol. Clustering is not supported by the SFN5.

**Storage Manager for SAK**

A storage management tool that includes storage reports, directory quotas, and file-screening functions.



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## Chapter 2. Installation

This chapter describes how to install the Model G02.

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### Preinstallation checklist

Ensure that you have the following items in addition to this guide:

- 5187 Model 7RY engine
- Power cords (2)
- CD-ROMs (7)
- Enablement diskette
- Rack-mounting kit
- Rack-mounting installation instructions and template
- Cables necessary to connect to Ethernet network and storage

If you ordered options, your package might contain additional hardware, software, or publications for those options.

If an item is missing or damaged, contact your place of purchase.

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### Initial installation

The initial installation consists of the following steps:

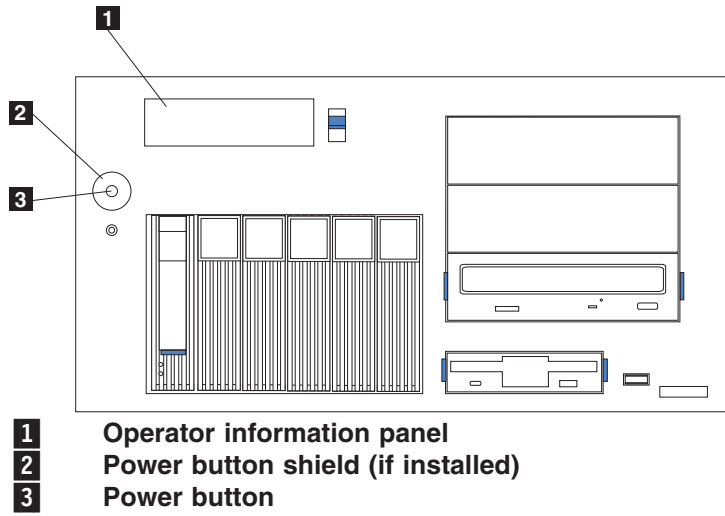
- Rack installation
- Installation testing

### Rack installation

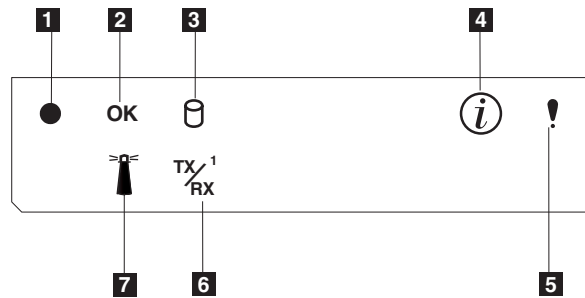
Refer to the *Rack Mounting Instructions* included with the appliance.

### Installation testing

Test your installation by powering on the appliance (refer to “Powering on and off the Model G02” on page 6 for this procedure). Each time the appliance is powered on, it automatically runs a self-testing program to ensure that it is running correctly. If the power-on diagnostics complete successfully, one beep will sound and the information LED and the system error LED on the operator information panel are off. See Figure 1 on page 4 for the location of the operator information panel, and Figure 2 on page 5 for the location of the LEDs on the operator information panel.



*Figure 1. Location of the operator information panel*



- 1 Power-on LED:** This green LED is on when system power is present in the appliance. When this LED flashes, the appliance is in standby mode (the system power supply is turned off and ac power is present). If this LED is not on, the power cord is not on, the power supply has failed, or this LED has failed.
- 2 POST complete (OK) LED:** This green LED is on when POST completes without any errors.
- 3 Hard disk drive activity LED:** This green LED is on when there is activity on the internal hard disk drive.
- 4 Information LED:** This amber LED is on when the information log contains information about certain conditions in your appliance that might affect performance. For example, the LED is on if your appliance does not have functioning redundant power. An LED on the diagnostic panel on the system board will also be on.
- 5 System error LED:** This amber LED is on when a system error occurs. An LED on the diagnostic panel on the system board will also be on to further isolate the error.
- 6 Ethernet transmit/receive activity (TX/RX<sup>1</sup>) LED:** This green LED is on when there is transmit or receive activity to or from the appliance on the integrated Ethernet port.
- 7 System locator LED:** This blue LED can be turned on remotely to identify a specific engine.

Figure 2. LEDs on the operator information panel

If a problem is detected, refer to the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*. If you are instructed to power down the appliance, refer to "Powering on and off the Model G02" on page 6.

After the power-on diagnostics have completed successfully, you can install any additional optional adapters that you might have ordered for your engine. For information on installing additional adapters, see the *IBM TotalStorage NAS Gateway 300 Model G27 Hardware Installation Guide*.

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## Powering on and off the Model G02

The following sections list the steps necessary to power on and shut down the Model G02.

### Powering on the Model G02

Follow this procedure to power on the Model G02:

1. Power on any uninterruptible power supply and allow it to return to normal operation.
2. Power on any network hubs or switches.
3. Power on the Model G02.

### Shutting down the Model G02

Follow this procedure to shut down the Model G02:

1. Select **Start** → **Shut Down** and select **Shut down** from the drop-down menu.
2. Click **OK**.
3. You can power off any network hubs or switches that are used exclusively by the NAS Gateway 300. If they are used by other network attached devices, do not power off.
4. You can also power off any uninterruptible power supplies that regulate power for the NAS Gateway 300, provided that no other equipment that you want to keep powered on is plugged into the same uninterruptible power supply.

## Chapter 3. Setup and configuration

This chapter gives details to set up the initial communication to the Model G02 to enable setup and configuration. These instructions refer specifically to a base configuration as shipped and do not cover the setup of additional storage units, which can be purchased separately.

### A suggestion for first-time users . . .

Your understanding of the Model G02 and your ability to use it will be greatly enhanced if you first proceed to the NAS Setup Navigator tutorial.

The NAS Setup Navigator maps out the initial configuration tasks and leads you through the tasks in the proper order. The tool detects which NAS appliance it is running on and adjusts the menu and content appropriately. You can follow links to more in-depth information and to the configuration panels used to perform the steps. You can also tailor the instructions to fit your needs by selecting optional topics. The Navigator allows you to enable the functions and features. To start the NAS Setup Navigator, click the NAS Setup Navigator icon on the desktop.

After you have become familiar with the Model G02, you can refer to the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference* for more details.

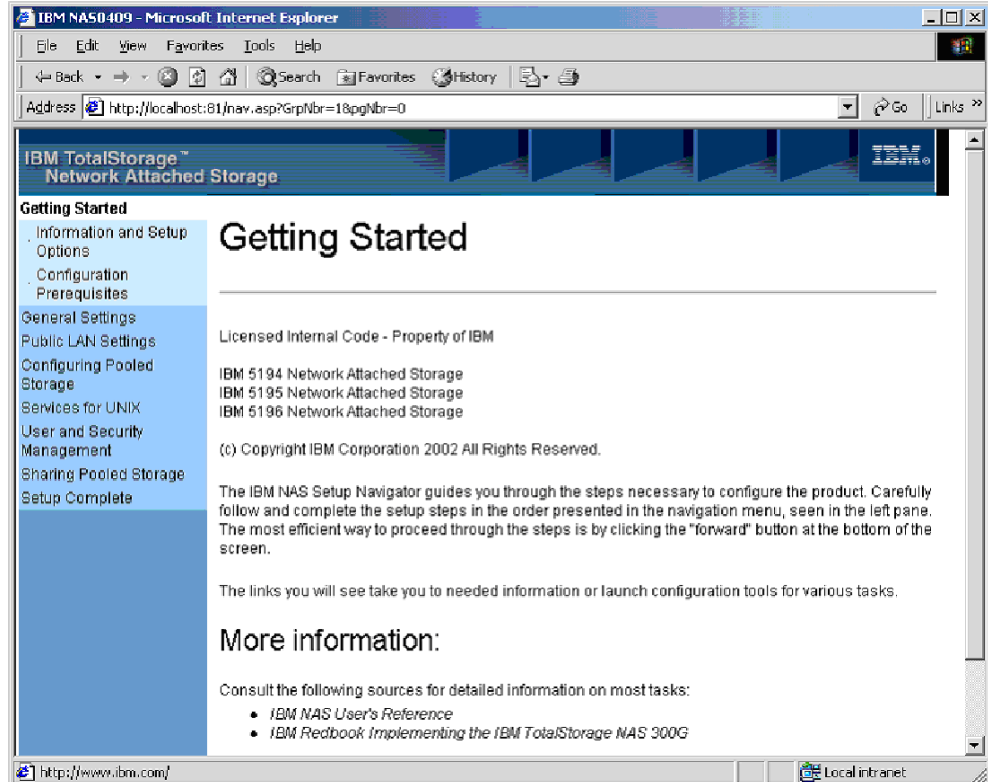


Figure 3. Opening screen of the NAS Setup Navigator

**Note:** References to “Public LAN” in the NAS Setup Navigator refer to the LAN connection to the network, whether that is a public or internal network.

The following procedures explain the requirements and instructions for setting up and configuring the Model G02. Following these directions and referring to the appropriate sections of the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference* will help you in this task.

### **Prerequisites**

- A domain controller must exist on the network and a login ID must be defined.
- All Windows shared disks must be defined as basic. Windows 2000 dynamic disks are not supported.
- All shared storage must be defined as NT File System (NTFS) and be on primary partitions.
- Compression cannot be enabled on any disk partition.
- The node must have a public adapter.

### **Configuration and administration tools**

The Model G02 is a network-attached-storage appliance that has several different methods of configuration depending on your environment.

First, determine how you will manage the device. You can manage the Model G02 in either “headless” mode or with a keyboard, display, and mouse directly attached to the engine. It is recommended that you directly attach a keyboard, display, and mouse to the Model G02 when you are performing the following procedures:

- Setting up and configuring the Model G02 for the first time
- Changing or adding RAID arrays defined on the fibre-attached storage
- Troubleshooting the device
- Managing when there is a single or few appliances in the network and you use static setup and definition.

For “headless” management of the Model G02, you can use one of the following tools:

- **Windows Terminal Services**

If Dynamic Host Configuration Protocol (DHCP) is installed and the IP address requested can be determined, use this method for initial setup, but you should change the address to static later in the configuration.

This condition is most appropriate when using Windows Terminal Services for operation of the Model G02. See “Terminal Services and the IBM NAS Administration console” on page 11 for more information.

- **IBM Advanced Appliance Configuration Utility**

If you have multiple appliances or cannot determine the DHCP address, install the IAACU to identify appliances and define IP addresses. The tool also allows you to set static addresses. See “IBM Advanced Appliance Configuration Utility” on page 13 for more information.

- **Universal Manageability Services (UMS)**

Enables management through a Web browser. See “Accessing Universal Manageability Services” on page 19 for more information.

- **Windows 2000 for NAS**

A Web-based GUI for those not familiar with the Windows desktop. See “Windows 2000 for Network Attached Storage” on page 18 for more information.

After you determine how you will manage the Model G02, you can begin setup and configuration of the device.

For more information on configuration and administration tools, see Chapter 3, "Configuration and administration tools" in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.

### Step 1 - Initial network setup

Configure the node to enable access over the network. The general steps to do this are given below.

1. Use DHCP or static addressing to set up one public network connection in the node.
  - a. If you are operating with a keyboard, display, and mouse, set up a public network connection to access the device.
  - b. If you are operating in a headless environment, use one of the following methods:
    - If DHCP is installed and the IP address requested can be determined, you can use DHCP for initial setup, but you should change this address to static later in the configuration.
    - If you have multiple appliances or cannot determine the DHCP address, you can install the IAACU utility to identify appliances and define IP addresses. With this tool, you can also set static addresses.
2. Complete the steps in "Set the date and time" on page 19 and "Set up the network" on page 19.

### Step 2 - Define storage and setup partitions

The Model G02 attaches to your SAN-attached storage device, through the Fibre Channel, and provides your Ethernet LAN-attached clients access to that storage. You must define storage arrays and logical drives on the SAN-attached storage device and set up Windows partitions on the logical drives as defined in Chapter 4, "Setting up storage" in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.

For more information on defining storage and setting up partitions, see Chapter 4, "Setting up storage" in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.

**Note:** If you are attaching an IBM TotalStorage Enterprise Storage Server, follow these steps to set the TimeoutValue in the Windows 2000 registry of your Model G02:

1. Click **Start -> Run**.
2. Enter regedt32.exe.
3. Navigate to the following registry key: HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\Disk.
4. Locate the value called TimeoutValue. If the value exists, continue with step 5 on page 10. If the value does not exist, create it by following this procedure:
  - a. Click **Edit -> Add Value**.
  - b. In the ValueName field, type TimeoutValue.
  - c. In the Data Type field, select **REG-DWORD** from the drop-down list.
  - d. Click **OK**.

- e. In the Data field, type 3c.
  - f. Select the **Hex** radio button.
  - g. Click **OK**
  - h. Skip to step 6
5. If the value is less than X'0000003c' (60 decimal), complete this procedure to increase it to X'0000003c'
    - a. Click **TimeOutValue**.
    - b. Click **Edit -> DWORD**.
    - c. In the Data field, type: 3c.
    - d. Select the **Hex** radio button.
    - e. Click **OK**.
  6. Exit the regedt32 program by closing the window.
  7. Restart the Model G02 to allow the new settings to take effect.

### Step 3 - Complete network setup

1. Power on the node.
2. Set up the node:  
See “Configure the local area connection” on page 20 and “Add the appliance to a domain” on page 21.

### Step 4 - Additional functions

Additional functions are available for backup, persistent images, and adding more storage areas. It is recommended that after you complete the setup and configuration procedures, you use the Persistent Storage Manager Disaster Recovery option (see “Disaster recovery” in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*) or other method to back up the system configuration in the event of a failure.

Also, **it is imperative to use the system shutdown procedure** described in “Powering on and off the Model G02” on page 6 to ensure system integrity.

For more information, see Chapter 6, “Managing and protecting the network and storage” in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.

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## Select the configuration and administration tool

Table 1 suggests which tool to use for specific functions, but does not list all options or combinations. The administrator's training level or preferences might determine an alternate approach from that suggested in the table.

*Table 1. Summary of configuration and administration tools for the Model G02*

Administration tool	Main functions
Windows Domain Controller (not NAS appliance)	Users and user groups can be defined and authenticated by the Windows Domain Controller, although this is not required.
IBM Advanced Appliance Configuration Utility (IAACU)	Access a headless Model G02 node, particularly for the initial setup of the network connectivity. (Alternatively, you can attach a keyboard, mouse, display to the Model G02.) IAACU enables you to: <ul style="list-style-type: none"> <li>• Set time, date, and initial network connectivity parameters</li> <li>• Access Windows 2000 for NAS GUI, Terminal Services (NAS Desktop), and Universal Manageability Services</li> </ul>



Table 1. Summary of configuration and administration tools for the Model G02 (continued)

Administration tool	Main functions
Windows 2000 for NAS GUI	Provides ease-of-use administration, but not all the capabilities of Terminal Services and IBM NAS Administration. The GUI enables you to: <ul style="list-style-type: none"> <li>• Configure public LAN connections</li> <li>• Create and format logical drives</li> <li>• Join domains</li> <li>• Set up access permissions and disk quotas for CIFS, NFS, HTTP, FTP, and Novell NetWare shares</li> <li>• Use Persistent Storage Manager</li> </ul>
IBM NAS desktop and IBM NAS Admin program, through a Terminal Services session or a directly connected keyboard and monitor	Provides in-depth administration of all aspects of Model G02. Provides all of the Windows 2000 for NAS GUI functions above, plus the ability to: <ul style="list-style-type: none"> <li>• Use NAS Backup Assistant, or NT Backup and Restore wizard</li> <li>• Learn detailed inventory information about hardware, OS, and so on, using Universal Manageability Services</li> <li>• Diagnose system problems: <ul style="list-style-type: none"> <li>– Check the onboard Ethernet controller using the Broadcom Advanced Control Suite.</li> <li>– Check Ethernet adapters using PROSet II, SLICuser, or both, depending on which adapters are installed.</li> <li>– Check Fibre Channel card using FASiT MSJ.</li> </ul> </li> </ul>
Disaster Recovery	Restores a previously saved PSM image of the system partition to a failed machine. This restores all configuration information on the failed node. You create the recovery boot diskette from the PSM tools in the Windows for 2000 NAS GUI.
Recovery CD-ROM Set	Reinstalls the software to the original state as shipped on the machine; however, does not restore configuration information (configuration changes you applied to the original shipped configuration are lost). You must first boot with the Recovery Enablement Diskette, and then reboot with the Recovery CD-ROM. To create the Recovery Enablement Diskette, run <code>enablement_disk_x.y.exe</code> (where <code>x.y</code> are the version number of the disk), located on the Supplementary CD-ROM. You will be prompted to insert a blank disk into drive <b>a:</b> .
Integrated System Management Processor (ISMP) configuration program	Configures the ISMP that is integrated on the engine planar board.
Remote Supervisor Adapter (RSA) configuration program	Configures the optional RSA.

## Terminal Services and the IBM NAS Administration console

If you are familiar with Windows operating systems, you can use Terminal Services. In some cases, you must use Terminal Services to complete administrative tasks.

You can access Terminal Services in two ways:

1. Through the UM Services browser, as described in Starting UM services in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.
2. By using the Terminal Services Client software.

### Installing Terminal Services

To use the Terminal Services Client, complete the following steps to install it on the remote workstation and connect to the Model G02 appliance:

1. Insert Supplementary CD-ROM #2 into the workstation CD-ROM drive.
2. Select **Start** → **Run**.
3. In the Open field, type (with quotation marks)

```
"x:\Terminal Services Client\Disk 1\setup.exe"
```

where *x* is the drive letter assigned to the CD-ROM drive.

4. Click **OK** to begin the Terminal Services Client Setup program.
5. Accept the defaults in each window that opens or refer to the Microsoft Windows documentation for more instructions.
6. When the Terminal Services Client Setup program completes, ensure that the workstation has network connectivity to the NAS appliance so that you can administer the appliance.

## Connecting to the desktop through Terminal Services

To connect to Terminal Services from your workstation, do the following:

1. Click **Start** → **Programs** → **Terminal Services** → **Terminal Services Client**.
2. In the Server field, select the computer name of the appropriate Model G02. If that Model G02 is not listed, type the IP address or the computer name of the Model G02. The computer name is predefined as IBM5196-xxxxxxx, where xxxxxx is the serial number located in the lower right corner of the bezel on the front of the appliance. If you have changed the computer name from the predefined value, use that name instead.

**Note:** Although you can do so, it is recommended that you not change the default computer name to avoid the chance of propagating misidentification through the system. And, if you are using IBM Director to manage your appliance, and you change the default name, the default name continues to appear in IBM Director.

3. For **Size**, select a screen size in which the Model G02 desktop will appear. It is recommended that you choose a size other than full screen.
4. Click **Connect** to start the Terminal Services Client session. A user login window opens.
5. Log in. Type *Administrator* in the Username field, type *password* in the Password field, and then click **OK** to log in. After you log in, you can begin using Terminal Services Client to configure and manage the Model G02, as if a keyboard, mouse, and monitor were directly attached to it. The Model G02 desktop contains a shortcut, titled **IBM NAS Admin**, to a special console, the IBM NAS Administration console.

## IBM NAS Administration console

The IBM NAS Administration console includes all the standard functions provided by the standard Computer Management console available on any Windows 2000 desktop, plus the following advanced functions specific to the Model G02 (see Chapter 6, “Managing and protecting the network and storage” in the *IBM TotalStorage NAS Gateway 300 Model G27 User’s Reference*):

- NAS Backup Assistant
- Persistent Storage Manager

## Determining who is using the network-attached storage

Occasionally, you might want to know who is using the network-attached storage.

To determine this information:

1. Start a Windows Terminal Services session from the administrator’s console to the Model G02.
2. Click the **IBM NAS Admin** icon on the desktop.
3. In the left pane, click **File Systems** → **Shared Folders** → **Sessions**.

4. The users currently using the storage are displayed. To close those sessions, use a right-click. Before you close a session, notify the user that you are going to close the session by clicking **Start** → **Programs** → **Accessories** → **Command Prompt**, and then issuing the `net send hostname messagetext` command.

## IBM Advanced Appliance Configuration Utility

**Note:** Although you can do so, it is recommended that you not change the default computer name of your NAS appliance to avoid the chance of propagating misidentification through the system. Also, The IBM Advanced Appliance Configuration Utility (IAACU) depends on the original name to function.

The IBM Advanced Appliance Configuration Utility helps you to set up and reconfigure the network configuration on the Model G02 appliance, as well as other IBM appliances.

The IAACU agent, preinstalled on the Model G02 appliance, works with the IAACU console, a Java-based application that is installed on a network-attached system. You can use the IAACU as a systems-management console to automatically detect the presence of Model G02 appliances on the network. After the Model G02 appliance is detected by the IAACU console, use the IAACU to set up and manage the appliance's network configuration, including assigning the IP address, default gateway, network mask, and DNS server to be used by the appliance. You can also use the IAACU to start Universal Manageability Services (UM Services) on the appliance, enabling you to perform more advanced systems-management tasks.

For networks that are not currently running DHCP servers, the IAACU is useful for automatically configuring network settings for newly added appliances, such as the Model G02.

However, networks with DHCP servers will also benefit from using the IAACU because it enables you to reserve and assign the appliance IP address in an orderly, automated fashion. Even when you use DHCP and do not reserve an IP address for the appliance, you can still use the IAACU to discover appliances and to start UM Services Web-based systems management.

### Notes:

1. The IAACU configures and reports the TCP/IP settings of the first adapter on each appliance. The "first" adapter is determined by its position. If there is a connection to the onboard Ethernet controller, then this is the first adapter. If there is no connection there, then it will make slot 2 the first adapter.  
Be sure to connect the first adapter to the same physical network as your systems-management console. You can do this by manually configuring the network adapter to be on the same subnetwork as the systems-management console.
2. The IAACU must be running to configure newly installed appliances automatically.
3. The system running the IAACU console automatically maintains a copy of its database (ServerConfiguration.dat) in the Advanced Appliance Configuration Station installation directory (Program files\IBM\iaaconfig). To remove previous configuration data, close the IAACU, delete this file, and then restart the utility. This deletes all previously configured Families. However, the IAACU will automatically discover connected appliances and their network settings.

## Installing the IBM Advanced Appliance Configuration Utility

These instructions assume that you have installed and powered on the appliance according to the installation procedures. You are now ready to install the IAACU console application from the Supplementary CD-ROM.

Install the IAACU console application from the Supplementary CD-ROM onto a Windows NT<sup>®</sup> 4.0 or Windows 2000 workstation that is attached to the same IP subnetwork to which the appliance is attached.

**Note:** The IAACU creates a private database that is specific to the IP subnetwork to which it is attached. Therefore, do not install it on more than one systems-management console residing on the same IP subnetwork.

After you install the IAACU console application, the following steps will take you to the point where you can administer the appliance.

1. Start the IAACU console application by clicking its icon.
2. On the left pane of the Advanced Appliance Configuration console, select the appliance to administer. Initially, the appliance name is **IBM5196-serial number**; the serial number is located in the lower right corner of the bezel on the front of the appliance.
3. Click **Start Web Management** to start the UM Services browser. This will open a separate Web browser window.
4. Proceed to “Accessing Universal Manageability Services” on page 19.

For more information on the IAACU, see “IAACU console”.

## Initial network adapter selection and connection to the IAACU

### IAACU agent

The IAACU agent is preinstalled on the Model G02 appliance.

After you connect the Model G02 to your network, the IAACU agent automatically reports the appliance serial number and type, the MAC address of its onboard Ethernet controller, and whether DHCP is in use by the appliance. Furthermore, it reports the host name, primary IP address, subnet mask, primary DNS server address, and primary gateway address if these are configured on the system.

**Note:** The IAACU agent periodically broadcasts the appliance IP settings. To prevent the service from broadcasting this data periodically, stop the `iaaconfig` service.

### IAACU console

The IAACU console is a Java application that you install on one system in your network for use as a systems-management console. For information on how to install the IAACU console, see “Installing the IBM Advanced Appliance Configuration Utility”.

**Note:** The IAACU creates a private database that is specific to the IP subnetwork to which it is attached. Therefore, do not install it on more than one systems-management console residing on the same IP subnetwork.

The IAACU console enables you to:

- Automatically discover Model G02 appliances, as well as other IBM appliances that run the IAACU agent and are attached to the same physical subnet as the IAACU console.

- Use a GUI-based application to configure the appliance network settings.  
Use the IAACU to assign network parameters such as IP addresses, DNS and gateway server addresses, subnet masks, and host names.
- Start UM Services Web-based systems-management console.  
Launch UM Services on your appliances and perform advanced systems-management tasks on a selected appliance with a single mouse click.

The IAACU console is divided into two panes:

- **Tree View Pane**

The Tree View Pane, located on the left side of the IAACU console window, presents a list of all discovered Model G02 appliances. The Tree View Pane also includes groups for appliances that were not configured using the IAACU or that have IP addresses that conflict with other devices on your network. When you click any item in the Tree View, information about that item (and any items that are nested below that item in the tree view) appears in the Information Pane.

- **Information Pane**

The Information Pane, located on the right side of the IAACU console, displays information about the item that is currently selected in the Tree View Pane. The information that appears in the Information Pane varies depending on the item that is selected. For example, if you select the All Appliances item from the Tree View Pane, the Information Pane displays configuration information (IP settings, host name, serial number, and so on) about each of the Model G02 appliances that have been discovered by the IAACU console.

The IAACU console also features the following menus:

**File** Use the File menu to import or export the IAACU console configuration data, to scan the network, or to exit the program.

**Appliance**

Use the Appliance menu to remove a previously discovered appliance from a group.

**Help** Use the Help menu to display product information.

**Discovering Model G02 appliances:** Any Model G02 appliance, or other IBM appliance, that is running and is connected to the same subnet as the system running the IAACU console is automatically discovered when you start the IAACU console. Discovered appliances appear in the IAACU console tree view (in the left pane of the IAACU console window). Every discovered appliance is listed in the tree view under All Appliances.

## Universal Manageability Services

Universal Manageability Services (UM Services) is a Windows application that functions as both a stand-alone management tool for the system it is installed on and a client to IBM Director.

As a Director Client, it receives and sends information to the Director Server as controlled from the IBM Director Console.

As a stand-alone tool, it provides a Web-browser based interface and a Microsoft Management Console (MMC) interface, where you can view the system status, perform certain management tasks and configure alerts.

The UM Services GUI enhances the local or remote administration, monitoring, and maintenance of IBM systems. UM Services is a lightweight client that resides on each managed computer system. With UM Services, you can use a Web browser and UM Services Web console support to inventory, monitor, and troubleshoot IBM systems on which UM Services is installed.

This “point-to-point” systems-management approach, in which you use a Web browser to connect directly to a remote-client system, enables you to effectively maintain IBM systems without requiring the installation of additional systems-management software on your administrator console.

In addition to point-to-point systems-management support, UM Services also includes support for UM Services Upward Integration Modules. These modules enable systems-management professionals who use any supported systems-management platform (including Tivoli Enterprise™, CA Unicenter TNG Framework, and Microsoft Systems Management Server [SMS]) to integrate portions of UM Services into their systems-management console. Because it was designed to use industry-standard information-gathering technologies and messaging protocols, including Common Information Model (CIM), Desktop Management Interface (DMI), and Simple Network Management Protocol (SNMP), UM Services adds value to any of these supported workgroup or enterprise systems-management platforms.

You can use UM Services to perform the following tasks:

- View detailed information about your computers, including operating system, memory, network cards, and hardware.
- Track your computers with features such as power management, event log, and system monitor capabilities.
- Upwardly integrate with Tivoli Enterprise, Tivoli NetView®, Computer Associates Unicenter, Microsoft SMS, and Intel LANDesk® Management Suite.

Complete documentation on how to use UM Services is included on the Documentation CD-ROM that came with the appliance.

## **System requirements**

The UM Services client is preinstalled on the Model G02 appliance. However, you must have a Web browser installed on your systems-management console. It is recommended that you set Microsoft Internet Explorer 5.x (or later) as the default browser.

### **Notes:**

1. You must install the optional Java Virtual Machine (VM) support to access a client system running UM Services.
2. If you reinstall Internet Explorer after installing UM Services, you must reapply the Microsoft VM update. The UM Services client requires Microsoft VM Build 3165 or later. Download the latest Microsoft VM from [www.microsoft.com/java](http://www.microsoft.com/java)
3. If you install UM Services before you install MMC 1.1 (or a later version), you will not have an icon for MMC in the IBM Universal Manageability Services section of the Start menu.

## **Starting UM Services**

You can use IAACU or Terminal Services Client to configure the network setting remotely, or you can attach a keyboard and mouse to your appliance and configure the Network settings using the Windows Control Panel. After you have configured the network settings for your appliance, you are ready to use UM Services.



To start UM Services:

1. Start a Web browser and then, in the **Address** or **Location** field of the browser, type:

**http://ip\_address:1411**

where *ip\_address* is the IP address of the Model G02, and then press **Enter**.

Or, type:

**http://computer\_name:1411**

where *computer\_name* is the computer name of the Model G02. The computer name is predefined as: IBM5196-xxxxxxx, where xxxxxx is the serial number located in the lower right corner of the bezel on the front of the appliance.

If you have changed the computer name from the predefined value, use that name instead. A user login window opens.

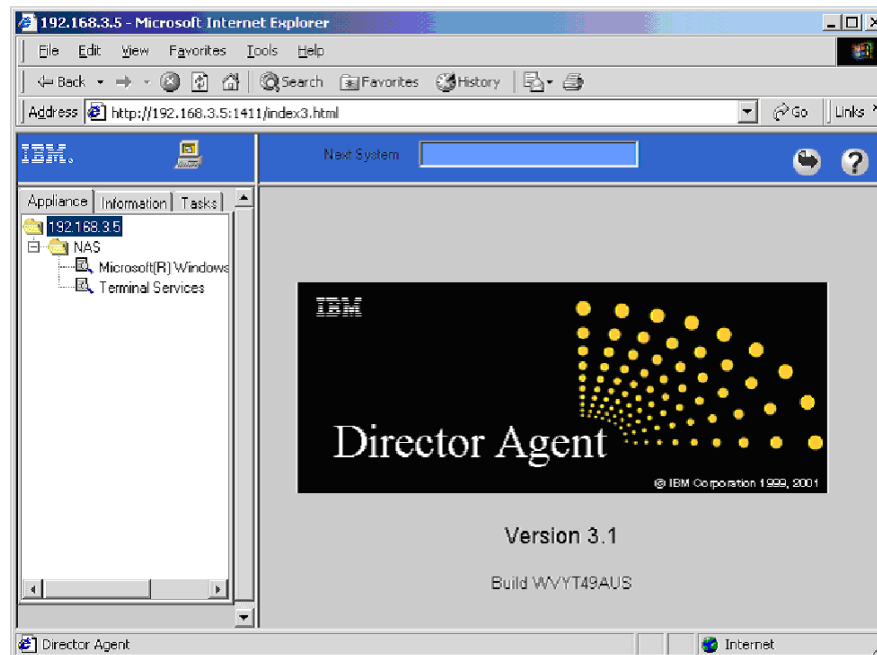


Figure 4. UM Services default page

2. Type *Administrator* in the User Name field, and type *password* in the Password field. You can leave the Domain field blank. Make sure the **Save this password in your password list** check box is **not** selected, and then click **OK**.

**Note:** To ensure system security, change the Administrator password from “password” to something else. After you do, or if you create another user in the Administrator group in the future, use your new username/password combination instead of the default username/password combination.

The first time you connect, you might be prompted to install XML and Swing components. Follow the on-screen instructions to install these components and then close and restart Internet Explorer before you proceed.

You are now connected to the Model G02 through UM Services. In addition to the standard UM Services functionality, the appliance includes functionality for administering the appliance, available from the Appliances tab in the left pane of the UM Services browser. The default view (in the right pane of the UM Services browser) when you connect to the appliance is Windows 2000 for NAS. The other selectable view in the Appliances tab is Windows 2000 Terminal Services, which displays a Terminal Services Web Connection page.

3. To start Windows 2000 for NAS, click **Administer this server appliance** in the right pane of the UM Services browser. To connect to the Model G02 and manage it as though you were running Terminal Services Client from the desktop, select **Terminal Services** in the Appliance tab of the UM Services browser, and then follow the instructions for connecting to the Model G02 using Terminal Services described in “Terminal Services and the IBM NAS Administration console” on page 11.

**Launching UM Services from the configuration utility:** You can use the IAACU to launch UM Services on the Model G02 appliances.

**Note:** The selected appliance must be running UM Services as a UM Services client. Also, the systems-management console (the system that is running the IAACU console) must use a Web browser that is supported for use with UM Services. If you have not used UM Services from this system, you must install several plug-ins before proceeding.

To use the IAACU console to start UM Services on an appliance:

1. Click the appliance in the IAACU console Tree View Pane.  
When you select the appliance from the tree view, information about the selected appliance appears in the Information Pane.
2. Click **Start Web-Based Management**.  
Your default Web browser starts, loading the UM Services browser automatically.
3. Log in to the UM Services browser. Refer to Step 2 on page 17 for login instructions.

For more information on using UM Services to manage your appliances, see the *Universal Manageability Services User's Guide*, included on the Documentation CD-ROM that came with the appliance.

## Windows 2000 for Network Attached Storage

While you can perform most administrative tasks using Windows 2000 for NAS, you must use Terminal Services Client for some advanced tasks. See “Terminal Services and the IBM NAS Administration console” on page 11 for more information.

Task categories available to you through Windows 2000 for NAS include:

- Status
- Network
- Disks
- Users
- Shares
- Maintenance
- Controller



To start Windows 2000 for NAS, use one of these methods:

- UM Services, described in Step 3 on page 18
- Web browser, by entering **http://ip\_address:8099** or **http://computer\_name:8099** and then logging on to the Model G02
- Model G02 desktop while using Terminal Services Client and starting a browser

You can access online help for Windows 2000 for NAS in two ways:

1. Click the **Help** button at the top of any Web page. This displays a table of contents that you can navigate to find help for any Windows 2000 for NAS task.
2. Click the question mark (?) button at the top of any Web page. This displays context-sensitive help for the task you are currently performing.

## Accessing Universal Manageability Services

1. You will be prompted to authenticate with the administrative user name (“Administrator”) and password (initially “password,” but you can change it later; note that the password is case-sensitive, but the user name is not).  
If this is the first time you have accessed the UM Services browser (on any appliance) from this workstation, you will also be prompted to install the Swing and XML Java libraries in your Web browser. You can download these libraries from the Model G02 through the network link.
2. The UM Services browser starts. In the left pane, Microsoft Windows 2000 for Network Attached Storage is automatically selected on the Appliances tab. In the right pane, Windows 2000 for Network Attached Storage starts.
3. Again, you are prompted to authenticate with the administrative user name and password.
4. Click **Administer this server appliance** to bring up the Microsoft Windows 2000 for Network Attached Storage GUI.

You are now ready to begin administering the appliance. Details for this task are described in the section “Initial setup and configuration” in the *IBM TotalStorage NAS Gateway 300 Model G27 User’s Reference*.

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## Set the date and time

To change the date and time, click **Date and Time**. (Remember that you can also access all of these task groups by clicking the titled tabs at the top of the page.) The Set Date and Time page appears, allowing you to adjust information as necessary.

---

## Set up the network

**Note:** All appliances have an initial default user name of “Administrator” and password of “password.”

As part of the Network task group, you can change the administrator password and (optionally) you can configure the properties of each network interface that resides on the appliance.

To change the administrator password, click **Change Administrator Password**. The Change Administrator Password page appears, allowing you to change the password. Note the warning on the page that any information that you enter can be

viewed by others on the network. To prevent others from seeing your information, set up a secure administration Web site as described in the online help.

To change IP addresses, click **Interfaces**. The Network Adapters on Server Appliance page appears. Use this page primarily to change IP addresses from dynamic (DHCP, which is the system default) to static.

**Note:** During the initial setup, you can configure either the onboard Ethernet controller, or a nonplanar Ethernet adapter.

If you want to use an Ethernet adapter other than the onboard Ethernet controller or the Ethernet adapter in slot 2 as the network interface to be attached to the subnet, then you can change the order of precedence later with the Windows Networking Properties option. The order of precedence for the initial configuration is: onboard Ethernet controller, then PCI slot 2.

During initial setup, the IAACU first looks for an onboard Ethernet connection. If that connection exists, it enables it. If there is no connection to the onboard Ethernet controller, then it will enable the Ethernet adapter in slot 2. You can then enable any other NIC interfaces by right-clicking the adapter icon.

You must modify the adapter by completing the **IP** task (to modify IP configurations) and then choosing one or more of the following tasks, as appropriate:

- **DNS** (to modify DNS configurations)
- **WINS** (to modify WINS configurations)
- **HOSTS** (to modify host configurations)

---

## Configure the local area connection

**Note:** The network adapter's IP address can be obtained automatically if a DHCP server is available.

To configure the local area connection, perform the following steps:

1. Right-click **My Network Places**, and then click **Properties**.
2. Select a **Local Area Connection**.
3. To rename the connection, click **Rename**, and then type (for example) **Public 1**, and press **Enter**. Ensure that local area connection names are unique.
4. Enter the networking addresses:
  - a. Right-click **My Network Places**.
  - b. Click **Properties**.
  - c. Right-click the **Public** icon, and then click **Properties**.
  - d. Select **Internet Protocol (TCP/IP)**.
  - e. Click **Properties**, select **Use the following IP address:**, and enter the addresses for the IP, subnet mask, default gateway, and preferred DNS server.
5. If needed, configure the DNS, WINS, HOSTS, or whichever method you will be using for names resolution. To view this information, click **Advanced** on the Properties window.

**Note:** NetBIOS should be disabled.

6. Click **OK** on each panel to return to the Properties window.

Do not place paired adapters on the same IP network unless you are going to use adapter teaming or adapter load balancing.

---

## Add the appliance to a domain

You will need the domain name, as well as the domain administrator username and password to add the appliance to an existing domain. To add the Model G02 to a domain, follow these steps:

**Note:**

1. On the Windows desktop, right-click the **My Computer** icon.
2. Select **Properties**.
3. Click the Network Identification tab.
4. Click **Properties**.
5. Select the **Domain** radio button.
6. Type the name of the domain into the text field.
7. Click **OK**.
8. When prompted, enter the domain administrator username and password for the domain.
9. Click **OK**.

---

## Verify network connectivity and names resolution

Verify network connectivity and names resolution.

To verify that the networks are communicating correctly:

1. Click **Start → Run**, type **cmd** in the text box, and click **OK** to bring up an MS-DOS prompt.
2. Type **ping ipaddress** where *ipaddress* is the IP address of a different network adapter, and press **Enter**.

You can do this from any machine that is physically connected to the network of each node.

To view the address, use the **ipconfig** command on the node.

1. Click **Start → Run**, type **cmd** in the text box, and click **OK** to bring up an MS-DOS prompt.
2. Type **ipconfig** and press **Enter**. IP information should appear for the connected network adapter in the machine.

---

## Create a disaster recovery boot diskette

Use of the NAS Disaster Recovery feature for backup of the C: to a local FAT32 partition (D:) or a network share requires the creation of a boot diskette. The diskette is used to boot the recovering appliance and includes a DOS-based operating system, as well as the location of the image of C: from which to restore. You must make this diskette bootable. The NAS Administration GUI online help text inaccurately indicates that this can be accomplished with a menu option in Windows® Explorer. The correct method is as follows (excerpted from the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*):

1. Insert a blank, formatted diskette in the diskette drive of the node.
2. On the Disaster Recovery page, click **Create Disk**.

3. Click **OK** on the Create Recovery Disk page. The diskette drive LED will turn off when the creation is complete. The diskette creation should take no more than two minutes. Note that after you start the process of creating the backup boot diskette, the user interface will not indicate when the diskette is finished. Follow these steps to verify that the diskette is complete:
  - a. Wait until the diskette activity LED is consistently off.
  - b. Open Windows Explorer.
  - c. Select the diskette drive.
  - d. Verify that there are no changes occurring to the diskette (press F5 to refresh).
4. When there are no additional updates to the diskette, execute “fixboot.exe” (should be located in **A:\fixboot.exe**), which executes against A:\ to make the diskette image DOS-bootable. From a command prompt, either through the desktop of the node itself (with the diskette still in the diskette drive of the node), or on another system with the diskette in its diskette drive, type:  
a:\fixboot.exe  
  
and answer the prompts.
5. Remove the diskette from the appropriate diskette drive. Label the diskette appropriately and keep it in a safe place.

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## Appendix A. Additional notes for release 2.7

This chapter contains the additional information about Release 2.7 of the IBM® 5196 TotalStorage™ NAS Gateway 300, Model G02.

Refer to [www.ibm.com/storage/support/nas](http://www.ibm.com/storage/support/nas) for possible updates to this information.

The 2.7 CD includes these drivers:

- ServeRAID™ 5.11
- Intel PROset II Version 5.3.42.0
- Alacritech SLICuser Package 5.34
- Drivers and firmware upgrades:
  - ServeRAID Driver Version 5.11
  - Intel Ethernet Gigabit Version 6.2.21.0
  - LSI On-board SCSI Version 1.8.12
  - Alacritech Ethernet Adapters
    - Alacritech ATCP Driver Version 5.34.0.0
    - Alacritech Simba Driver 5.32.0.0
  - Adaptec SCSI LVD Win2k Device Driver Version 4.10.4000

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## Known problems and solutions

For Release 2.7, there are several known problems. Table 2 lists these known problems and suggested solutions or workarounds.

*Table 2. Known problems and solutions*

Abstract	Problem	Solution or workaround
Problem installing Veritas Backup Exec	<p>During installation of Veritas Backup Exec 8.6, the program attempts to create a new cluster group and move resources (like the shared drive) into a group called Backup Exec. During this process, Veritas installation aborts with the following error message: Severe - Error in Creating the Cluster Group.</p> <p>This problem may also happen when you are using the Cluster Administration tool or Cluster.exe tool to try to add a network resource name that contains an underscore ( _ ) character; you might receive an error message that indicates that the resource name contains invalid characters.</p>	Workaround: The workaround currently is to manually create the groups in the Cluster hive and to not use the “underscore” character.
Server Wizard appears during the login process	When logging on to the appliance using an Administrative User other than the default “Administrator” account, a wizard dialog is invoked, prompting you to configure the engine.	This is normal behavior when a new Administrative User logs on to the appliance. A Server to-do list is created every time a new Administrative User logs on to NAS Gateway 300. Bypass the wizard and use the IBM NAS Admin.msc to configure the appliance.

Table 2. Known problems and solutions (continued)

Abstract	Problem	Solution or workaround
Disk Wizard completes with error	If invoking the Microsoft Disk Manager when the appliance has a hardware RAID Solution, and no external Fibre Channel storage is attached, the User sees a wizard for writing a signature to a drive that is detected. The User finishes the wizard and receives an error on completion that Disk "0" is unknown.	This is normal behavior on Fibre Channel and RAID-based appliances. Connect the Fibre Channel to the HBA and it should detect any configured external Logical Volumes. <b>Note:</b> The "Unknown disk" is the "Pseudo disk" in Device Manager and is used by Fibre HBA.
Plug-in does not start	When selecting plug-ins in the IBM NAS Administration console, the required plug-in does not start.	Right-click the plug-in; then click <b>Refresh</b> . This is standard Microsoft Management Console (MMC) behavior.
IBM Appliance Advance Configuration Utility	The IBM Appliance Advance Configuration Utility (IAACU) console does not allow the creation and placement of the appliance within a designated group or family.	This is normal behavior when the IAACU Console has been updated to support the latest appliances. This may be addressed with a future release of the console.
FTP virtual directory is not displayed in directory listing	A virtual directory in an FTP site cannot be seen by the client.	Visit the Microsoft Web site for a workaround to view the contents of an FTP virtual directory.
ServeRAID Agent terminated unexpectedly	When the appliance shuts down, the ServeRAID agent logs an event to the System Event Log that the agent has shut down unexpectedly.	This is normal behavior for the ServeRAID agent, and the agent starts normally when the appliance is turned on.

## Functional notes

The following sections contain functional information.

### NFS share configuration in Server Appliance Kit

#### Error when assigning client group to an NFS share

When assigning a client group to an NFS share, you get the message:

The client machine name XXXX could not be resolved.

(where XXXX is the *name* of a defined client group)

To work around this problem, either:

1. Assign the IP address of the machine instead of using the client group name, OR
2. Use the desktop interface by navigating to the actual folder that you want to share using Windows Explorer; then right-click the folder and select **Sharing**.

#### Error when assigning machine IP address to an NFS share

When assigning a machine IP address, you get the message:

The client machine name XXXX could not be resolved.

(where XXXX is the *IP address* of a client on your network)

To work around this problem, either:

1. Ensure that the client machine is on the network and that you can ping it, OR

2. Use the desktop interface by navigating the actual folder that you want to share using Windows Explorer; then right-click the folder and select **Sharing**.

## Reestablishing SNMP service

The SNMP Service has been turned off in Release 2.7 to increase performance and security. This service can be turned on by following these steps:

1. Use Terminal Services or attach a monitor, keyboard, and mouse to the appliance.
2. Double-click **IBM NAS Admin Snap-in**.
3. Expand Maintenance and click **Services**.
4. Right-click **SNMP Service** and select **Properties**.
5. Set Service to “Automatic” or “Manual” (default is “Manual”); then click **Apply**.
6. To start SNMP service, click **Start**.

## Persistent Storage Manager notes

### FAT32 file system functional limitation

Persistent Storage Manager (PSM) does not allow a Persistent Image (snapshot) to be taken of a FAT32 file system formatted volume. The Maintenance (D:) partition is formatted FAT32 by default, to allow system restore from a DOS boot disk by a back up of the system volume (C:) stored as a file on D:. Therefore D: must be formatted FAT32. The NAS Backup Assistant can be used to backup C: to D: using a PSM-generated snapshot to allow backup of open files. However, a PSM snapshot-assisted backup of D: is not possible because D: must be a FAT32 volume, and attempted snapshot assisted backups of D: will fail.

You can back up D:, if you do not use PSM. Backups of D: that do not use PSM to generate a snapshot will succeed as long as other variables (such as sufficient space available on the destination volume) are correct.

### Command line interface

PSM uses several system-level files, one of which has a command line interface. Use of this is supported only for IBM-provided applications and services, as well as use by IBM support technicians to assist in debugging problems. All PSM function (including sophisticated scheduling and automation of remote management) is provided by the GUI described in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.

### PSM failure to take a snapshot

Defragmentation of managed storage is often an essential maintenance task for Windows machines. Defragmentation of a NAS that uses PSM is complicated by the data protection activity of PSM. PSM caches all the old data that is overwritten by the extra write traffic generated by the defragmentation engine. Therefore, defragmentation of volumes with snapshots managed by PSM is disabled: the defragmentation engine will complete and report success, but the volume will be unchanged. However, defragmentation remains necessary, and PSM will even cease taking snapshots if its cache file becomes too fragmented, reporting the following errors to the System Event Log:

```
<date/time> psman5 Error None 4135 N/A <mach.name> A persistent image could not  
be created due to error 0xe000103f.  
<date/time> psman5 Error None 4159 N/A <mach.name> Cannot create PSM files  
because the volume is too fragmented.
```

To successfully defragment the volume, delete all snapshots on the volume (ensure that you have a valid backup on hand) using the PSM GUI. PSM allows



defragmentation of the volume; however, the PSM Cache files still remain fragmented, and you will not be able to create snapshots. To enable snapshots, you must delete the PSM Cache files on the defragmented volume. PSM automatically rebuilds them.

**Attention:** NEVER delete or alter the PSM Cache files or directory on a volume that still has snapshots.

#### **Cache Deletion Procedure:**

1. Open Windows Explorer and click the defragmented volume under “My Computer” so that the top-level contents of the volume are displayed in the right pane. Click **Windows Explorer**→**Tools**→**Folder Options**. Select the View tab. Ensure that **Show Hidden Files and Folders** is selected, and that **Hide protected operating system files** is not selected. Click **OK** to close and apply the Folder Options settings.
2. Press the F5 function key to Refresh the top-directory volume contents. You should see a folder named “Persistent Storage Manager State.” Right-click the directory and select **Properties**. Select the Security tab. Select **Administrators** in the Name field. Ensure that **Full Control** is selected in the permissions field; the other permissions should automatically become selected. Click **OK** to save the security settings and close.
3. Right-click the folder named “Persistent Storage Manager State” again, and select **Delete**. Click **Yes** at the pop-up warning. Then, right-click the Recycle Bin icon and select **Empty Recycle Bin** to complete the deletion of the PSM Cache directory and contents.

PSM should be now able to take snapshots again. Creating the first snapshot will take a little longer as PSM rebuilds the cache file.

#### **Known issues**

1. If a re-extended volume (containing True Images of the pre-extended volume) is reverted, the re-extended area of the disk is unusable. To reclaim this space, executed the “reextend.exe” utility after reverting from a True Image of the pre-extended volume. This utility is available in the directory: “c:\winnt\system32\serverappliance”. Use this utility by typing “reextend -?”.
2. The event log error “a driver below this one has failed in some way for” may occur when the cache file is full.
3. If all your Persistent True Images on “C:” are tagged as Always Keep, and the cache file fills up, the system might experience a BSOD at reboot. It is not recommended to flag all Persistent True Images as Always Keep because this disallows the deletion logic of PSM to delete the older Persistent True Images to free up cache file space.
4. Default cache setting is not displayed correctly. For example, if you set the cache file % at the Volume setup page to 2% and then take a Persistent True Image, the value grays out and is not selectable. If you then select restore default settings, the cache file appears to change to 20%, and you click OK. When you return to that page, the screen would show 2%, not 20%. To avoid this problem, you must delete Persistent True Images before increasing the Cache size.
5. In certain cases where the IBM NAS is under load, Persistent Storage Manager might fail to automatically delete the last snapshot on a volume when the cache file fills up. The volume typically has one snapshot outstanding when the cache file exceeds the deletion threshold. At this point, if the system is experiencing heavy file system load, the write volume prevents PSM from successfully



deleting the last snapshot before the cache reaches 100%. At this point, the last snapshot must be deleted manually to return to normal operation. The cache file should then show 0% utilization through the PSM interface (if not, try restarting the Terminal Services client by closing the window and reopening it) and PSM operation should proceed normally. If the issue remains or the cache does not go to 0% utilization, call IBM service.

### Limitations

1. Only NTFS volumes are supported by PSM.
2. The Page file size must not change and the initial size must be set equal to the maximum size. This setting is located in the Virtual Memory settings under System Properties.
3. If the system cannot boot, the revert ability cannot be performed.
4. PSM automatically disables the ability to revert the system boot drive.
5. Microsoft confirmed that the NFS Services for UNIX does not support volume mount points. The NFS clients cannot access data on volumes mounted using a volume mount point. Although Persistent True Images for a volume are shared using NFS, the NFS clients cannot access the Persistent True Image data because Persistent True Images for a volume are mounted as directory junctions (mount points). Refer to Release Notes for Microsoft Server Appliance Kit dated June 2001.

## Operating system shows two physical CPUs as four CPUs

The NAS Gateway 300 incorporates the latest Intel Xeon processors, which use a new technology called Hyperthreading. Hyperthreading allows one physical CPU to run multiple threads simultaneously, as if it were two CPUs. Because of this, each physical processor looks like two logical processors to the operating system. This can be confusing when observing that the BIOS reports that the system has two CPUs, and Windows reports that the system has four CPUs.

## UPS service error

On the Status of the Windows 2000 for NAS GUI, you will see that the UPS service has been stopped.

**Note:** This is the default state of this service on the NAS GUI. In addition, the “Uninterruptible Power Supply” must be set to **Manual** in the **Control Panel→Administrative Tools→Services**. UPS Service must be enabled before you can use your uninterruptible power supply device. Do **not** enable the UPS Service unless you have an uninterruptible power supply device attached to your appliance.

The process to correctly configure and enable the UPS Service using the Windows 2000 for NAS GUI follows:

1. Attach your customer-provided RS-232 cable from your uninterruptible-power-supply hardware to an available COM Port on your NAS appliance.
2. To set “Uninterruptible Power Supply” Control Panel Service to “Automatic” and “Start”:
  - a. Log in to the NAS appliance through the Terminal Services Client.
  - b. Click **My Computer→Control Panel→Administrative Tools→Services** and highlight “Uninterruptible Power Supply” service.
  - c. Right-click **Service**, go to Properties, and then set Services to “Automatic.”
  - d. Click **Apply**; then, to start the service, click **Start**.

3. To configure uninterruptible-power-supply connections and enable service using Windows 2000 for NAS GUI:
  - a. Click **Maintenance** → **UPS**.
  - b. Select the manufacturer, model, and COM port to which your uninterruptible power supply device is attached.
  - c. Select the **Enable the UPS service on this appliance** check box and click **OK**.

---

## Administration notes

This section contains administration information.

## NAS Setup Navigator

Version 2.7 of the Model G02 includes the NAS Setup Navigator configuration tool. The NAS Setup Navigator maps out the initial configuration tasks and leads you through the tasks in the proper order. The tool detects which NAS appliance it is running on and adjusts the menu and content appropriately. You can follow links to more in-depth information and to the configuration panels used to perform the steps. You can also tailor the instructions to fit your needs by selecting optional topics. To start the NAS Setup Navigator, click the NAS Setup Navigator icon on the desktop.

## NAS Admin tool

If users other than the local machine Administrator have administrative privileges and will need to use the NAS Admin tool, this file must be copied to that user's Desktop folder. Example:

```
copy "c:\Documents and Settings\Administrator\Desktop\IBM NAS Admin.msc"  
"c:\Documents and Settings\\Desktop"
```

## IBM Director

NAS Version 2.7 includes the IBM Director 3.1.1 agent in the preloaded software. The 3.1.1 designation means that the IBM Director 3.1 agent is installed as well as the IBM Director 3.1 Service Pack 1. If you intend to use the IBM Director Server to manage your NAS product, ensure that your IBM Director Server and Console are at the 3.1 version; you must also install the IBM Director 3.1 Service Pack 1 on your IBM Director Server and Consoles.

For more information about obtaining the IBM Director 3.1 Service Pack 1 for your IBM Director Server and Consoles, visit [www.ibm.com/pc/support](http://www.ibm.com/pc/support) and click **Systems Management**.

Supplementary CD 1 contains NAS-specific extensions to the IBM Director Server to assist you in managing NAS appliances using the IBM Director Server. These extensions are identified as "IBM NAS Extensions for IBM Director". One of the features within these extensions creates an 'IBM NAS Appliances' group on the IBM Director Console which enables you to manage NAS appliances as a group, but the version of these extensions on the CD might not include the most current NAS products. For the latest version of the IBM NAS-specific extensions to the IBM Director Server, visit [www.ibm.com/storage/support/nas](http://www.ibm.com/storage/support/nas).

The section titled "Rack Manager and inventory enhancements" in the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference* describes enhancements to recognize IBM NAS components in the Rack Manager Task of the IBM Director Server and indicated that these enhancements were available through

the application of the IBM Director Server 3.1 Service Pack 1. These enhancements are not available in the IBM Director Server 3.1 Service Pack 1, but will be made available in a future IBM Director deliverable. For more information about IBM Director deliverables, visit [www.ibm.com/pc/support](http://www.ibm.com/pc/support) and click the link for **Systems Management**.

## Uninterruptible power supply support

Release 2.7 includes support for uninterruptible power supplies. Uninterruptible power supply devices provide emergency backup power for a specific period of time when the local power fails. This power comes from batteries housed within the device. High-performance surge suppression helps protect your appliance from electrical noise and damaging power surges. During a power failure, the uninterruptible power supply is designed to instantly switch your appliance to emergency battery backup power. After you have installed an uninterruptible power supply for your appliance, you can set options for its operation using the UPS Task on the Maintenance page. The UPS Task enables you to control how the uninterruptible power supply service works on your appliance. The available UPS Settings depend on the specific uninterruptible power supply hardware installed on your system. Before you use your uninterruptible power supply device, type the following information on the UPS Configuration page:

- Uninterruptible power supply device manufacturer
- Uninterruptible power supply device model
- The serial port to which the uninterruptible power supply device is connected

To configure the uninterruptible power supply service, see “UPS service error” on page 27.

To help protect your appliance from power failures, test it by simulating a power failure by disconnecting the main power supply from the uninterruptible power supply device. Do **not** perform this test during production use. Your appliance and peripherals connected to the uninterruptible power supply device should remain operational, messages should be displayed, and events should be logged. Wait until the uninterruptible power supply battery reaches a low level to ensure a correct shutdown occurs. Restore the main power to the uninterruptible power supply device, and check the event log to verify that all actions were logged and there were no errors. All detected power fluctuations and power failures are recorded in the event log, along with uninterruptible power supply service start failures and appliance shutdown initiations. Critical events might change the status of the appliance.

## Configuring LAN-free backup when using TSM Server v4.2.2

The NAS 300 Model G02 is preloaded with TSM Client, TSM Agent and TSM Driver Version 4.2.2. When also using TSM Server Version 4.2.2 on a separate server, configuring the Model G02 to use LAN-free backup to a tape library can be difficult. To ease this configuration, a TSM macro file is supplied on the Supplementary CD as file: “\tsm\_scripts\tsm\_lan\_free.mac”. The file contains instructions for using it during the configuration process.

## Configuring page files for optimization

NAS appliances are based on a Windows Powered Operating System and have a default pagefile of 1024 MB that is located on the boot system drive “C:”. This default size is based on a minimum base memory configuration for all IBM TotalStorage appliances and preloaded software. Memory options can vary on each appliance depending on what you have ordered.

By default, Windows Powered places the pagefile on the boot partition where the operating system is installed. The pagefile is not a shared disk, but a local disk for the clustered systems. To determine the size of the pagefile, multiply the amount of physical RAM by 1.5 to a maximum of 4095 MB. Be aware that placing the pagefile on the boot partition does not optimize performance because Windows has to perform disk I/O on both the system directory and the pagefile. Therefore, it is recommended that you place the pagefile on a different partition (such as the maintenance partition) or a different physical hard disk drive, so that Windows Powered can handle multiple I/O requests more quickly. It is highly recommended that on the NAS appliances, you increase the pagefile by adding to the maintenance partition. The size will vary depending on the physical memory installed on the appliance. You can check memory by right-clicking **My Computer**→**properties**. This opens a System Properties window, and the memory will be displayed. This can be performed through Terminal Services or by connecting a monitor, keyboard, and mouse to the appliance.

**Note:** Do not remove the pagefile from the boot partition. If the pagefile is not on the boot partition, the operating system cannot create a crash dump file (Memory.dmp) in the event that a kernel mode STOP error occurs. Not having this crash dump file could lead to extended server downtime if the STOP requires a debug operation to be performed.

The optimal solution is to create one pagefile on the boot partition using the default settings and create one pagefile on another, less frequently used partition. The best option is to create the second pagefile so that it is on its own partition (such as a maintenance partition), with no data or operating system-specific files.

Windows Powered uses the pagefile on the less frequently used partition over the pagefile on the heavily used boot partition. Windows Powered also uses an internal algorithm to determine which pagefile to use for virtual memory management. In the above scenario, the following goals of the page file are served:

- The system is correctly configured to capture a Memory.dmp file if the computer experiences a kernel mode STOP error.
- The page file on the less frequently used partition is used the majority of the time because it is not on a busy partition.

Another advantage of using a pagefile on its own partition is that the pagefile will not become fragmented. If the pagefile is on a partition with other data, the pagefile might experience fragmentation because it expands to satisfy the extra virtual memory required. A defragmented pagefile leads to faster virtual memory access and improves the chances of capturing a dump file without significant errors.

## Microsoft® Windows blue screen possible when hot-swapping a hard disk drive

On a NAS Gateway 300 using mirrored (RAID 1) disks, the hot swap of a disk drive can cause a Windows blue screen when ServeRAID Manager is used to set a mirrored drive's state to "defunct" and then the drive is removed. If the drive's state is not explicitly set to "defunct" but instead fails or is removed directly, then the Windows blue screen does not occur.

## Checking Persistent Storage Manager version

The only reliable way to verify the version of PSM on your system is to execute the following on a command prompt local to the NAS:

```
c:\winnt\system32\serverappliance\ss -version
```

An example of the output from this command executed on a system with PSM version 2261 + 2263 QFE installed is:

```
C:\WINNT\system32\ServerAppliance>ss -version
ss - Snapshot Command line management utility
Copyright (c) 2000-2002 Columbia Data Products, Inc. All Rights Reserved.
```

```
IBM version
LoVersion = 0x00000200
Version   = 2.20 build 2262
Eval      = no
```

```
Date/Time      Version      File
7/26/2002 12:19 2.20.00.2261 'C:\WINNT\system32\ServerAppliance\psmlapi.dll'
8/13/2002 11:36 2.20.00.2263 'C:\WINNT\system32\ServerAppliance\ss.exe'
7/26/2002 12:19 2.20.00.2261 'C:\WINNT\System32\psmready.exe'
8/06/2002 6:18 2.20.00.2262 'C:\WINNT\System32\drivers\psman5.sys'
7/26/2002 12:19 2.20.00.2261 'C:\WINNT\System32\serverappliance\mui\0409\snapshot.dll'
7/26/2002 12:19 2.20.00.2261 'C:\WINNT\System32\serverappliance\PSMCom.dll'
7/26/2002 12:19 2.20.00.2261 'C:\WINNT\System32\serverappliance\drbackup.dll'
```

## Updated information on Supplementary CDs

This information replaces the information in the section titled “Using the Supplementary CD” in Chapter 10 of the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.

The Supplementary CDs contain documentation and copies of key software applications that are preinstalled on the NAS Gateway 300. Table 3 and Table 4 on page 32 include the names of the directories found on the Supplementary CDs and a description of the contents of each directory.

Table 3. Supplementary CD 1 directories

Directory name	Contents
DB2®	<ul style="list-style-type: none"> <li>• EnableDB2Support.exe</li> <li>• DisableDB2Support.exe</li> </ul> <p>These files enable and disable support for Linux- and Solaris-based DB2 clients using NFS shares.</p>
DiskImages	<p>This directory contains a diskette image for the Recovery Enablement Diskette and a diskette image for a bootable diskette that automatically configures the ServeRAID controller and drives.</p> <p>To create the Recovery Enablement Diskette, run enablement_diskette291.EXE and insert an HD 1.44 floppy diskette into drive A: when prompted.</p> <p>To create the bootable diskette to automatically configure the ServeRAID controller and drives, run IBM_NAS_AutoRAID_diskette_2.9.EXE and insert a HD 1.44 floppy diskette into drive A: when prompted.</p>
diskpart Samples	<p>This directory contains an example script for use with the DiskPart utility. This script will clean disk 2, convert it to dynamic, partition it, and assign drive letters to the partitions. This script is unsupported and should be used with extreme caution.</p>
IBM Advanced Appliance Configuration	<p>Run Setup.exe on the machine from which you will administer the appliance. The agent is preinstalled on the appliance.</p>
IBM NAS Extensions For IBM Director	<p>The IBM NAS extensions to IBM Director provide capabilities to IBM Director that are specific to the IBM NAS appliances.</p>
Zip Tools	<p>This directory contains compression tools used for sending information to IBM technical support.</p>
readme.txt	<p>This text file describes the contents of the Supplementary CDs.</p>

Table 4. Supplementary CD 2 directories

Directory name	Contents
AoP	This is the add-on pack for the Server Appliance Kit.
SFU_2073.1	Microsoft Services for UNIX (SFU) Version 2.2 support files: <ul style="list-style-type: none"> <li>• QFE 320175 for performance enhancements</li> <li>• QFE 321096 for SAK and SFU performance enhancements</li> </ul>
readme_SFN5.txt	Instructions for installing Microsoft File and Print Services for NetWare 5.0.
Terminal Services Client	Microsoft Terminal Services Client installation files.
w2ksp2	Windows 2000 Service Pack 2.

## Fibre Channel adapter event logs

You can view event logging for the Fibre Channel adapter for troubleshooting problems using the event viewer. The detailed event code is displayed at offset 34 (hex). Table 5 gives a list of detailed event codes for the adapter. For some of the event codes, additional data will be recorded in the least significant 16 bits of the longword. Additional data might also be recorded in the longword at offset 10 (hex).

Certain codes will be logged only if you set a Fast!UTIL parameter to enable additional event logging. These codes are indicated by an asterisk (\*). By default, these events are not logged.

If an error occurs that is not listed in Table 5, contact the IBM Support Center (1 800 426-7378 in the U.S.). In all other countries, contact your IBM reseller or IBM marketing representative.

Table 5. Fibre Channel adapter error codes

Event code offset 34h	More data offset 10h	Description	Suggested action
4002xxxx	yyyy00zz	Host interface error: xxxx = mailbox1; yyyy = mailbox2; zz = command	Hardware DMA error: replace adapter
4005xxxx	Yyyy00zz	Mailbox command error: xxxx = mailbox1; yyyy = mailbox2; zz = command	Normally indicates loop down, check all cabling
4005xx6F	yyyyyyzz	Login Fabric port mailbox command error: xx = adapter; state yyyyyy = port id; zz = loop id	Normally indicates loop down, check all cabling
* 80010000	00000000	Reset detected	Not logged during normal operation
8003xxxx	yyyyzzzz	RISC request queue transfer error: xxxx = mailbox1; yyyy = mailbox2; zzzz = mailbox3	Hardware error: replace adapter
8004xxxx	yyyyzzzz	RISC response queue transfer error: xxxx = mailbox1; yyyy = mailbox2; zzzz = mailbox3	Hardware error: replace adapter
* 80100000	0000xxxx	LIP occurred: xxxx = mailbox1	Not logged during normal operation
* 80110000	xxxxyyzz	Link up 2200: xxxx = current ISP connection mode (0 = Loop, 1 = P2P); yy = ISP connection option 0 = Loop, 1 = P2P, 2 = Loop->P2P, 3 = P2P->Loop; zz = starting loop ID for remote devices. 2100: xxxx = 0000; yyyy = 0000	Not logged during normal operation
80120000	00000000	Link down error	Not logged during normal operation



Table 5. Fibre Channel adapter error codes (continued)

Event code offset 34h	More data offset 10h	Description	Suggested action
80130000	0000xxxx	LIP reset occurred: xxxx = mailbox1	Not logged during normal operation
**80300000	xxxxyyzz	Link mode up: xxxx = current ISP connection mode 0 = Loop 1 = P2P; yy = ISP connection option (0 = Loop, 1 = P2P 2 = Loop->P2P 3 = P2P->Loop); zz = starting loop ID for remote devices	Not logged during normal operation
**8036aabb	xxxxyyzz	Point-to-Point update configuration: xxxx = mailbox1; yy = current ISP connection mode (0 = Loop, 1 = P2P); zz = ISP connection option 0 = Loop, 1 = P2P, 2 = Loop->P2P, 3 = P2P->Loop; aa = starting loop ID value for remote devices; bb = current retry count for the ISP initialization mode	Not logged during normal operation
* F0000000	00000000	Restarting RISC firmware	Initial driver load or loop down longer than 4 minutes
* F0030004	00xx00yy	Reset command completion error: xx = CDB opcode; yy = target loop ID	Not logged during normal operation
* F0030005	00xx00yy	Command aborted by OS: xx = CDB opcode; yy = target loop ID	Not logged during normal operation
F0030028	00xx00yy	Port unavailable, command completion error: xx = CDB; opcode yy = target loop ID	Check target device and cabling
F0030029	00xx00yy	Port logged out command completion error: xx = CDB; opcode yy = target loop ID	Check target device and cabling
F003001C	00xx00yy	Target device queue full (SCSI status 28 from target): xx = CDB opcode; yy = target loop ID	Check target device and cabling
* F00A0000	0000xxxx	RISC firmware state during adapter initialization: xxxx = firmware state	Not logged during normal operation
F00B0000	00000000	Reset ISP chip failed	
F00D0000	00000000	Fail to allocate noncached memory	
F00E0000	00000000	Fail to map ISP registers	
F00F0000	00000000	Fail to load RISC code	
F0100000	0000xxxx	Fail to start RISC code: xxxx = mailbox0	
F0110000	0000xxxx	Fail to initialize firmware xxxx = mailbox0	
F0120000	0000xxxx	Fail to get firmware state: xxxx = mailbox0	
* F0130000	00000000	Port Update notification (RISC database changed)	
* F0140000	xxxxxxxx	RSCN notification (Name server change detected): xxxx = RSCN Information	
* F0150000	00xx00yy	Name server query rejected (v6 2100): xx = Reason Code; yy = Explanation Code (Valid if reason code is 0x09)	

Table 5. Fibre Channel adapter error codes (continued)

Event code offset 34h	More data offset 10h	Description	Suggested action
* F0150000	xxxxyyzz	Name server query rejected (v7 2100/2200): xxxx = response status; yy = Reason Code; zz = Explanation Code (Valid if reason code is 0x09, for example, if zz = 0x09, yy = 07, this means no SCSI device found.)	
* F0160000	00000000	Driver reset called; command timed out	
* F0170000	00xxxxxx	Fabric port login (for information only): xxxxxx = Port ID	
F0180000	000000xx	Excessive link errors, loop down: xx = number of link errors per second	
* F0190000	00000000	Verify firmware checksum failure	
* F01B0000	000000xx	Device marked offline after being not-ready longer than port down retry count: xx = loop ID of device	
* F01C0000	000000xx	Bad type field in IOCB from RISC: xx = IOCB type	
* F01D0000	00000000	Error downloading post RISC code	
* F01Exxxx	Yyyyyzzz	Error running post RISC code: xxxx = mailbox0; Yyyy = mailbox1; zzzz = mailbox2	
* F01Fxyyy	Zzzzzzzz	DMA 64 bit (PAE) configuration (for information only): xx = Dma64BitAddressess flag set by W2K; yy = Dma64BitAddressess flag set by driver; zzzzzzzz = driver adapter flags	
F0200000	Xxxxxyyy	Error ISP not accessible: xxxx = ISP host command and control; yyyy = ISP interrupt status	
* F0210000	xxyy00zz	ISP connection option/topology (for information only): xx = ISP connection option from NVRAM; yy = previous ISP topology; zz = current ISP topology code: 0000 = Loop, 0001 = FL_Port, 0002 = N_Port to N_Port, 0003 = F_Port	
* F0220000	0000xxxx	External RISC ram parity error (for 2200G only): xxxx = number of parity errors detected	
* F0230000	Xxxxxyyy	Subvendor ID not match (for information only): xxxx = actual subvendor ID; yyyy = expected subvendor ID	

## Persistent Storage Manager event log messages

If you experience problems while using the Persistent Storage Manager to create, schedule, or delete persistent images, or while using the NAS Backup Assistant / IBMSNAP.EXE to perform a Persistent Image backup, use the Table 6 on page 35 to troubleshoot any problems. Each of these messages are logged to the system event log by the PSMAN5 driver (file system driver for Persistent Storage Manager [PSM]); each entry appears with "psman5" as the source name.

For more information about Persistent Storage Manager and persistent images, see the *IBM TotalStorage NAS Gateway 300 Model G27 User's Reference*.



Table 6. Persistent Storage Manager event log messages

Error Code	Description	Action
0x00000001	An invalid IOCTL was sent to the driver.	Contact IBM technical support.
0x00000002	Device name is not recognized by PSM.	Contact IBM technical support.
0x00000003	An invalid path was given for the cache file. This error will appear if the cache file cannot be created because the cache file drive is not present.	Contact IBM technical support.
0x00000005	An exception occurred.	Contact IBM technical support.
0x00000005	You do not have sufficient rights to the cache file directory.	Contact IBM technical support.
0x00000005	The cache file specified is a directory instead of a file.	Contact IBM technical support.
0x00000005	PSM was told to shut down.	Contact IBM technical support.
0x00000006	User performing PSM function without opening PSM.	Contact IBM technical support.
0x00000015	Access to a virtual volume has been attempted after the virtual volume has been destroyed.	Do not access virtual volumes after they have been destroyed.
0x00000016	Something has gone wrong with PSM.	Contact IBM technical support.
0x00000017	Bad sector was detected in the cache file.	Contact IBM technical support.
0x0000001F	General failure.	Contact IBM technical support.
0x00000057	An invalid parameter was passed to a function.	Contact IBM technical support.
0x00000079	I/O timed out while reading from the cache file.	Contact IBM technical support.
0x0000007A	Buffer size supplied is insufficient to hold requested information.	Contact IBM technical support.
0x000000A1	An invalid path was given for the cache file.	Contact IBM technical support.
0x000000EA	Buffer size supplied is insufficient to hold requested information.	Contact IBM technical support.
0x000003E6	An exception occurred.	Contact IBM technical support.
0x00000456	PSM was stopped because the media of a device was changed on which PSM was running.	Contact IBM technical support.
0x0000045D	An error occurred on the device.	Contact IBM technical support.
0x000005AA	There is insufficient memory available.	Contact IBM technical support.
0x000006F8	Buffer size supplied is insufficient to hold requested information.	Contact IBM technical support.
0x000006F8	Invalid buffer address passed for I/O.	Contact IBM technical support.
0x80000005	Specified buffer size is too low.	Contact IBM technical support.
0x8000001C	PSM was stopped because the media of a device was changed on which PSM was running.	Take a new persistent image.

Table 6. Persistent Storage Manager event log messages (continued)

Error Code	Description	Action
0xA0000004	<p>The cache file is &lt;x&gt;% full. The oldest persistent images will automatically be deleted at &lt;y&gt;%.</p> <p>This is a warning that the cache file size is approaching the threshold at which some persistent images will be deleted automatically to free up some cache file capacity. &lt;x&gt; is the percentage for which the warning message will be generated, and &lt;y&gt; is the percentage that represents the threshold. (By default, these values are 80% and 90%, respectively, and can be modified in Windows 2000 for NAS [Disks/Persistent Storage Manager]).</p>	In Windows 2000 for NAS (Disks/Persistent Storage Manager), delete some (noncritical) persistent images before the system does to guarantee that critical persistent images do not get deleted accidentally.
0xC0000001	General failure.	Contact IBM technical support.
0xC0000002	Function is not yet implemented.	Contact IBM technical support.
0xC0000005	An Access Exception occurred.	Contact IBM technical support.
0xC0000008	User performing PSM function without opening PSM.	Contact IBM technical support.
0xC000000D	An invalid parameter was passed to a function.	Contact IBM technical support.
0xC000000E	Device name is not recognized by PSM.	Contact IBM technical support.
0xC0000010	An invalid IOCTL was sent to the driver.	Contact IBM technical support.
0xC0000013	Access to a virtual volume has been attempted after it has been destroyed.	Contact IBM technical support.
0xC000001C	An invalid IOCTL was sent to the driver.	Contact IBM technical support.
0xC0000022	An access exception occurred.	Contact IBM technical support.
0xC0000022	You do not have sufficient rights to the cache file directory.	Contact IBM technical support.
0xC0000023	Specified buffer size is too small.	Contact IBM technical support.
0xC0000034	Cache file name is invalid.	Contact IBM technical support.
0xC000003A	An invalid path was given for the cache file.	Contact IBM technical support.
0xC000003B	An invalid path was given for the cache file.	Contact IBM technical support.
0xC000003E	Bad sector was detected in the cache file.	Contact IBM technical support.
0xC0000043	A file cannot be opened because the share access flags are incompatible.	This occurs when the very last persistent image is deleted. PSM initializes its files when the last persistent image is deleted. While it is initializing, a new persistent image can not be created. Try again in a few minutes.
0xC000009A	There is insufficient memory available.	Contact IBM technical support.
0xC00000B5	I/O timed out while reading from the cache file.	Contact IBM technical support.
0xC00000BA	The cache location must be a file rather than a directory.	Contact IBM technical support.
0xC00000E8	Invalid buffer address passed for I/O.	Contact IBM technical support.
0xC000010A	PSM was told to shut down.	Contact IBM technical support.

Table 6. Persistent Storage Manager event log messages (continued)

Error Code	Description	Action
0xC0000184	Something has gone wrong with PSM.	Contact IBM technical support.
0xC0000185	An error occurred on the device.	Contact IBM technical support.
0xC0000206	Buffer size supplied is insufficient to hold requested information.	Contact IBM technical support.
0xE0001001	PSM could not start due to the server being constantly busy for <x> minutes.	Take a persistent image when NAS appliance demands are lower.
0xE0001002	PSM detected a deadlock.	Contact IBM technical support.
0xE0001003	Specified volume not active or deleted.	Do not delete volumes with active persistent images.
0xE0001004	PSM was specified for a volume on which PSM is not running.	Contact IBM technical support.
0xE0001005	Cache file overflow caused all existing persistent images to be deleted.	Increase the cache file size in Windows 2000 for NAS (Disks/Persistent Storage Manager), or take or schedule persistent images when fewer users are online.
0xE0001006	The application tried to enable PSM without first calling PSM_Register.	Contact IBM technical support.
0xE0001007	Invalid license code.	Contact IBM technical support.
0xE0001008	Another application already has PSMed locked exclusively.	Contact IBM technical support.
0xE0001009	PSM needs to be locked exclusive for this function to work.	Contact IBM technical support.
0xE000100A	Wrong version of the driver has been loaded on this system.	Contact IBM technical support.
0xE000100B	A reboot is required before PSM can operate.	Reboot the appliance, and try taking a persistent image again. If this still fails, contact IBM technical support.
0xE000100C	PSM is not installed.	Contact IBM technical support.
0xE000100D	An incompatible DLL from another version of PSM is already loaded.	Contact IBM technical support.
0xE000100E	Out of memory.	Contact IBM technical support.
0xE000100F	Invalid parameter.	Contact IBM technical support.
0xE0001010	Invalid handle.	Contact IBM technical support.
0xE0001011	Not implemented yet.	Contact IBM technical support.
0xE0001012	Object type is not expected object.	Contact IBM technical support.
0xE0001013	User buffer is not large enough.	Contact IBM technical support.
0xE0001014	Out of available structures.	In Windows 2000 for NAS (Disks/Persistent Storage Manager), delete some persistent images.
0xE0001015	PSM is shutting down.	Contact IBM technical support.
0xE0001016	The device, volume or object does not exist.	Contact IBM technical support.
0xE0001017	Unsuccessful.	Contact IBM technical support.
0xE0001018	The device does not have any media loaded.	Contact IBM technical support.
0xE0001019	Object already exists.	Contact IBM technical support.
0xE000101A	Specified path is a directory and not a file.	Contact IBM technical support.

Table 6. Persistent Storage Manager event log messages (continued)

Error Code	Description	Action
0xE000101B	Invalid path was specified.	Contact IBM technical support.
0xE000101C	The static volume was not mounted.	Look at the system event log for a warning message (from the PSMAN5 service) whose code should appear in this list. The action depends on the message.
0xE000101D	The static volume had errors during mount.	Look at the system event log for a warning message (from the PSMAN5 service) whose code should appear in this list. The action depends on the message.
0xE000101E	The static volume could not be found.	Contact IBM technical support.
0xE000101F	The volume the cache file resides on is out of space.	The cache file for each volume resides on the volume itself. Free some space on the volume.
0xE0001020	The volume the cache file resides on was dismantled.	The cache file for each volume resides on the volume itself. Do not dismantle the volume.
0xE0001021	The server was shut down.	Do not shut down the IBM TotalStorage NAS appliance while persistent images are in progress.
0xE0001022	Unable to create cache file.	Contact IBM technical support.
0xE0001023	PSM recovery could not find a persistent image entry.  A persistent image was lost during the recovery process. It is unknown which persistent image it was.	Contact IBM technical support.
0xE0001024	PSM recovery could not open the index file. All persistent images are corrupt.	Contact IBM technical support.
0xE0001025	PSM recovery encountered error <x>inserting key (<y>:<z>) into dictionary.  <x> is the error that occurred and can be found in this list of errors.	Look up the error in this list and take the specified action.
0xE0001026	PSM recovery encountered corrupt index sector %2.  An index entry was found to be corrupt during the last boot.	Contact IBM technical support.
0xE0001027	A persistent image could not be created due to error 0x<x>.  <x> is the error that occurred.	Look up the error in this list and take the specified action.
0xE0001028	The cache file is <x>% full. Persistent images have been deleted.  The oldest persistent images have been deleted.	In Windows 2000 for NAS (Disks/Persistent Storage Manager), delete persistent images to make sure specific (critical) persistent images are not destroyed by mistake.

Table 6. Persistent Storage Manager event log messages (continued)

Error Code	Description	Action
0xE0001029	<p>The maximum (&lt;x&gt;) allowed persistent images has been reached. A persistent image was not created.</p> <p>PSM cannot create any more persistent images because the configured maximum number of persistent images that PSM can keep concurrently has been reached.</p>	<p>In Windows 2000 for NAS (Disks/Persistent Storage Manager) increase the number of persistent images allowed, or edit the schedules to not make so many persistent images.</p>



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## Appendix B. Notices

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## End of Life (EOL) statement

This box is a purchased unit. Therefore, it is the sole responsibility of the purchaser to dispose of it in accordance with local laws and regulations at the time of disposal.

This unit contains recyclable materials. The materials should be recycled where facilities are available and according to local regulations. In some areas IBM may provide a product take-back program that ensures proper handling of the product. Contact your IBM representative for more information.

---

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## Appendix C. Safety notices

The following sections describe the safety and environmental items you must consider for an IBM NAS Appliance.

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### Basic safety information



#### DANGER

**Before you begin to install this product, read the safety information in *Caution: Safety Information--Read This First*, SD21-0030. This booklet describes safe procedures for cabling and plugging in electrical equipment.**



**Gevarr:** Voodrat u begint met de installatie van dit produkt, moet u eerst de veiligheidsinstructies lezen in de brochure *PAS OP! Veiligheidsinstructies--Lees dit eerst*, SD21-0030. Hierin wordt beschreven hoe u elektrische apparatuur op een veilige manier moet bekabelen en aansluiten



**Danger:** Avant de procéder à l'installation de ce produit, lisez d'abord les consignes de sécurité dans la brochure *ATTENTION: Consignes de sécurité--A lire au préalable*, SD21-0030. Cette brochure décrit les procédures pour câbler et connecter les appareils électriques en toute sécurité.



**Perigo:** Antes de começar a instalar deste produto, leia as informações de segurança contidas em *Cuidado: Informações Sobre Segurança--Leia Primeiro*, SD21-0030. Esse folheto descreve procedimentos de segurança para a instalação de cabos e conexões em equipamentos elétricos.



危險：安裝本產品之前，請先閱讀  
"Caution: Safety Information--Read  
This First" SD21-0030 手冊中所提  
供的安全注意事項。這本手冊將會說明  
使用電器設備的纜線及電源的安全程序。



Opasnost: Prije nego što počnete sa instalacijom produkta, pročítajte naputak o pravilima o sigurnom rukovanju u Upozorenje: Pravila o sigurnom rukovanju - Prvo pročítaj ovo, SD21-0030. Ovaj privitak opisuje sigurnosne postupke za priključivanje kabela i priključivanje na električno napajanje.



**Upozornění:** než zahájíte instalaci tohoto produktu, přečtěte si nejprve bezpečnostní informace v pokynech „Bezpečnostní informace“ č. 21-0030. Tato brožurka popisuje bezpečnostní opatření pro kabeláž a zapojení elektrického zařízení.



**Fare!** Før du installerer dette produkt, skal du læse sikkerhedsforskrifterne i *NB: Sikkerhedsforskrifter – Læs dette først* SD21-0030. Vejledningen beskriver den fremgangsmåde, du skal bruge ved tilslutning af kabler og udstyr.



**Gevarr:** Voordat u begint met het installeren van dit produkt, dient u eerst de veiligheidsrichtlijnen te lezen die zijn vermeld in de publikatie *Caution: Safety Information - Read This First*, SD21-0030. In dit boekje vindt u veilige procedures voor het aansluiten van elektrische apparatuur.



**VARRA:** Ennen kuin aloitat tämän tuotteen asennuksen, lue julkaisussa *Varoitus: Turvaohjeet–Lue tämä ensin*, SD21-0030, olevat turvaohjeet. Tässä kirjasessa on ohjeet siitä, mitensähkölaitteet kaapeloidaan ja kytketään turvallisesti.



**Danger :** Avant d'installer le présent produit, consultez le livret *Attention : Informations pour la sécurité–Lisez-moi d'abord*, SD21-0030, qui décrit les procédures à respecter pour effectuer les opérations de câblage et brancher les équipements électriques en toute sécurité.



**Vorsicht:** Bevor mit der Installation des Produktes begonnen wird, die Sicherheitshinweise in *Achtung: Sicherheitsinformationen–Bitte zuerst lesen*. IBM Form SD21-0030. Diese Veröffentlichung beschreibt die Sicherheitsvorkehrungen für das Verkabeln und Anschließen elektrischer Geräte.



**Κίνδυνος:** Πριν ξεκινήσετε την εγκατάσταση αυτού του προϊόντος, διαβάστε τις πληροφορίες ασφαλείας στο φυλλάδιο *Caution: Safety Information-Read this first*, SD21-0030. Στο φυλλάδιο αυτό περιγράφονται οι ασφαλείς διαδικασίες για την καλωδίωση των ηλεκτρικών συσκευών και τη σύνδεσή τους στην πρίζα.



**Vigyázat:** Mielőtt megkezdi a berendezés üzembe helyezését, olvassa el a *Caution: Safety Information-Read This First*, SD21-0030 könyvecskében leírt biztonsági információkat. Ez a könyv leírja, milyen biztonsági intézkedéseket kell megtenni az elektromos berendezés huzalozásakor illetve csatlakoztatásakor.



**Pericolo:** prima di iniziare l'installazione di questo prodotto, leggere le informazioni relative alla sicurezza riportate nell'opuscolo *Attenzione: Informazioni di sicurezza-Prime informazioni da leggere* in cui sono descritte le procedure per il cablaggio ed il collegamento di apparecchiature elettriche.



危険： 導入作業を開始する前に、安全に関する小冊子SD21-0030 の「最初にお読みください」(Read This First)の項をお読みください。  
この小冊子は、電気機器の安全な配線と接続の手順について説明しています。



위험: 이 제품을 설치하기 전에 반드시 "주의: 안전 정보-시작하기 전에" (SD21-0030) 에 있는 안전 정보를 읽으십시오.



**ОПАСНОСТ**

Пред да почнете да го инсталирате овој продукт, прочитајте ја информацијата за безбедност:  
"Предупредување: Информација за безбедност: Прочитајте го прво ова", SD21-0030.  
Оваа брошура опишува безбедносни процедури за каблирање и вклучување на електрична опрема.



**Fare:** Før du begynner å installere dette produktet, må du lese sikkerhetsinformasjonen i *Advarsel: Sikkerhetsinformasjon – Les dette forst*, SD21-0030 som beskriver sikkerhetsrutinene for kabling og tilkobling av elektrisk utstyr.



Uwaga:

Przed rozpoczęciem instalacji produktu należy zapoznać się z instrukcją:

"Caution: Safety Information - Read This First", SD21-0030.

Zawiera ona warunki bezpieczeństwa przy podłączaniu do sieci elektrycznej i eksploatacji.



**Perigo:** Antes de iniciar a instalação deste produto, leia as informações de segurança *Cuidado: Informações de Segurança–Leia Primeiro*, SD21-0030. Este documento descreve como efectuar, de um modo seguro, as ligações eléctricas dos equipamentos.



**ОСТОРОЖНО:** Прежде чем устанавливать этот продукт, прочтите Инструкцию по технике безопасности в документе "Внимание: Инструкция по технике безопасности -- Прочестъ в первую очередь", SD21-0030. В этой брошюре описаны безопасные способы каблирования и подключения электрического оборудования.



Nebezpečenstvo: Pred inštaláciou výrobku si prečítajte bezpečnostné predpisy v

Výstraha: Bezpečnostné predpisy - Prečítaj ako prvé, SD21-0030. V tejto brožúrke sú opísané bezpečnostné postupy pre pripojenie elektrických zariadení.



Pozor: Preden začnete z inštalacijo tega produkta preberite poglavje: "Opozorilo: Informacije o varnem rokovanju-preberite pred uporabo," SD21-0030. To poglavje opisuje pravilne postopke za kabliranje.



**Peligro:** Antes de empezar a instalar este producto, lea la información de seguridad en *Atención: Información de Seguridad–Lea Esto Primero*, SD21-0030. Este documento describe los procedimientos de seguridad para cablear y enchufar equipos eléctricos.



**Varning — livsfara:** Innan du börjar installera den här produkten bör du läsa säkerhetsinformationen i dokumentet *Varning: Säkerhetsföreskrifter – Läs detta först*, SD21-0030. Där beskrivs hur du på ett säkert sätt ansluter elektrisk utrustning.



危險：

開始安裝此產品之前，請先閱讀安全資訊。

注意：

請先閱讀 - 安全資訊 SD21-0030

此冊子說明插接電器設備之電纜線的安全程序。

## General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb.) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.

- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.  
**Remember:** Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

## Electrical safety



### Caution:

**Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the appliance covers, unless instructed otherwise in the installation and configuration procedures.**

Observe the following rules when working on electrical equipment.

**Important:** Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.  
**Remember:** Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

**Remember:** There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.

- When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
- Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators
  - Similar units

This practice ensures correct grounding of the units.

- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.

## Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
  - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
  - b. The power cord should be the appropriate type as specified in the parts listings.
  - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.



## Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

### Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

**Note:** The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the AC plug on AC-operated computers.

## Grounding (earthing) requirements

Electrical grounding (earthing) of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.



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## Appendix D. Product warranty information

This chapter contains the warranty period for your product and the IBM Statement of Limited Warranty.

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### Warranty period

This warranty period varies by country or region.

**Machine:** Model G02

Country or region	Warranty period
United States and Canada	Parts - 3 years, labor - 1 year

**Notes:**

- Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country or region where service is performed.
- A warranty period of 3 years on parts and 1 year on labor means that IBM will provide warranty service without charge for:
  1. Parts and labor during the first year of the warranty period
  2. Parts only, on an exchange basis, in the second and third years of the warranty period. IBM will charge you for any labor it provides in performance of the repair or replacement.

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### IBM statement of limited warranty

Refer to the *IBM Statement of Limited Warranty* document that came with your appliance for detailed information about the country-specific warranty information.



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# Readers' Comments — We'd Like to Hear from You

IBM TotalStorage NAS Gateway 300 Model G02  
Installation and Initial Setup Guide

Publication No. GA27-4331-00

Overall, how satisfied are you with the information in this book?

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Easy to find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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