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Hitachi TagmaStore™ Adaptable Modular Storage and Workgroup Modular Storage

Windows® 2000 Host Installation Guide

MK-95DF735-01

Trademarks

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Document Revision Level

Revision	Date	Description
MK-95DF735-00	June 2005	Initial Release
MK-95DF735-01	August 2005	Revision 1, supersedes and replaces MK-95DF735-00

Source Document(s) for this Revision

- *Hitachi TagmaStore™ Adaptable Modular Storage Windows® 2000 Host Installation Guide*, MK-92DLM129.
- Hitachi Data Systems' review of this document.

Changes in this Revision

- Added Workgroup Modular Storage to the title page.
- Changed the footer to read "Hitachi TagmaStore™ AMS and WMS Windows® 2000 Host Installation Guide".
- Changed the verbiage under "Convention for Storage Capacity Values".
- Replaced instances of "system" with "system" when appropriate.

Preface

This host installation guide describes and provides instructions for configuring the devices on the Adaptable Modular Storage and Workgroup Modular Storage systems for operation with the Microsoft® Windows® 2000 operating system (OS). This guide assumes that the user:

- Has a background in data processing and understands direct-access storage device (DASD) systems and their basic functions,
- Is familiar with the Hitachi Adaptable Modular Storage or Workgroup Modular Storage system, and
- Is familiar with the Microsoft® Windows® 2000 Server and/or Windows® 2000 Professional operating systems, the Win2000 server/workstation, and the fibre-channel adapters.

Notes:

- The terms "Adaptable Modular Storage" and "Workgroup Modular Storage" refer to the entire Hitachi Adaptable and Workgroup Modular Storage system family, unless otherwise noted. Refer to the *Hitachi TagmaStore Adaptable Modular Storage Model AMS500 User's Guide* (MK-95DF714) or *Hitachi TagmaStore Adaptable Modular Storage Model AMS200 User's Guide* (MK-95DF713) for more information about the Adaptable Modular Storage and Workgroup Modular Storage systems.
- For more information about Windows® 2000, please consult the Windows® 2000 online help and/or user documentation, or contact Microsoft® technical support.
- Note: The use of Hitachi TagmaStore™ Adaptable Modular Storage and Workgroup Modular Storage systems and all other Hitachi Data Systems products is governed by the terms of your agreement(s) with Hitachi Data Systems.

Microcode Level

This document revision applies to TagmaStore™ Adaptable Modular Storage and Workgroup Modular Storage versions 2.0 and higher.

Convention for Storage Capacity Values

Storage capacity values for hard disk drives (HDDs) on the AMS and WMS systems are calculated based on the following values:

1 KB = 1,000 bytes
1 MB = $1,000^2$ bytes
1 GB = $1,000^3$ bytes
1 TB = $1,000^4$ bytes

Storage capacity values for logical units (LUs) on the AMS and WMS systems are calculated based on the following values:

1 KB = 1,024 bytes
1 MB = $1,024^2$ bytes
1 GB = $1,024^3$ bytes
1 TB = $1,024^4$ bytes

Referenced Documents

- *Hitachi TagmaStore™ Adaptable Modular Storage and Workgroup Modular Storage: Storage Navigator-Modular Command Line Interface (CLI) User's Guide*, MK-95DF712
- *Hitachi TagmaStore™ Adaptable Modular Storage and Workgroup Modular Storage: Storage Navigator-Modular Graphical User Interface (GUI) User's Guide*, MK-95DF711
- *Hitachi TagmaStore™ Adaptable Modular Storage: Storage Navigator Web User's Guide*, MK-95DF719
- *Hitachi TagmaStore™ Adaptable Modular Storage Model AMS500 User and Reference Guide*, MK-95DF714
- *Hitachi TagmaStore™ Adaptable Modular Storage Model AMS200 User and Reference Guide*, MK-95DF713
- *Hitachi TagmaStore™ Hitachi Dynamic Link Manager User's Guide for Windows® Systems*, MK-92DLM129

Comments

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Chapter 1 Introduction

Welcome to the Windows® 2000 Host Installation Guide for Hitachi TagmaStore™ Adaptable Modular Storage and Workgroup Modular Storage.

This guide describes the requirements and procedures for connecting Adaptable Modular Storage and Workgroup Modular Storage systems to a Windows® 2000 system. It also describes how to configure the new Adaptable Modular Storage disk devices for operation with the Windows® operating system. The Hitachi Data Systems representative performs the initial physical installation of the Adaptable Modular Storage system. The user then configures the new Adaptable Modular Storage devices with assistance as needed from the Hitachi Data Systems representative.

Configuration of the Adaptable Modular Storage disk devices for Windows® 2000 operations includes:

- Setting the host-specific parameters (section 2.3.1)
- Configuring the host fibre-channel adapters (section 2.3.2)
- Writing the signatures (section 3.1)
- Partitioning and labeling the new devices (section 3.2)
- Verifying Auto-Mount (section 3.4)
- Disabling the "Write Cache Option" on Hitachi Data Systems external disks (section 3.5)

Note on the term "SCSI disk": The Adaptable Modular Storage logical devices are defined to the host as SCSI disk devices, whether the interface is SCSI or fibre-channel.

1.1 Adaptable Modular Storage System

The Hitachi Adaptable Modular Storage Series system is a high-performance, medium-capacity storage system, with added features for increasing data accessibility and enabling continuous user data access. The architecture of the Adaptable Modular Storage enables the user to scale the system to meet a wide range of capacity and performance requirements. The Adaptable Modular Storage system provides connectivity to most open systems through a standard fibre-channel interface.

For more information about the Adaptable Modular Storage system, refer to the *Hitachi TagmaStore Adaptable Modular Storage Model AMS500 User's Guide* (MK-95DF714), the *Hitachi TagmaStore Adaptable Modular Storage Model AMS200 User's Guide* (MK-95DF713), or contact your Hitachi Data Systems account team.

Chapter 2 Preparing for New Device Configuration

This chapter covers the following topics:

- Configuration requirements (section 2.1)
- Installing the Adaptable Modular Storage system (section 2.2)
- Preparing to connect Adaptable Modular Storage (section 2.3)
- Connecting the Adaptable Modular Storage to a Windows® system (section 2.4)

2.1 Configuration Requirements

The requirements for undertaking an Adaptable Modular Storage Windows® 2000 configuration are:

- **Hitachi Adaptable Modular Storage system**

  The Storage Navigator Adaptable Modular Storage software is required to configure the fibre-channel (FC) ports on the Adaptable Modular Storage system.

  Note: The availability of Adaptable Modular Storage features and functions depends on the level of microcode installed on the Adaptable Modular Storage system.

- **Windows® 2000 server/workstation**

  Refer to the Microsoft® user documentation for PC server hardware requirements.

- **Windows® 2000 Server or Windows® 2000 Professional operating system**

  Important: Contact Microsoft® to make sure that the most current operating system patches are installed. For more information about supported Windows® 2000 versions, contact Hitachi Data Systems.

- **Windows® 2003 Server/Workstation**

  Refer to the Microsoft® user documentation for PC server hardware requirements.

- **Windows® 2003 Server operating system IA32, IA64**

  For the latest information on Windows® 2003 version support, contact your Hitachi Data Systems account team.

- **Fibre-channel adapters**

  Be sure to install all utilities, tools, and drivers that come with the adapter(s).

  – The Adaptable Modular Storage system supports full-speed (1 and 2 Gbps), shortwave, non-OFC (open fibre control) optical fibre-channel interface and multimode optical cables with SC and/or LC connectors. Do not connect any OFC-type fibre-channel interface to the Adaptable Modular Storage system.

- **High-availability (HA) software (optional)**

  The Adaptable Modular Storage currently supports the following HA software products for the Windows® operating system. Please contact your Hitachi Data Systems account team for the latest information on supported software products:

  – Hitachi Dynamic Link Manager (HDLM) for path failover

  – VERITAS Volume Manager™ (VxVM) for logical volume management

2.2 Installing the Adaptable Modular Storage System

The Adaptable Modular Storage system comes with all the hardware and cabling required for installation. Installation of the Adaptable Modular Storage system involves the following activities:

- **Hardware installation**

  The Hitachi Data Systems representative performs the hardware installation as specified in the Adaptable Modular Storage Maintenance Manual. Follow all precautions and procedures in the Adaptable Modular Storage maintenance manual. Check all specifications to ensure proper installation and configuration. Hardware installation includes:

  - Assembling all hardware and cabling.
  - Upgrading to the latest microcode level.
  - Creating RAID groups and LUNs and formatting LUNs using the Storage Navigator Adaptable Modular Storage software. For information and instructions on using Storage Manager, refer to the following documents:
    - *Hitachi TagmaStore™ Adaptable Modular Storage-Storage Navigator Modular Command Line Interface (CLI) User's Guide* (MK-95DF712)
    - *Hitachi TagmaStore™ Adaptable Modular Storage-Storage Navigator-Modular Graphical User Interface (GUI) User's Guide* (MK-95DF711)
    - *Hitachi TagmaStore™ AMS Storage Navigator Web User's Guide* (MK-95DF719)
  - Installing the fibre-channel adapters and cabling.

- **Adaptable Modular Storage FC Port**

  The fibre topology parameters for each Adaptable Modular Storage fibre-channel port depend on the type of device to which the Adaptable Modular Storage port is connected. Determine the topology parameters supported by the device, and set your topology accordingly.

  You use the Storage Navigator Adaptable Modular Storage software to configure the Adaptable Modular Storage fibre ports. For instructions on using Storage Navigator, refer to the following documents:

  - *Hitachi TagmaStore™ Adaptable Modular Storage-Storage Navigator Modular Command Line Interface (CLI) User's Guide* (MK-95DF712)
  - *Hitachi TagmaStore™ Adaptable Modular Storage-Storage Navigator-Modular Graphical User Interface (GUI) User's Guide* (MK-95DF711)
  - *Hitachi TagmaStore™ AMS Storage Navigator Web User's Guide* (MK-95DF719)

2.3 Preparing to Connect the Adaptable Modular Storage

Before connecting the Adaptable Modular Storage system, perform the following tasks:

- Set the host-specific parameters for the Adaptable Modular Storage fibre-channel port(s) (see section 2.3.1).
- Verify host bus adapter installation (see section 2.3.2).

2.3.1 Setting Host-specific Parameters for Adaptable Modular Storage Ports

The Adaptable Modular Storage ports must be configured for the connected operating system. Use the Storage Navigator Adaptable Modular Storage software to configure the Adaptable Modular Storage fibre ports.

For instructions about using Storage Navigator, refer to the following documents:

- *Hitachi TagmaStore™ Adaptable Modular Storage-Storage Navigator Modular Command Line Interface (CLI) User's Guide* (MK-95DF712)
- *Hitachi TagmaStore™ Adaptable Modular Storage-Storage Navigator-Modular Graphical User Interface (GUI) User's Guide* (MK-95DF711)
- *Hitachi TagmaStore™ Adaptable Modular Storage-Storage Navigator Web User's Guide* (MK-95DF719)

2.3.1.1 Fibre Technology

You configure the Adaptable Modular Storage FC ports to define the fibre topology parameters and port addresses. The Adaptable Modular Storage systems support up to 512 LUNs. You will select the appropriate settings for each Adaptable Modular Storage FC port based on the device to which the port is connected. Determine the topology parameters supported by the device, and set your topology accordingly.

Note: If you plan to connect different types of servers to the Adaptable Modular Storage via the same fabric switch, use either **zoning** on the switch or the Hitachi Volume Security (LUN Management) feature on the Adaptable Modular Storage, or a combination of both.

2.3.1.2 Port Address

In fabric environments, the port addresses are assigned automatically by fabric switch port number and are not controlled by the Adaptable Modular Storage port settings. In FC arbitrated-loop (FCAL) environments, the port addresses are set by entering an AL-PA (arbitrated-loop physical address, or loop ID, or port address). The host communicates with the devices comprising the loop with 8-bit AL-PA (see Table 2.1).

Table 2.1 shows the available Adaptable Modular Storage AL-PA values ranging from 01 to EF. Fibre-channel protocol uses the AL-PAs to communicate on the fibre-channel link, but the software driver of the platform host adapter translates the AL-PA value assigned to the Adaptable Modular Storage port to a SCSI TID. See Appendix B for a description of the AL-PA-to-TID translation.

Note on loop ID conflict: The Windows® system assigns port addresses from lowest (01) to highest (EF). To avoid loop ID conflict, assign the port addresses from highest to lowest (i.e., starting at EF). The AL-PAs should be unique for each device on the loop to avoid conflicts. Do not use more than one port address with the same TID in same loop (e.g., addresses EF and CD both have TID 0, see Table B.1 in Appendix B).

Table 2.1 Available AL-PA Values

EF	CD	B2	98	72	55	3A	25
E8	CC	B1	97	71	54	39	23
E4	CB	AE	90	6E	53	36	1F
E2	CA	AD	8F	6D	52	35	1E
E1	C9	AC	88	6C	51	34	1D
E0	C7	AB	84	6B	4E	33	1B
DC	C6	AA	82	6A	4D	32	18
DA	C5	A9	81	69	4C	31	17
D9	C3	A7	80	67	4B	2E	10
D6	BC	A6	7C	66	4A	2D	0F
D5	BA	A5	7A	65	49	2C	08
D4	B9	A3	79	63	47	2B	04
D3	B6	9F	76	5C	46	2A	02
D2	B5	9E	75	5A	45	29	01
D1	B4	9D	74	59	43	27	
CE	B3	9B	73	56	3C	26	

2.3.2 Verifying the Host Fibre-channel Adapter Installation

Before the Adaptable Modular Storage is connected to the Windows® 2000 system, verify the FC adapter installation. To ensure that the host fibre configuration is correct, you will verify recognition of the FCA and the FCA driver.

To verify the fibre-channel host configuration:

1. Log in to the Windows® system as **administrator**, and ensure all existing devices are powered on and properly connected to the Windows® 2000 system.
2. Display the host configuration. Make sure that the host recognizes the following four classes of fibre information (underlined in the following example): **fibre channel adapter**, **SCSI bus characteristics**, **world wide name**, and **FCA driver**. If this information is not displayed or if error messages are displayed, the host environment may not be configured properly.

   Note: For information on the HBA-specific text displayed on screen, refer to the user documentation for the HBA.

2.4 Connecting the Adaptable Modular Storage System to a Windows® System

The Adaptable Modular Storage system comes with all the hardware and cabling required for connection to the host system(s). Connection of the Adaptable Modular Storage system involves the following steps. Some of these steps are performed by the Hitachi Data Systems representative, while other steps are performed by the user.

1. **Verify system installation.** The Hitachi Data Systems representative verifies the fibre port address configuration and the status of the FC adapters and LDEVs (normal).
2. **Shut down the Windows® 2000 system.** The user shuts down and powers off the Windows® system before connecting the Adaptable Modular Storage:
   a) Shut down the Windows® 2000 system.
   b) When shutdown is complete, power off the Windows® display.

      Note: You do not have to shut down the Windows® display.

   c) Power off all peripheral devices except for the Adaptable Modular Storage system.
   d) Power off the Windows® system. You are now ready to connect the Adaptable Modular Storage system.
3. **Connect the Adaptable Modular Storage to the Windows® 2000 system.** The Hitachi Data Systems representative installs the fibre-channel cables between the Adaptable Modular Storage and the Windows® system.

   Note: The Hitachi Data Systems representative must use the Adaptable Modular Storage maintenance manual during all installation activities. Follow all precautions and procedures in the maintenance manual, and always check all specifications to ensure proper installation and configuration.
4. **Power on the Windows® 2000 system.** The user or Hitachi Data Systems representative powers on the **Windows® 2000** system after connecting the Adaptable Modular Storage system:
   a) Power on the Windows® 2000 system display.
   b) Power on all peripheral devices. The Adaptable Modular Storage system should be on and the fibre-channel ports should be configured. If the Adaptable Modular Storage fibre ports are configured after the Windows® system is powered on, the system must be restarted to recognize the new devices.
   c) Confirm the ready status of all devices.
   d) Power on the Windows® 2000 system.

Chapter 3 Configuring New Devices

After Adaptable Modular Storage installation and connection procedures have been performed, the new Adaptable Modular Storage devices are ready to be configured for use. Configuration of the Adaptable Modular Storage devices is performed by the user and requires administrator access to the Windows® 2000 system. The activities involved in device configuration are:

- Writing the signatures on the new devices (section 3.1)
- Creating and formatting the partitions on the new devices (section 3.2)
- Verifying file system operations (section 3.3)
- Verifying auto mount (section 3.4)
- Disabling the "Write Cache Option" on Hitachi Data Systems External Disks (section 3.5)

***Note*:** Chapter 4 provides troubleshooting information, while Appendix B provides instructions for configuring the Windows® 2000 boot disk on the Adaptable Modular Storage system.

3.1 Writing Signatures

The first step in configuring the new devices is to write a signature on each device using the Win2000 Disk Management. You must write a signature on each disk device to enable the Win2000 system to vary the device online. The 32-bit signature identifies the disk to the Win2000 system. If the disk's TID and/or LUN are changed, or if the disk is moved to a different controller, the Disk Management and Windows® 2000 fault-tolerant driver will continue to recognize it.

Note: The Win2000 system assigns the disk numbers sequentially, starting with the local disks and then by adapter, and by TID/LUN. If the Adaptable Modular Storage is attached to the first adapter (displayed first during system start-up), the disk numbers for the new devices start at 1 (the local disk is 0). If the Adaptable Modular Storage is not attached to the first adapter, the disk numbers for the new devices start at the next available disk number. For example, if 40 disks are attached to the first adapter (disks 1–40) and the Adaptable Modular Storage is attached to the second adapter, the disk numbers for the Adaptable Modular Storage start at 41.

To write the signatures on the new disk devices (see Figure 3.1):

1. From the Start-Programs menu, select **Administrative Tools (Computer Management)**, then select **Disk Management** to start the Disk Manager. Initialization takes a few seconds.
2. When the Disk Management notifies you that one or more disks have been added, select **OK** to update the system configuration.

   Note: The Disk Management will notify you if you removed any disks.
3. You may want to reboot your system after adding new devices.
4. The Disk Management displays each new device by disk number and asks if you want to write a signature on the disk (see Figure 3.2). You may only write a signature once on each device. For all SCSI disk devices, select **OK** to write a signature.
5. After you write or decline to write a signature on each new device, the Disk Management main panel displays the devices by disk number (see Figure 3.1). The total capacity and free space are displayed for each disk device with a signature. **Configuration information not available** or an "Unknown" status indicates no signature. Do not exit the Disk Manager yet. You will create partitions on the new SCSI disk devices next.

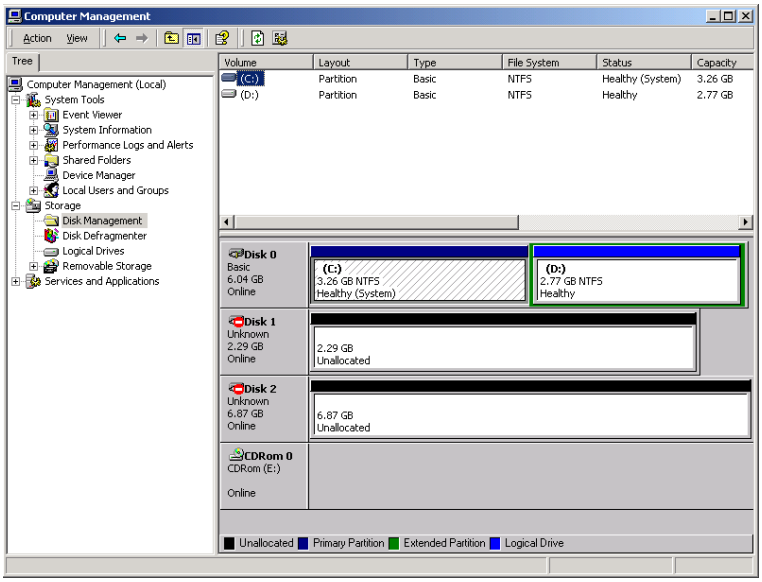

Figure 3.1 Disk Management Panel showing New Devices

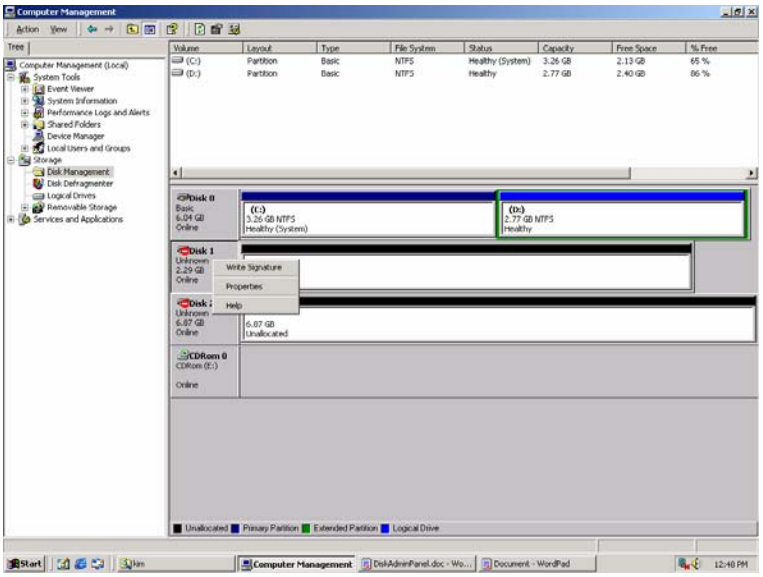

Figure 3.2 Writing Signatures

3.2 Creating and Formatting Partitions

After you write the signatures on the new devices, you create and format the partitions on the new SCSI disk devices.

Dynamic Disk is supported with no restrictions for the Adaptable Modular Storage connected to the Windows® 2000 operating system. For more information, refer to Microsoft® online help.

To create and format partitions on the new disk devices:

1. On the Disk Management main panel, select the unallocated area for the SCSI disk you want to partition and select the **Create Partition** menu. A Select Partition Type wizard screen displays (see Figure 3.3). Select the desired type of partition, and then click **Next**.
2. The Specify Partition Size window displays (see Figure 3.4). Specify the desired partition size. If the size is greater than 1024 MB, the Disk Management requests confirmation to create the partition. Click **Next.**
3. The Assign Drive Letter or Path screen displays (see Figure 3.5). Select a drive letter. You can also state no drive letter or drive path.
4. Click **Next**. The Format Partition window displays (see Figure 3.6).
5. Click **Next**.
6. If all partitions have been successfully completed, a window confirms this and lists all your selections. The word **Healthy** displays next to each device that has been successfully added.
7. Enter the following information on the Format panel (see Figure 3.7):
   - **File System to use:** Select **NTFS** (enables the Win2000 system to write to the disk).
   - **Allocation unit size Default allocation size**. Do not change this entry.
   - **Volume label:** Enter a volume label, or leave this field blank for no label.
   - **Format Options: Select Perform a Quick Format** to decrease the time required to format the partition; select **Enable file and folder compression** only if you want to enable compression.
8. Select **Next** to format the partition as specified. When the format warning is displayed (this new format will erase all existing data on disk), select **OK** to continue. The Format panel displays the progress of the format partition operation (see Figure 3.8).
9. When the format complete message displays, select **OK**, and then select **Finish** to close the Format panel. Verify that the Disk Manager main panel displays the correct file system (NTFS) for the formatted partition (see Figure 3.9).
10. Repeat steps 1 through 9 for each new disk device. When you finish creating and formatting partitions, exit the Disk Manager (select **Partition-Exit**). When the disk configuration change message displays, select **Yes** to save your changes.

    Note: Be sure to make your new Emergency Repair Disk using RDISK.EXE.

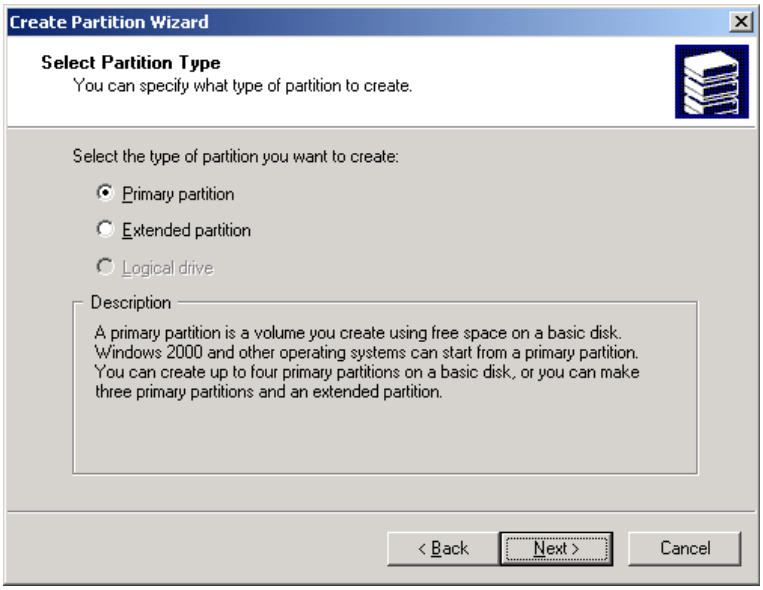

Figure 3.3 Create Partition Wizard Screen

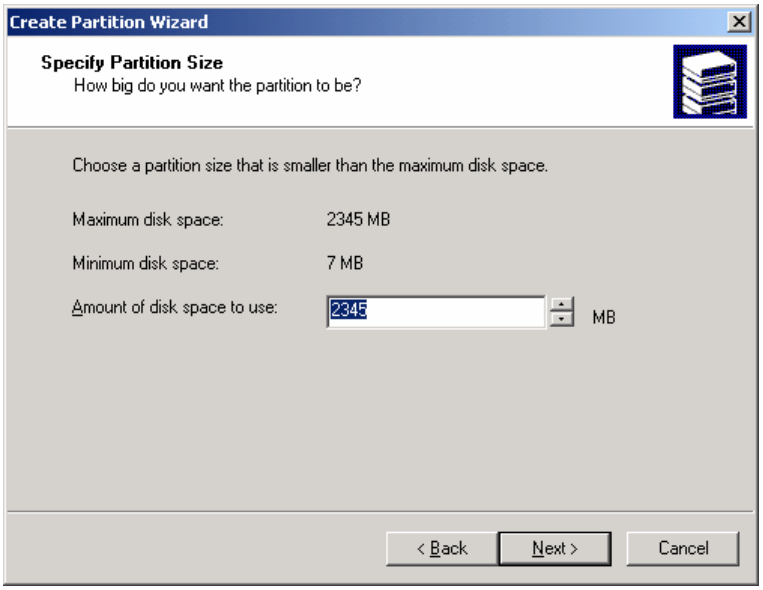

Figure 3.4 Specify Partition Size

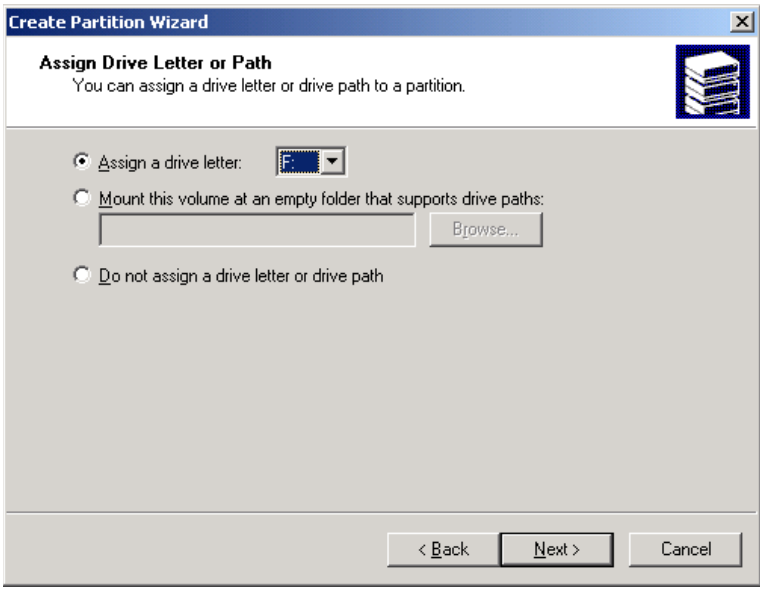

Figure 3.5 Assign Drive Letter or Path

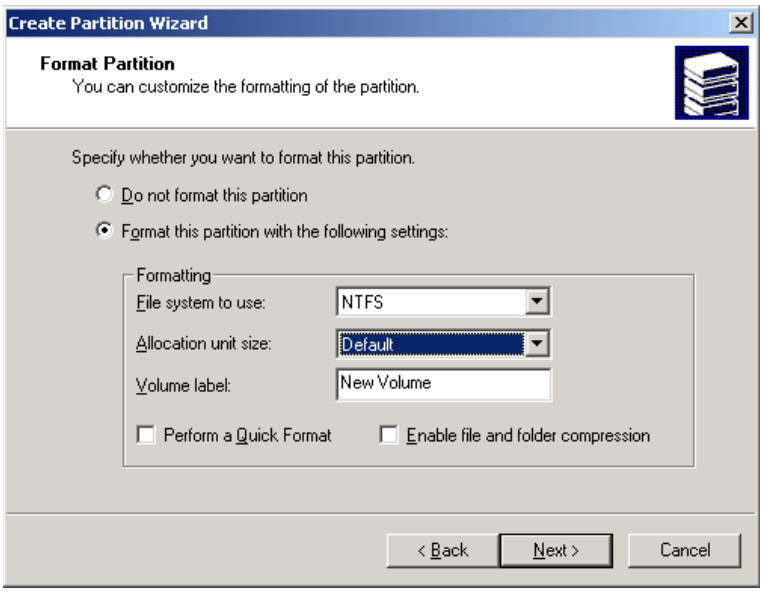

Figure 3.6 Format Partition Window

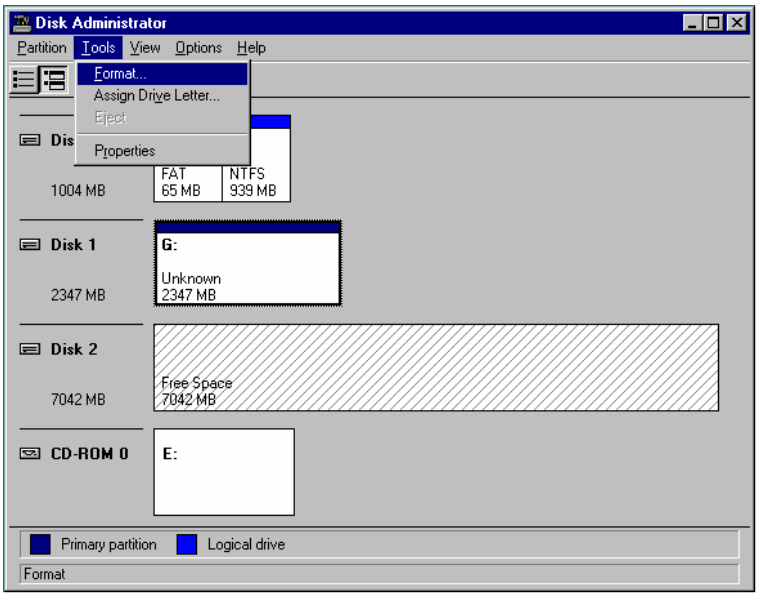

Figure 3.7 Opening the Format Panel

Note: After committing the changes, notice that the newly created partition changes from **Unformatted** to **Unknown**.

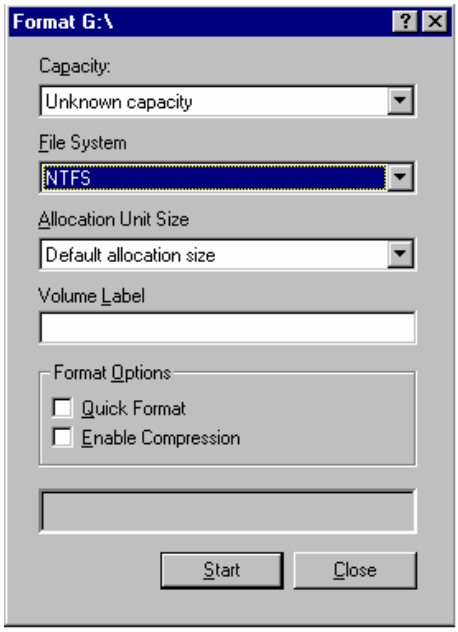

Figure 3.8 Formatting the Partition

Note: In the example in Figure 3.9, the name of the partition being formatted is **G:**

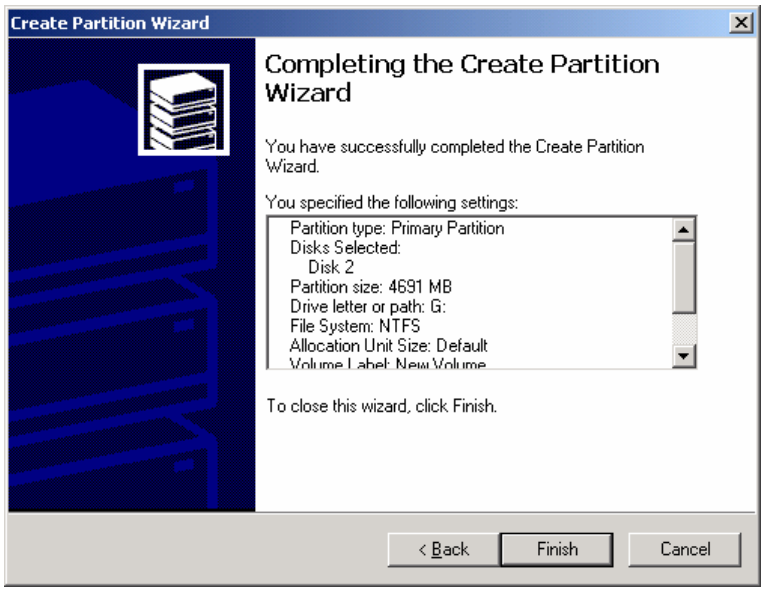

Figure 3.9 Verifying the Formatted Partition

3.3 Verifying File System Operations

After creating and formatting the partitions, verify that the file system is operating properly on each new SCSI disk device (OPEN-*x*, OPEN VIR, and LUSE). The file system enables the Win2000 system to access the devices. You can verify file system operation easily by copying a file onto each new device. If the file is copied successfully, this verifies that the file system is operating properly (i.e., the Win2000 system can access the new device).

To verify file system operations for the new SCSI disk devices:

1. From the Win2000 desktop, double-click **My Computer** to display all connected devices. All newly partitioned disks should displays in this window (see Figure 3.10).
2. Select the device you want to verify, and then display its Properties (select the **File** menu and select **Properties**, or right-mouse-click the device and select **Properties**).
3. On the Properties panel (see Figure 3.11), verify that the properties are correct: label (optional), type, capacity, and file system.
4. Copy any file to the new device (select a small file to speed things along).
5. Display the contents of the new device to make sure the copy operation completed successfully (see Figure 3.12). The copied file should be displayed with the correct file size. If desired, compare the copied file with the original file to verify no differences.
6. Delete the copied file from the new device and verify the file was deleted successfully.
7. Repeat steps 2 through 6 for each new SCSI disk device.

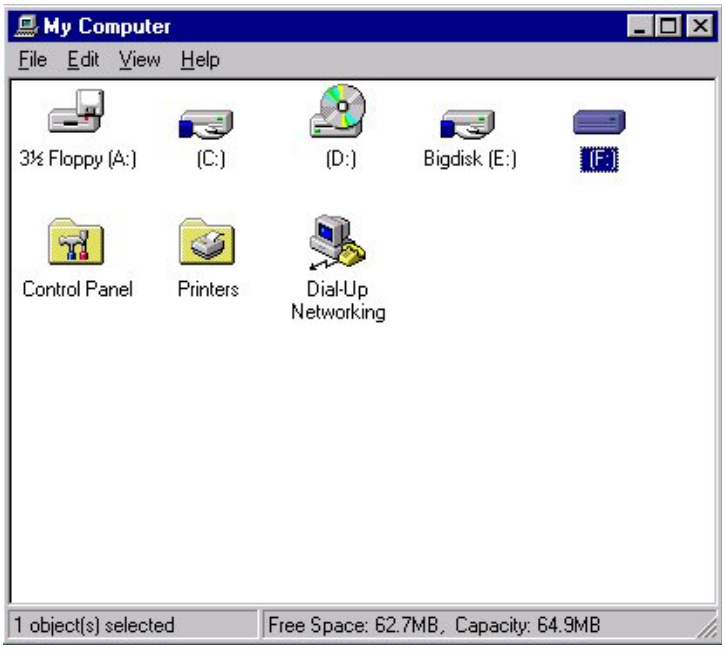

Figure 3.10 Displaying Connected Devices

Note: In this example, [F:] is the only new device.

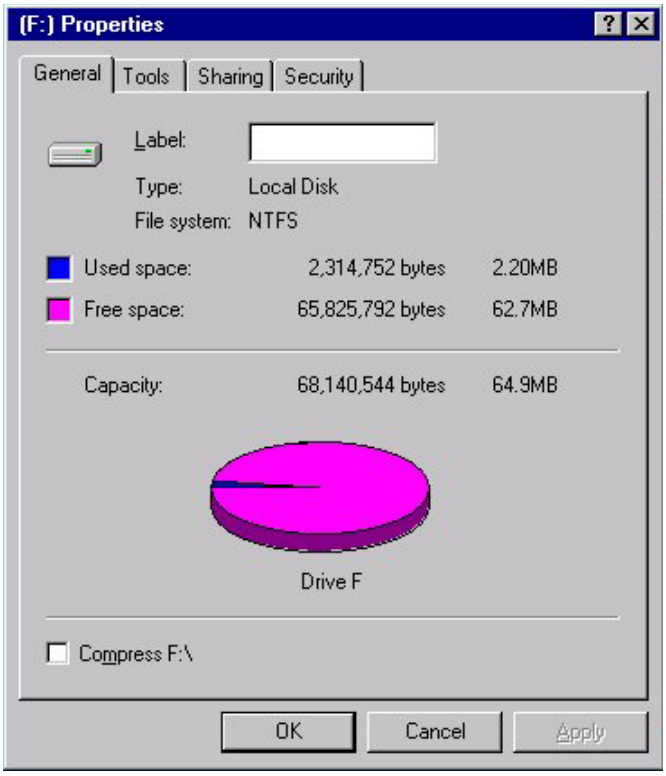

Figure 3.11 Verifying New Device Properties

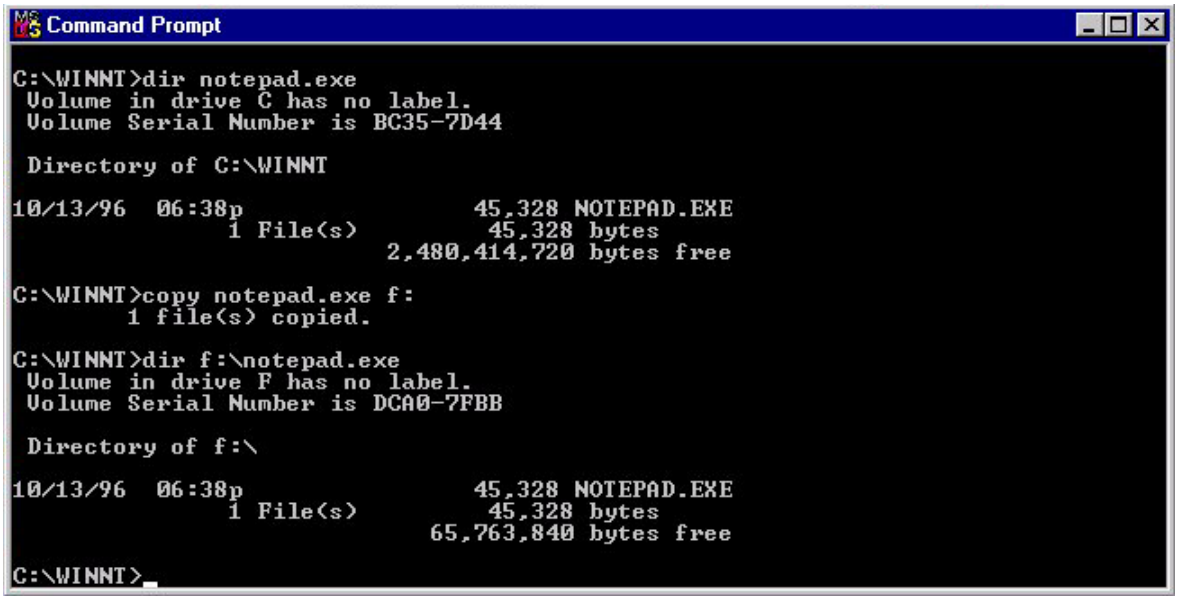

Figure 3.12 Verifying File Copy Operation

3.4 Verifying Auto-mount

The last step in configuring the new devices is to verify that all new devices are automatically mounted at system boot-up. To verify auto-mount of the new devices:

1. Shut down and restart the Windows® 2000 system.
2. Open **My Computer**, and verify that all new SCSI disk devices are displayed.
3. Verify that the Win2000 system can access each new device by repeating the procedure in the previous section (3.3):
   a) Verify the device properties for all new devices (see Figure 3.11).
   b) Copy a file to each new device to make sure that the devices are functioning properly (see Figure 3.12).

3.5 Disabling the “Write Cache Option” on External Disks

WARNING: Ensure all HDS external disks are configured with the “Write Cache Option” **disabled**. There is strong potential for data loss if this feature is enabled. The write cache option is strictly a JBOD or internal disk setting and should never be used on intelligent disks.

To disable the “Write Cache Option”:

1. Right-click **My Computer**.
2. Click **Manage**.
3. Click **Device Manager**.
4. Click the “+” sign next to **Disk Drives**.
5. Double-click the first external HDS disk drive.
6. Click the **Policies** or **Disk Properties** tab.
7. Ensure “Enable Write Caching on the Disk” is **disabled** (no check-mark). See Figure 3.13.

   Note: If Enable Write Cache is gray, it is already disabled (see Figure 3.14).
8. Repeat this procedure for all HDS external disk drives.

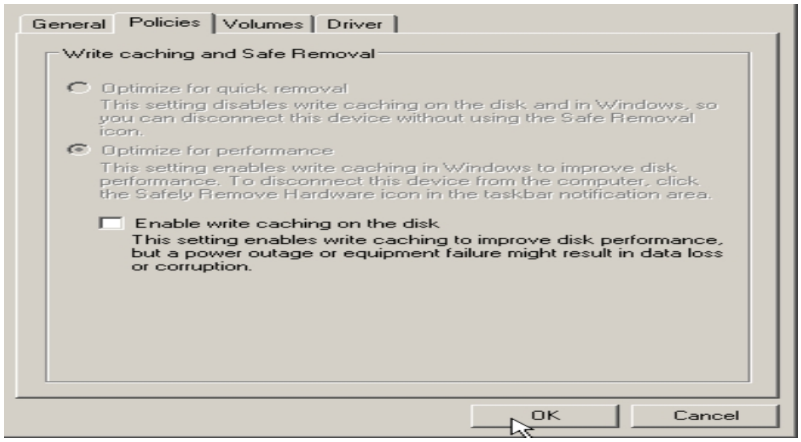

Figure 3.13 Enable Write Caching on the Disk (disabled)

Figure 3.14 Enable Write Cache (already disabled)

Chapter 4 Troubleshooting

4.1 Troubleshooting

For troubleshooting information about Adaptable Modular Storage system, refer to the *Hitachi TagmaStore Adaptable Modular Storage Model AMS500 User's Guide* (MK-95DF714) or *Hitachi TagmaStore Adaptable Modular Storage Model AMS200 User's Guide* (MK-95DF713).

Table 4.1 lists potential error conditions during Adaptable Modular Storage Windows® 2000 configuration and provides instructions for resolving each condition. If you are unable to resolve an error condition, please contact your Hitachi Data Systems representative or VAR for help, or call the Hitachi Data Systems Support Center for assistance.

Table 4.1 Troubleshooting

Error Condition	Recommended Action
The devices are not recognized by the system.	Make sure that the READY indicator lights on the Adaptable Modular Storage system are ON. Make sure that the fibre cables are correctly installed and firmly connected.
The Win2000 system does not reboot properly after hard shutdown.	If the Win2000 system is powered off unexpectedly (without the normal shutdown process), wait three minutes before restarting the Win2000 system. This allows the Adaptable Modular Storage's internal time-out process to purge all queued commands so that the Adaptable Modular Storage is available (not busy) during system startup. If the Win2000 system is restarted too soon, the Adaptable Modular Storage will continue trying to process the queued commands and the Win2000 system will not reboot successfully.

4.2 Calling the Hitachi Data Systems Support Center

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible, including the circumstances surrounding the error or failure and the exact content of any error messages displayed on the host system(s).

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
  San Diego, California, USA
  1-800-348-4357
  1-619-537-3000
- Hitachi Data Systems Europe
  Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
  North Ryde, Australia
  011-61-2-9325-3300

Appendix A Configuring the Boot Disk on the Adaptable Modular Storage

You can configure the Windows® 2000 boot disk with Hitachi Dynamic Link Manager version 2.0.1 or greater.

For assistance, contact your Hitachi Data Systems representative.

Appendix B SCSI TID Map for Fibre-channel Adapters

When an arbitrated loop (AL) is established or re-established, the port addresses are assigned automatically to prevent duplicate TIDs. When using the SCSI over fibre-channel protocol (FCP) there is no longer a need for target IDs in the traditional sense. SCSI is a bus-oriented protocol requiring each device to have a unique address since all commands go to all devices. For fibre channel, the AL-PA is used instead of the TID to direct packets to the desired destination. Unlike traditional SCSI, once control of the loop is acquired, a point-to-point connection is established from initiator to target. To enable transparent use of FCP, Windows NT® "maps" a TID to each AL-PA.

Table B.1 identifies the fixed mappings between the bus/TID/LUN addresses assigned by Windows® and the FC native addresses (AL_PA/SEL_ID) for FC adapters where ScanDown = 0 (default).

Note: When Adaptable Modular Storage devices and other types of devices are connected in the same arbitrated loop, the mappings defined in Table B.1 cannot be guaranteed.

Note: The Emulex® driver emulates six SCSI busses per adapter to map all 126 possible AL-PAs to target IDs. The first bus (bus 0) is a dummy bus.

Table B.1 AL-PA to SCSI TID Mapping (t value)

AL-PA	t value	AL-PA	t value	AL-PA	t value	AL-PA	t value	AL-PA	t value	AL-PA	t value	AL-PA	t value	AL-PA	t value
EF	0	CD	0	B2	0	98	0	72	0	55	0	3A	0	25	0
E8	1	CC	1	B1	1	97	1	71	1	54	1	39	1	23	1
E4	2	CB	2	AE	2	90	2	6E	2	53	2	36	2	1F	2
E2	3	CA	3	AD	3	8F	3	6D	3	52	3	35	3	1E	3
E1	4	C9	4	AC	4	88	4	6C	4	51	4	34	4	1D	4
E0	5	C7	5	AB	5	84	5	6B	5	4E	5	33	5	1B	5
DC	6	C6	6	AA	6	82	6	6A	6	4D	6	32	6	18	6
DA	7	C5	7	A9	7	81	7	69	7	4C	7	31	7	17	7
D9	8	C3	8	A7	8	80	8	67	8	4B	8	2E	8	10	8
D6	9	BC	9	A6	9	7C	9	66	9	4A	9	2D	9	0F	9
D5	10	BA	10	A5	10	7A	10	65	10	49	10	2C	10	08	10
D4	11	B9	11	A3	11	79	11	63	11	47	11	2B	11	04	11
D3	12	B6	12	9F	12	76	12	5C	12	46	12	2A	12	02	12
D2	13	B5	13	9E	13	75	13	5A	13	45	13	29	13	01	13
D1	14	B4	14	9D	14	74	14	59	14	43	14	27	14	00	-
CE	15	B3	15	9B	15	73	15	56	15	3C	15	26	15		

Appendix C Acronyms and Abbreviations

AL	arbitrated loop
AL-PA	arbitrated loop physical address
CLI	Command Line Interface
FC	fibre channel
GUI	graphical user interface
HBA	host bus adapter
HDS	Hitachi Data Systems
I/O	input/output
LDEV	logical device
LU	logical unit
LUN	logical unit number, logical unit
LUSE	LU Size Expansion
MB	megabyte
NTFS	NT File System
OFC	open fibre control
PC	personal computer system
SCSI	small computer system interface