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DATA SYSTEMS

Hitachi Freedom Storage™ Thunder 9500™ V Series

Windows® 2000 Host Installation Guide

Trademarks

Notice of Export Controls

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The following source document was used to produce this 9500V configuration guide:

- *Hitachi Freedom Storage™ Thunder 9200™ Windows® 2000 Host Installation Guide* (MK-90DF515)
- HDS review of this document

Changes in this Revision

- Updated host-specific parameters information (Section 2.3.1)

Preface

The *Hitachi Thunder 9500™ V Series Windows® 2000 Host Installation Guide* describes and provides instructions for configuring the devices on the 9500V array subsystem for operation with the Microsoft® Windows® 2000 operating system (OS). This configuration guide assumes that:

- The user has a background in data processing and understands direct-access storage device (DASD) subsystems and their basic functions,
- the user is familiar with the 9500V array subsystems,
- The user is familiar with the Microsoft® Windows® 2000 Server and/or Windows® 2000 Professional operating systems, the Win2000 server/workstation, and the fibre-channel adapters, and

Note: The term "9500V" refers to the entire Hitachi Freedom Storage™ 9500™ V Series subsystem family, unless otherwise noted. Please refer to the *Hitachi Thunder 9500™ V Series User and Reference Guide* (MK-92DF601) for further information on the 9500V disk array subsystems.

For further information on Windows® 2000, please consult the Windows® 2000 online help and/or user documentation, or contact Microsoft technical support.

COMMENTS

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Make sure to include the document title, number, and revision.
Please refer to specific page(s) and paragraph(s) whenever possible.

(All comments become the property of Hitachi Data Systems Corporation.)

Thank you!

Contents

List of Figures

List of Tables

Chapter 1 Overview of 9500V Windows® 2000 Configuration

1.1 Windows® 2000 Configuration

This document describes the requirements and procedures for connecting the 9500V subsystem to a Windows® 2000 system and configuring the new 9500V devices for operation with the Windows® operating system.

Configuration of the 9500V disk devices for Windows® 2000 operations includes:

- Setting the host-specific parameters (section 2.3.1)
- Configuring the host fibre-channel adapters (see section 2.3.2)
- Writing the signatures (see section 3.1)
- Partitioning and labeling the new devices (see section 3.2), and
- Creating and mounting the file systems (see sections 3.3 and 3.4).

Note on the term "SCSI disk": The 9500V logical devices are defined to the host as SCSI disk devices, whether the interface is SCSI or fibre-channel.

1.2 9500V Array Subsystem

The Hitachi 9500V RAID subsystem supports concurrent attachment to multiple UNIX®-based and PC-server platforms. Please contact your Hitachi Data Systems account team for the latest information on platform support. The 9500V subsystem provides continuous data availability, high-speed response, scaleable connectivity, and expandable capacity for PC server and open-system storage. The 9500V subsystem can operate with multihost applications and host clusters, and is designed to handle very large databases as well as data warehousing and data mining applications that store and retrieve terabytes of data.

For further information on the 9500V subsystem, please refer to the *Hitachi Thunder 9500™ V Series User and Reference Guide* (MK-92DF601), or contact your Hitachi Data Systems account team.

Chapter 2 Preparing for New Device Configuration

2.1 Configuration Requirements

The requirements for 9500V Windows® 2000 configuration are:

- **9500V subsystem**.
  - The Resource Manager 9500V software is required to configure the fibre-channel (FC) ports.

  Note: The availability of 9500V features and functions depends on the level of microcode installed on the 9500V subsystem.

- Windows® 2000 server/workstation. Please refer to the Microsoft® user documentation for PC server hardware requirements.

- Windows® 2000 Server or Windows® 2000 Professional operating system.
  Important: Please contact Microsoft® to make sure that the most current OS patches are installed.

  Note: For further information on supported Windows® 2000 versions, please contact Hitachi Data Systems.

- **High-availability (HA) software.** The 9500V currently supports specific software products. Please contact your Hitachi Data Systems account team for the latest information on supported software products.

- **Fibre-channel adapters**. Make sure to install all utilities, tools, and drivers that come with the adapter(s).
  - The 9500V subsystem supports full-speed (1 and 2 Gb/s), 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 9500V subsystem.

Note: This document does not cover SCSI connection for the 9500V subsystem. Please refer to the *Hitachi Thunder 9200™ Windows 2000 Installation Guide (SCSI)*, MK-91DF549.

2.2 Installing the 9500V Subsystem

The 9500V subsystem comes with all hardware and cabling required for installation. Installation of the 9500V subsystem involves the following activities:

Hardware installation. Perform hardware installation as specified in Hitachi Data Systems' documentation and Hitachi, Ltd. source documentation. Follow all precautions and procedures in this documentation. 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 Resource Manager 9500V software. For information and instructions on using Resource Manager, please refer to the *Hitachi Thunder 9200™ Resource Manager User's Guide* (MK-91DF552).
- Installing the fibre-channel adapters and cabling.

  9500V FC Port: The fibre topology parameters for each 9500V fibre-channel port depend on the type of device to which the 9500V port is connected. Determine the topology parameters supported by the device, and set your topology accordingly.

2.3 Preparing to Connect the 9500V Subsystem to the Host

Before connecting the 9500V subsystem, you must perform the following tasks:

- Set the host-specific parameters for the 9500V fibre-channel port(s) (see section 2.3.1), and
- Verify host bus adapter installation (see section 2.3.2).

You will use the Resource Manager 9500V software to configure the 9500V fibre ports. For instructions on using Resource Manager, please refer to the *Hitachi Thunder 9200™ Resource Manager User's Guide* (MK-91DF552).

2.3.1 Setting the Host-Specific Parameters for the 9500V Ports

The 9500V ports must be configured for the connected operating system.

Fibre Topology. You need to configure the 9500V FC ports to define the fibre topology parameters and port addresses (see Table 2.1). The 9500V subsystem supports up to 512 LUs and 128 host groups per port. You will select the appropriate settings for each 9500V 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 9500V via the same fabric switch, you must use either **zoning** on the switch or the Hitachi SANtinel™ (LUN security) on the 9500V, or a combination of both.

Port address. In fabric environments, the port addresses are assigned automatically by fabric switch port number and are not controlled by the 9500V 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 AL-PA values and the corresponding SCSI TID address. The number of available port addresses is 126. (There are 127 port addresses, but address 00H is reserved for fibre connection.) 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 9500V port to a SCSI TID.

Devices communicate with hosts using individual port addresses. However, hosts map SCSI protocol to fibre channel devices. The hosts access the device's LUs using the device files /dev/dsk/c*t*d* and /dev/rdsk/c*t*d*. SCSI and fibre-channel devices are accessed the same way; however, the device files for SCSI and fibre-channel devices are configured differently.

Table 2.1 Fibre Port Addressing

AL-PA	TID	AL-PA	TID	AL-PA	TID	AL-PA	TID	AL-PA	TID	AL-PA	TID	AL-PA	TID	AL-PA	TID
EF	0	CD	16	B2	32	98	48	72	64	55	80	3A	96	23	112
E8	1	CC	17	B1	33	97	49	71	65	54	81	39	97	23	113
E4	2	CB	18	AE	34	90	50	6E	66	53	82	36	98	1F	114
E2	3	CA	19	AD	35	8F	51	6D	67	52	83	35	99	1E	115
E1	4	C9	20	AC	36	88	52	6C	68	51	84	34	100	1D	116
E0	5	C7	21	AB	37	84	53	6B	69	4E	85	33	101	1B	117
DC	6	C6	22	AA	38	82	54	6A	70	4D	86	32	102	18	118
DA	7	C5	23	A9	39	81	55	69	71	4C	87	31	103	17	119
D9	8	C3	24	A7	40	80	56	67	72	4B	88	2E	104	10	120
D6	9	BC	25	A6	41	7C	57	66	73	4A	89	2D	105	0F	121
D5	10	BA	26	A5	42	7A	58	65	74	49	90	2C	106	08	122
D4	11	B9	27	A3	43	79	59	63	75	47	91	2B	107	04	123
D3	12	B6	28	9F	44	76	60	5C	76	46	92	2A	108	02	124
D2	13	B5	29	9E	45	75	61	5A	77	45	93	29	109	01	125
D1	14	B4	30	9D	46	74	62	59	78	43	94	27	110		
CE	15	B3	31	9B	47	73	63	56	79	3C	95	26	111		

2.3.2 Verifying the Host Fibre-Channel Adapter Installation

Before the 9500V is connected to the Windows® 2000 system, you must 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 **root**, and make sure that all existing devices are powered on and properly connected to the Sun™ 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, please refer to the MAN pages and/or user documentation for the HBA.

2.4 Connecting the 9500V Subsystem to the Windows® System

The 9500V subsystem comes with all the hardware and cabling required for connection to the **host system(s). Connection of the 9500V subsystem involves the following activities:**

1. Verify subsystem installation. Verify that the status of the fibre/SCSI adapters and LUNs is NORMAL.
2. Connect the 9500V to the Windows® 2000 system. Install the fibre-channel cables between the 9500V subsystem and the Windows® 2000 system.

After connecting the 9500V subsystem to the Windows® host, you need to perform the necessary tasks before rebooting the host.

Chapter 3 Configuring the 9500V Devices

After 9500V installation and connection are complete, the devices on the 9500V subsystem are ready to be configured for use. Configuration of the 9500V devices is performed by the user and requires root access to the Sun™ system. The activities involved in device configuration are:

- Writing the signatures on the new devices (see section 3.1),
- Creating and formatting the partitions on the new devices (see section 3.2),
- Verifying system access to the new devices (see section 3.3), and
- Verifying auto-mount of the new devices (see section 3.4).

Troubleshooting: Chapter 4 provides troubleshooting information.

Boot disk: Appendix B provides instructions for configuring the Windows® 2000 boot disk on the 9500V subsystem.

3.1 Writing the 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 is changed, or even 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 9500V is attached to the first adapter (displayed first during system start-up), the disk numbers for the new devices will start at 1 (the local disk is 0). If the 9500V is not attached to the first adapter, the disk numbers for the new devices will start at the next available disk number. For example, if 40 disks are attached to the first adapter (disks 1–40) and the 9500V is attached to the second adapter, the disk numbers for the 9500V will 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)**, and 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 allow the system configuration to be updated. ***Note:*** If you removed any disks, the Disk Management will also notify you at this time.
3. You will need to reboot your system after adding each new device (see Figure 3.2).

Instructions continue on the next page.

4. The Disk Management now displays each new device by disk number and asks if you want to write a signature on the disk (see Figure 3.3). You may only write a signature once on each device. For all SCSI disk devices, select **OK** to write a signature. For HRX devices without MSCS, select **No**.

5. After you have written a signature (or declined to write a signature) on each new device, the Disk Management main panel opens and 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** indicates no signature. Do not exit the Disk Manager yet. You will create partitions on the new SCSI disk devices next.

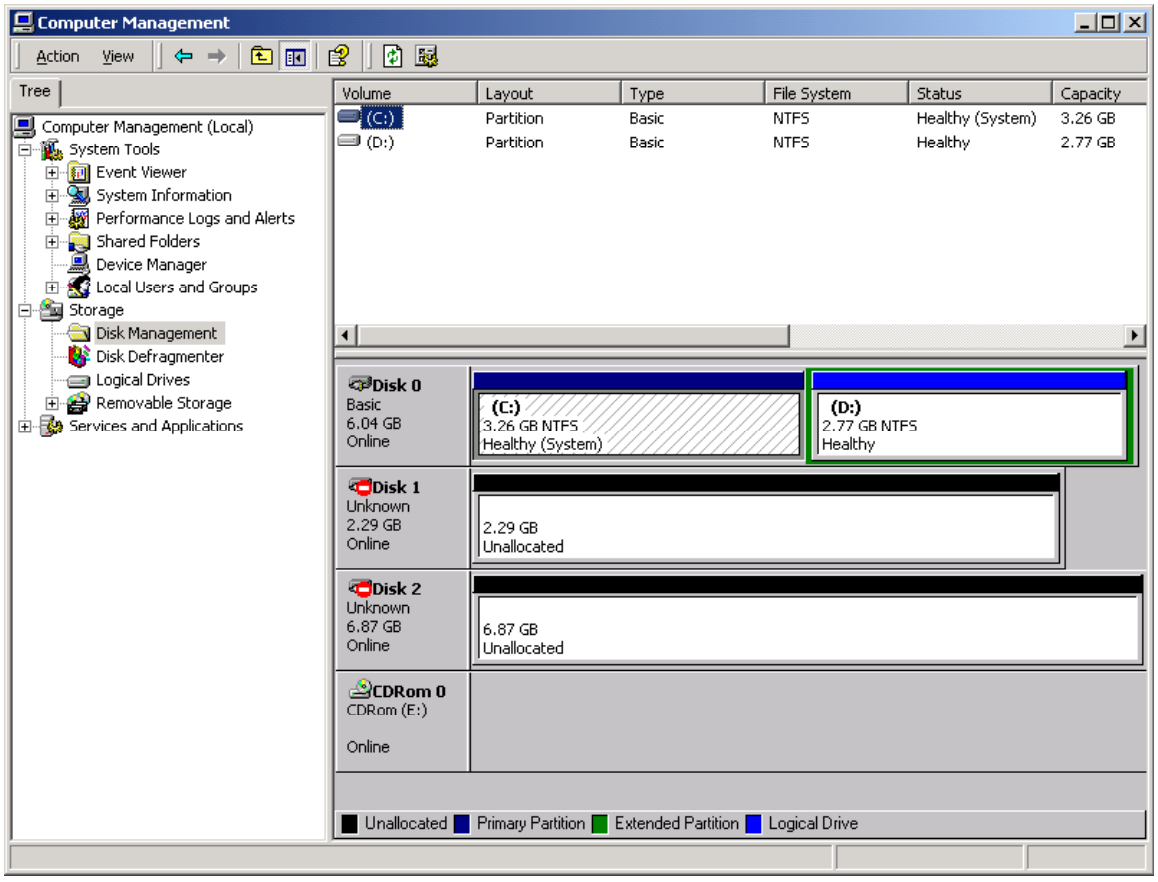


Figure 3.1 Disk Management Panel Showing New Devices

Figure 3.2 Rebooting Your PC After Each New Device Is Added

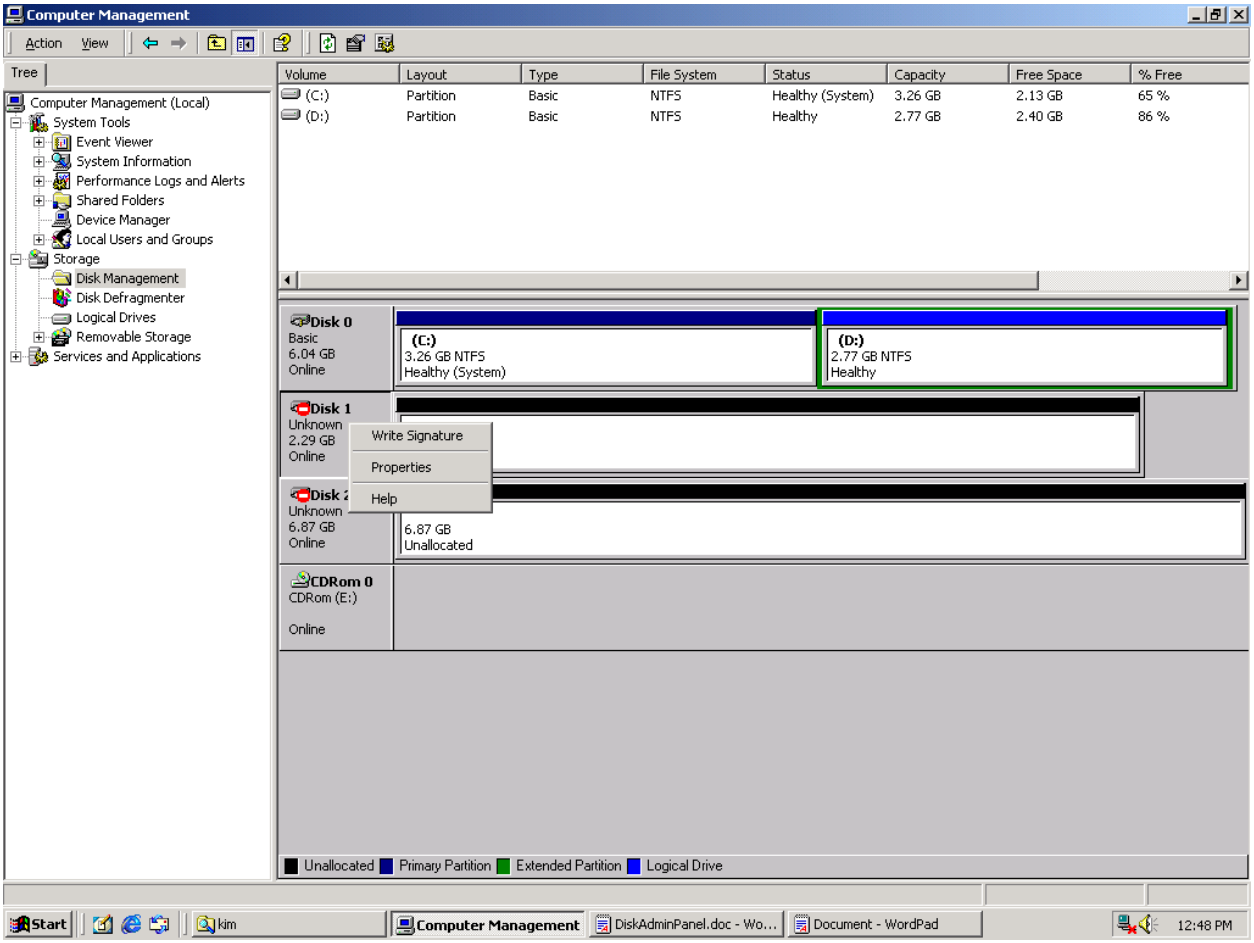


Figure 3.3 Writing the Signatures

3.2 Creating and Formatting the Partitions

After you have written the signatures on the new devices, you are ready to create and format the partitions on the new SCSI disk devices.

Dynamic Disk is supported with no restrictions for the 9500V connected to the Windows® 2000 operating system. For more information, please refer to Microsoft's online help.

To create and format partitions on the new disk devices (see Figure 3.4–Figure 3.11):

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 appears (see Figure 3.4). Select the desired type of partition, and click **Next**.
   Note: Stripe Set Volume with parity is not currently supported on the 9500V.
2. The Specify Partition Size window appears (see Figure 3.5). Specify the desired partition size. If the size is greater than 1024 MB, the Disk Management will request confirmation to create the partition. Click **Next.**
3. The Assign Drive Letter or Path screen appears (see Figure 3.6). Select a drive letter. You may also state no drive letter or drive path. Click **Next**.
4. The Format Partition window appears (see Figure 3.7). Click **Next**.
5. If all partitions have been successfully completed, a window appears confirming this and listing all your selections. The word **Healthy** appears next to each device that has been successfully added.
6. Enter the following information on the Format panel (see Figure 3.9):
   - **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.
7. 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 3.10).
8. When the format complete message is displayed, 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 3.11).
9. Repeat steps (1) through (8) for each new disk device. When you are finished creating and formatting partitions, exit the Disk Manager (select **Partition-Exit**). When the disk configuration change message comes up, select **Yes** to save your changes.
   Note: Make sure to make your new Emergency Repair Disk using RDISK.EXE.

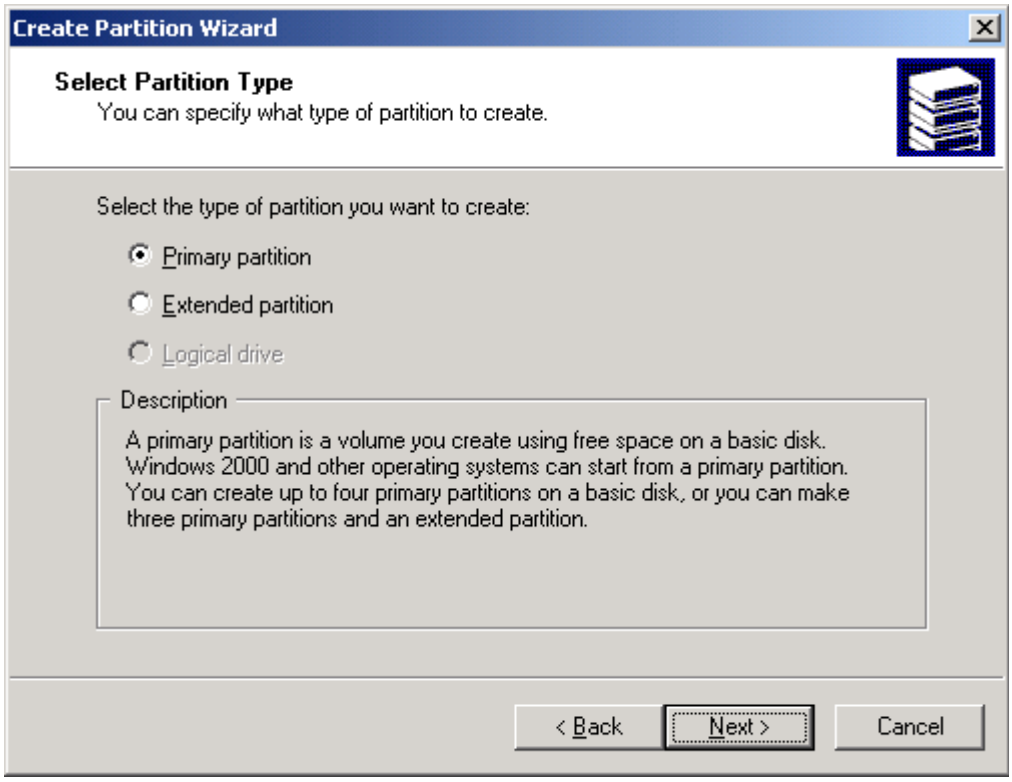


Figure 3.4 Create Partition Wizard Screen

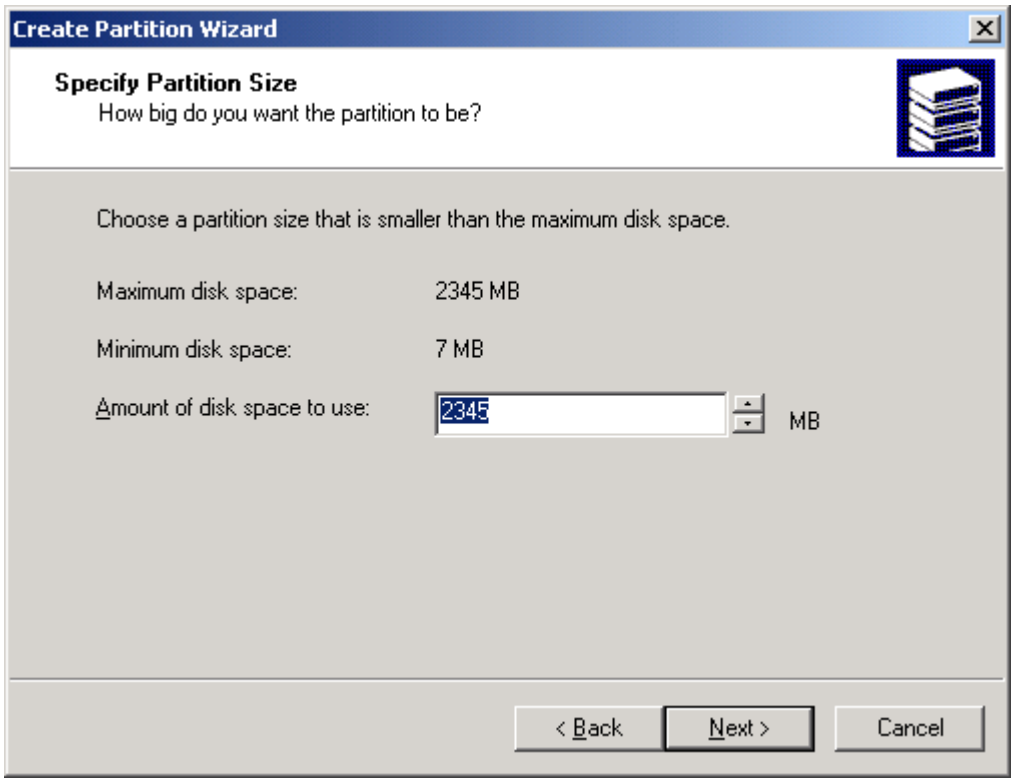


Figure 3.5 Specify Partition Size

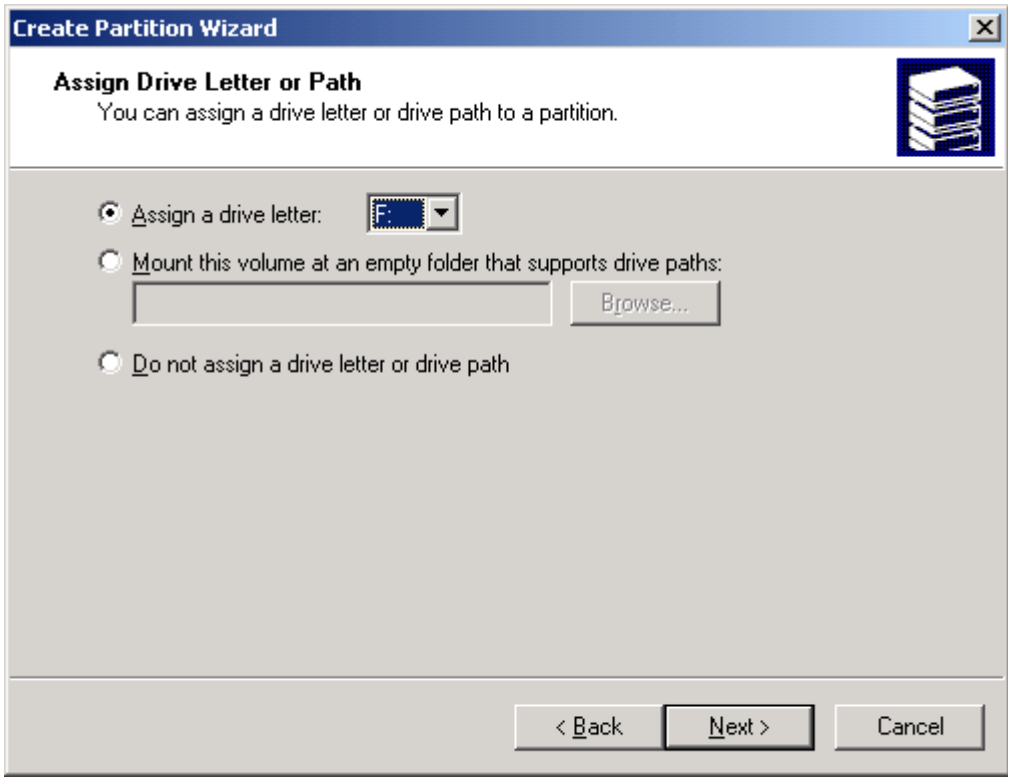


Figure 3.6 Assign Drive Letter or Path

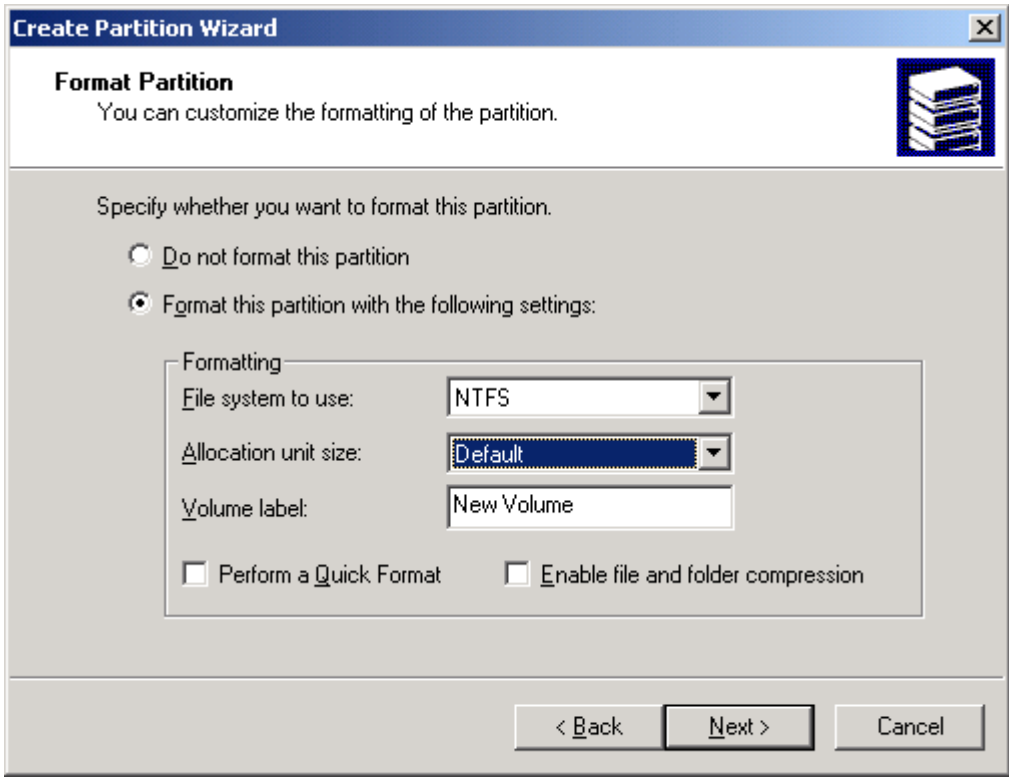


Figure 3.7 Format Partition Window

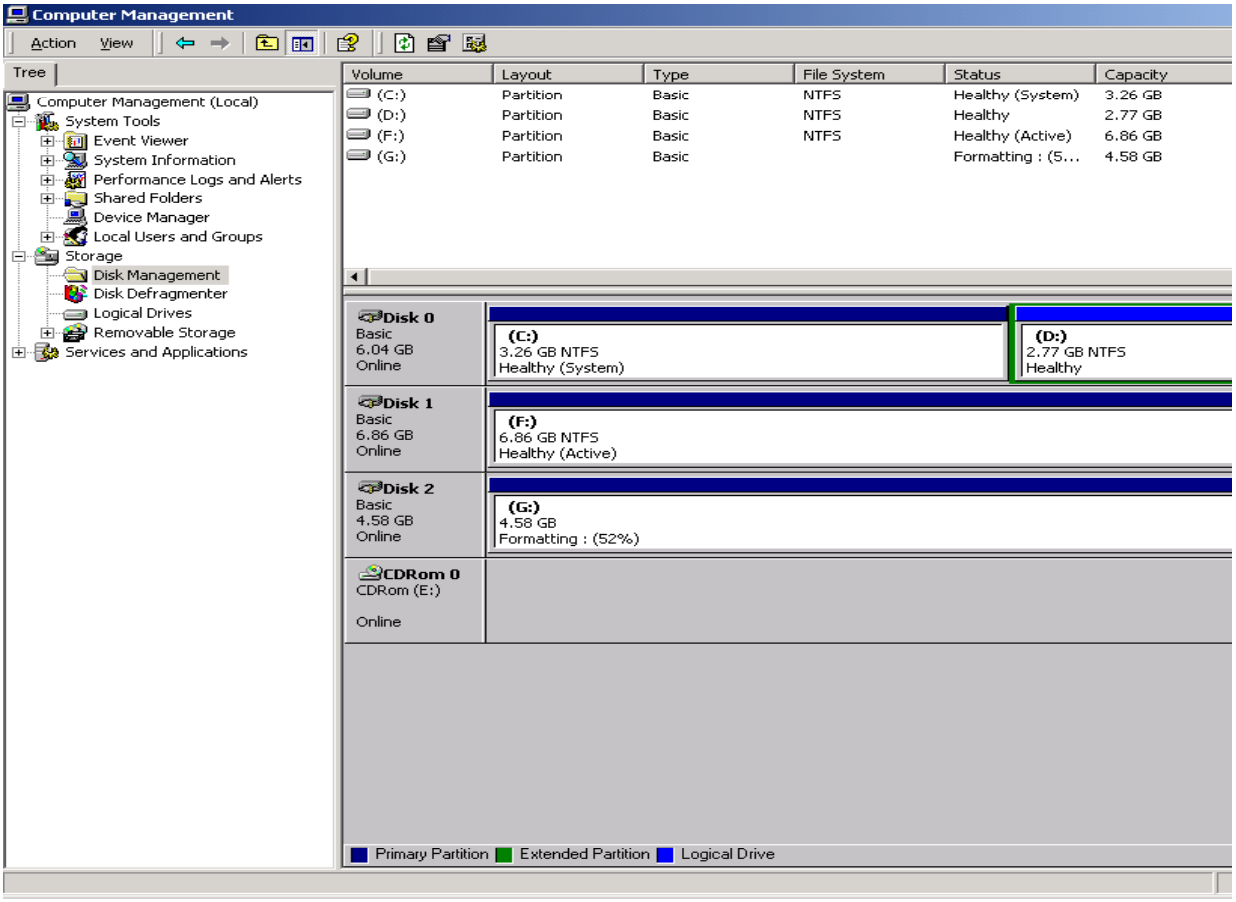
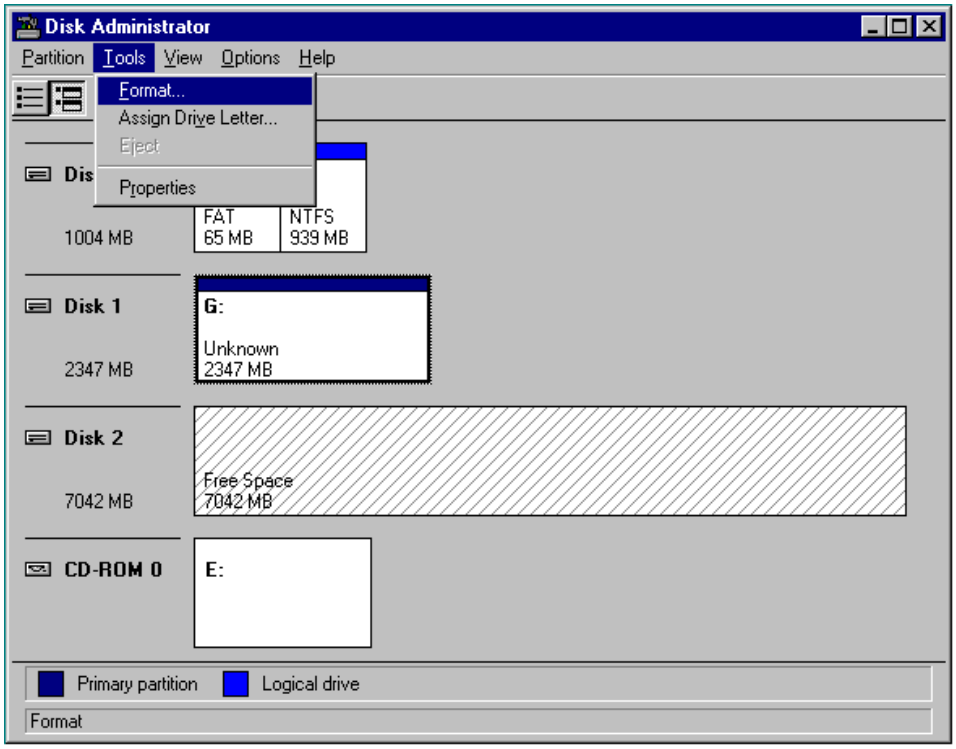
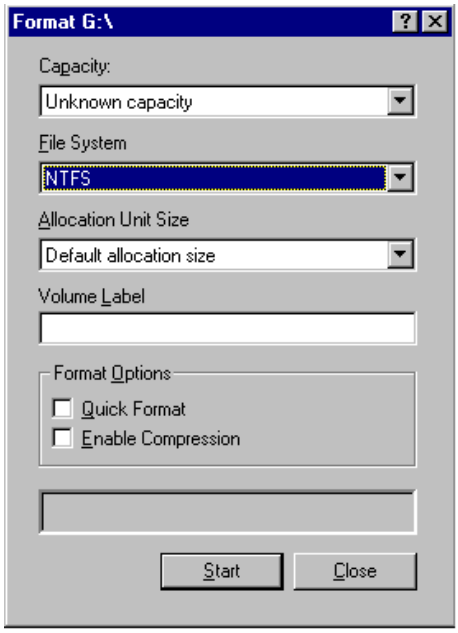


Figure 3.8 Successful Formatting Confirmation Window



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

Figure 3.9 Opening the Format Panel



Note: In this example, the name of the partition being formatted is **G:**

Figure 3.10 Formatting the Partition

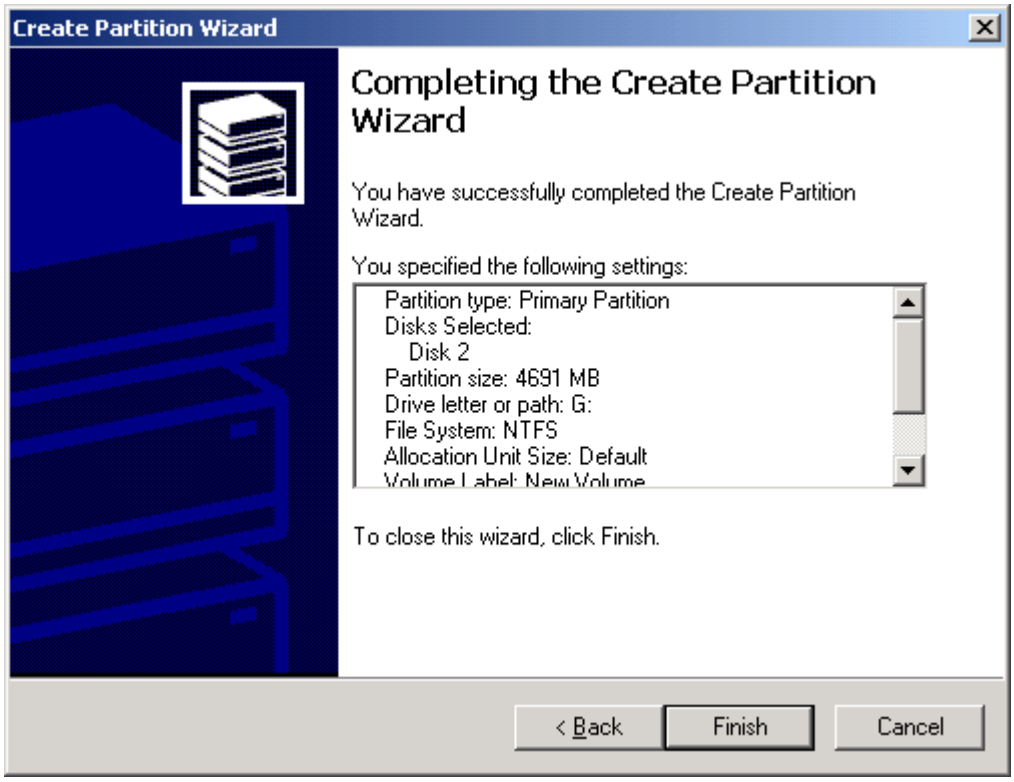


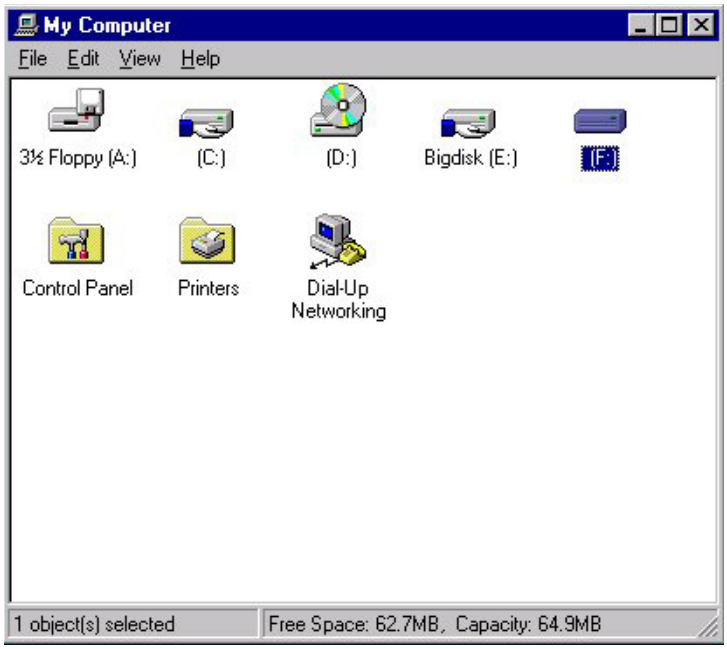
Figure 3.11 Verifying the Formatted Partition

3.3 Verifying File System Operations

After creating and formatting the partitions, you need to 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 on **My Computer** to display all connected devices. All newly partitioned disks should appear in this window (see Figure 3.12).
1. Select the device you want to verify, and then display its Properties (select the **File** menu and then select **Properties**, or right-mouse-click and then select **Properties**).
2. On the Properties panel (see Figure 3.13), verify that the properties are correct: label (optional), type, capacity, and file system.
3. Copy a file to the new device. Any file will do, so choose a small one to speed things up.
4. Display the contents of the new device to make sure that the copy operation completed successfully (see Figure 3.14). 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.
5. Delete the copied file from the new device, and verify the file was deleted successfully.
6. Repeat steps (2) through (6) for each new SCSI disk device.



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

Figure 3.12 Displaying the Connected Devices

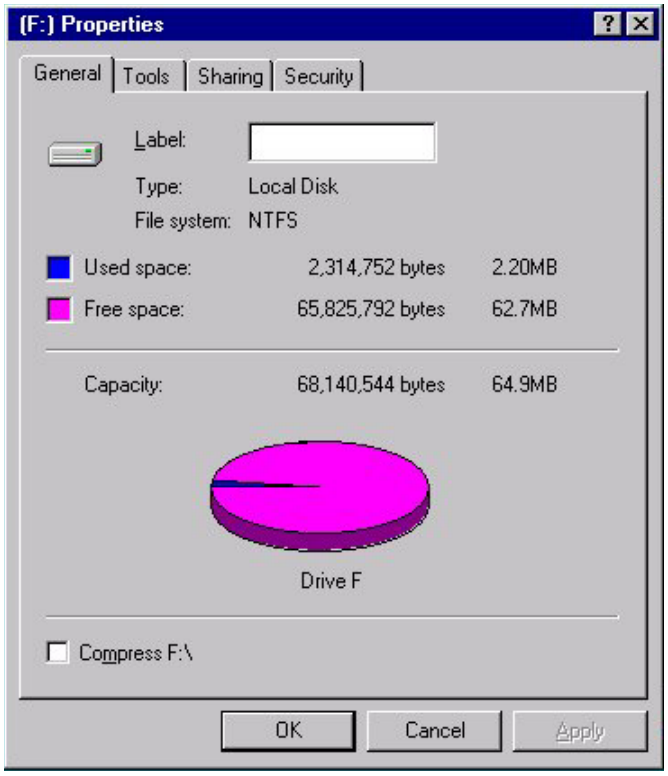


Figure 3.13 Verifying the New Device Properties

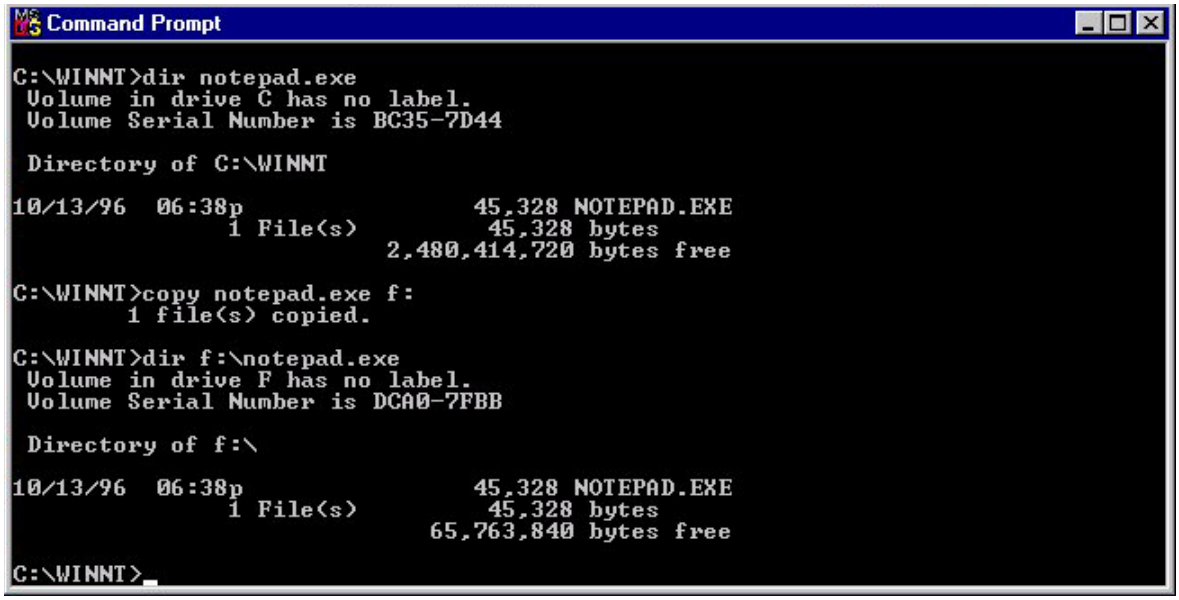


Figure 3.14 Verifying the File Copy Operation

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 then 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 (section 3.3):
   a) Verify the device properties for all new devices (refer to Figure 3.13).
   b) Copy a file to each new device to make sure that the devices are functioning properly (refer to Figure 3.14).

Chapter 4 Troubleshooting

4.1 Troubleshooting

The 9500V disk array subsystems provide continuous data availability.

Table 4.1 lists potential error conditions during 9500V 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 9500V subsystem 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 9500V's internal time-out process to purge all queued commands so that the 9500V is available (not busy) during system startup. If the Win2000 system is restarted too soon, the 9500V 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 Acronyms and Abbreviations

AL	arbitrated loop
AL-PA	arbitrated loop physical address
FC	fibre channel
HBA	host bus adapter
HDS	Hitachi Data Systems
I/O	input/output
LDEV	logical device
LU	logical unit
LUN	logical unit number, logical unit
NTFS	NT File System
OFC	open fibre control
PC	personal computer system
SCSI	small computer system interface

Appendix B Configuring the Boot Disk on the 9500V

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

For assistance, please contact your Hitachi Data Systems representative.