

*PRELIMINARY RELEASE*



**Hitachi Freedom Storage™  
Thunder 9500™ V Series**

**Windows NT® Host Installation Guide**

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## Source Document Revision Level

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

- *Hitachi Thunder 9200™ Windows NT® Host Installation Guide*, MK-90DF521.
- 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 NT® Host Installation Guide* describes and provides instructions for configuring the devices on the Hitachi 9500V array subsystem for operation with the Microsoft Windows NT® 4.0 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 Hitachi 9500V array subsystems, and
- the user is familiar with the Microsoft Windows NT® Server 4.0 and/or Windows NT® Workstation 4.0 operating systems, the Windows NT® server/workstation computer, and the fibre-channel adapters.

**Note:** The term “9500V Series” 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.

**Note:** For further information on the Windows NT® operating system, please consult the Windows® NT online help and/or user documentation, or contact Windows NT® technical support.

For further information on Windows NT® 4.0, please consult the Windows NT® 4.0 online help and/or user documentation, or contact Microsoft technical support.

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# Chapter 1 Overview of 9500V Windows NT® Configuration

## 1.1 Windows NT® Configuration

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

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

- Writing the signatures (see section 3.1),
- Creating and formatting the partitions (see section 3.2),
- Verifying file system operations (see section 3.3), and
- Verifying client operations (see section 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 Hitachi 9500V 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.

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## Chapter 2 Preparing for New Device Configuration

### 2.1 Configuration Requirements

The requirements for 9500V Windows NT® configuration are:

- **Hitachi 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 NT® server/workstation.** Please refer to the Microsoft user documentation for PC server hardware requirements.

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

**Important:** Please contact Microsoft to make sure that the most current OS patches are installed on the Microsoft system(s).

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

- **High-availability (HA) software.** The 9500V currently supports several 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.

## 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 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 2.4).

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.

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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/rdisk/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		

## 2.4 Verifying the Host Fibre-Channel Adapter Installation

Before the 9500V is connected to the Windows NT<sup>®</sup> 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.

## 2.5 Verifying the Disk and Device Parameters

After you have configured the fibre-channel adapters during boot-up, you need to verify the required disk and device parameters using the Windows NT<sup>®</sup> Registry. You must verify the disk I/O timeout value (TOV) and the queue depth, and you should also verify other required parameters such as FC fabric support, and link down timeout.

### 2.5.1 Verifying the Disk I/O Timeout Value (TOV)

The disk I/O TOV parameter, which applies to all SCSI disk devices attached to the Windows NT<sup>®</sup> system, must be set to 60 seconds. The default setting is hexadecimal 0x3c, which is decimal 60.

**WARNING:** The following procedure utilizes the Windows NT<sup>®</sup> Registry Editor and is intended for the system administrator and the Hitachi Data Systems representative. **Use the Registry Editor with extreme caution.** Always use **regedt32** (not **regedit**). Do not make any changes to the system registry other than those specified below. For instructions on editing the registry, please refer to the online help for the Registry Editor. When specifying multiple parameters, separate each parameter by a semi-colon and a space. If you have questions or concerns, please contact the Hitachi Data Systems Support Center before beginning this procedure.

Verify the disk I/O TOV using the Registry Editor as follows (see Figure 2.1):

1. Start the Windows NT<sup>®</sup> Registry Editor: from the **Start** menu click on **Run** and enter **regedt32**, or double-click on **regedt32** in the Windows NT<sup>®</sup> system directory.
2. Display the disk parameters as follows: go to **HKEY\_LOCAL\_MACHINE** → **SYSTEM** → **CurrentControlSet** → **Services** → **Disk** (see Figure 2.1).
3. Make sure that the **TimeOutValue** disk parameter is set to 60 seconds (0x3c).
  - If the **TimeOutValue** is not set to 60 seconds, reboot the Windows NT<sup>®</sup> system, and set the TOV to 60 seconds using one of the HBA setup utilities. If you do not want to reboot, **carefully** edit the **TimeOutValue** entry using the Windows NT<sup>®</sup> Registry Editor (see CAUTION above). For instructions on adding or modifying the **TimeOutValue**, refer to the online help for the Registry Editor.
4. Save your changes (if any), and exit the Registry Editor.

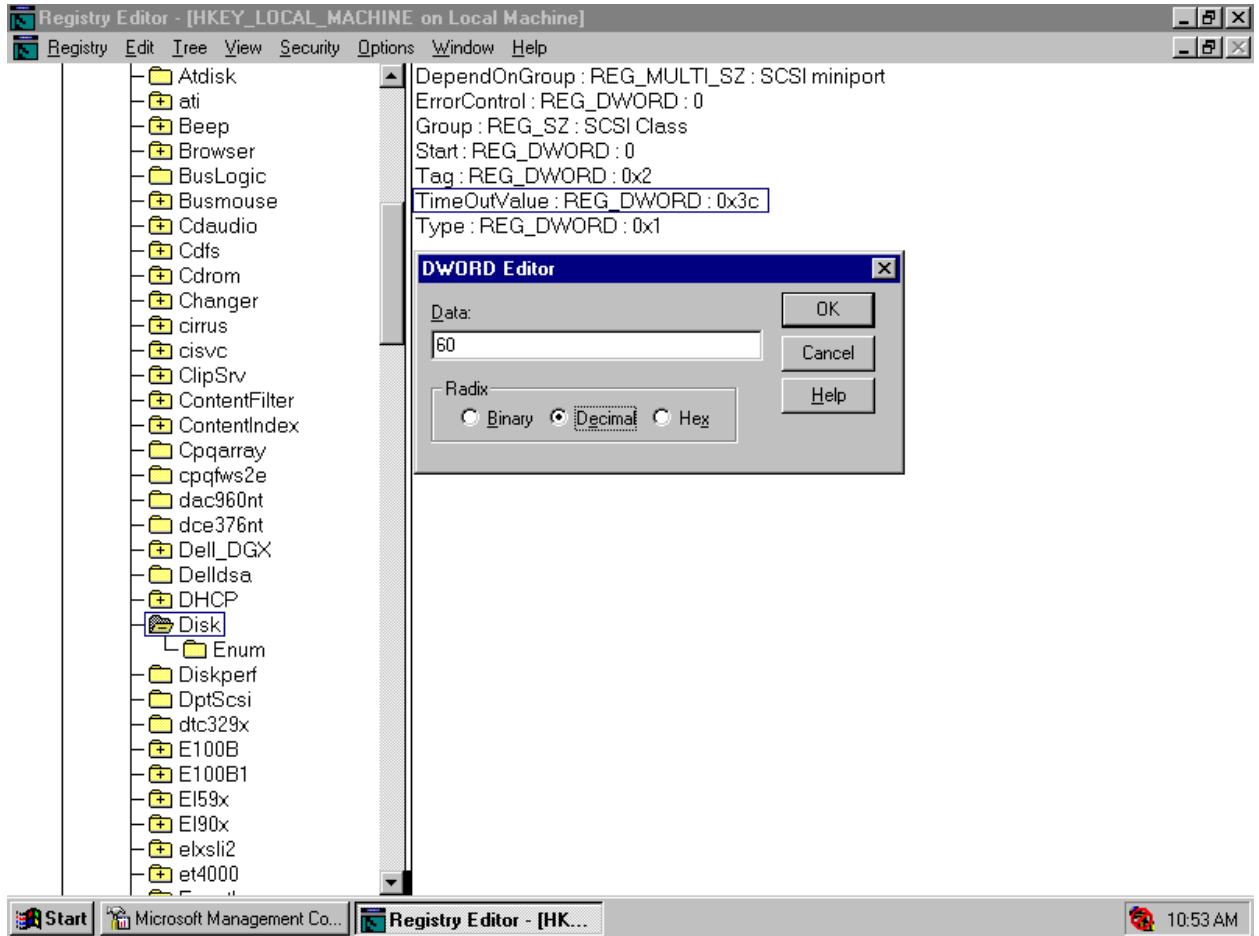


Figure 2.1 Verifying/Setting the Disk I/O TOV Using the Registry Editor

## 2.5.2 Verifying the Device Parameters

The queue depth parameter for the 9500V devices must be set as specified in section 2.5. In addition to queue depth, you should also verify all other required settings for your operational environment (e.g., FC fabric support). You must also make sure that the device parameters are the same for all 9500V devices. For specific adapters, please refer to the user documentation for the adapter.

**CAUTION:** The following procedure utilizes the Windows NT® Registry Editor and is intended for the system administrator. **Use the Registry Editor with extreme caution.** Always use **regedt32** instead of **regedit**. Do not make any changes to the system registry other than those specified below. For instructions on editing the registry, please refer to the online help for the Registry Editor. When specifying multiple parameters, separate each parameter by a semi-colon and a space. If you have questions or concerns, please contact the Hitachi Data Systems Support Center before beginning this procedure.

**Note:** If the parameters do not exist, use the Registry Editor to add them.

Verify the queue depth and other device parameters using the Registry Editor as follows:

1. Start the Windows NT® Registry Editor.
2. For each Emulex FC adapter (see Figure 2.2):
  - a) For the SCSI Mini Port Driver, go to: **HKEY\_LOCAL\_MACHINE → SYSTEM → CurrentControlSet → Services → Ip6nds35 → Parameters → Device.**
  - b) Make sure that the **DriverParameter** device parameter has the following values:  
SCSI Mini Port Driver: **QueueDepth=X.**
  - c) If the Emulex adapter (SCSI Mini Port Driver) is connected to a fabric switch, verify that the **DriverParameter** device parameter **Topology=1.**
  - d) Verify all other required settings for your operational environment. Refer to the user documentation for the adapter as needed.
  - e) For each QLogic FC adapter:
  - f) Display the device parameters for the QLogic FC adapter as follows: go to **HKEY\_LOCAL\_MACHINE → SYSTEM → CurrentControlSet → Services → ql2100 → Parameters → Device.**
  - g) Add the link down timeout parameters to the **DriverParameter**: **LipFFrecovery=1** and **LinkTimeOut=60.** These parameters assist in resolving “hung” loop conditions.
  - h) If connected to a fabric switch, add **FabricSupported=1** to the **DriverParameter.**
  - i) Verify all other required settings for your operational environment (e.g., support for more than eight LUNs per target ID). Refer to the user documentation for the adapter as needed.

3. If you need to change any adapter settings, reboot the Windows NT<sup>®</sup> system, and use the HBA setup utility. If you do not want to reboot, edit the registry *carefully* (see previous **CAUTION:**) using the Registry Editor.
4. Save your changes (if any), and exit the Registry Editor.

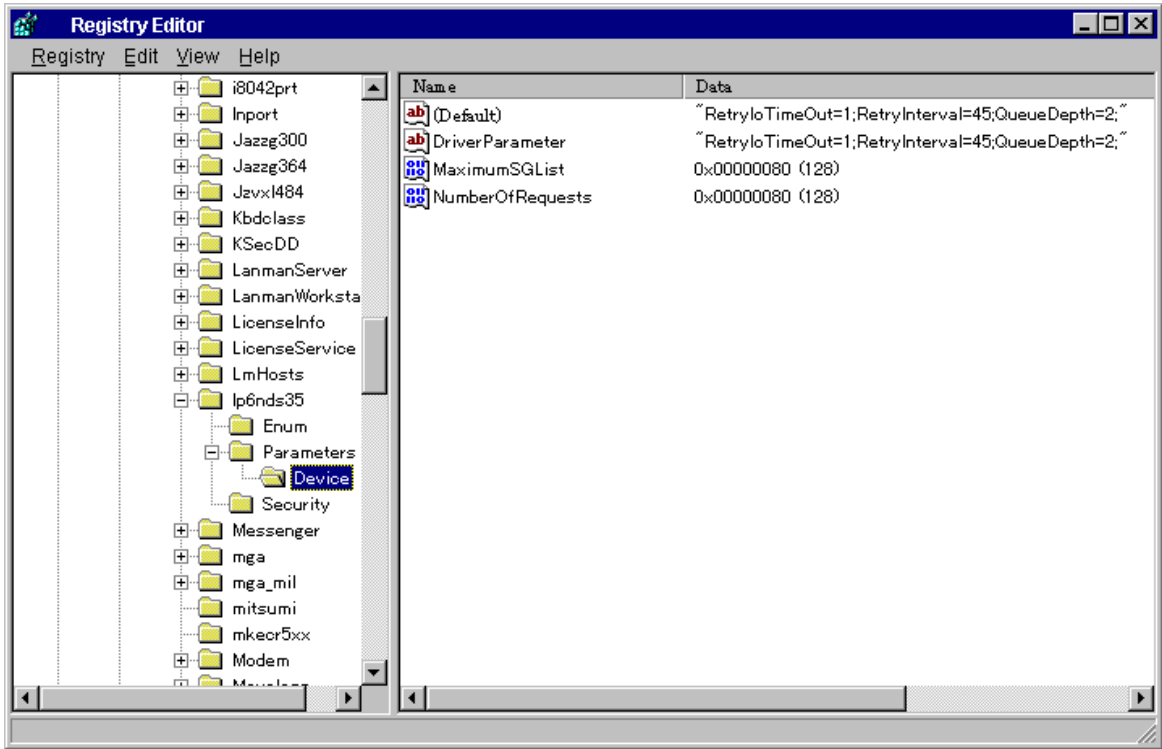



Figure 2.2 Verifying the Queue Depth (Emulex FC adapters shown)

## 2.6 Verifying New Device Recognition

The last step in preparing for new device configuration is to verify that the Windows NT® system recognizes the devices on the newly installed 9500V subsystem. You will display the SCSI device information using the SCSI Adapters control panel to verify that the Windows NT® system has recognized the new 9500V devices.

To verify that the Windows NT® system recognizes the new devices:

1. Open the Windows NT® Control Panel (**Start-Settings-Control Panel**), and double-click on **SCSI Adapters** to open the SCSI Adapters control panel.
2. Select the adapter connected to the 9500V, and display the devices connected to the adapter by expanding the view (click on  next to the adapter name).
3. Verify that all new 9500V devices are displayed. All new devices should be listed. To check the TID and LUN of any device, select the device, click on **Properties**, and then select the **Settings** tab.
4. Record the disk number for each new device. You will need this information when you write the signatures. To view the disk number of a device, select the device, click on **Properties**
5. If you used more than one adapter for the 9500V, repeat steps (3) and (4) to verify the new devices on each adapter.

## 2.7 Rebooting the Windows NT® System

After setting the disk and device parameters, setting and recognizing the LUs, and configuring the HBAs, you are ready to reboot the Windows NT® system.

After rebooting, you are now ready to configure the new LUs as described in Chapter 3.



## 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 Windows NT® system. The activities involved in device configuration are:

- Writing the Signatures (see section 3.1),
- Creating and Formatting the Partitions (see section 3.2),
- Verifying File System Operations (see section 3.3), and
- Verifying Auto-Mount (see section 3.4).

**Troubleshooting:** Chapter 4 provides troubleshooting information.

**Disk type configuration:** Appendix B provides instructions for determining the disk type parameters (data cylinders, heads, sectors per track) for the 9500V LUs.

### 3.1 Writing the Signatures

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

To write the signatures on the new disk devices (see Figure 3.1 and Figure 3.2):

1. From the **Start-Programs** menu, select **Administrative Tools (Common)**, and then select **Disk Administrator** to start the Disk Administrator. Initialization takes a few seconds.
2. When the Disk Administrator 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 Administrator will also notify you at this time.
3. The Disk Administrator now displays each new device by disk number and asks if you want to write a signature on the disk (see Figure 3.1). For all SCSI disk devices, select **Yes** to write a signature.
4. After you have written a signature (or declined to write a signature) on each new device, the Disk Administrator main panel opens and displays the devices by disk number (see Figure 3.2). 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 Administrator yet. You will create partitions on the new SCSI disk devices next.

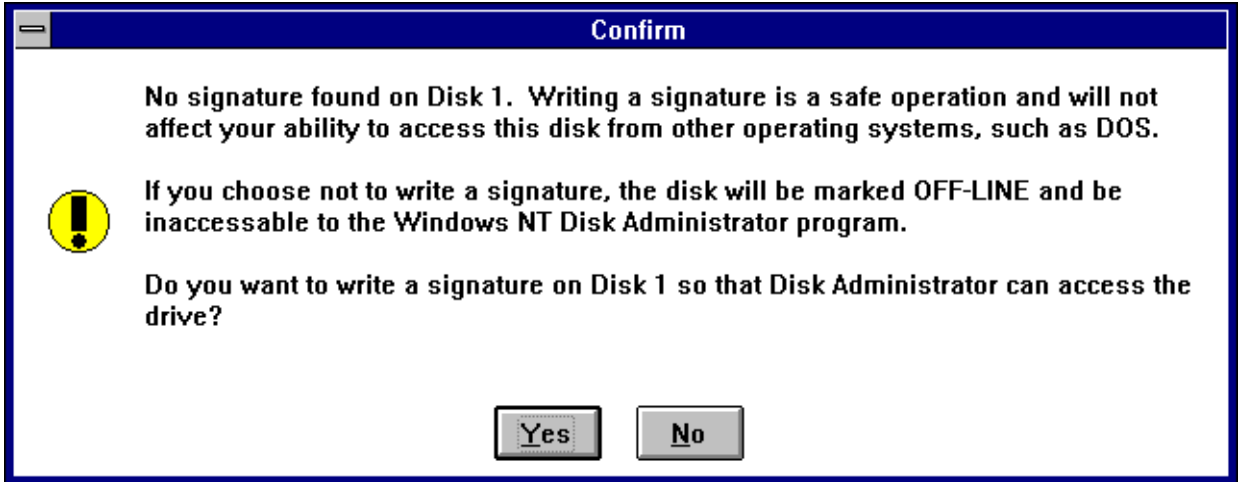


Figure 3.1 Writing the Signatures

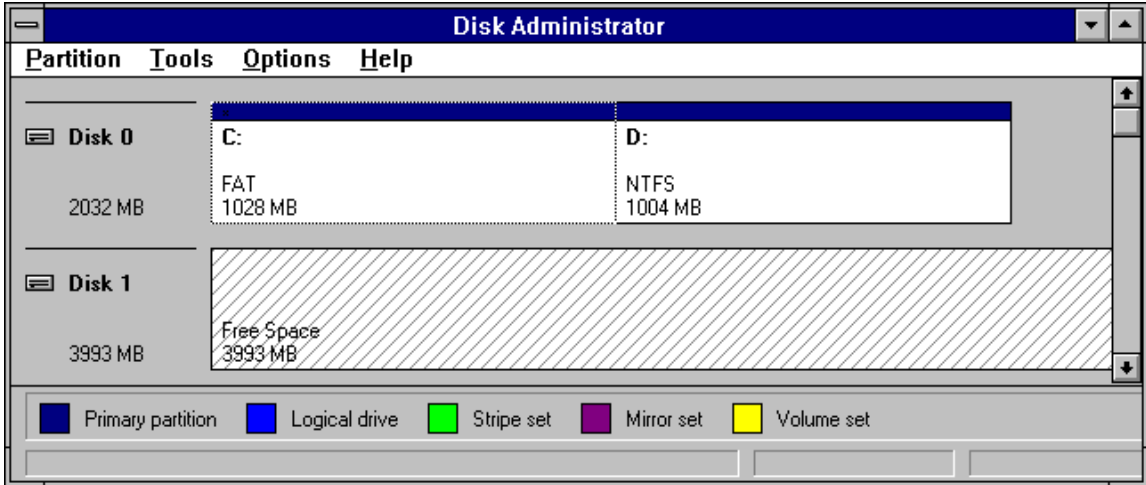
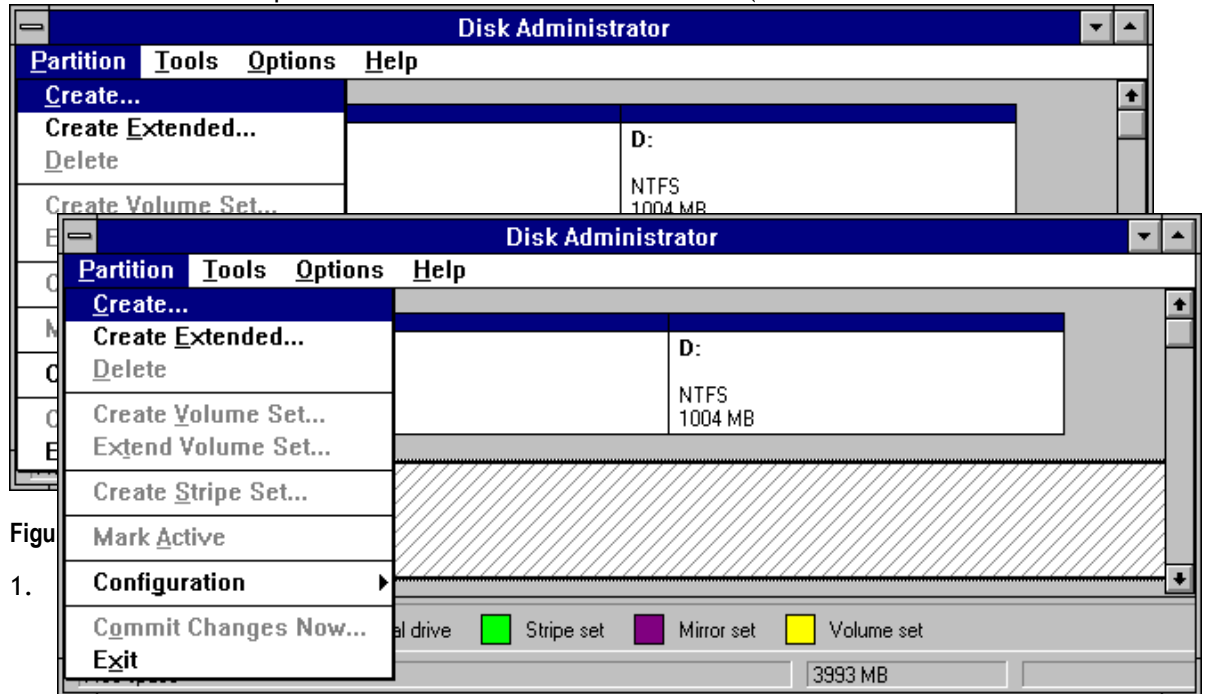


Figure 3.2 Disk Administrator Panel Showing New Devices

### 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.

To create and format partitions on the new SCSI disk devices (see



Figure

1.

2. Figure 3.3). **Note:** Stripe Set Volume with parity is not currently supported on the 9500V.
3. On the Create Primary Partition panel, enter the desired partition size (see Figure 3.4), and select **OK**. If the specified partition size is greater than 1024 MB, the Disk Administrator will request confirmation to create the partition.
4. The Disk Administrator panel now shows the new unformatted partition for the selected device. Make sure that the correct partition size is displayed. If the partition size is not correct, repeat steps (1) through (4) to re-enter the correct partition size.
5. Select the **Partition** menu, and select **Commit Changes Now...** (see Figure 3.5). When the confirmation panel appears, select **Yes** to save the changes to your disk configuration.
6. When the disk update confirmation message appears (see Figure 3.6), select **OK**. On the Disk Administrator main panel, verify that the newly created partition changes from **Unformatted** to **Unknown**.
7. On the Disk Administrator main panel, select the newly created partition, select the **Tools** menu, and then select **Format...** (see Figure 3.7) to open the Format panel. The Format panel displays the partition name in its title bar (F: in Figure 3.8).
8. Enter the following information on the Format panel (see Figure 3.8):
  - **Capacity:** Unknown capacity. Do not change this entry.

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- **File System:** Select **NTFS** (enables the Windows NT® 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 **Quick Format** to decrease the time required to format the partition; select **Enable Compression** only if you want to enable compression.
8. Select **Start** 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.
  9. When the format complete message is displayed, select **OK**, and then select **Close** to close the Format panel. Verify that the Disk Administrator 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 SCSI disk device. When you are finished creating and formatting partitions, exit the Disk Administrator (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.

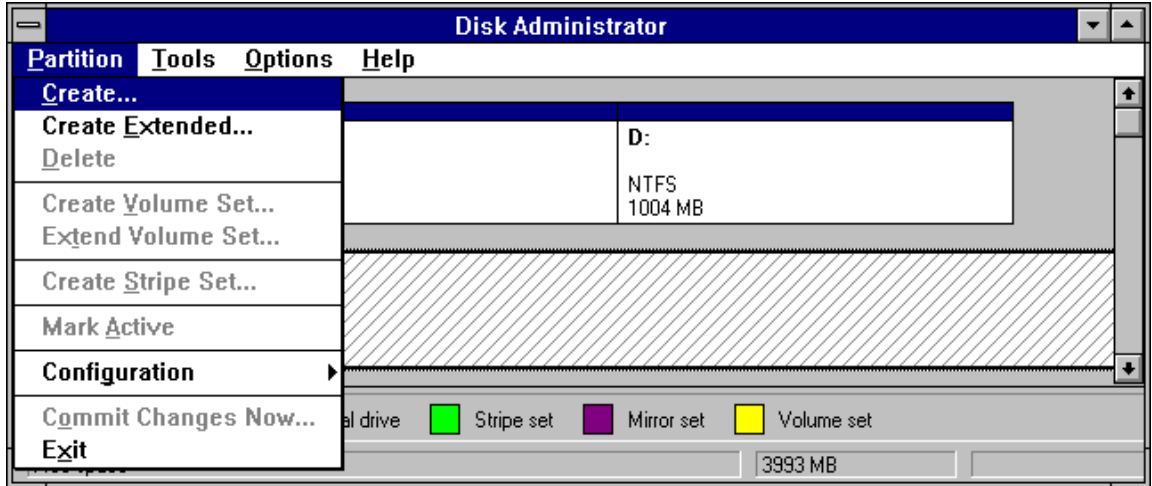


Figure 3.3 Opening the Create Primary Partition Panel

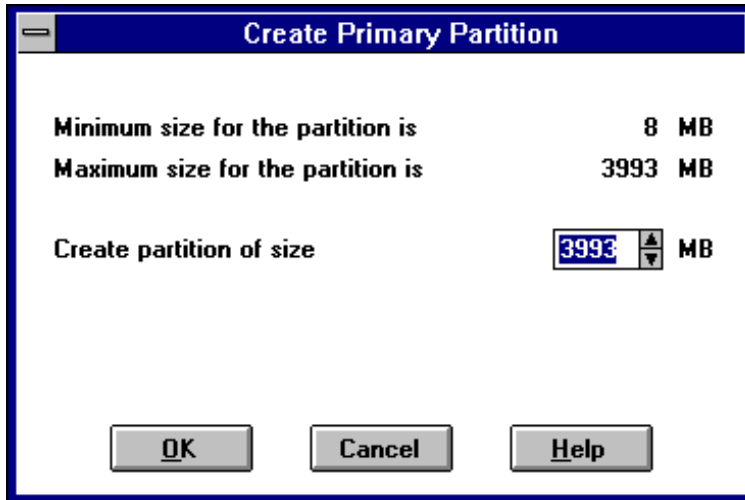


Figure 3.4 Entering the Partition Size

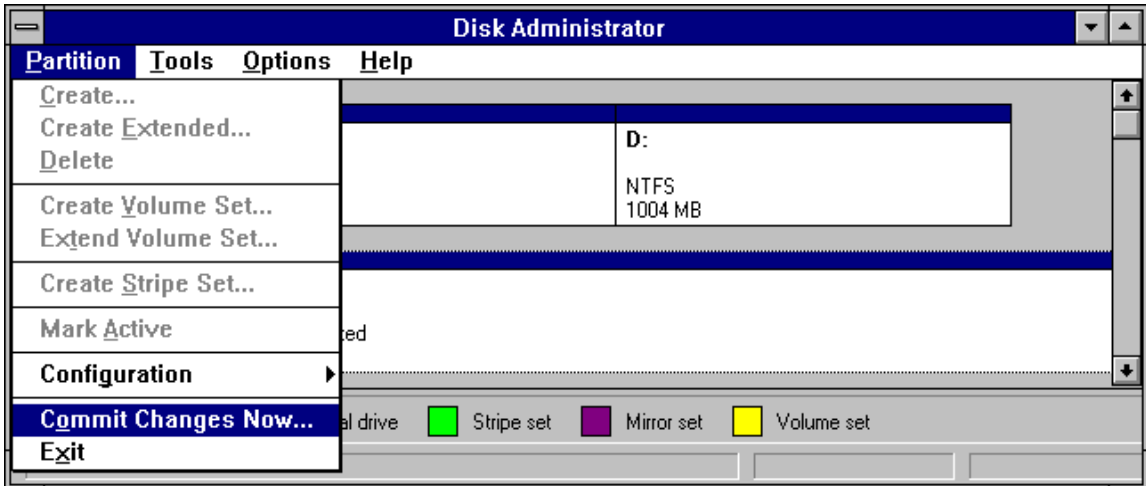


Figure 3.5 Saving the Changes to Disk Configuration

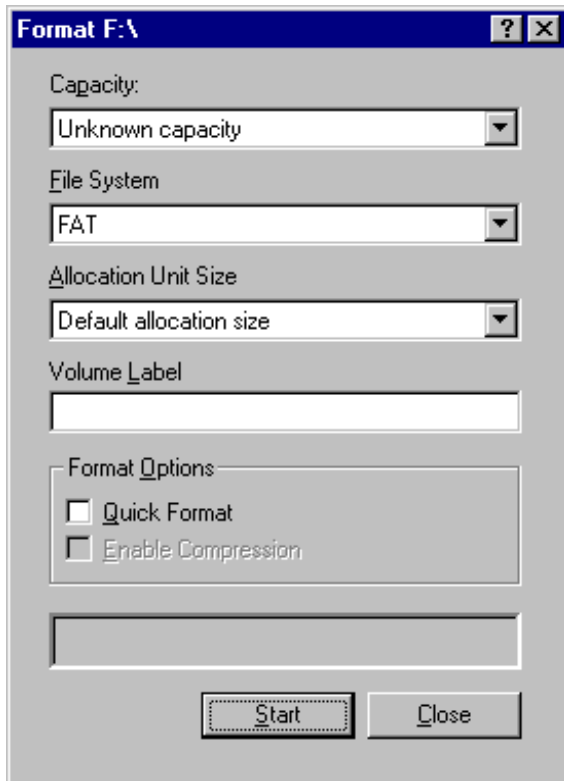


Figure 3.6 Confirming Disk Configuration Update



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

**Figure 3.7** Opening the Format Panel



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

**Figure 3.8** Formatting the Partition

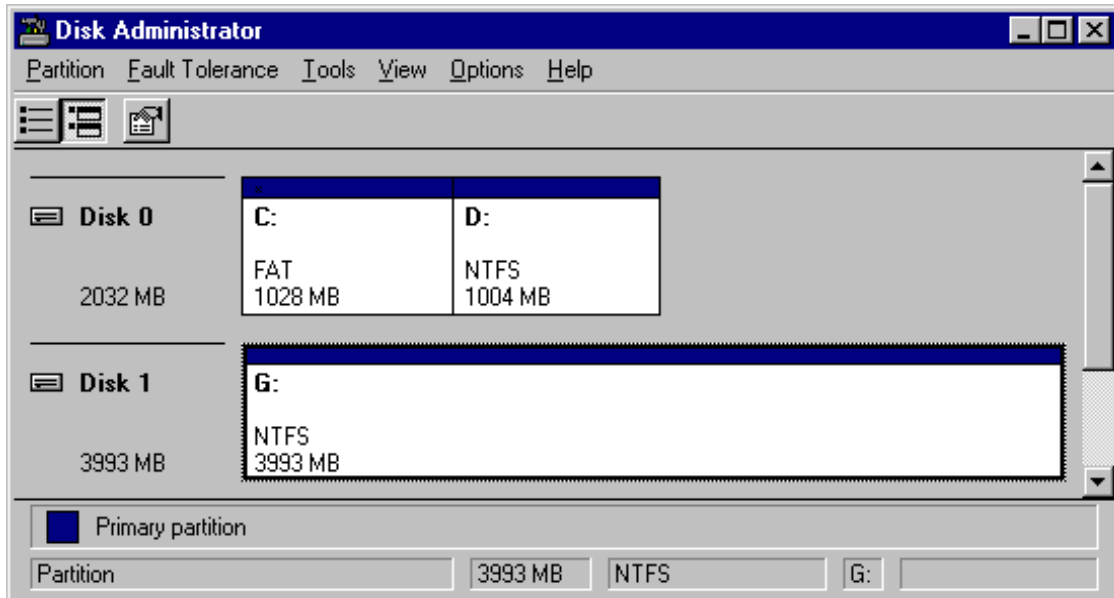


Figure 3.9 Verifying the Formatted Partition

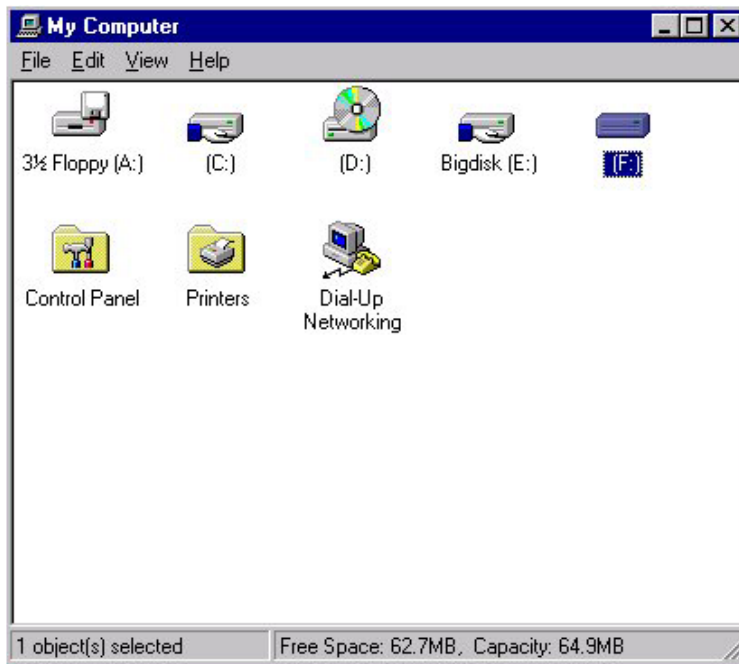
### 3.3 Verifying File System Operations

After creating and formatting the partitions, you need to verify that the file system is operating properly on each new SCSI disk device. The file system enables the Windows NT<sup>®</sup> 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 Windows NT<sup>®</sup> system can access the new device).

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

From the Windows NT<sup>®</sup> desktop, double-click on **My Computer** to display all connected devices. All newly partitioned disks should appear in this window (see Figure 3.10).

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 3.11), 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 3.12). 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.
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 3.10** Displaying the Connected Devices

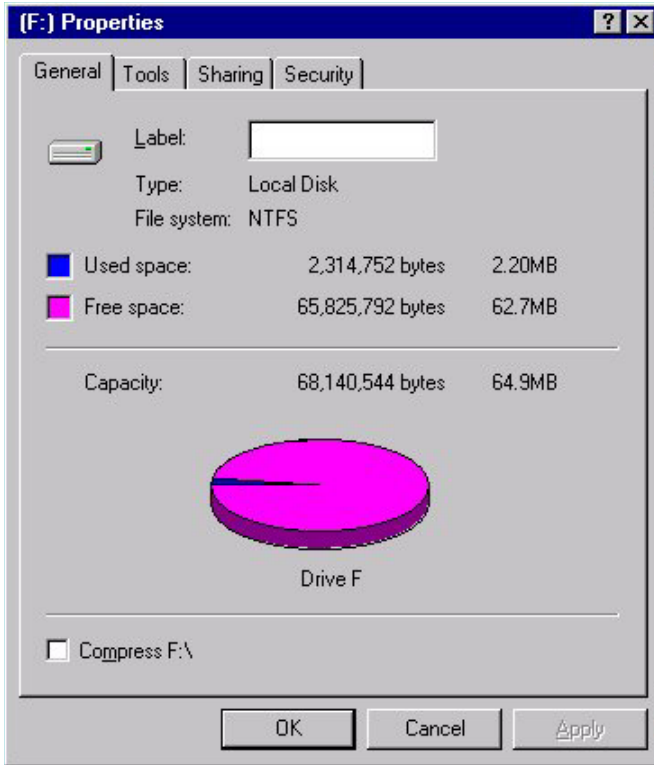


Figure 3.11 Verifying the New Device Properties

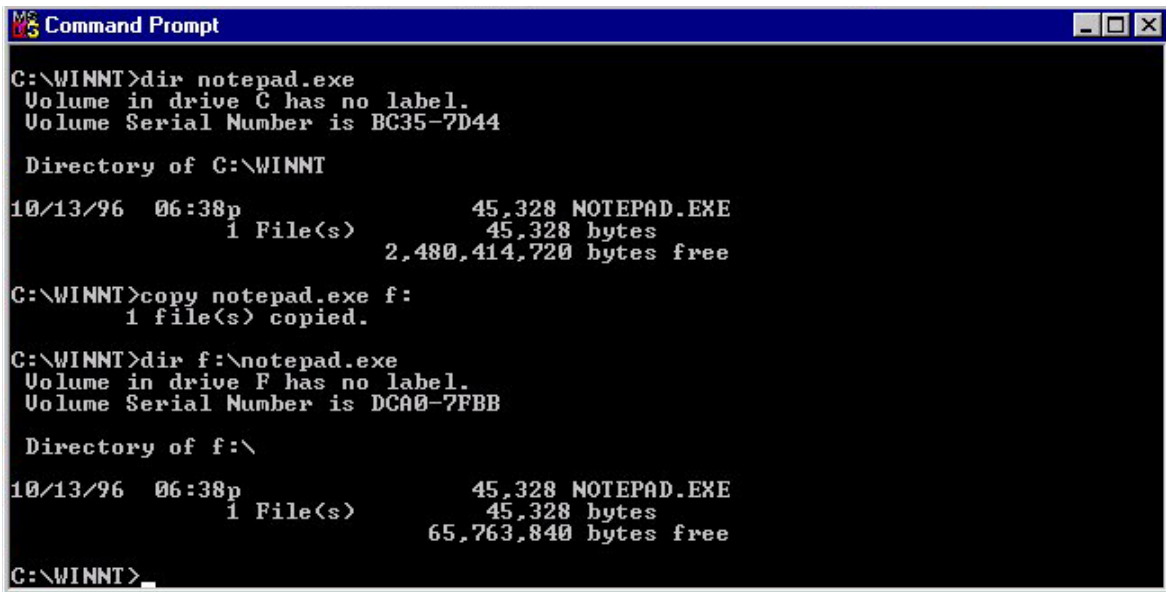


Figure 3.12 Verifying the File Copy Operation

### **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 NT<sup>®</sup> system.
2. Open **My Computer**, and verify that all new SCSI disk devices are displayed.
3. Verify that the Windows NT<sup>®</sup> system can access each new device by repeating the procedure in the previous section:
  - a) Verify the device properties for all new devices (refer to Figure 3.11).
  - b) Copy a file to each new device to make sure that the devices are functioning properly (refer to Figure 3.12).



## Chapter 4 Troubleshooting

### 4.1 Troubleshooting

The Hitachi 9500V array subsystem provides continuous data availability. For troubleshooting information for the 9500V subsystem, please refer to the *Hitachi Thunder 9500™ V Series User and Reference Guide* (MK-92DF601).

Table 4.1 lists potential error conditions during 9500V device configuration and provides instructions for resolving each condition. If you are unable to resolve an error condition, please ask your Hitachi Data Systems Customer Service representative 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.	<p>Make sure that the READY indicator lights on the 9500V subsystem are ON.</p> <p>Make sure that the fibre cables are correctly installed and firmly connected.</p> <p>Make sure that the fibre channel ports, LUN security, and/or switch zoning is defined properly.</p>
The Windows NT® system does not reboot properly after hard shutdown.	<p>If the Windows NT® system is powered off unexpectedly (without the normal shutdown process), wait three minutes before restarting the Windows NT® 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 Windows NT® system is restarted too soon, the 9500V will continue trying to process the queued commands, and the Windows NT® system will not reboot successfully.</p>

## **4.2 Calling the 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
- 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-PA	arbitrated loop physical address
blk	block
FC	fibre channel
FCP	fibre-channel protocol
HBA	host bus adapter
HDS	Hitachi Data Systems
I/O	input/output
IBM	International Business Machines Corporation
LDEV	logical device
LU	logical unit
LUN	logical unit number, logical unit
NTFS	NT file system
OFC	open fibre control
OS	operating system
PC	personal computer system
PCI	power control interface
SCSI	small computer system interface
TID	target ID
TOV	timeout value



## Appendix B SCSI TID Maps 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 NT® and the FC native addresses (AL\_PA/SEL\_ID) for FC adapters where ScanDown = 0 (default).

**Note:** When 9500V devices and other types of devices are connected in the same arbitrated loop, the mappings defined in Tables 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.

**PRELIMINARY RELEASE**

**Table B.1 SCSI TID Map for Emulex FC Adapter (ScanDown=1)**

Bus #	TID	LUN	AL_PA	SEL_ID
0	0-31	0-7	NONE	NONE
1	0	0-7	0xEF	0x00
	1	0-7	0xE8	0x01
	2	0-7	0xE4	0x02
	3	0-7	0xE2	0x03
	4	0-7	0xE1	0x04
	5	0-7	0xE0	0x05
	6	0-7	0xDC	0x06
	7	0-7	0xDA	0x07
	8	0-7	0xD9	0x08
	9	0-7	0xD6	0x09
	10	0-7	0xD5	0x0A
	11	0-7	0xD4	0x0B
	12	0-7	0xD3	0x0C
	13	0-7	0xD2	0x0D
	14	0-7	0xD1	0x0E
	15	0-7	0xCE	0x0F
	16	0-7	0xCD	0x10
	17	0-7	0xCC	0x11
	18	0-7	0xCB	0x12
	19	0-7	0xCA	0x13
	20	0-7	0xC9	0x14
	21	0-7	0xC7	0x15
	22	0-7	0xC6	0x16
	23	0-7	0xC5	0x17
	24	0-7	0xC3	0x18
	25	0-7	0xBC	0x19
	26	0-7	0xBA	0x1A
	27	0-7	0xB9	0x1B
	28	0-7	0xB6	0x1C
	29	0-7	0xB5	0x1D
	30	0-7	0xB4	0x1E
	31	0-7	NONE	NONE

Bus #	TID	LUN	AL_PA	SEL_ID
2	0	0-7	0xB3	0x1F
	1	0-7	0xB2	0x20
	2	0-7	0xB1	0x21
	3	0-7	0xAE	0x22
	4	0-7	0xAD	0x23
	5	0-7	0xAC	0x24
	6	0-7	0xAB	0x25
	7	0-7	0xAA	0x26
	8	0-7	0xA9	0x27
	9	0-7	0xA7	0x28
	10	0-7	0xA6	0x29
	11	0-7	0xA5	0x2A
	12	0-7	0xA3	0x2B
	13	0-7	0x9F	0x2C
	14	0-7	0x9E	0x2D
	15	0-7	0x9D	0x2E
	16	0-7	0x9B	0x2F
	17	0-7	0x98	0x30
	18	0-7	0x97	0x31
	19	0-7	0x90	0x32
	20	0-7	0x8F	0x33
	21	0-7	0x88	0x34
	22	0-7	0x84	0x35
	23	0-7	0x82	0x36
	24	0-7	0x81	0x37
	25	0-7	0x80	0x38
	26	0-7	0x7C	0x39
	27	0-7	0x7A	0x3A
	28	0-7	0x79	0x3B
	29	0-7	0x76	0x3C
	30	0-7	0x75	0x3D
	31	0-7	NONE	NONE

Bus #	TID	LUN	AL_PA	SEL_ID
3	0	0-7	0x74	0x3E
	1	0-7	0x73	0x3F
	2	0-7	0x72	0x40
	3	0-7	0x71	0x41
	4	0-7	0x6E	0x42
	5	0-7	0x6D	0x43
	6	0-7	0x6C	0x44
	7	0-7	0x6B	0x45
	8	0-7	0x6A	0x46
	9	0-7	0x69	0x47
	10	0-7	0x67	0x48
	11	0-7	0x66	0x49
	12	0-7	0x65	0x4A
	13	0-7	0x63	0x4B
	14	0-7	0x5C	0x4C
	15	0-7	0x5A	0x4D
	16	0-7	0x59	0x4E
	17	0-7	0x56	0x4F
	18	0-7	0x55	0x50
	19	0-7	0x54	0x51
	20	0-7	0x53	0x52
	21	0-7	0x52	0x53
	22	0-7	0x51	0x54
	23	0-7	0x4E	0x55
	24	0-7	0x4D	0x56
	25	0-7	0x4C	0x57
	26	0-7	0x4B	0x58
	27	0-7	0x4A	0x59
	28	0-7	0x49	0x5A
	29	0-7	0x47	0x5B
	30	0-7	0x46	0x5C
	31	0-7	NONE	NONE

**PRELIMINARY RELEASE**

**Table B.1 SCSI TID Map for Emulex FC Adapter (ScanDown=1) (continued)**

Bus #	TID	LUN	AL_PA	SEL_ID	Bus #	TID	LUN	AL_PA	SEL_ID
4	0	0-7	0x45	0x5D	5	0	0-7	0x02	0x7C
	1	0-7	0x43	0x5E		1	0-7	0x01	0x7D
	2	0-7	0x3C	0x5F		2	0-7	NONE	NONE
	3	0-7	0x3A	0x60		3	0-7	NONE	NONE
	4	0-7	0x39	0x61		4	0-7	NONE	NONE
	5	0-7	0x36	0x62		5	0-7	NONE	NONE
	6	0-7	0x35	0x63		6	0-7	NONE	NONE
	7	0-7	0x34	0x64		7	0-7	NONE	NONE
	8	0-7	0x33	0x65		8	0-7	NONE	NONE
	9	0-7	0x32	0x66		9	0-7	NONE	NONE
	10	0-7	0x31	0x67		10	0-7	NONE	NONE
	11	0-7	0x2E	0x68		11	0-7	NONE	NONE
	12	0-7	0x2D	0x69		12	0-7	NONE	NONE
	13	0-7	0x2C	0x6A		13	0-7	NONE	NONE
	14	0-7	0x2B	0x6B		14	0-7	NONE	NONE
	15	0-7	0x2A	0x6C		15	0-7	NONE	NONE
	16	0-7	0x29	0x6D		16	0-7	NONE	NONE
	17	0-7	0x27	0x6E		17	0-7	NONE	NONE
	18	0-7	0x26	0x6F		18	0-7	NONE	NONE
	19	0-7	0x25	0x70		19	0-7	NONE	NONE
	20	0-7	0x23	0x71		20	0-7	NONE	NONE
	21	0-7	0x1F	0x72		21	0-7	NONE	NONE
	22	0-7	0x1E	0x73		22	0-7	NONE	NONE
	23	0-7	0x1D	0x74		23	0-7	NONE	NONE
	24	0-7	0x1B	0x75		24	0-7	NONE	NONE
	25	0-7	0x18	0x76		25	0-7	NONE	NONE
	26	0-7	0x17	0x77		26	0-7	NONE	NONE
	27	0-7	0x10	0x78		27	0-7	NONE	NONE
	28	0-7	0x0F	0x79		28	0-7	NONE	NONE
	29	0-7	0x08	0x7A		29	0-7	NONE	NONE
	30	0-7	0x04	0x7B		30	0-7	NONE	NONE
	31	0-7	NONE	NONE		31	0-7	NONE	NONE

