HITACHI
DATA SYSTEMS

Hitachi Freedom Storage™
Thunder 9200™
Novell® NetWare® Host Installation Guide

Document Revision Level

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MK-90DF518-0	February 2001	Initial Release
MK-90DF518-1	February 2001	Supersedes and replaces MK-90DF518-0

Source Document Revision Level

The following source document was used to produce this Thunder 9200 host installation guide: *Hitachi Disk Array Subsystem Installation Manual (Fibre Channel)*, revision 1.

Preface

The *Hitachi Freedom Storage™ Thunder 9200™ Novell NetWare® Configuration Guide* describes and provides instructions for configuring the devices on the Thunder 9200™ disk array subsystem for operation with the Novell® NetWare® server operating system (OS). This configuration guide assumes that:

- the user has a background in data processing and understands direct-access storage device subsystems and their basic functions,
- the user is familiar with the Hitachi Thunder 9200™ array subsystem, and
- the user is familiar with the NetWare® operating system, the NetWare® server, and the fibre-channel adapters.

Note: The term "9200" refers to the entire Hitachi Thunder 9200™ subsystem family, unless otherwise noted. Please refer to the *Hitachi Freedom Storage™ Thunder 9200™ User and Reference Guide* (MK-90DF504) for further information on the 9200 disk array subsystems.

Note: For further information on the Novell® NetWare® operating system, please consult the NetWare® user documentation, or contact Novell® technical support.

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1.1 Novell NetWare® Configuration

This document describes the requirements and procedures for connecting the 9200 subsystem to a Novell® NetWare® server and configuring the new 9200 devices for operation with the Novell® NetWare® server operating system. The Hitachi Data Systems representative performs the physical installation of the 9200 subsystem. The user prepares for 9200 subsystem installation, and then configures the new 9200 devices with assistance as needed from the Hitachi Data Systems representative.

Configuration of the 9200 disk devices for Novell® NetWare®operations includes:

- Installing the 9200 subsystem (see Chapter 3),
- Setting LUs and file sizes (see Chapter 2),
- Creating and formatting partitions (see Chapter 3), and
- Verifying file system operations (see Chapter 3).

1.2 Hitachi Thunder 9200™ Array Subsystem

The Hitachi Freedom Storage™ Thunder 9200™ 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 9200 subsystem provides continuous data availability, high-speed response, scaleable connectivity, and expandable capacity for PC server and open-system storage. The 9200 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.

Chapter 2 Preparing for New Device Configuration

2.1 Configuration Requirements

The requirements for 9200 Novell® NetWare® configuration are:

- Hitachi Thunder 9200™ subsystem, all-open or multiplatform configuration.
  - The 9200 Remote Console PC and LUN Manager software are used to configure the fibre-channel (FC) ports. If the remote LUN Manager feature is not installed, please contact your Hitachi Data Systems account team for information on LUN and fibre-channel configuration services.

  Note: The availability of 9200 features and devices depends on the level of microcode installed on the 9200 subsystem.

- Novell® NetWare® PC server. Please refer to the Novell® NetWare® user documentation for PC server hardware and configuration requirements.

- Novell® NetWare® server operating system versions 5.0E and 5.1. Version 5.0E requires NetWare5 Support Pack 3a, Client component: Novell® Client for Windows NT. Version 5.1 requires Client component: Novell(r) Client for Windows® NT.

  Note: For the latest information on NetWare® version support, please contact your Hitachi Data Systems account team.

  Note: The NetWare® administrator password is required during 9200 device configuration.

- Fibre-channel adapters. Make sure to install all utilities and tools for the adapter(s).
  - The 9200 subsystem supports full-speed (100 MB/s) fibre-channel interface, including shortwave non-OFC (open fibre control) optical interface, and multimode optical cables with SC connectors. Do not connect any OFC-type fibre-channel interface to the 9200 subsystem. For information on supported FC adapters, optical cables, hubs, and related hardware, please contact your Hitachi Data Systems account team or the Hitachi Data Systems Support Center (see chapter 5).

- Drivers. Do not install/load the driver(s) yet.

  Specific FC adapters and drivers have been verified for use with the 9200 subsystem, yet certain NetWare versions and features may not be supported by all vendors. Please contact your Hitachi Data Systems representative for specific information. For information on the driver requirements for other FC adapters, please refer to the user documentation for the adapter or contact the vendor.

2.2 Installing the 9200 Subsystem

The 9200 subsystem comes with all hardware and cabling required for installation.

Note: The Hitachi Data Systems representative must use the 9200 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.

2.3 Preparing for New Device Configuration

Before setting up or installing the disk array subsystem, you should be familiar with the following activities:

- Setting logical units, and
- Setting file system sizes.

2.3.1 Setting Logical Units

The maximum number of logical units (LUs) that can be set on a single disk array subsystem is 64 for the Hitachi Freedom Storage™ Thunder 9200™. Contact your Hitachi Data Systems representative for information.

Chapter 3 Configuring the New Devices

Configuration of the new 9200 devices for Novell NetWare operations involves the following activities:

- Creating and formatting partitions (see section 3.1 and 3.4),
- Assigning new devices to volumes (see section 3.5),
- Mounting the new volumes (see section 3.6), and
- Verifying client access (see section 3.7).

3.1 Creating NetWare® 4.11 Partitions

The first step in configuring the newly installed 9200 devices is to create disk partitions on these new devices. Figures Figure 3.1 through Figure 3.7 show the sequence of screens displayed on the NetWare® server during the disk partitioning process.

Note: Do not create a partition on a disk device that will be accessed as a raw device (e.g. some database applications use raw devices).

To create NetWare® 4.11 disk partitions on the new SCSI disk devices:

1. At the server console, enter LOAD INSTALL to load the Installation Options module (see Figure 3.1).
2. On the Installation Options screen, select **Disk Options**, and press **Enter** to access the NetWare® disk options (see Figure 3.2).
3. On the Available Disk Option screen, select **Modify disk partitions and Hot Fix** and press **Enter**.
4. The Available Disk Drives screen (see Figure 3.3) lists the devices by device number. The Record the device numbers. On the Available Disk Drives screen, select the device to be partitioned and press **Enter**.
5. If the partition table has already been initialized, skip this step. If the partition table has not yet been initialized, the partition table message is displayed (see Figure 3.4). Press **Enter** to confirm the message. When the **Initialize the partition table?** message appears, select **Yes** and press **Enter** to initialize the partition table.
6. On the Disk Options screen (see Figure 3.5), select **Create NetWare disk partition**, and press **Enter**.
7. You are now prompted to create the partition either automatically or manually. Select the desired option, and press **Enter**. If you select automatic partitioning, the NetWare® system will create the disk partition and hot fix area using the available disk space (the hot fix area will be approximately two percent of the partition size). If you select manual partitioning, you must enter the desired partition size and hot fix area.

8. On the Disk Partition Information screen (see Figure 3.6), verify (or enter) the partition size and hot fix data area size, and press **F10** to save the changes. You are returned to the Disk Options screen.
9. Select **Create NetWare disk partition** again, and press **Enter**.
10. When the **Create NetWare Partition?** message appears (see Figure 3.7), select **Yes** and press **Enter** to create the specified disk partition on the selected device.
11. Press **Esc** until you are returned to the Available Disk Drives screen (refer to Figure 3.3). Repeat steps (1) through (12) to create the disk partition on each new SCSI disk device.
12. When you are finished creating disk partitions, return to the Available Disk Options screen (refer to Figure 3.2).

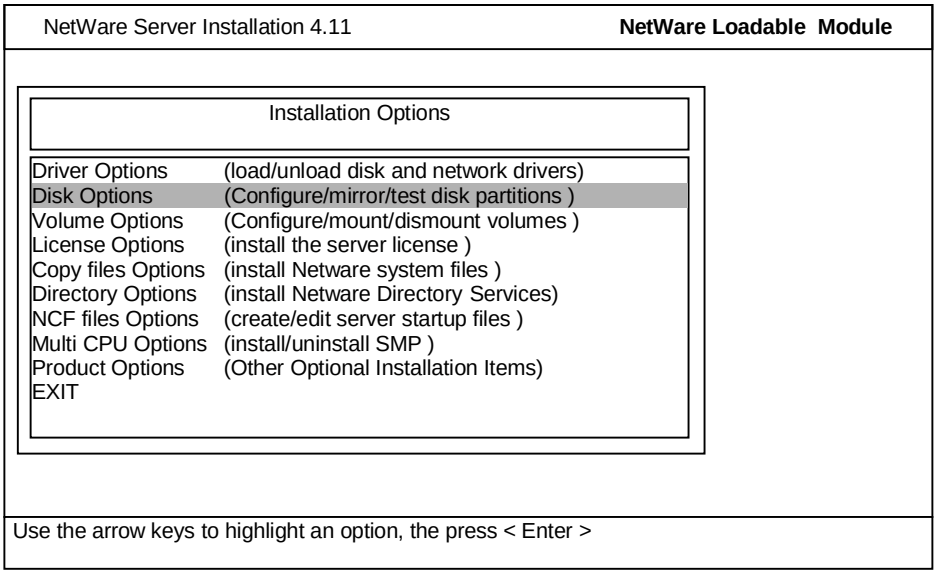

Figure 3.1 Opening the Disk Options Menu

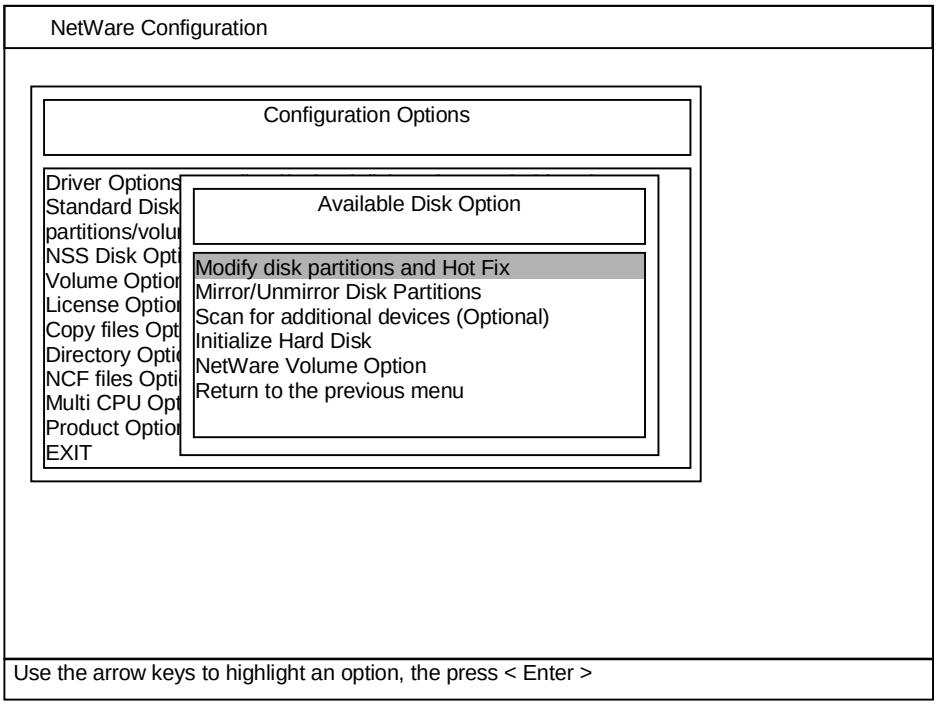

Figure 3.2 Accessing the NetWare® Disk Options

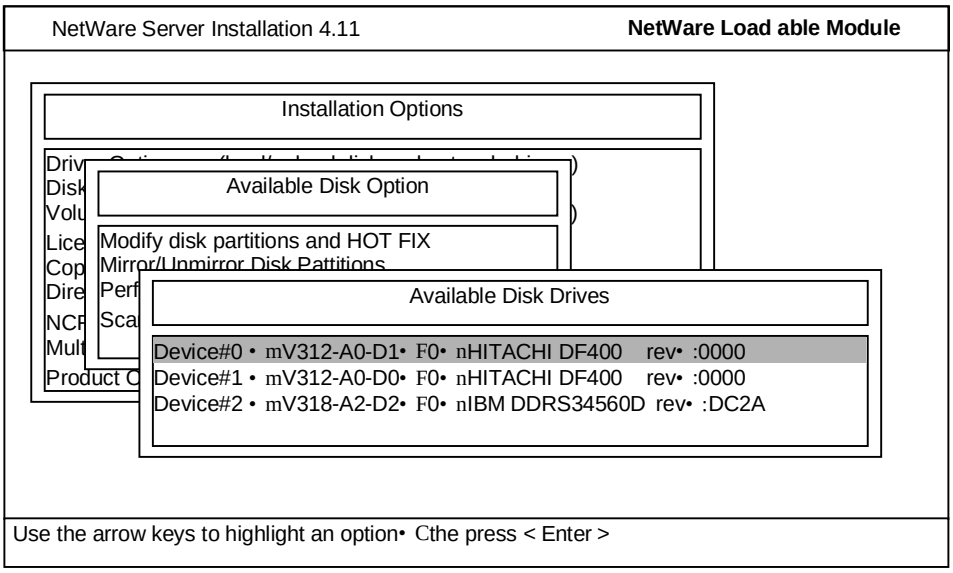

Figure 3.3 Selecting a Device to Install

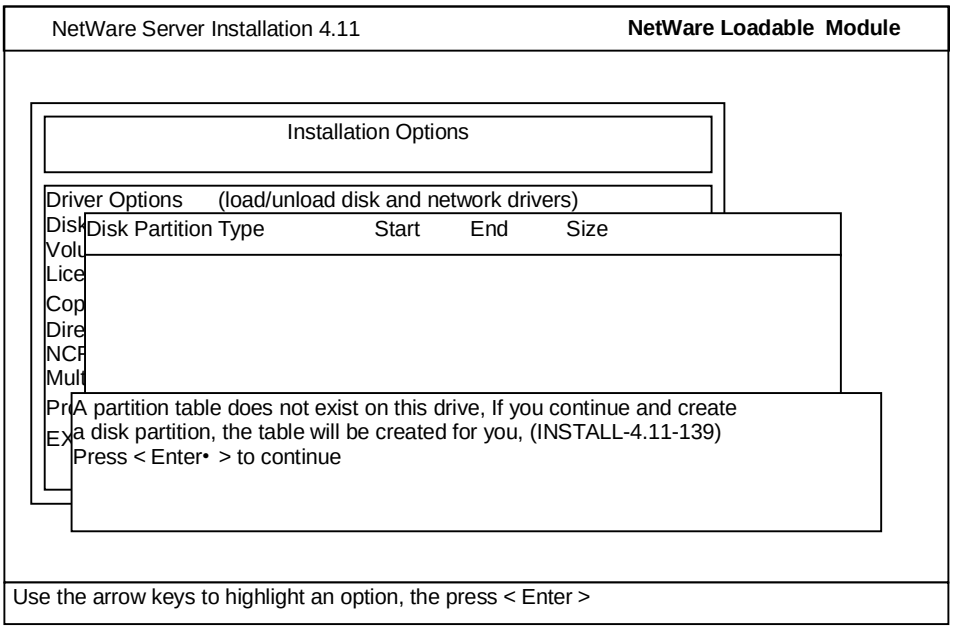

Figure 3.4 Creating a Partition Table

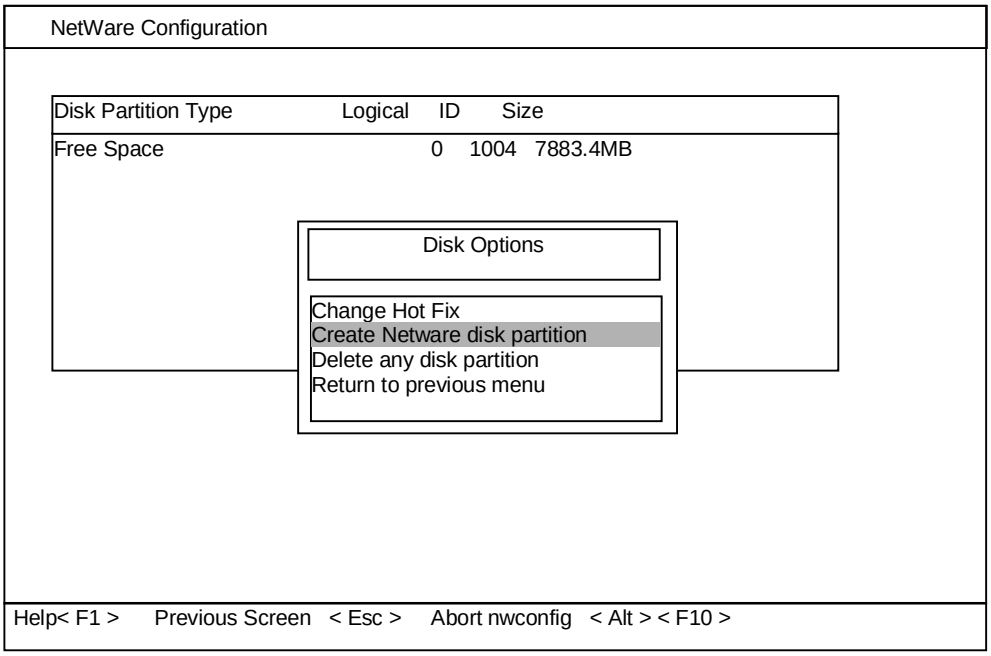

Figure 3.5 Starting to Create a Disk Partition

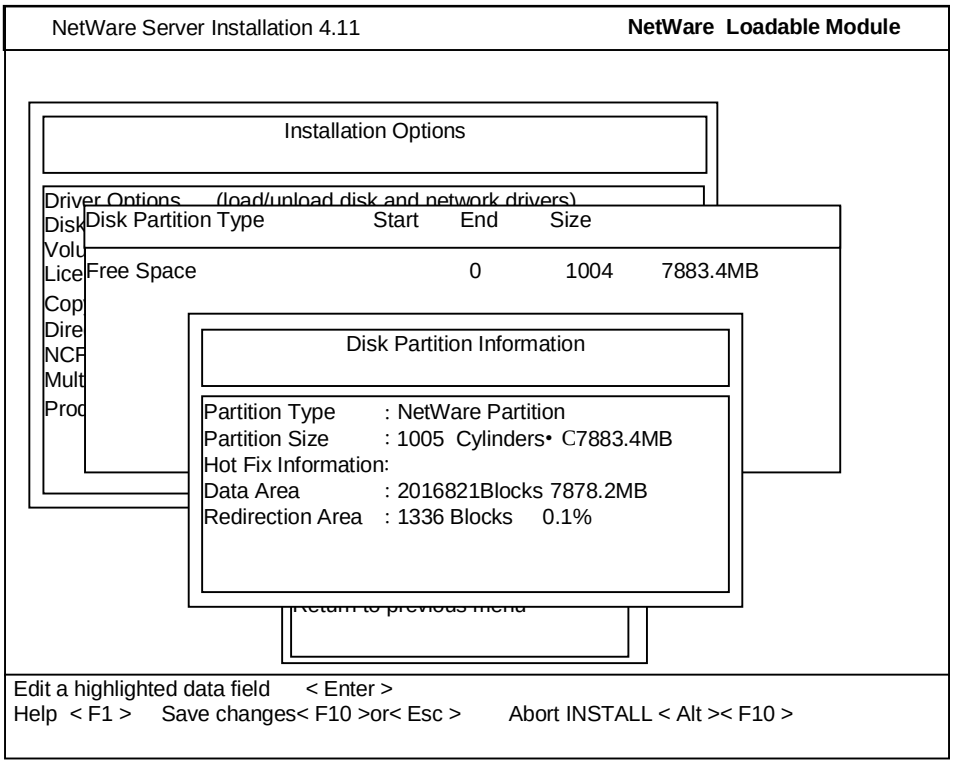

Figure 3.6 Specifying the Partition Size

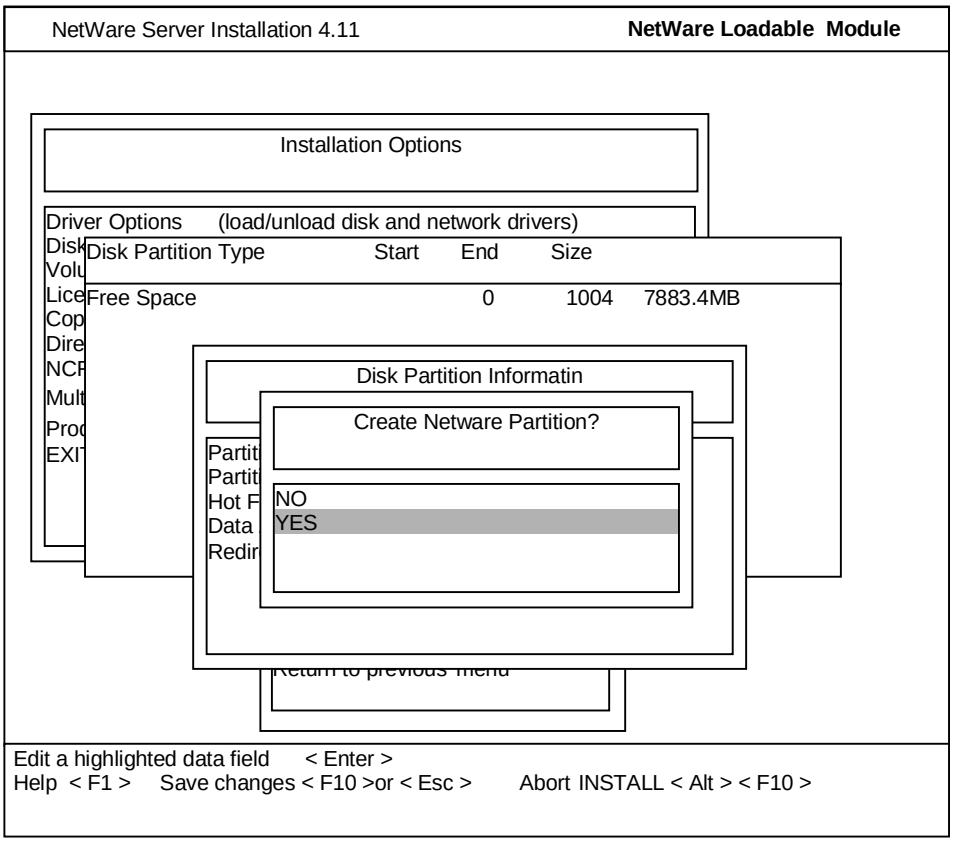

Figure 3.7 Creating Partitions

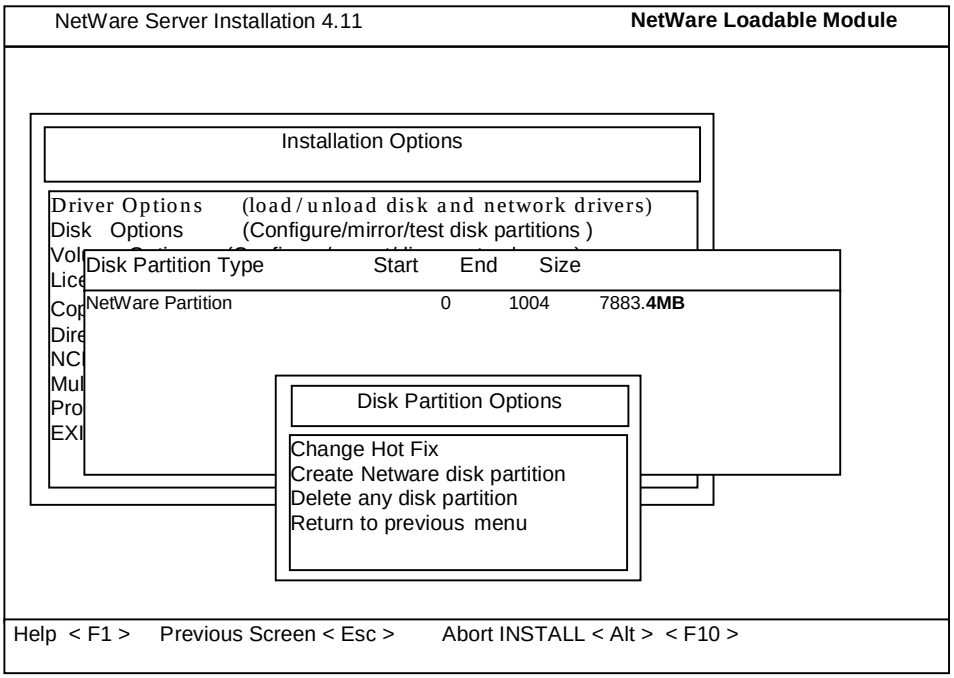

Figure 3.8 Verifying the NetWare® 4.11 Partition

3.2 Creating NetWare® 5.0 Partitions

The first step in configuring the newly installed 9200 devices is to create disk partitions on these new devices. Figure 3.9 through Figure 3.15 show the sequence of screens displayed on the NetWare® server during the disk partitioning process.

Note: Do not create a partition on a disk device that will be accessed as a raw device (e.g. some database applications use raw devices).

To create NetWare® 5.0 disk partitions on the new SCSI disk devices:

1. At the server console, enter LOAD NWCONFIG to load the Configuration Options module (see Figure 3.9).
2. On the Configuration Options screen, select **Standard disk options**, and press **Enter** to access the NetWare® disk options (see Figure 3.10).
3. On the Available Disk Options screen, select **Modify disk partitions and Hot Fix** and press **Enter**.
4. The Available Devices screen (see Figure 3.11) lists the devices by device number. On the Available Disk Drives screen, select the device to be partitioned and press **Enter**.
5. If the partition table has already been initialized, skip this step. If the partition table has not yet been initialized, the partition table message is displayed (see Figure 3.12). Press **Enter** to confirm the message. When the **Initialize the partition table?** message appears, select **Yes** and press **Enter** to initialize the partition table.
6. On the Disk Options screen (see Figure 3.13), select **Create NetWare disk partition**, and press **Enter**.
7. You are now prompted to create the partition either automatically or manually. Select the desired option, and press **Enter**. If you select automatic partitioning, the NetWare® system will create the disk partition and hot fix area using the available disk space (the hot fix area will be approximately two percent of the partition size). (See Figure 3.14.) If you select manual partitioning, you must enter the desired partition size and hot fix area.
8. On the Disk Partition Information screen (see Figure 3.15), verify (or enter) the partition size and hot fix data area size, and press **F10** to save the changes. You are returned to the Disk Options screen.
9. Select **Create NetWare disk partition** again, and press **Enter**.
10. When the **Create NetWare Partition?** message appears (see Figure 3.15), select **Yes** and press **Enter** to create the specified disk partition on the selected device.
11. Press **Esc** until you are returned to the Available Disk Drives screen (refer to Figure 3.11). Repeat steps (1) through (12) to create the disk partition on each new SCSI disk device.
12. When you are finished creating disk partitions, return to the Available Disk Options screen (refer to Figure 3.10).

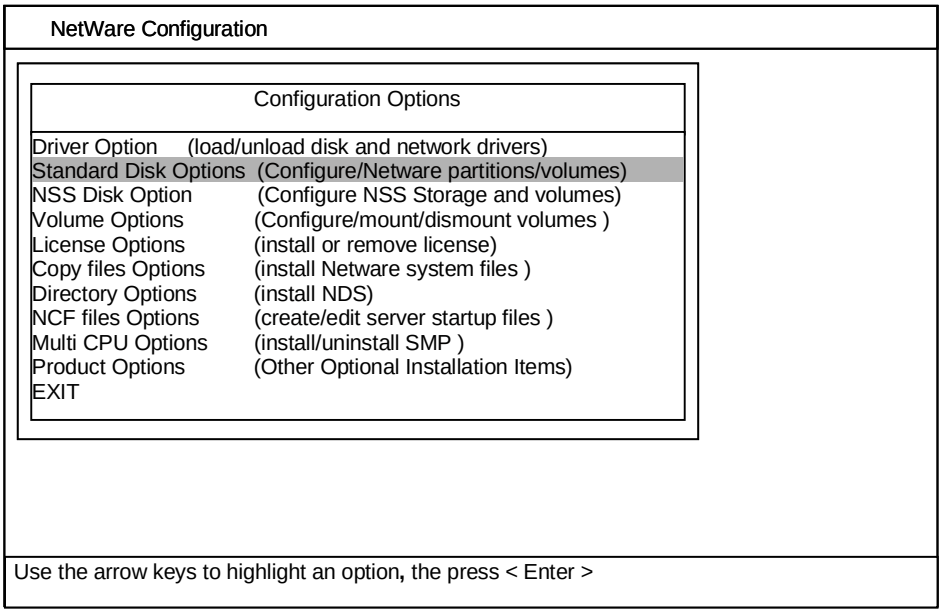

Figure 3.9 Loading the NetWare® Configuration Options Module

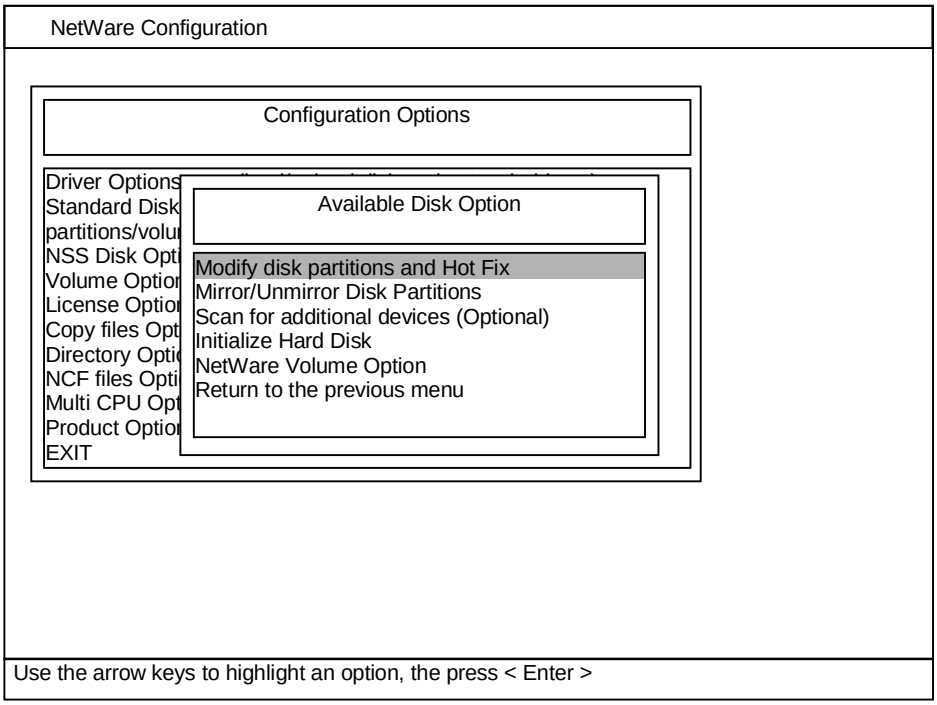

Figure 3.10 Accessing the NetWare Disk Options

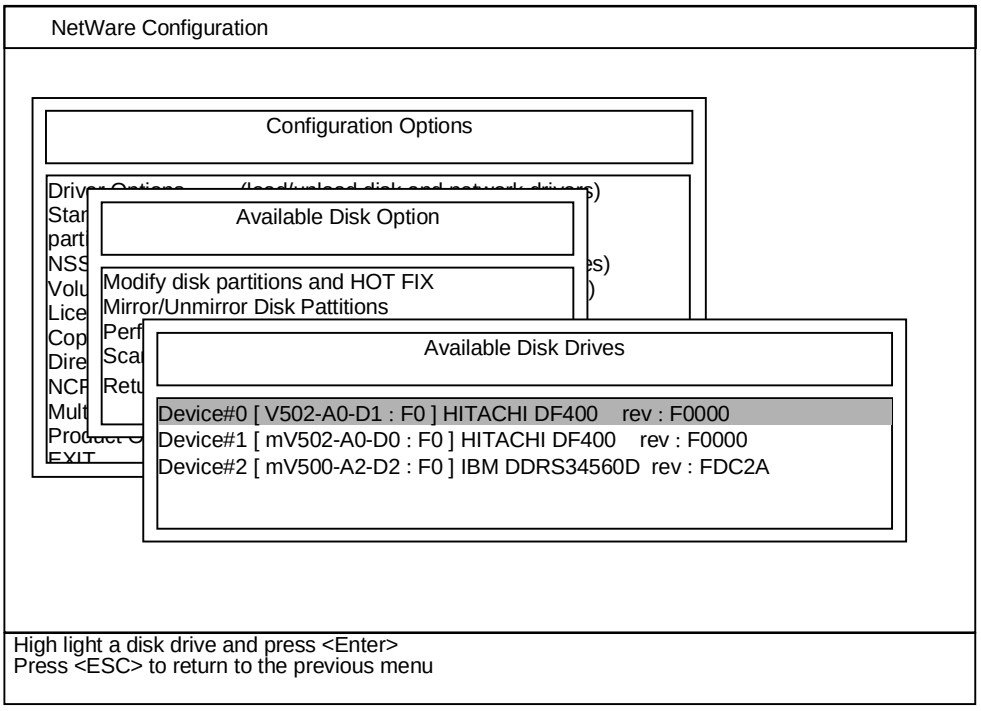

Figure 3.11 Selecting the Device to be Partitioned

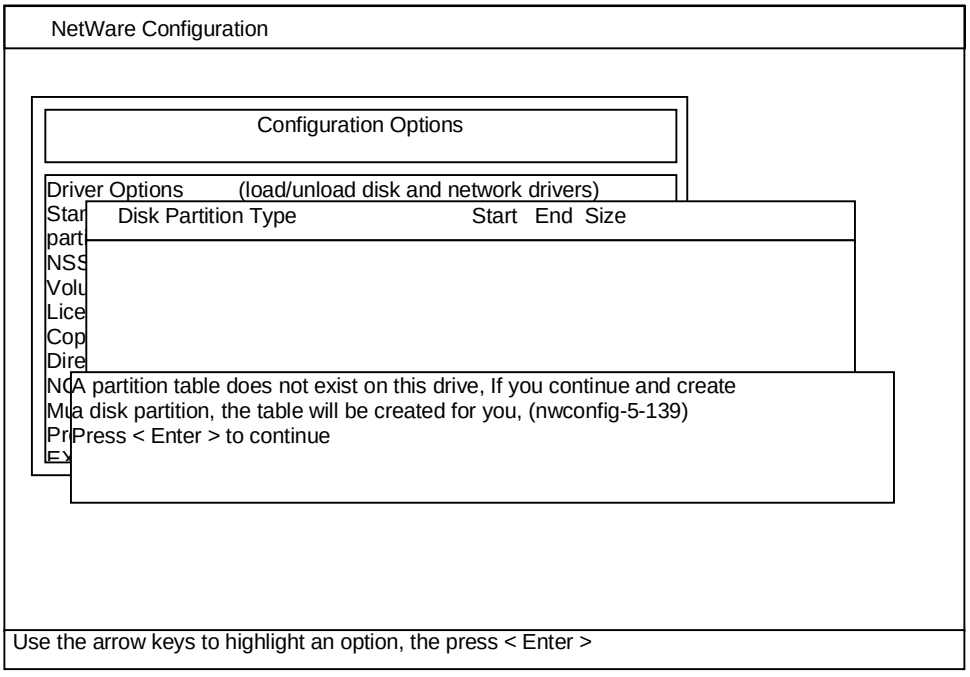

Figure 3.12 Confirming the Partition Table Message

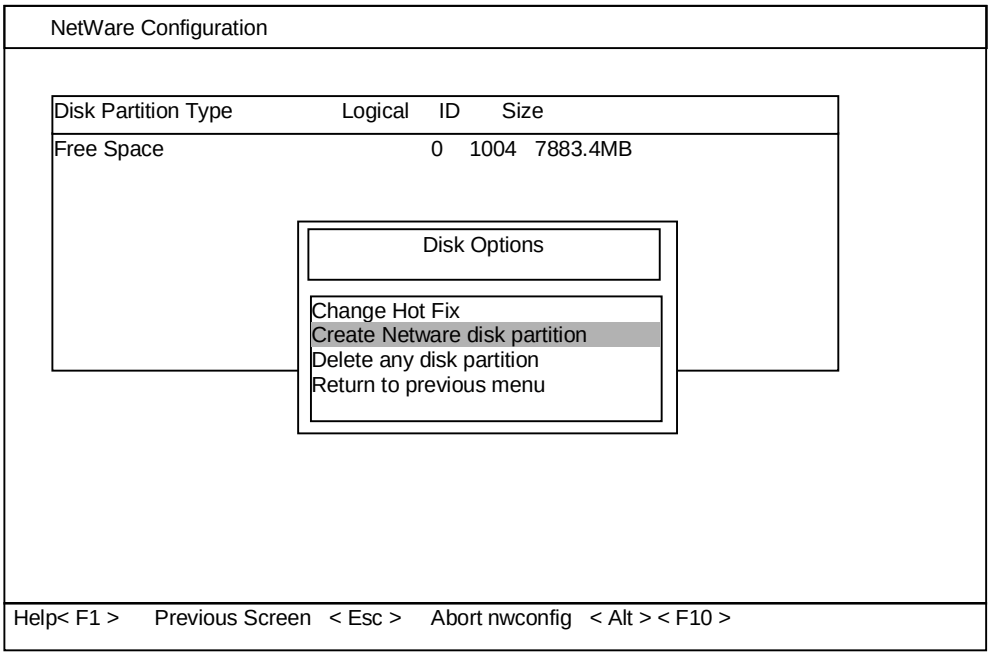

Figure 3.13 Starting to Create a Disk Partition

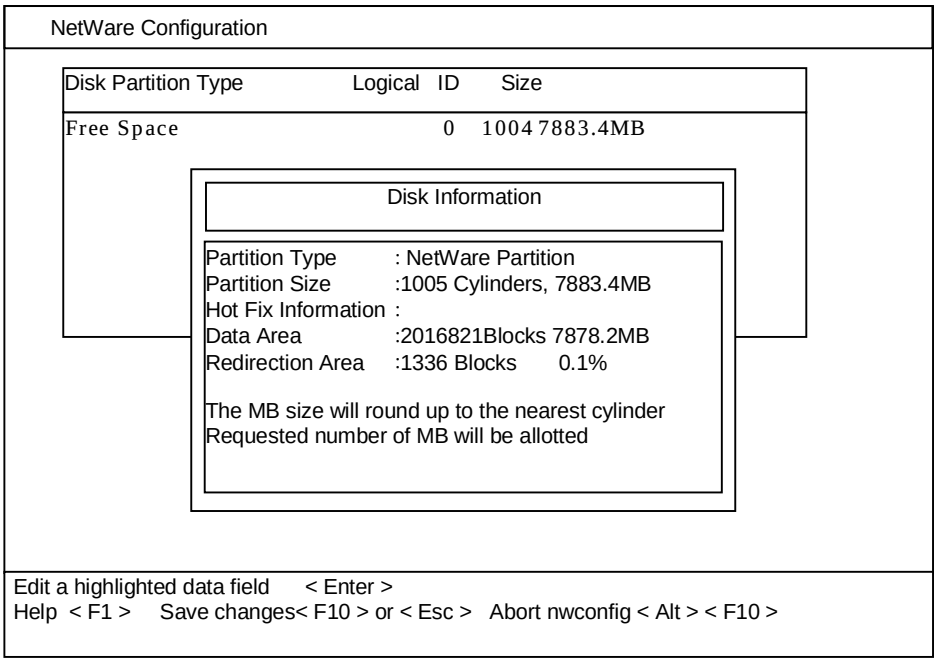

Figure 3.14 Entering the Disk Partition Information

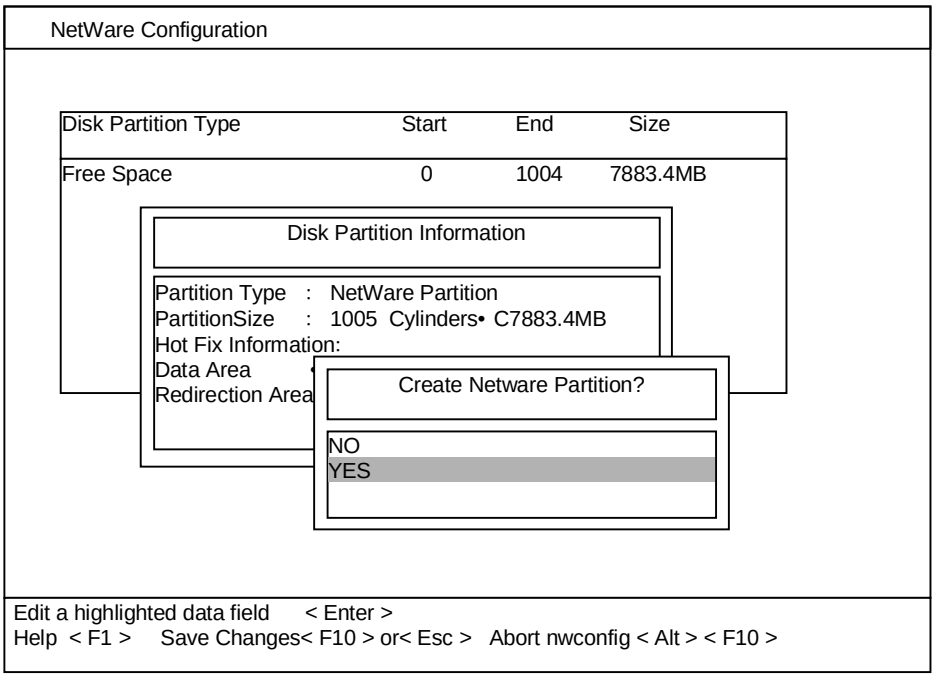

Figure 3.15 Creating the NetWare® Partition

3.3 Creating Volumes

To create volumes:

1. From the **Installation Options Menu**, select **Volume Options** (see Figure 3.16) and press the **Enter** key.
2. To add volumes, press the **Insert** key (see Figure 3.17).
3. To select the device you want to create volumes for, select the device as shown in **Error! Reference source not found.**
4. To make the selected segment a new volume, select **Make this segment a new volume (see** Figure 3.17**)**, then press **Enter**.
5. To set the volume parameters, enter the volume name and size as shown in Figure 3.18. Press the F10 key to save changes.
6. After creating the volumes, press the **Esc** key to return to the **Volume** panel (see Figure 3.19). To save the changes, select **Yes,** then press the **Enter** key**.**

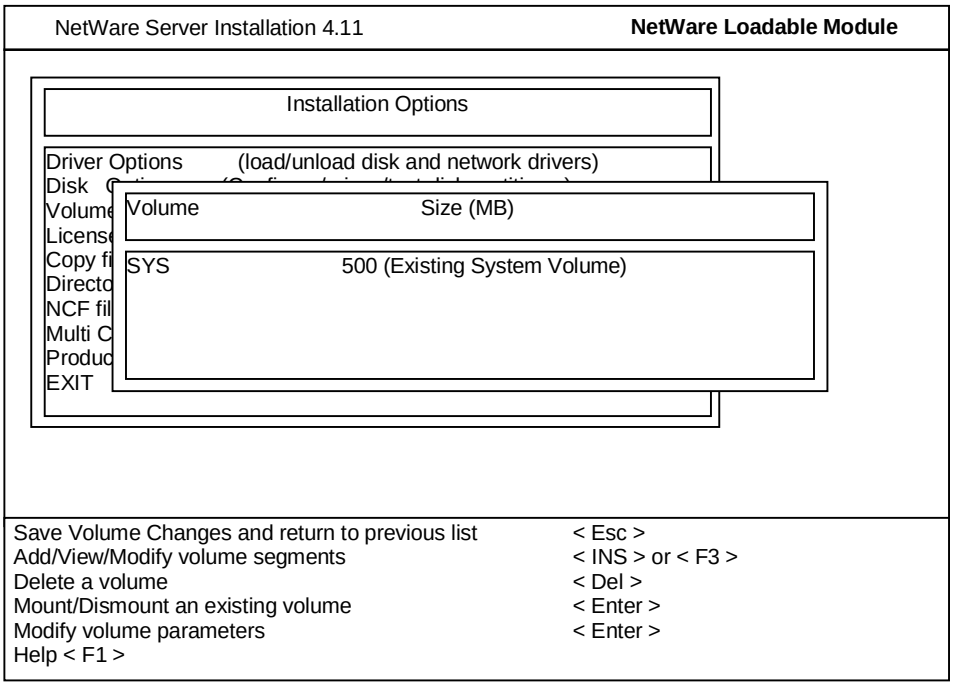

Figure 3.16 Creating Volumes

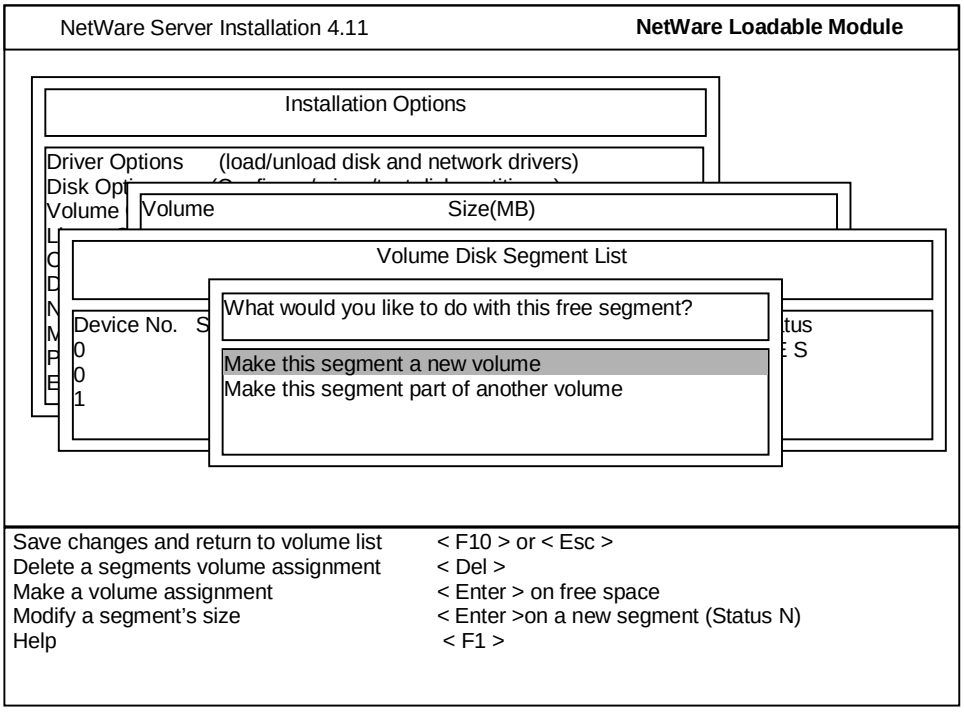

Figure 3.17 Making a Segment a New Volume

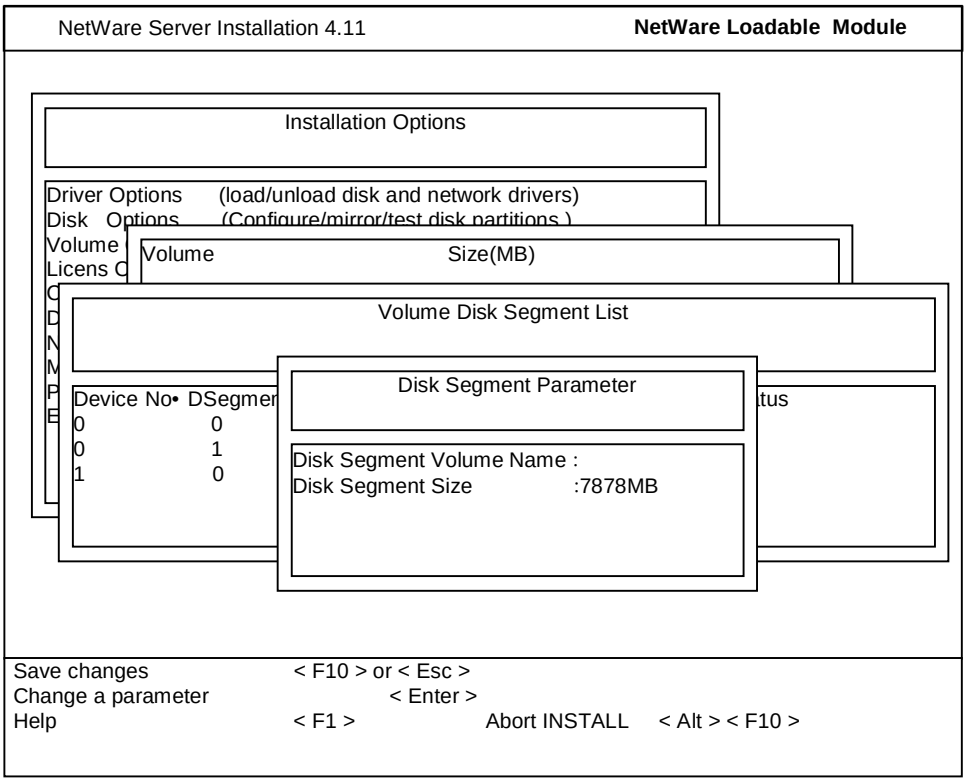

Figure 3.18 Setting the Volume Parameters

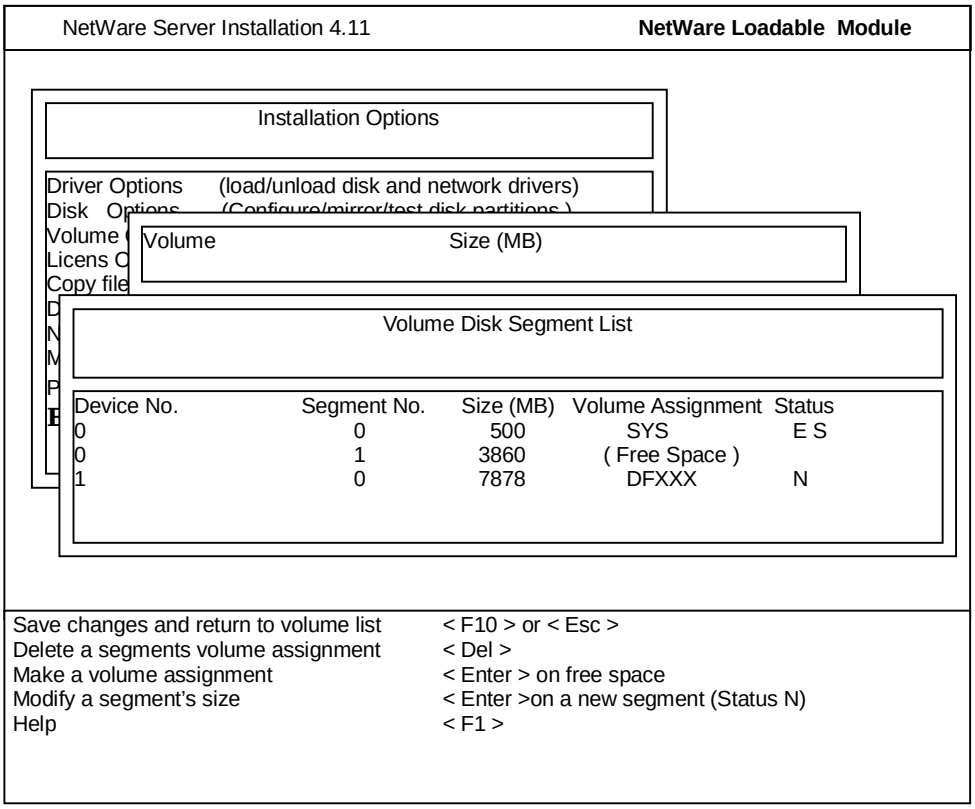

Figure 3.19 Returning to the Volume Screen

3.4 Mounting the New Volumes

After you have assigned the new 9200 devices to volumes, you are ready to mount the new volumes to verify that the NetWare® system can access the new devices. Figures Figure 3.20 through Figure 3.23 show the sequence of screens displayed on the NetWare® server during the volume mounting process. You should mount all new volumes.

To mount the new volumes:

1. After assigning the new devices to volumes, you should have returned to the Available Disk Options screen. Select **NetWare Volume options** to display the volume list and volume options, and then select **Mount/Dismount an existing volume** and press **Enter**.
2. The mount/dismount volume function requires the NetWare® administrator password. Enter the administrator password on the Directory Services Login screen, and then press **Enter** (see Figure 3.20).
3. An informational message displays the number of new volumes just added (see Figure 3.21). Press **Enter** to confirm this message.
4. You are now prompted to select the desired mount action (see Figure 3.22). Select either **Mount all volumes** or **Mount Volumes Selectively** as desired.
5. The mount status for all volumes is now displayed.

a) If you chose to mount volumes selectively, select the desired volume, press **Enter** to mount the volume, and then confirm that the volume's status changed to MOUNTED. Repeat this step for each new volume to confirm that all new volumes can be mounted successfully.

b) If you chose to mount all volumes, the system mounts all volumes and then displays the mount status for all volumes. Confirm that the status for all new volumes is MOUNTED.

6. When you have confirmed that all new volumes/devices were mounted successfully, you are finished with 9200 device configuration on the Novell® NetWare® PC server. Leave the new volumes mounted for now, so that you can verify that the NetWare® clients can access the new volumes.

7. After confirming that the volumes/devices were mounted successfully, return to the **Installation Options** screen (see Figure 3.23).

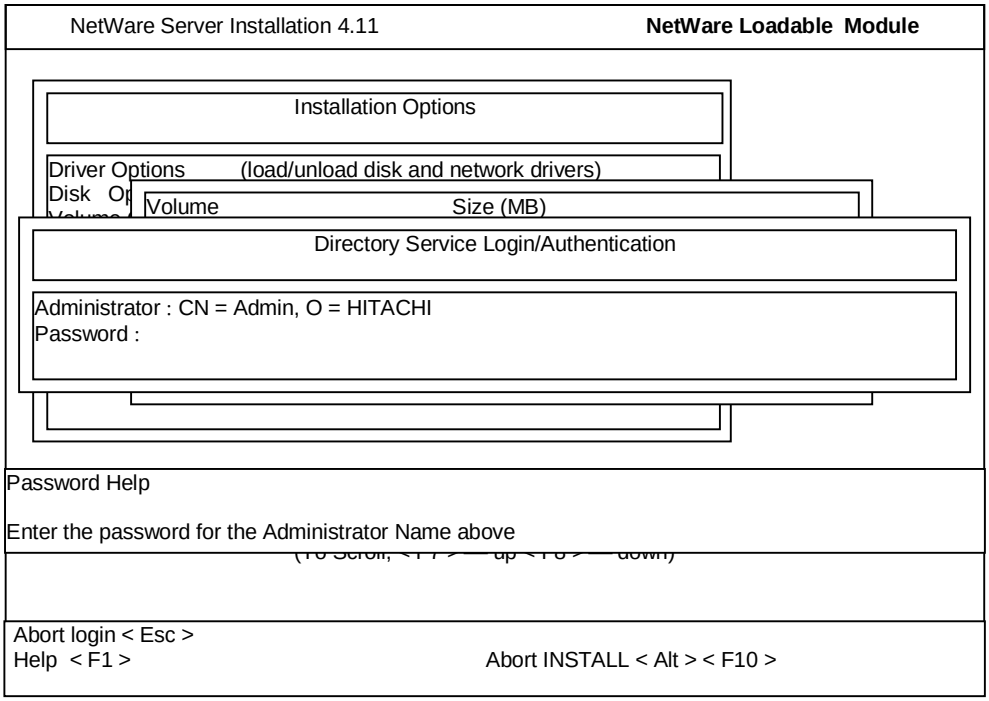

Figure 3.20 Entering the Administrator Password to Perform Mount Operations

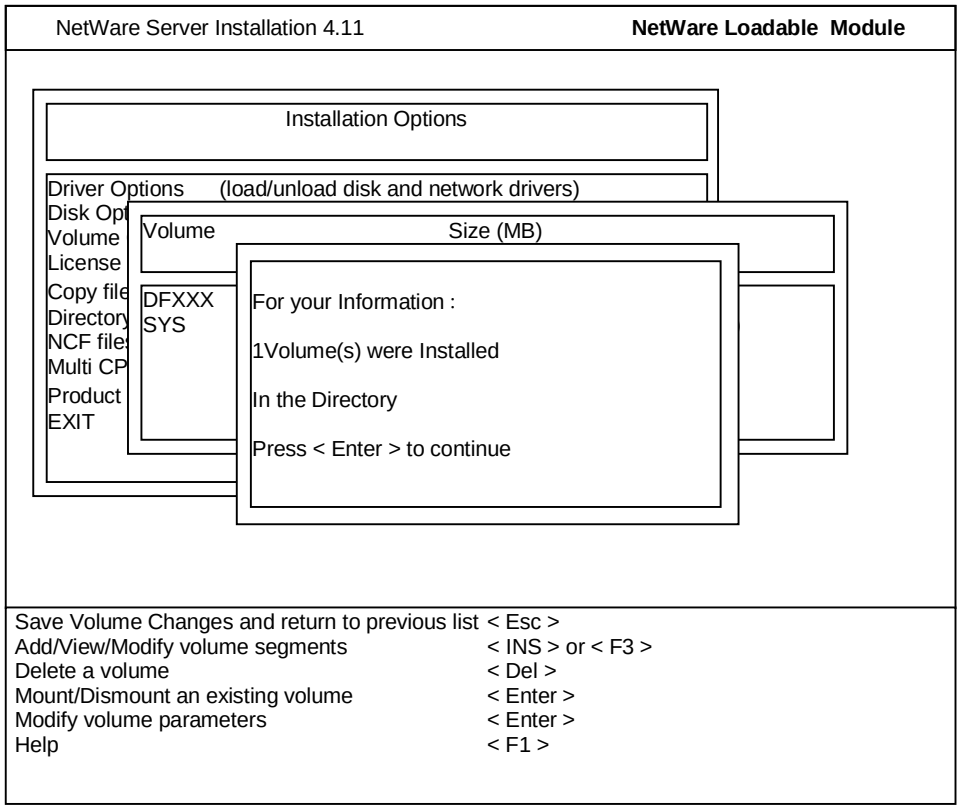

Figure 3.21 Confirming the New Volume Message

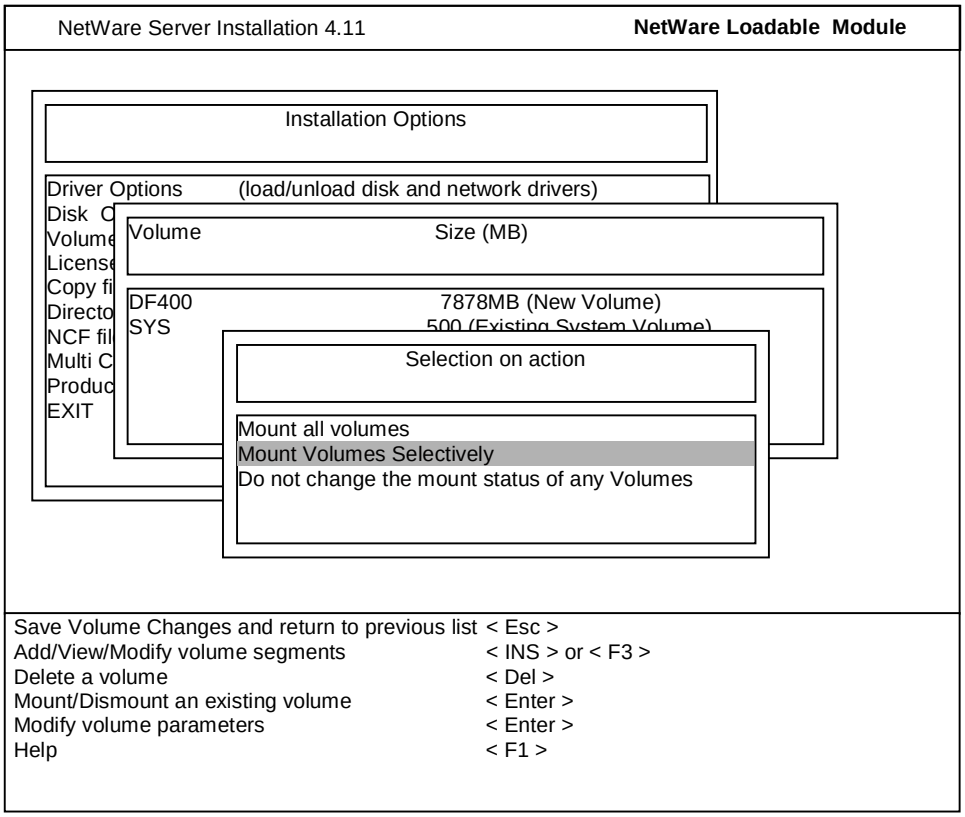

Figure 3.22 Mounting Volumes Selectively

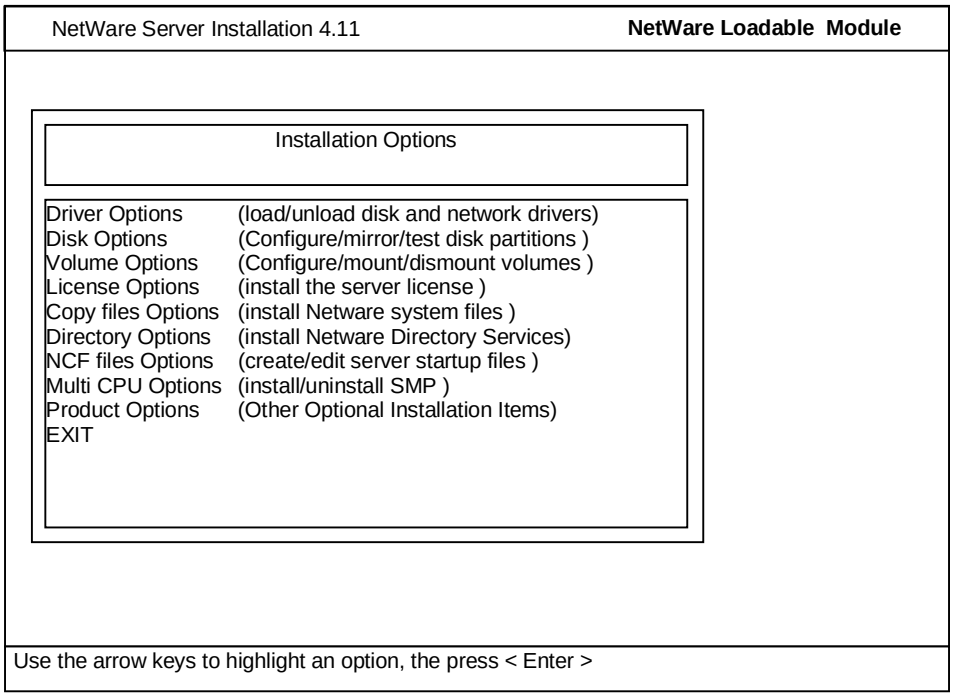

Figure 3.23 Installation Options Screen

3.5 Assigning the New Devices to Volumes

After you have created the disk partitions on the new devices, you are ready to assign the new SCSI disk devices to volumes, so that the NetWare® system can start writing to the new devices. Figures 3.9 through 3.15 show the sequence of screens displayed on the NetWare® server during the volume assignment process. *Reminder:* A volume can span as many as 32 devices, so you can assign more than one device to a volume.

Note: The addition of new volumes to the NetWare® server may require a memory upgrade. Please consult the NetWare® user documentation and/or contact Novell® technical support.

To assign the new SCSI disk devices to volumes:

1. After creating the disk partitions, you should have returned to the Available Disk Option screen. Select **NetWare Volume Option**, and press **Enter** to display the volume options.
2. The existing volumes are listed by volume name, and the volume options are displayed at the bottom of the screen (see Figure 3.25). Execute the **Add/View/Modify volume segments** command by pressing the **Ins** or **F3** key.
3. The Volume Disk Segment List screen (see Figure 3.26) displays the existing devices by device number. The **Volume assignment** column displays **(free space)** for each device which is not yet assigned to a volume.
4. Execute the **Make a volume assignment** command as follows: move the cursor to the line containing the desired device, then move the cursor over onto **(free space)** in the **Volume assignment** column, and press **Enter**.

5. When the **What would you like to do with this free segment?** message appears (see Figure 3.27), select the desired option, and press **Enter**. If you selected **Make this segment part of another volume**, select the volume you want to add this segment to, and press **Enter**.
6. On the Disk Segment Parameters screen, enter the new volume name (or verify the selected volume), and enter the disk segment size (see Figure 3.28). The segment size is the same as the partition size entered during disk partitioning.
7. Press **F10** to save the new volume information and return to the Volume Disk Segment List screen (see Figure 3.26).

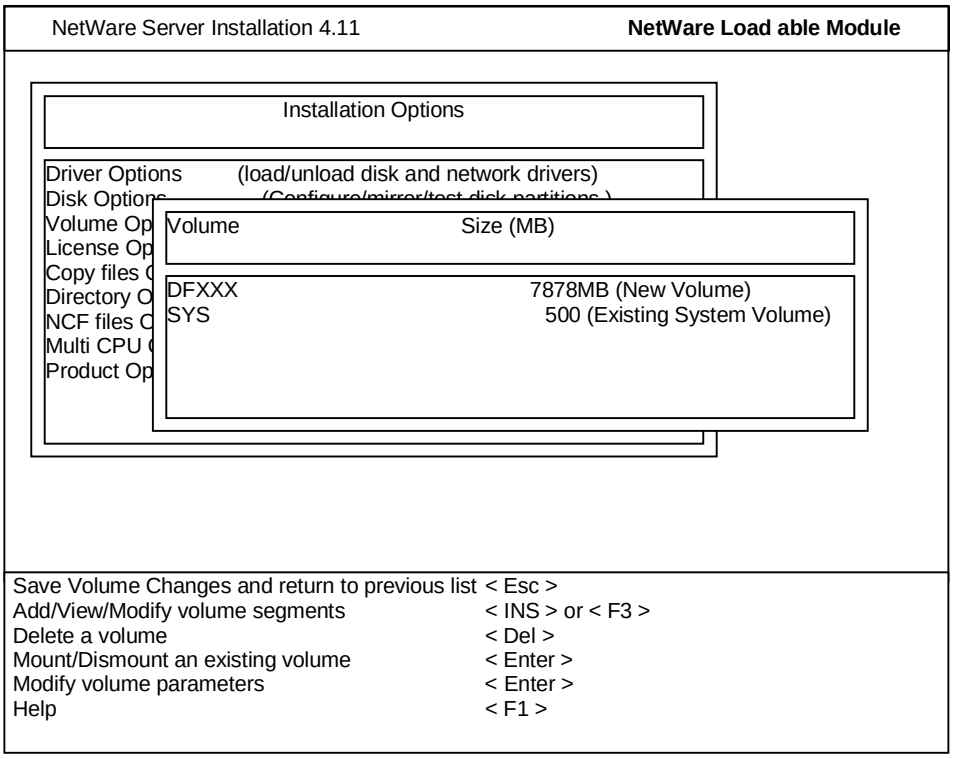

Figure 3.24 Viewing the Volumes and Volume Options

7. Repeat steps (2) through (9) until you have assigned all new 9200 devices to volumes.
8. When you are finished assigning new devices to volumes, press **Esc** to save your volume changes. When the confirmation message appears (see Figure 3.31), select **Yes** and then press **Enter** to save all changes and return to the Available Disk Options screen.

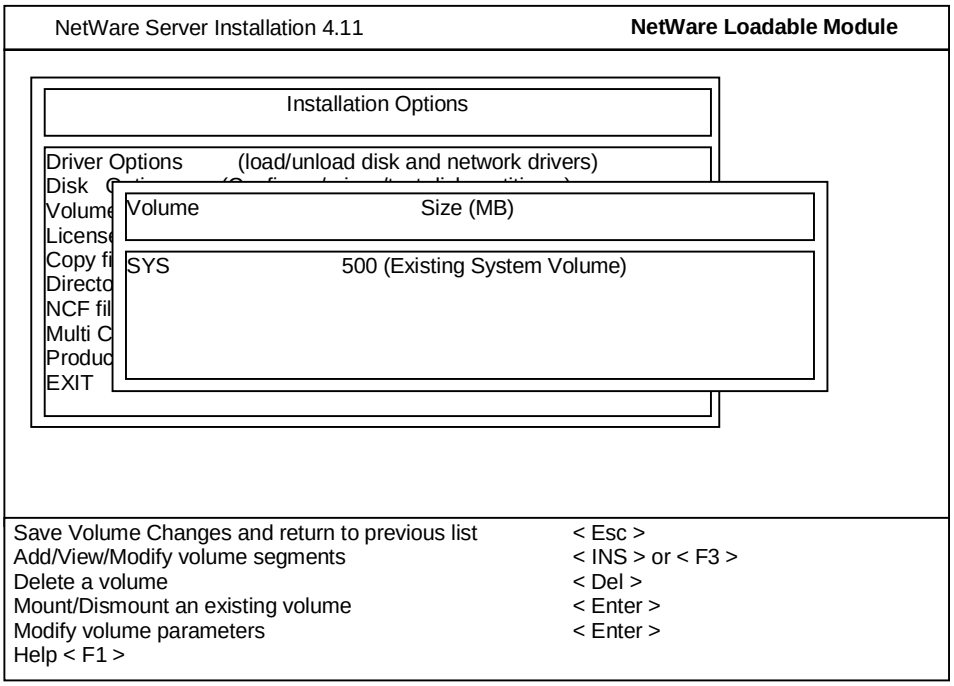

Figure 3.25 Displaying the Existing Volumes and Volume Options

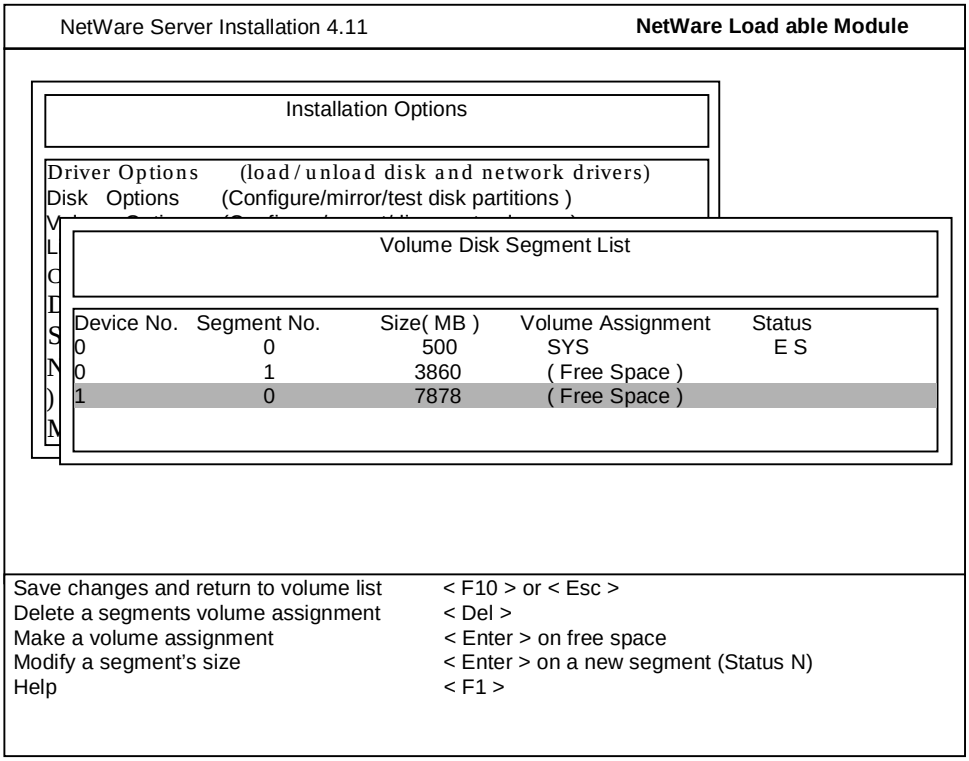

Figure 3.26 Displaying the Existing Devices and Selecting the Device

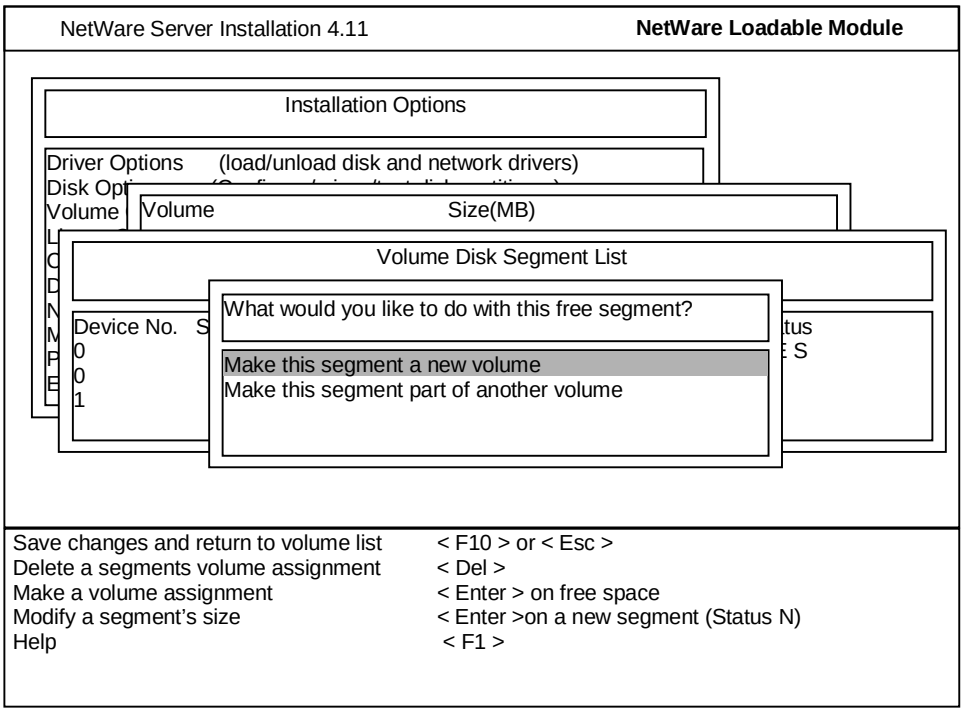

Figure 3.27 Creating a New Volume on the Selected Device

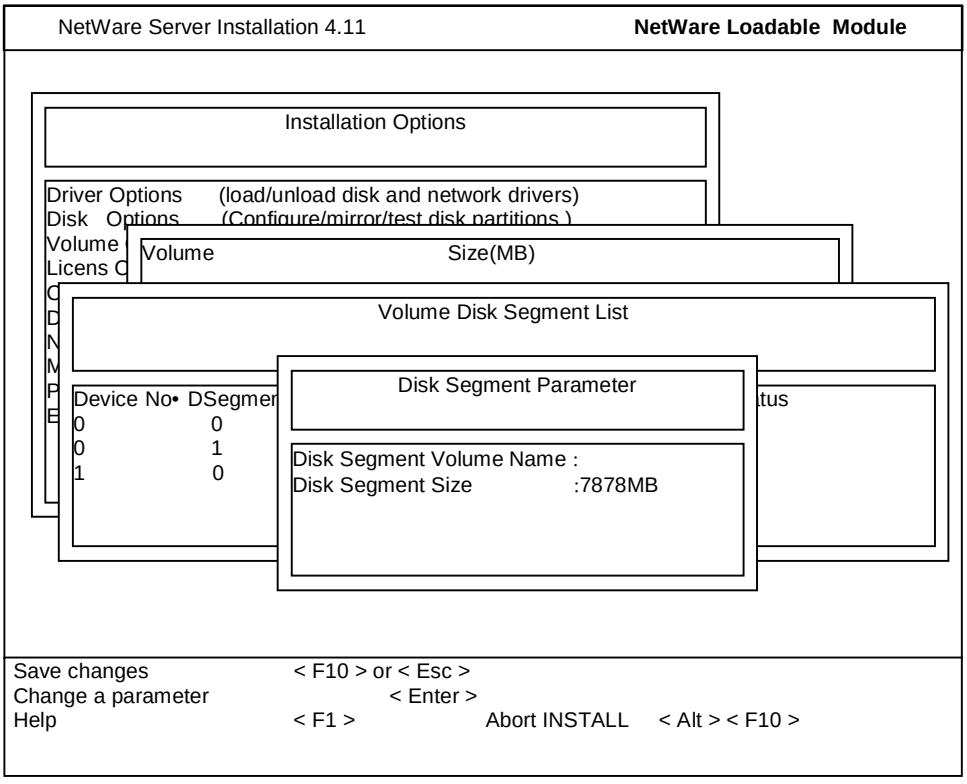

Figure 3.28 Entering the Disk Segment Parameters

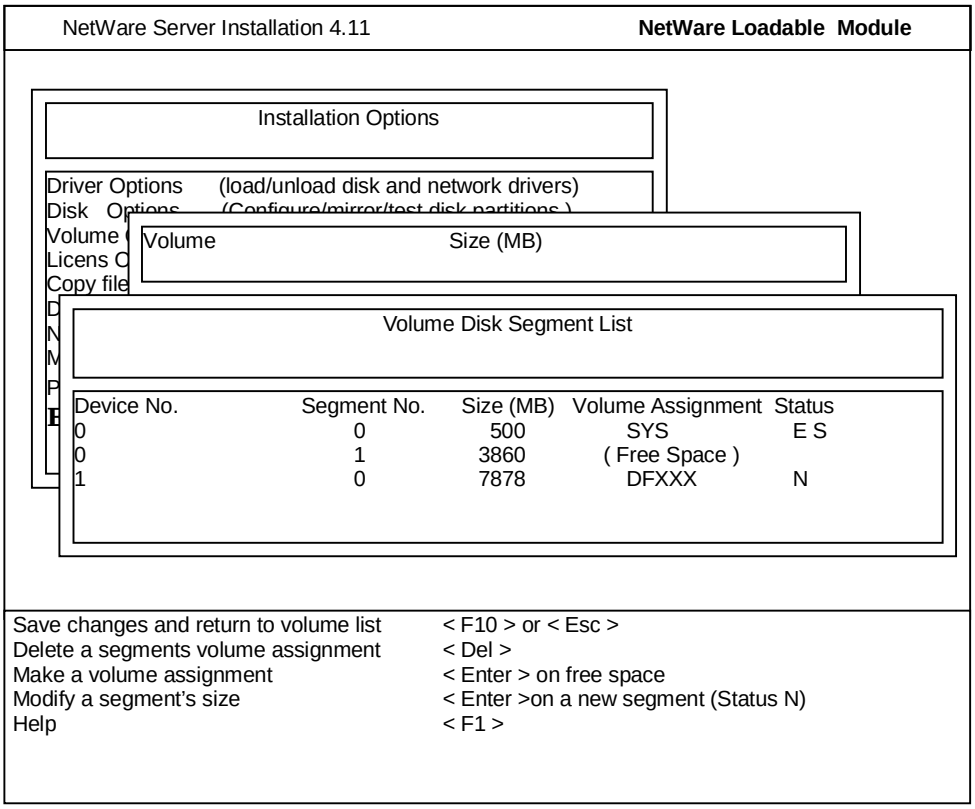

Figure 3.29 Saving the Disk Segment Parameters

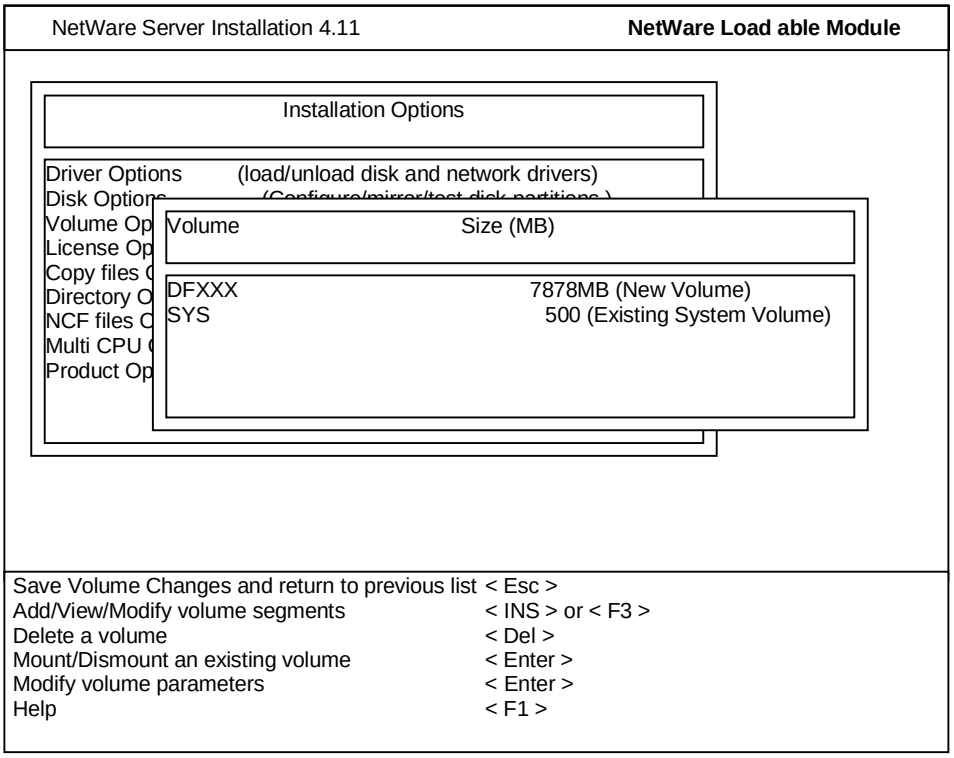

Figure 3.30 Saving the Specified New Volume

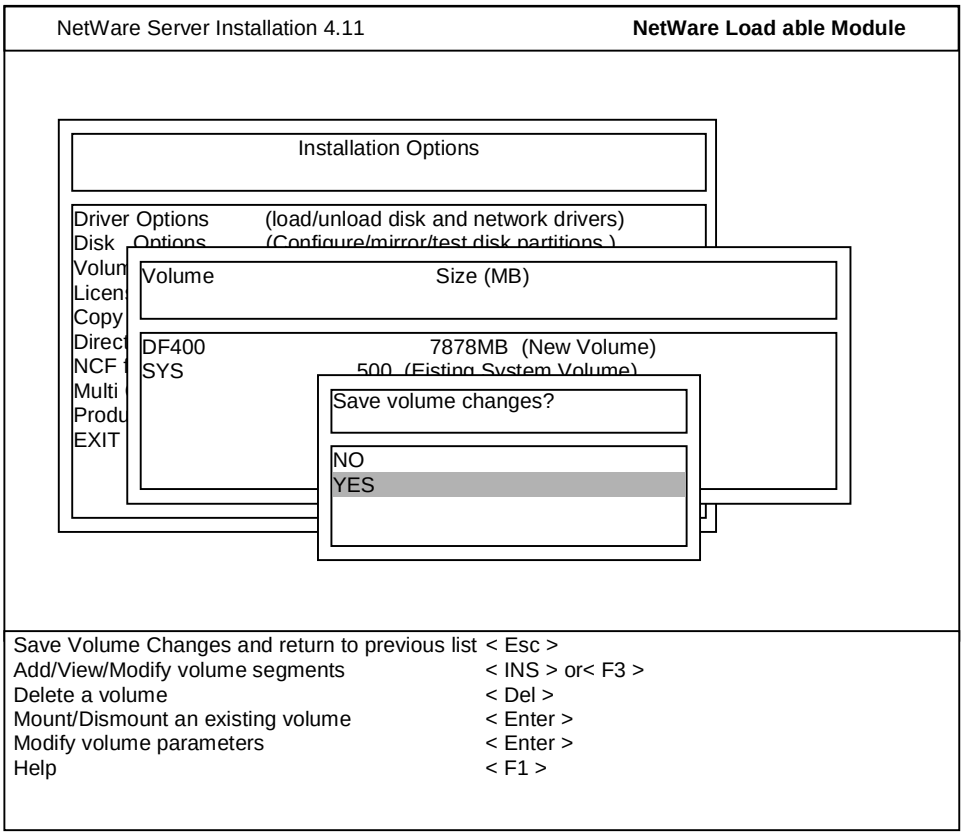

Figure 3.31 Saving All New Volumes

3.6 Mounting the New Volumes

After you have assigned the new 9200 devices to volumes, you are ready to mount the new volumes to verify that the NetWare® system can access the new devices. Figures 3.16 through 3.20 show the sequence of screens displayed on the NetWare® server during the volume mounting process. You should mount all new volumes.

To mount the new volumes:

1. After assigning the new devices to volumes, you should have returned to the Available Disk Options screen. Select **NetWare Volume options** to display the volume list and volume options, and then select **Mount/Dismount an existing volume** and press **Enter**.
2. The mount/dismount volume function requires the NetWare® administrator password. Enter the administrator password on the Directory Services Login screen, and then press **Enter** (see Figure 3.32).

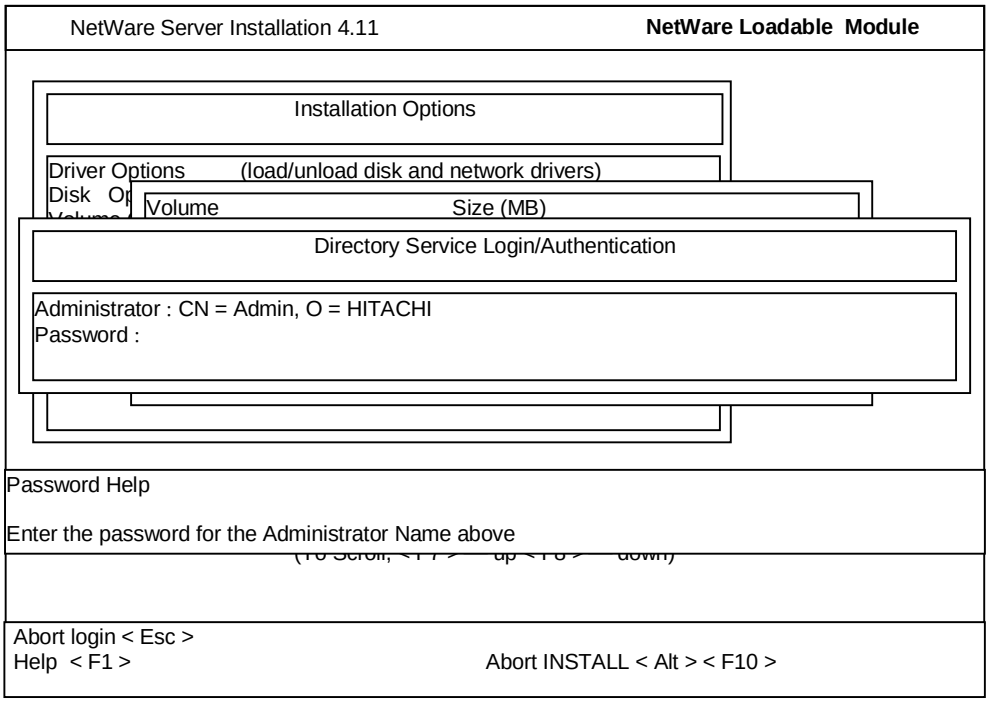

Figure 3.32 Entering the Administrator Password to Perform Mount Operations

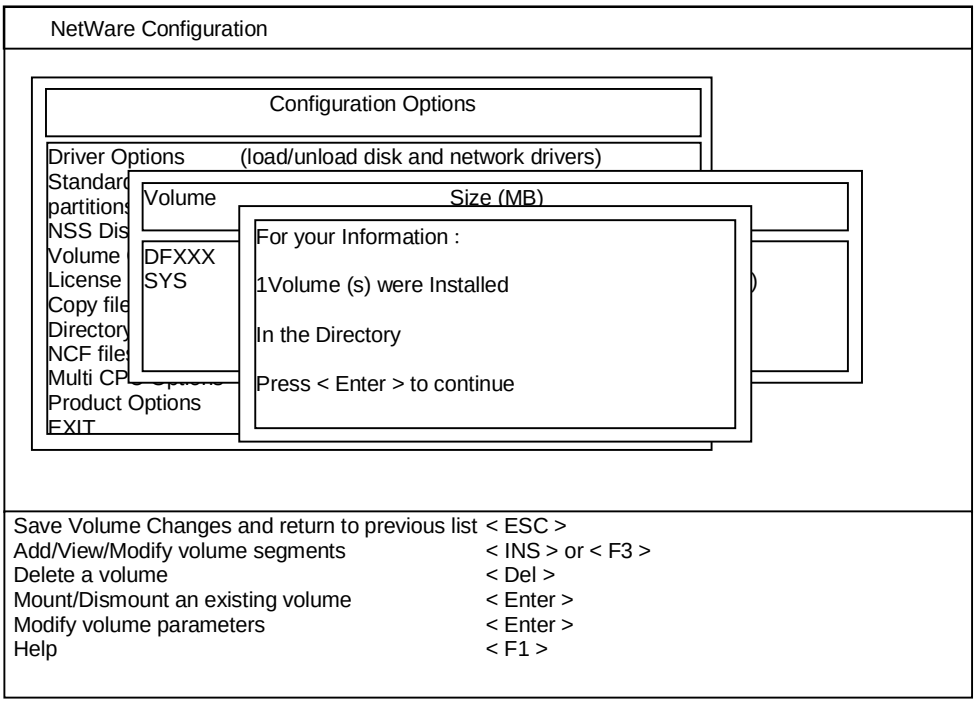

Figure 3.33 Confirming the New Volume Message

3. You are now prompted to select the desired mount action (see Figure 3.36). Select either **Mount all volumes** or **Mount volumes selectively** as desired.

4. The mount status for all volumes is now displayed.

c) If you chose to mount volumes selectively (see Figure 3.37), select the desired volume, press **Enter** to mount the volume, and then confirm that the volume's status changed to MOUNTED. Repeat this step for each new volume to confirm that all new volumes can be mounted successfully.

d) If you chose to mount all volumes, the system mounts all volumes and then displays the mount status for all volumes (see Figure 3.38). Confirm that the status for all new volumes is MOUNTED.

5. When you have confirmed that all new volumes/devices were mounted successfully, you are finished with 9200 device configuration on the Novell® NetWare® PC server. Leave the new volumes mounted for now, so that you can verify that the NetWare® clients can access the new volumes.

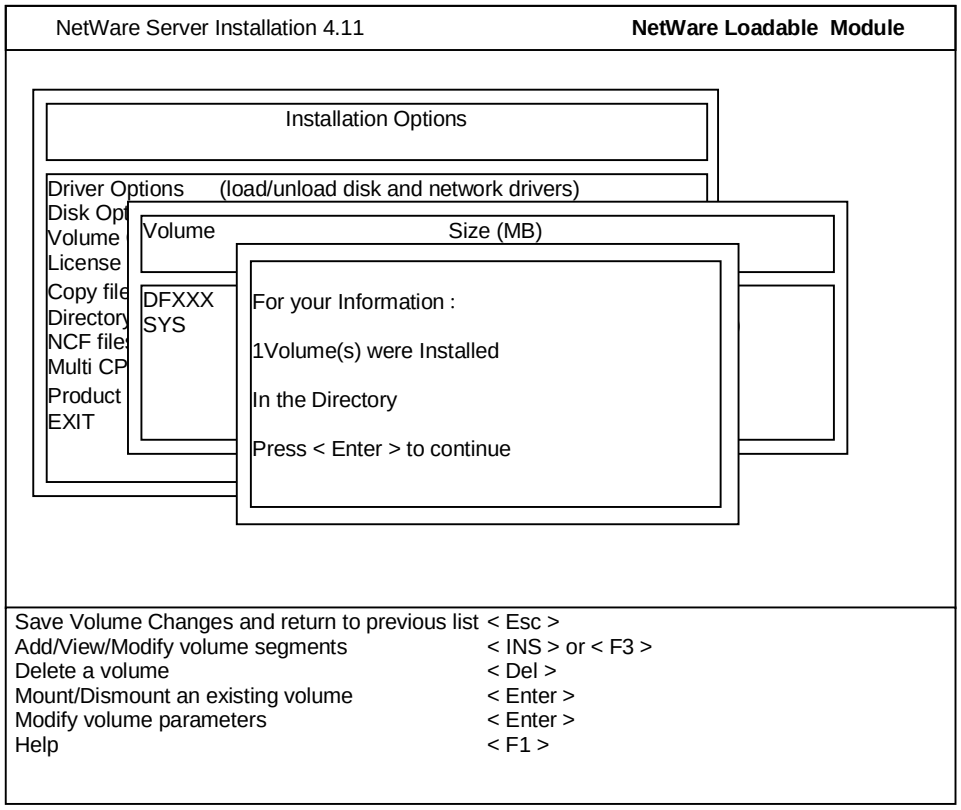

Figure 3.34 Entering the Administrator Password to Perform Mount Operations

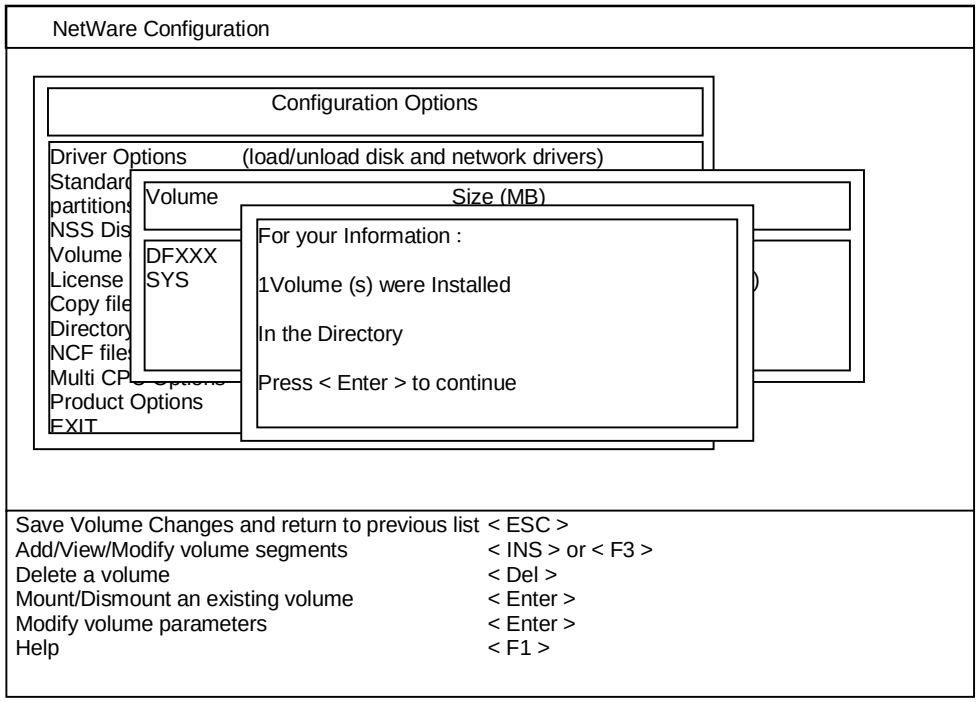

Figure 3.35 Confirming the New Volume Message

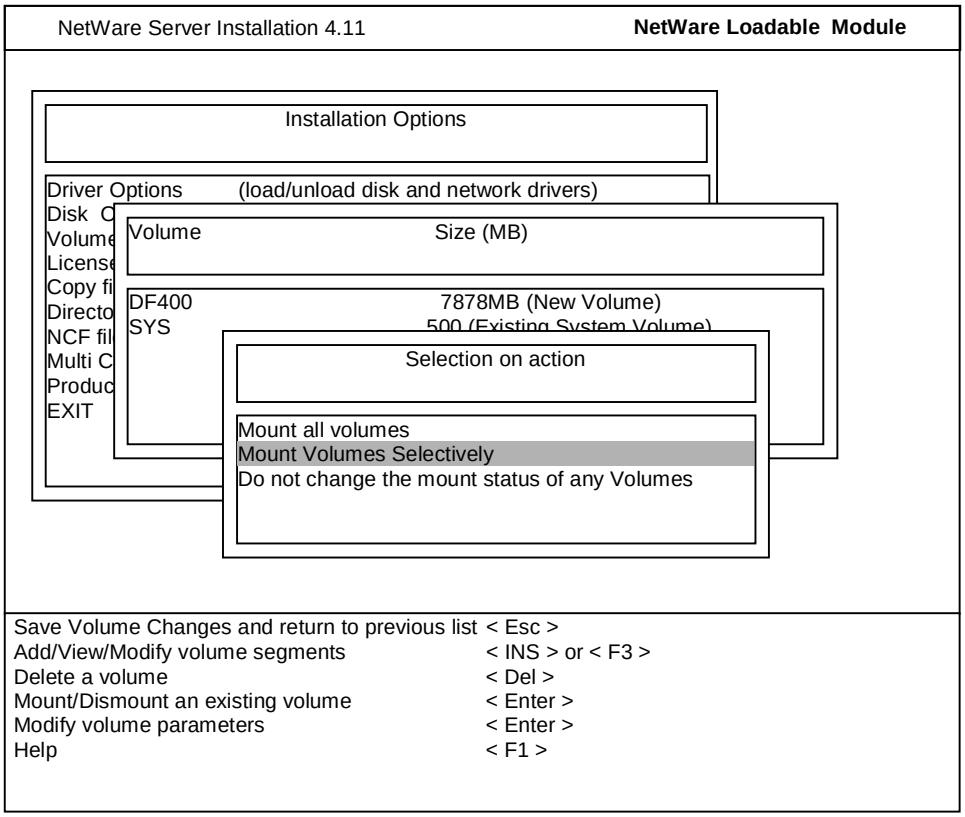

Figure 3.36 Selecting the Desired Mount Action

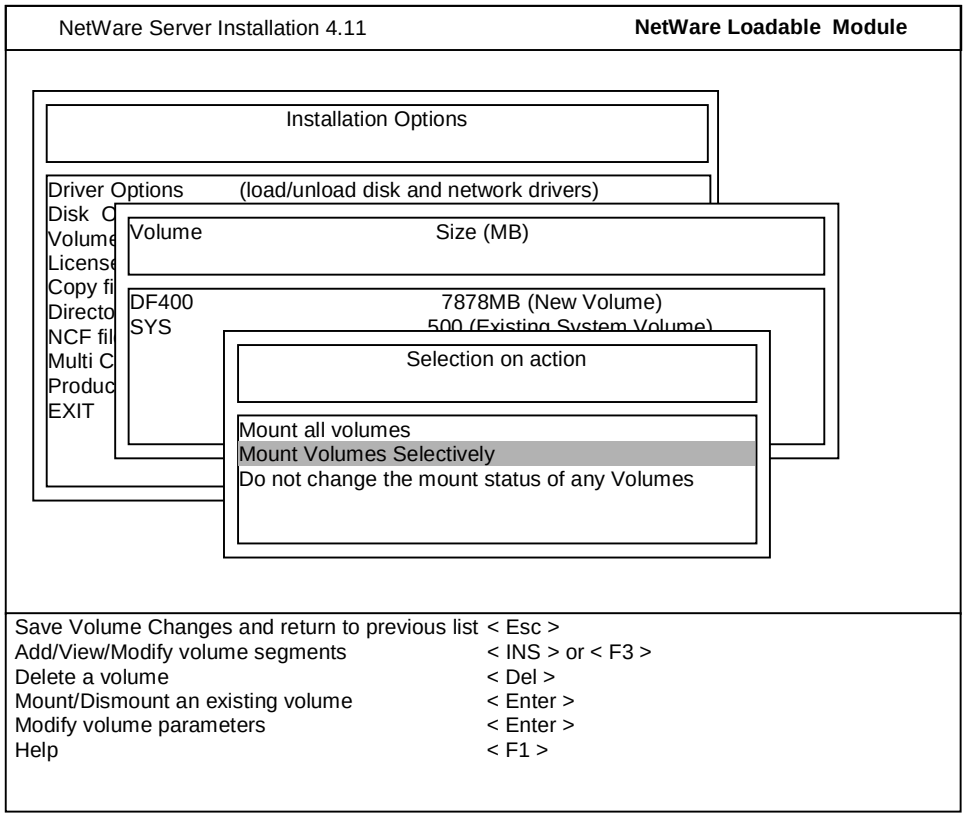

Figure 3.37 Selecting and Mounting the Volume

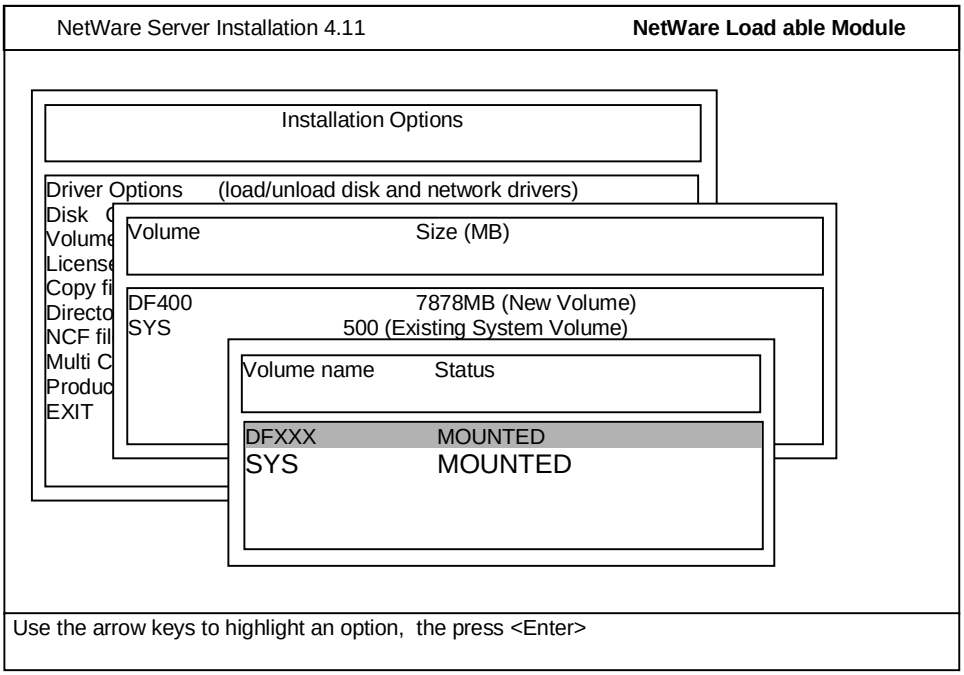

Figure 3.38 Confirming the MOUNTED Status of the New Volume(s)

3.7 Verifying Client Access

The last step in new device configuration is to verify that the NetWare® clients can access the new volumes. To verify access:

1. Copy an existing file onto each new volume.

   Note: This document does not provide instructions for copying a file to a mounted volume.

2. Verify that the file was copied successfully. If not, see Chapter 5 for troubleshooting information.

Chapter 4 Troubleshooting

4.1 Troubleshooting

The Hitachi Freedom Storage™ Thunder 9200™ array subsystem provides continuous data availability. For troubleshooting information for the 9200 subsystem, please refer to the *Hitachi Freedom Storage™ Thunder 9200™ User and Reference Manual* (MK-90DF504).

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). Please check the SVP service information messages (SIMs) using Web access, and note the reference codes and severity levels of the recent messages.

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

LUN	logical unit number
MB	megabytes
OFC	open fibre control
PC	personal computer system
RAID	redundant array of independent disks
SCSI	small computer system interface