Intel® Server RAID Controller U2-1 Integration Guide For Novell* NetWare 5

Revision 1.0
February 2000

Revision History

Revision	Revision History	Date
1.0	Initial	02/10/00

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Integrating an SRCU21 in a High- Performance File/Print Server

This installation procedure will describe the steps required to install NetWare* 5 on a system where the SRCU21 has created and controls an array of RAID 5 drives that will contain the bootable operating system. The system will contain no other hard drives.

Hardware Requirements

System:

- 9MB free hard drive space
- CD-Rom
  - SCSI, boot from NT boot diskettes
  - IDE, Enable system BIOS to boot CD
- Video
- Floppy Drive
- 1 available PCI slot
- PCI 2.2 compliant BIOS (3.3 Volts to the PCI slot)
- Intel Integrated RAID adapter:

Intel Integrated RAID adapter:

- SCSI hard drives
- SCSI cabling and terminators

Hardware Integration Overview

- Install the memory DIMM on the SRCU21.
- Install the SRCU21 into the server system.
- Flash the latest SRCU21 firmware update.
- Make a diskette containing the SRCU21 drivers for NetWare.
- Follow Normal NetWare 5 installation procedure using the diskette driver just created.

Your Resource CD

The SRCU21 was shipped with a bootable CD the contains the following items.

- A ROM-DOS menu system that can be accessed when you boot from the CD.
- A flash update utility and flash update code.
- An option available from the menu to make operating system driver diskettes.
- An option available from the menu to make RAID troubleshooting diskettes.
- An option available from the menu to make recover diskettes.

- A GUI interface available from within Windows* that includes the Windows NT* setup utility.
- Other options available from the GUI interface.

- The SRCU21 User's Manual and other documentation.

1. Place your CD into the CD-ROM drive of your system and boot to the CD.
2. At the ROM-DOS menu, create driver diskettes for Novell NetWare.
3. At the ROM-DOS menu, update the firmware on the SRCU21 with the latest firmware revision available at http://support.intel.com/support/motherboards/server/SRCU21
4. Because installation of NetWare requires the creation of a DOS partition, if you are using a SCSI CD-ROM drive you need to make a set of SCSI device disks for installing the SCSI CD-ROM drive in a DOS environment. NetWare 5 provides the SCSI and Network card drivers used during the NetWare portion of the installation, you do not need to make NetWare driver disks.

Creating a Drive Array.

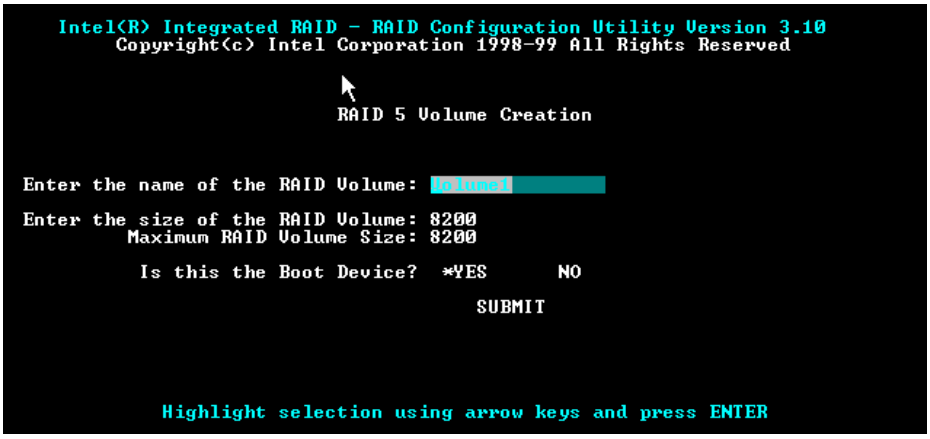
Because the operating system will be loaded on drives controlled by the SRCU21, it is necessary to create the drive array prior to operating system installation. This drive array is sometimes referred to as a RAID volume and must not be confused with a NetWare volume. During this installation, a set of three drives will be configured as a RAID 5 array (RAID volume). This array will then be partitioned to include a DOS partition and a NetWare partition. A NetWare volume will then be created on the NetWare partition. During this installation the set of three hard drives will look like one drive. Further explanation of RAID levels and theory is contained in the SRCU21 User's Manual.

Array configuration Steps

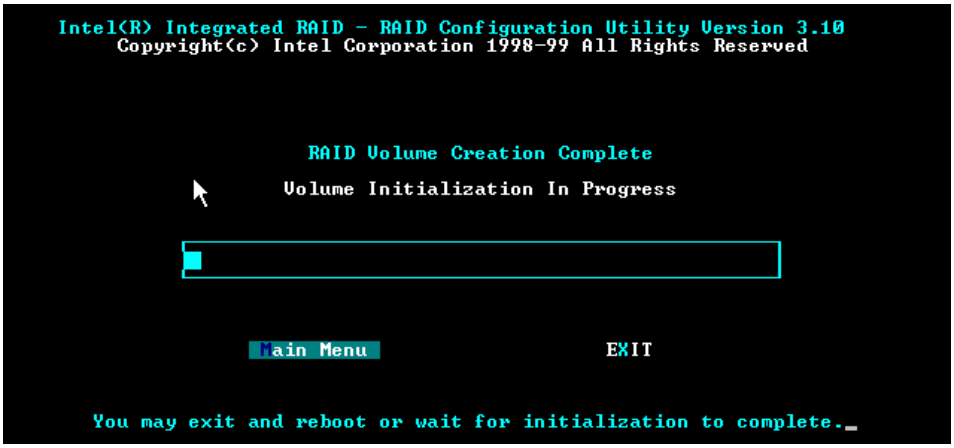
Invoke the RAID Configuration Utility by pressing Ctrl C during the POST process. The following ROM-DOS menu will display.

Create a RAID Volume, at the main menu, highlight “Create RAID Volume” and press enter. The number of drives present in your system determines the type of menu the user sees next. The following graphic depicts a system with thee or more drives available and the RAID options they allow. If only two drives were available, the options would be for RAID 0 and RAID 1.

Create a RAID 5 Volume by pressing enter on the RAID 5 option above. You will see the following screen.



You may now name the volume by overtyping in the space containing the label “volume1”. The name you choose must be 15 characters or less.
In addition, you may choose the volume size, the system will default to the largest size. Remember that parity storage takes space. You will lose the space equivalent to one drive. In the example above, we have three – 4GB drives but space available is 8GB due to parity.
You should then choose submit and press enter. The volume will then begin the initialization process as indicated on the graphic below.



At the initialization progress screen, you can choose to allow the initialization to continue or choose to exit. Although it is advisable to complete the initialization prior to installation of the OS, you can choose to exit. Initialization will complete even if the system is rebooted.

Installing Novell NetWare 5

The total amount of server memory has a larger impact on the overall performance of the operating system than any other subsystem. It is therefore essential to provide enough RAM to support server needs. Previous versions of NetWare required complex calculations to determine the amount of RAM required by a particular installation. NetWare 5 eliminates the need for this series of calculations. The minimum amount of RAM for NetWare 5 is 64MB, it is recommended that you have at least 128MB.

The NetWare operating system requires a minimum DOS boot partition size of 50 MB. To determine the optimal size of the DOS boot partition, add the amount of server memory to the minimum size of boot partition. For example, a server with 64MB of RAM would have an optimal boot partition of 114MB (64MB+ 50MB = 114MB). The disk must also have enough available space outside the DOS boot partition to accommodate volume Sys. Most of the NetWare products are installed on volume Sys, so you must have enough available disk space to accommodate NetWare and all products to be installed.

NetWare 5 Operating system	350MB Minimum Volume Sys
NetWare 5 with default products	450MB Minimum Volume Sys
NetWare 5 with all products	550MB Minimum Volume Sys
NetWare 5 will all products and docs	700MB Minimum Volume Sys

Pre-Installation Steps

A) Determine what protocol(s) this server will be running. If using TCP/IP record information below.

IP Address _____
Subnet Mask _____
Default Gateway _____
Server Name _____

See Appendix C & D for additional worksheets

B) Power up your system and note at the initial screen what level of BIOS is installed. You should update the bios and firmware to the latest version. These files and instructions can be found at http://support.intel.com/support/motherboards/server/

C) Enter BIOS Set Up (Press F2 during boot), Advanced Menu and confirm/set **Multi-Processing Specification to 1.4**.

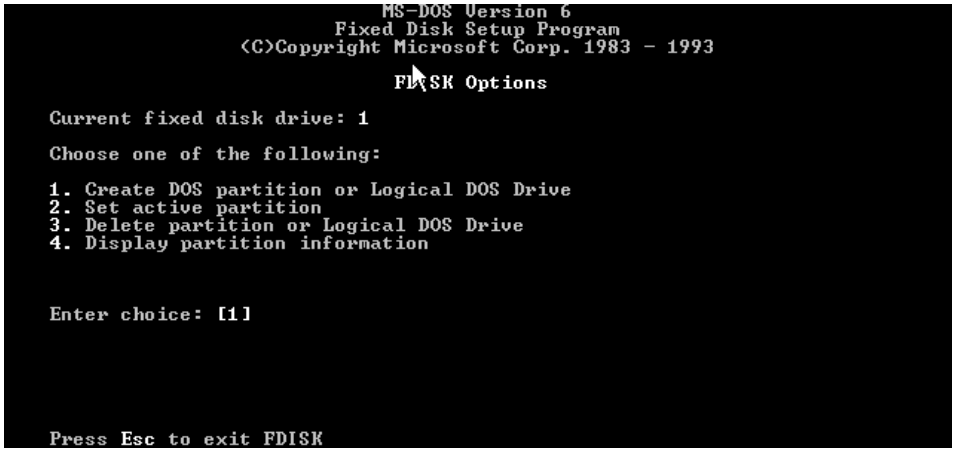
Note: Intel server board Resource CD's also contain the System Setup Utility and the product manual. This CD can also be launched from within Windows 95 or Windows NT* to run the graphical user interface (GUI). In addition to all the functionality listed above, the GUI provides more product and support information along with links to various Intel web sites.*

Setting up the DOS Partition

The installation and operation of NetWare* requires the creation of a small DOS partition on the boot drive. This DOS partition can be set up manually by booting from a DOS disk or can be set up by booting from the NetWare 5 CD. For calculation of the partition size, refer to page 6 above. The following section is provided as a guide for manual configuration of this partition.

1. Reboot the system with the DOS bootable disk. Do not use the version of DOS that comes with Windows 95/98* or Windows NT*

2. Type "FDISK" at the command prompt and hit <Enter>.

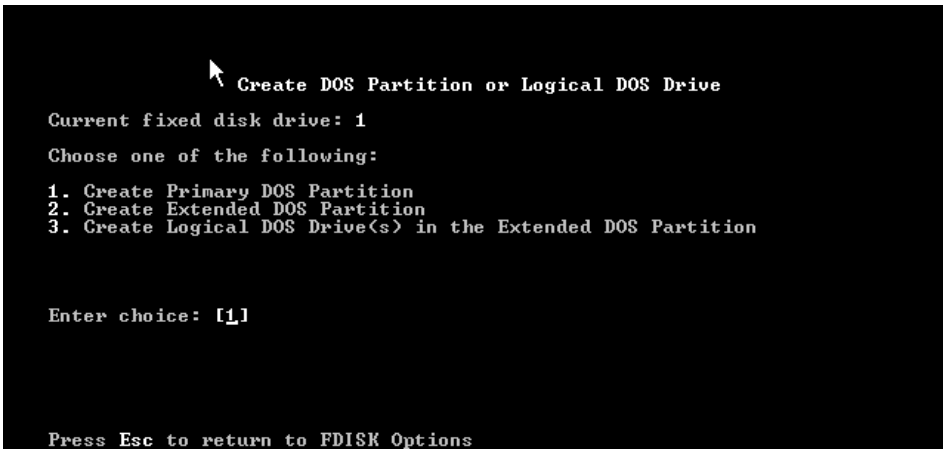


3. Press <4> to view the partition information screen. Note the number of partitions on your hard drive. If FDISK shows an extended partition, keep in mind that there are logical partitions within that extended partition. Press <Esc> to get back to the Main Menu.

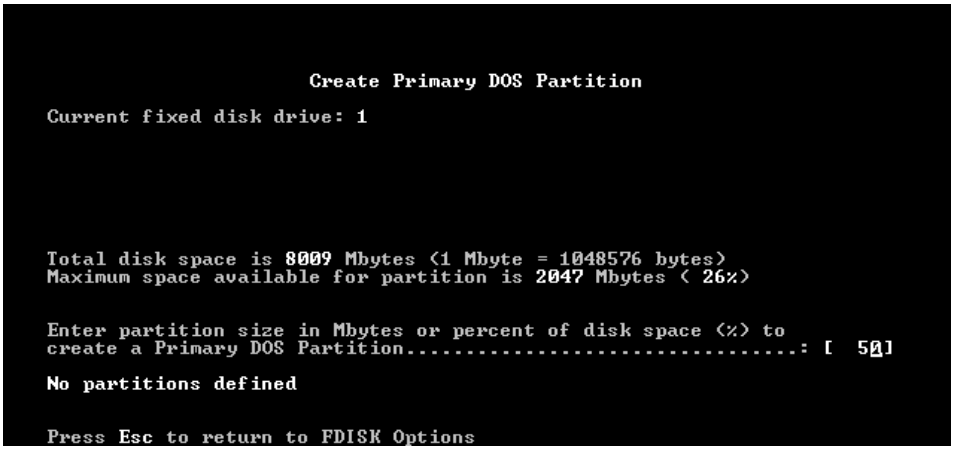
4. If you had any extended partitions, delete the embedded logical partitions by selecting <3> and follow the prompts. Then delete the extended partition that contained the logical partitions. ***WARNING: This procedure is not reversible.***

5. If you had any Non-DOS partitions on your hard drive, delete them now by selecting <3>, then <4> and follow the prompts.

6. You can now delete the primary DOS partition by selecting <3>, then <1>, then follow the prompts.



7. Now that all existing partitions have been deleted, select <1> to create the primary DOS partition. When prompted "Use maximum partition size?" answer <No> and you will be given a field showing the maximum partition size.



8. Enter in the partition size you wish to make (you determined this size above). Leave all other free space on the hard drive UN-partitioned. NetWare system volumes will use this remaining space.

9. You must make the primary partition active so that it is bootable. Select <2> from the main menu, and then select the primary partition to be active. Quit FDISK and reboot the system.

10. To format the hard drive, restart the system with the DOS disk. Type "FORMAT C: /S" at the command prompt and press <Enter> as shown above. This will format the hard drive and transfer the system files from floppy to the hard drive.

11. You may now copy all the necessary files from the DOS floppy diskette to the hard drive or you may perform a full DOS install (recommended) on to the hard drive.

CD-ROM Drive Configuration:

To configure the CD-ROM, run the CD-setup utility that accompanied CD-ROM drive and follow the instructions.

1. For IDE CD-ROM setup, run the setup or install program that copies the files to a directory on the C: drive and modifies the config.sys file to include the CD-ROM driver. The autoxec.bat file will be modified to include the mscdex.exe driver.
   a. Your C:\Config.Sys file should now contain the following entries:
   - Device=C:*path to cd-rom.sys file* /d:*cdrom_name (cd-rom name is user definable and must be the same as the cd-rom name in the autoexec.bat file)*
   - Files=40
   - Buffers=30

   Note: Do not use a memory manager such as himem.sys in the config.sys file.

   b. Your C:\Autoexec.bat file should now contain the following entries:

- Path c:\dos
- C:\dos\mscdex.exe /d:*cdrom_name*

2. For SCSI CD-ROM setup insert the floppy disk that you previously made (see "Your Resource CD" on page 4 above). Run the Dosinst.bat file from the A: prompt. Complete the following steps.

   1st. A menu will pop up, to use the default setup press <enter>.
   2nd. You are notified that the system will be scanned for adapters, press <enter>.
   3rd. You are notified of the adapters found. Press <enter> to continue.
   4th. You are notified that the system will be scanned for devices. Press <enter>.
   5th. You are notified of devices found. The system should find your CD-ROM drive, press <enter>.
   6th. You are notified of driver copy to c:\EXSCSI50. Press <enter> to choose the default.
   7th. You are notified of Drive letter assignment, press <enter> to choose the default.
   8th. You are notified that Config.sys will be updated, press <enter> to choose the default and allow modifications.
   9th. You are notified that changes have been made, press <Esc>.
   10th. You are notified the Autoexec.bat will be updated, press <enter> to choose the default and allow modifications.
   11th. You are notified that changes have been made, press <Esc>.
   12th. You are notified of a successful completion, press <enter> to return to DOS.

   a. Your C:\Config.Sys file should now contain the following entries:
   - Device=C:\ezscsi50\aspi8u2.sys /d
   - Device=C:\exscsi50\aspicd.sys /d:aspicd0
   - Files=40
   - Buffers=30

   Note: Do not use a memory manager such as himem.sys in the config.sys file.

   b. Your C:\Autoexec.bat file should now contain the following entries:
   - Path c:\dos
   - C:\dos\mscdex.exe /d:aspicd0

13. Boot the system from the newly configured DOS partition. *Note: You should now have a small DOS partition as C:, and the CD-ROM drive should be assigned the drive letter D:. The system is now prepared for Novell NetWare Server 5.*

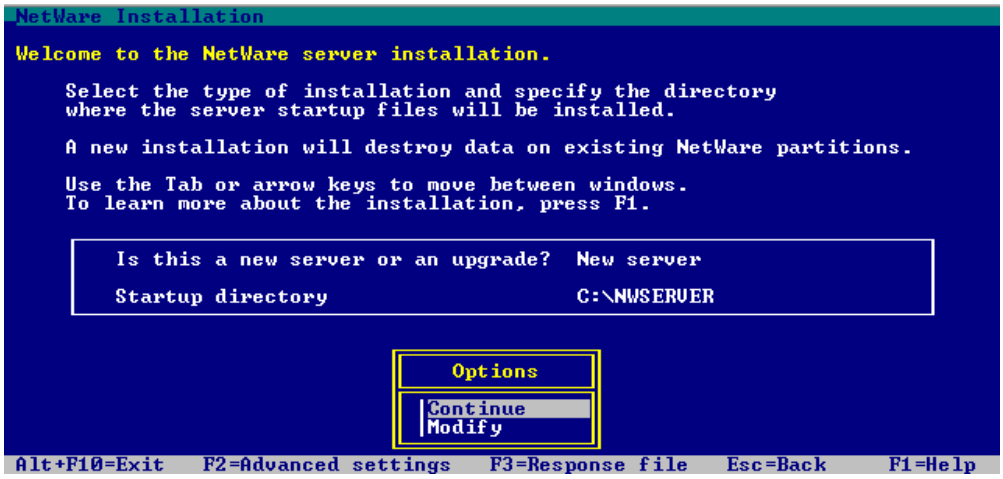
NetWare Installation

1. Insert the NetWare 5 Operating System CD-ROM into the CD-ROM drive.

2. Change to the drive letter corresponding to the CD-ROM.

3. Type INSTALL and press <Enter> .

4. If prompted, choose the installation language and press <Enter>.



5. The "Welcome to the NetWare server installation" menu appears as depicted above, with a "Continue" or "Modify" option. *Note: although we will not choose them, the "modify" options are:*

   - ***New Server***---*If you are performing a new server installation, select New Server. The server installation will not delete system partitions or other partitions such as DOS, UNIX*, or Windows.*

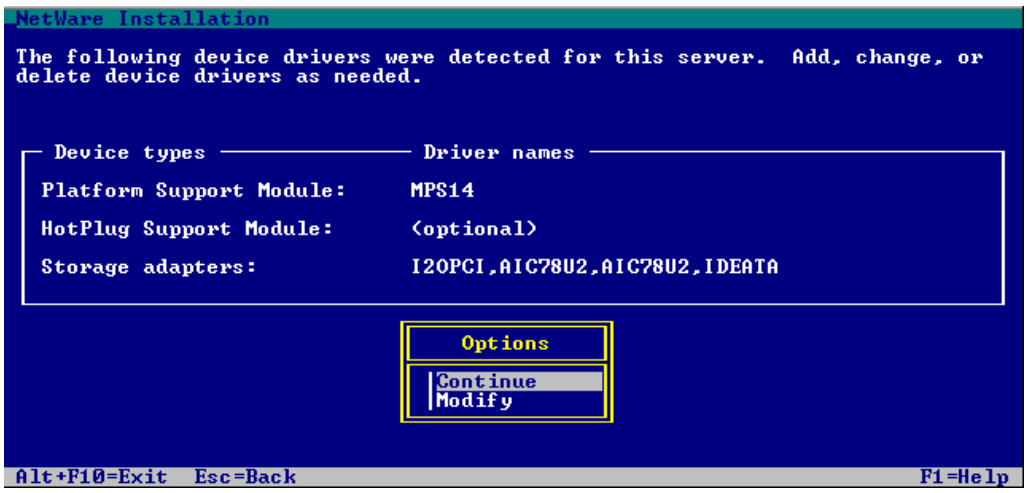
   - ***Upgrade***---*If you are upgrading an existing server from a previous version of NetWare, select Upgrade from NetWare 3.1 x or 4.1 x. Upgrading retains all your server data such as files, directory structures, partitions, and volumes.*

   - ***Startup Directory***---*The startup directory is the directory on the boot partition which contains the files to launch the NetWare server.*

   Choose the "continue" option.

6. Select the Regional Settings -- Choose the appropriate country, code page, and keyboard mapping for your language and computer then select "continue".

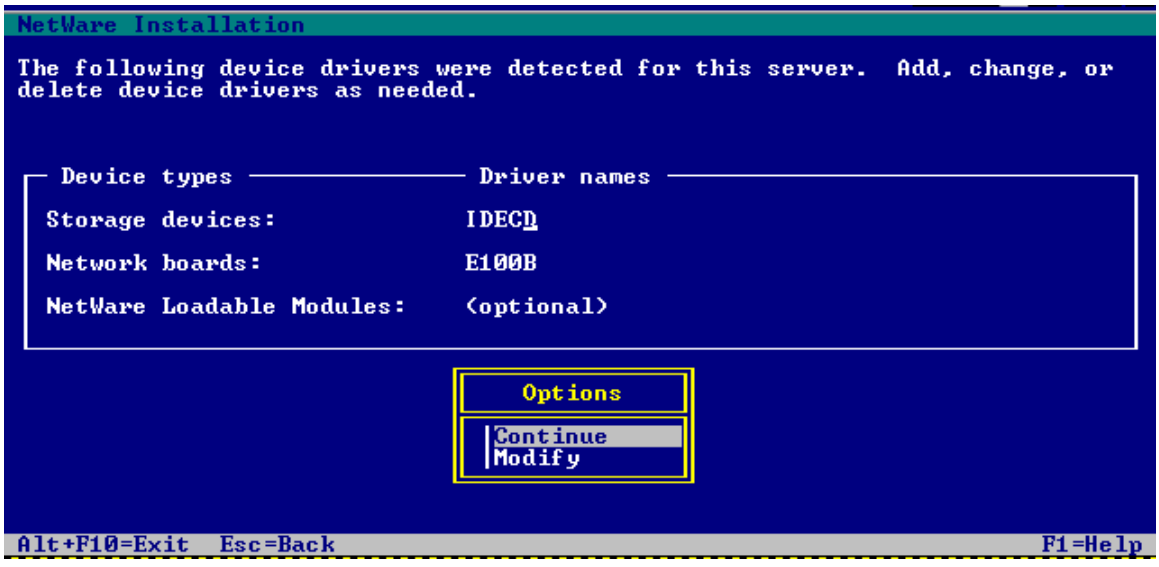
7. Select the mouse and video type, then select "continue" – *Note: the mouse type and video type are not auto-detected by the installation program. You must select the settings for the computer. Choose standard VGA only if your video board does not support 256 colors.*



8. Select a platform support module -- A platform support module (PSM) provides increased performance for multi-processor computers and some specific hardware configurations. When installing NetWare 5 on an Intel server system with dual processors, NetWare will auto detect the correct PSM (mps14.psm).

9. Select a PCI hot plug module – most Intel server systems do not support hot plug PCI.

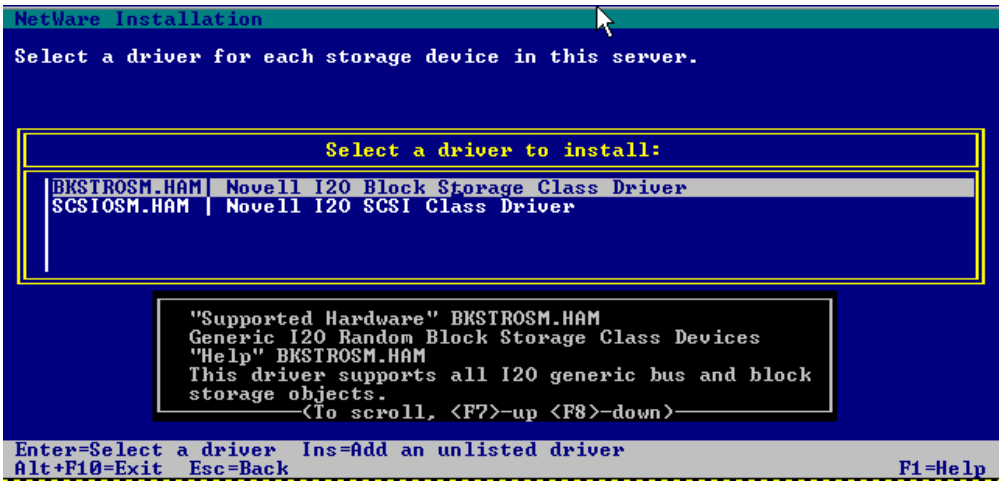
10. Select a storage adapter -- The storage adapter requires a software driver called a host adapter module (HAM) to communicate with the computer (host). Storage devices require a separate driver called a custom device module (CDM). The installation program auto-



detects many types of storage adapters, such as IDE and SCSI adapters.

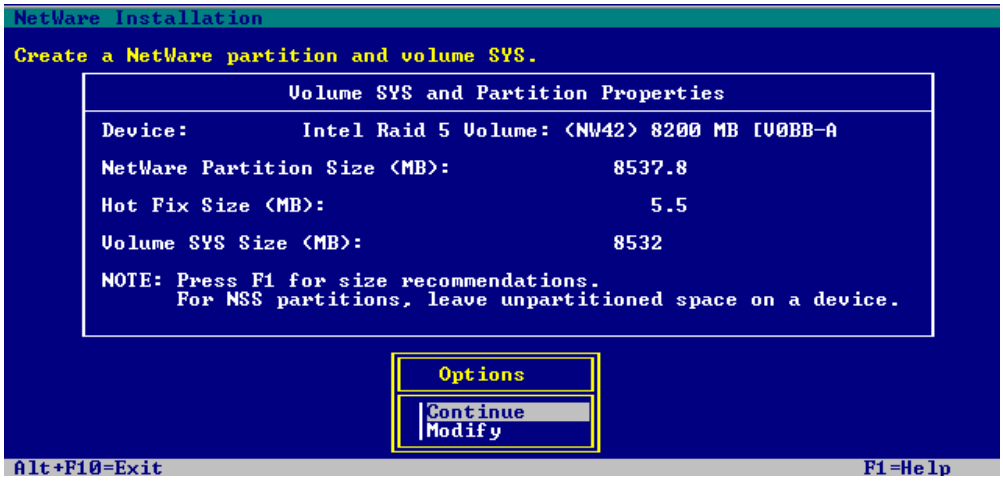
11. You will be prompted to accept the detected storage devices or modify the list. Choose modify.

12. Press <Insert> to select an additional driver. Insert into the floppy drive the diskette you made from the SRCU21 CD. Press enter to read the floppy, the following graphic will display.



13. Choose the BKSTROSM.HAM and continue.

14. Select a network board – The on-board Intel 82559 device will be auto detected. *Note: The latest drivers for this board can be obtained from C440GX+ support web site at* http://support.intel.com/support/motherboards/server.

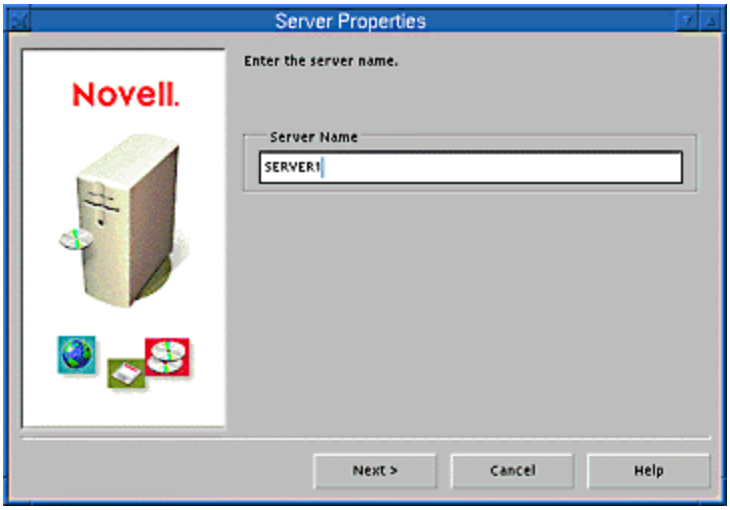


15. Create a NetWare Partition and volume Sys -- All available space on the storage device will be allocated to the NetWare partition, unless you change the size. The NetWare 5 operating system requires a volume of at least 350 MB named Sys (refer to page 6 above).

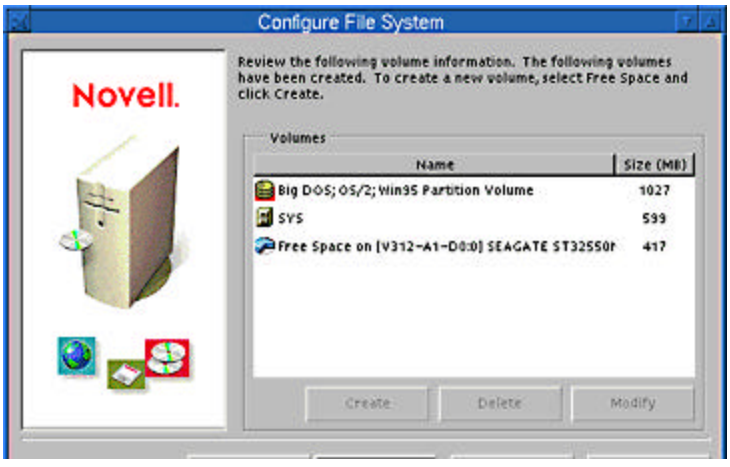
Although the NetWare operating system requires only 350 MB, volume Sys must be large enough to accommodate all of the NetWare products that will be installed.

16. You may receive an error indicating that the CD-ROM did not mount as a volume, this is normal because the CD-ROM drive is under DOS control. When install finishes, it will remove the DOS drivers for the CD-ROM from the config.sys and autoexec.bat files. You will need to manually include the CDROM.NLM in your autoexec.ncf file as explained at the end of this install section. For now, NetWare system files will now be copied to volume Sys: from the DOS drive letter D:. The NetWare 5 installation program will continue in graphical display mode.

17. Name the NetWare Server -- The NetWare 5 server name must be unique from all other servers on the NDS tree. The name can be between 2 and 47 alphanumeric characters and can contain underscores and dashes, but no spaces. The first character cannot be a period. *NOTE: The server name should be different from the name you plan to use for the NDS tree.*

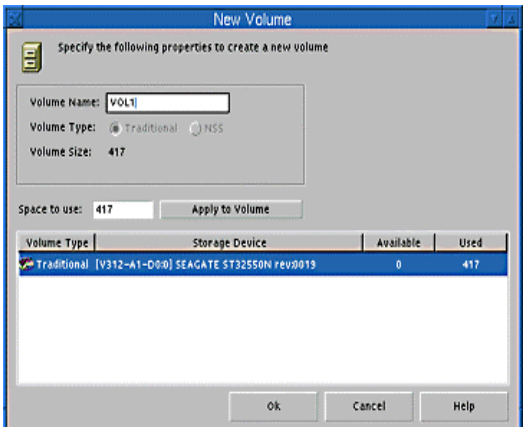


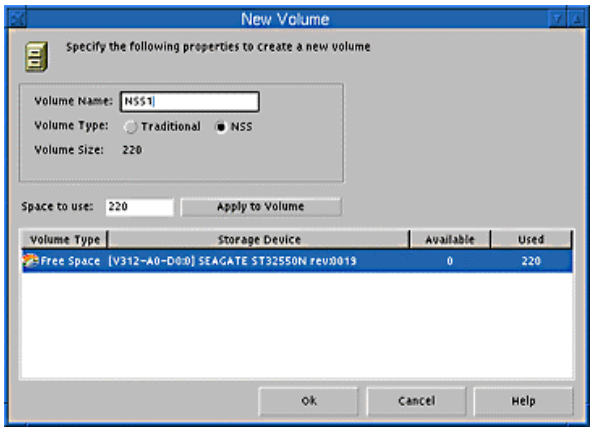
18. Install the NetWare Server File System -- The server should now have a single NetWare



partition and one volume named Sys. If you have space available for creating additional partitions and volumes, you can create them now.

19. Create Volumes -- Additional volumes can be created from any available free space on a storage device. Volume names can be between 2 and 15 characters. Valid characters include A through Z, 0 through 9 and characters _ ! - @ # $ % & ( ). The volume name cannot begin with an underscore nor have two or more consecutive underscores. A large disk can be divided into several volumes during installation. Conversely, a volume can be distributed over multiple disks. *WARNING: Creating a volume that spans two or more storage devices is not recommended. If a volume spans disk devices and one of the devices fails, all data on the entire volume could be lost.*



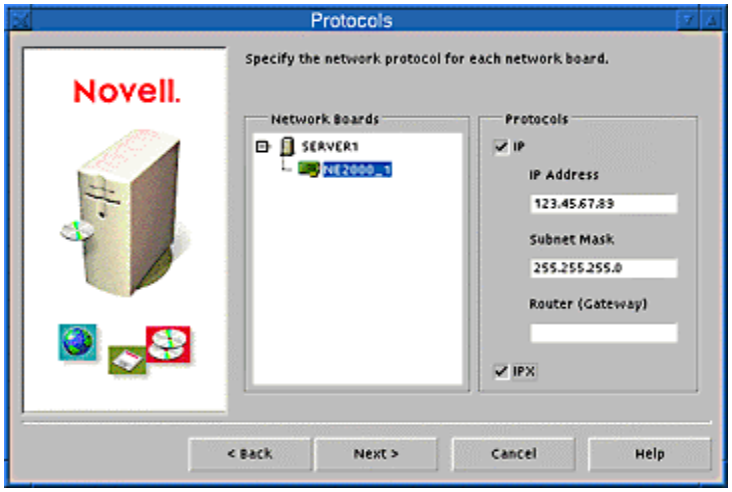


20. Mounting volumes -- In order for volumes to be accessed by NetWare, they must be mounted. Volumes can be mounted immediately or at the end of installation.

21. Install the Network Protocol -- NetWare 5 can process IP network packets and traditional IPX packets. You can install networking protocols in the following ways:
    - IP with IPX Compatibility Mode
    - Internet Protocol (IP) only
    - Internetwork Packet Exchange (IPX) only
    - IP and IPX

Protocols are assigned to network boards. Both protocols can be assigned to a single network board, which allows the server to communicate using IP and IPX.

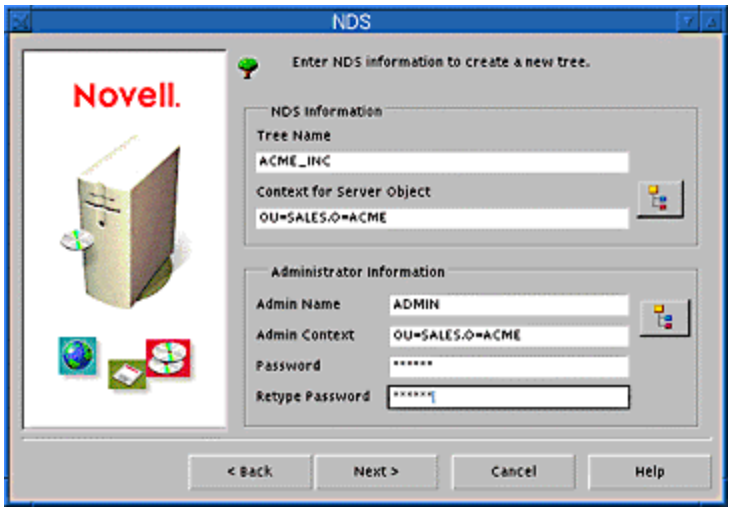
For the purpose of this guide, both IPX and IP were configured. IPX addresses will be



automatically assigned and include the MAC (hardware address of the network interface card which makes them unique. IP addresses must also be unique but do not derived from the MAC address, they must be assigned from an available pool of addresses assigned to your organization. You may use a "generic" IP address if your server will not be seen on the Internet and as long as it is unique on your intranet. In addition you must have a "subnet mask" number which is used to filter addresses to you network segment. If your server will send TCP/IP packets across a router to the Internet, you must provide the TCP/IP address of that router. For more information on TCP/IP numbering and routing refer to the On-line Server Encyclopedia at:
http://channel.intel.com/business/ibp/servers/encyc.htm

22. Set the Server Time Zone -- The server time and time zone are important in order to synchronize network events. Advanced time synchronization settings are available during the Customize section of the installation.

23. Set up NDS* -- NDS, Novell's directory technology, provides global access to all networking resources. NDS allows users with the proper access rights to log in to the network and view and access network resources. Network resources such as servers and printers are presented hierarchically in an NDS tree. Users log in to the NDS tree with a single login name and password instead of logging in to specific servers.



24. Choose the type of NDS -- To set up NDS, you must choose one of the following options:
    - Install the server into an existing NDS tree
    - Create a new NDS tree

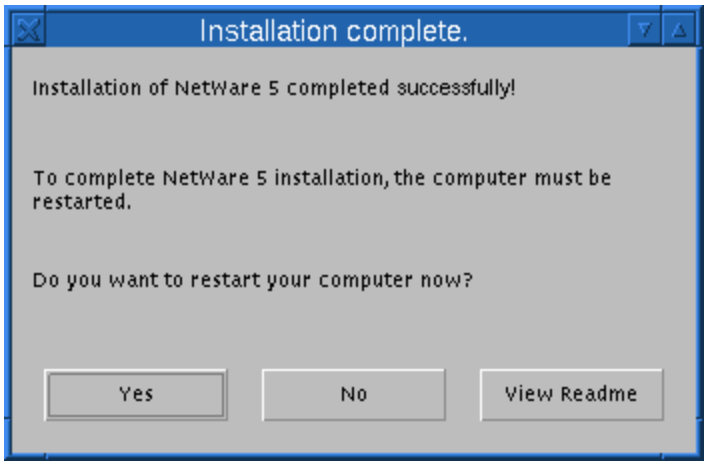
    For the purpose of this installation, no other NetWare servers were installed, therefore, the "Create a new NDS tree" option was used.

Each NDS tree must have a name unique from other NDS trees on the network. You will also be prompted to create a user (default name ADMIN) with Supervisor rights, identify an NDS context, and assign a password. Do not install a NetWare 5 server into a tree containing NetWare 4 servers until you have followed the upgrade NDS (NDS.nlm) server update procedure. These files are available in the DS411L.EXE update at http://support.novell.com.

25. License the NetWare Server -- NetWare 5 must have a valid license in order to function as a server. You can install the license from the NetWare 5 License diskette or browse to a directory that contains NetWare 5 licenses.

26. Install other Networking Products -- After completing the NetWare server portion of the installation, you can select other networking products to install. Other networking products provide enhanced functionality to NetWare 5, such as network management and Internet access. You may need to supply the drive letter of the CD-ROM if it did not mount as a Volume.

27. Complete the Server Installation -- The basic server installation is now complete. Depending on which additional products you are installing, you might be prompted to insert additional CD-ROMs. Don't forget to load the cdrom.nlm following reboot.



Obtaining and installing the latest NetWare support packs:

Service pack 2a or later must be installed. The latest service packs and client software for Novell products can be obtained at:
http://support.novell.com/misc/patlst.htm

Installing the Support Pack

During the NetWare 5 Support Pack installation, the following happens:

- The NetWare Support Pack files are copied to the server. Newer files on the server are not overwritten. The installation program checks the version of each file. If two files have the same version, the installation program then checks the date of each file.

- *Note: Files in the \MISC directory are not installed automatically by the NetWare Support Pack.*

- A record is added to the PRODUCTS.DAT file, in the "Installed Products" section, and the following message appears: "SPACK 5.0.1 v1.0 Support Pack for NetWare 5." Any other product updates are also listed.

Prerequisites

Before you install the NetWare 5 Support Pack, you must:

- Unload JAVA.NLM and all Java applications to update JAVA.NLM and the Java class libraries.

- Load IPXSPX.NLM to install the NetWare 5 Support Pack in an IP-only environment.

- Have rights to the server console.

- Make a record of your current SET parameter values. You can do so by loading CONLOG, typing "Display Modified Environment," and then unloading CONLOG. Information will be saved to SYS:\ETC\CONSOLE.LOG, which you can use as a reference. This NetWare 5 update contains a fix that resolves a problem with the registry. As a result, SET parameters will revert to the default NetWare 5 values the first time the server is started after installing the Support Pack. After the first start, SET parameters will maintain their values.

- Ensure that the NetWare 5 server is one of the following languages: English, French, German, Italian, Japanese, Portuguese or Spanish.

Installing the NetWare Support Pack

Note: The Support Pack cannot be installed through the GUI installation.

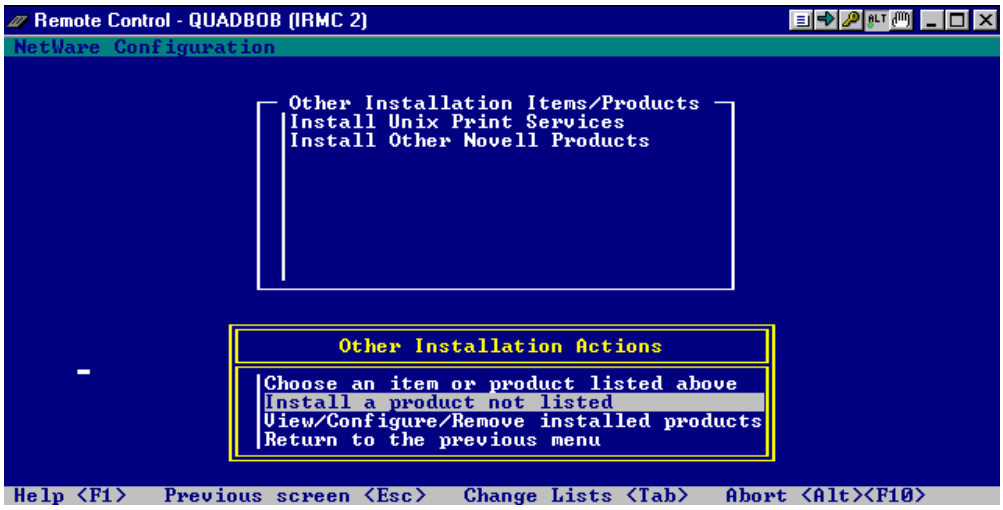
To install the NetWare 5 Support Pack on a single server, complete these steps:

1. To explode the file, type NW5SP2A (or the name of the file) and press Enter. Explode the file on the server's volume SYS:, on another server volume, or on a local client that is using RCONSOLE to run the installation.

Note: This file contains directory paths that could exceed the DOS limits. The file must be extracted in a root-level directory on your local drive or on a NetWare volume that accepts longer paths.

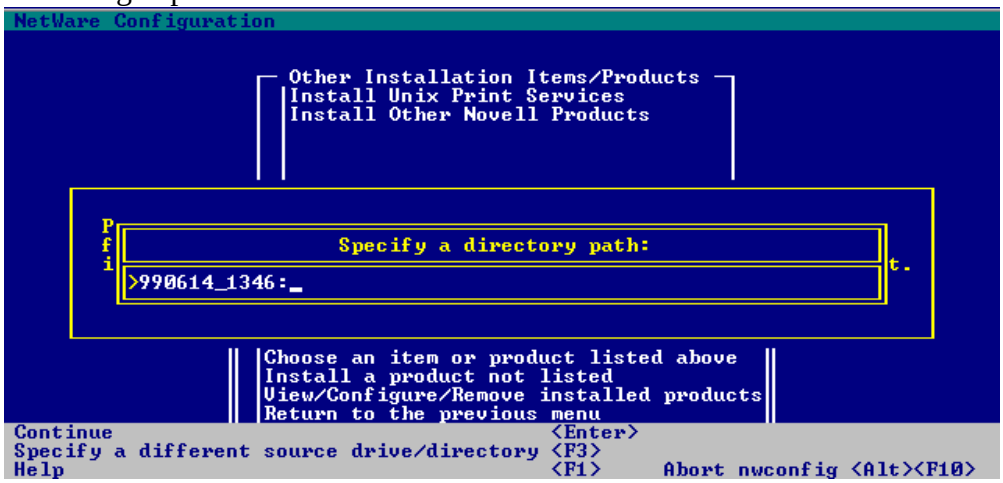
2. At the server console prompt, type NWCONFIG and press Enter.

3. Select Product Options.



4. Select Install a Product Not Listed.

5. Depending on where the NetWare Support Pack files are located, complete one of the following steps:



(a) From the local volume SYS:, press F3 and specify the path, including the volume name (for example, SYS:\directory name).

(b) From a different server on the network, press F3 and specify the full path including the server name (for example, Server_Name\VOL1:\directory name). You will be prompted for a login name and password for the other server.

(c) From a local drive on a client using RCONSOLE, press F4.

6. Press Enter.

7. Press F10 to accept the marked options and continue.

Note: If you want to be able to uninstall the Support Pack later, you must select the option to back up files.

8. Press Enter to end.

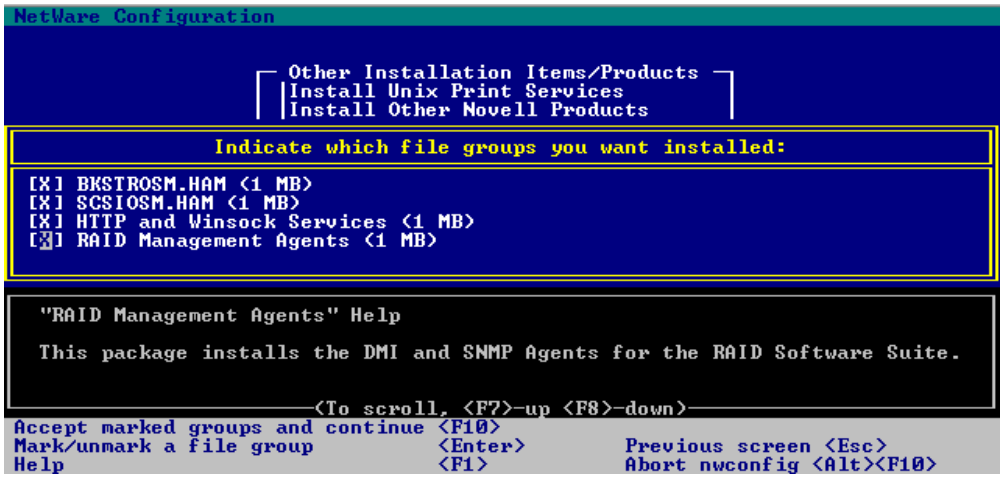
9. After files are copied, review the .NCF files for accuracy.

10. At the server console type "RESTART SERVER" and press Enter. This reboots the server and completes the installation of the NetWare Support Pack.

Installing the SRCU21 Software.

1. At the server console, run “NWCONFIG”.

2. Select “Product Options”, then “Install product not listed. Insert the driver diskette that was created from the SRCU21 CD and press <Enter> to continue.



3. A screen prompt will ask which components you wish to install. Select all of the components and press <F10> to continue. The appropriate files are copied and the AUTOEXEC.NCF and STARTUP.NCF are modified as necessary.

4. After the installation is complete, reboot the server to load the new drivers.

5. You may now customize your RAID volumes using Storage Console.