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Meridian Application Server
702t Installation and Maintenance Guide

Product Release 1.0 Standard 2.0 April 1999

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Meridian Application Server

702t Installation and Maintenance Guide

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The standard 1.0 version of the *Meridian Application Server 702t Installation and Maintenance Guide* is released.

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The standard 2.0 version of the *Meridian Application Server 702t Installation and Maintenance Guide* is released.

Contents

chapter 1

About this guide

In this chapter

Overview

Introduction

The *702t Installation and Maintenance Guide* provides information and instructions for maintaining the current functions of a Nortel Networks 702t Meridian Application Server (MAS), and for troubleshooting any problems that may arise.

For information on using or administering other tools and features of the MAS 702t components, refer to the appropriate document.

Who should read this guide

This guide is for planners, administrators, technicians, and engineers responsible for maintaining the MAS 702t.

Assumptions

This guide assumes that you are planning to maintain or troubleshoot an existing MAS 702t system.

Skills you need

Purpose

This section describes the skills and knowledge you need to use this guide effectively.

PC experience or knowledge

Knowledge of, or experience with, the following PC products will be of assistance when administering the MAS 702t:

- Windows NT
- client/server architecture
- Internet Protocol (IP)

Other experience or knowledge

Other types of experience or knowledge that may be of use include the following:

- database management
- programming

Inside this guide

Purpose

The *702t Installation and Maintenance Guide* is structured as follows.

Chapter 1, "About this guide," introduces the support technician to the structure of the *702t Installation and Maintenance Guide* and lists additional documentation resources that are available.

Chapter 2, "Getting started with installation," provides details about the preparatory steps that are required before installing the server.

Chapter 3, "Installing hardware," provides procedures for installing the server. Topics covered in this chapter include unpacking and setting up the hardware, adding peripherals to the server, connecting cables, and starting the server.

Chapter 4, "Performing software installation and configuration," provides procedures for software troubleshooting, installing, and configuring Windows NT and MS-DOS, and installing the server software.

Chapter 5, "Performing hardware maintenance," explains how to expand the capabilities of your system, and upgrade and replace hardware.

Chapter 6, "Troubleshooting," provides procedures for hardware component failures. Information about identifying hardware problems, using diagnostic tools, and fixing problems are included in this chapter.

The "**Glossary"** defines terms used in this manual, as well as related terms.

Symbols and conventions

Introduction

This section describes the symbols and conventions used in this guide.

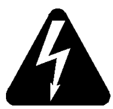
Symbols

You may encounter the following symbols in this manual.

DANGER!

Risk of personal injury

Warns you of an immediate hazard which, if not avoided, will result in serious injury or death. This does not include electric shock.



DANGER!

Risk of electric shock

Warns you of an immediate hazard which, if not avoided, can lead to electric shock or death.

CAUTION!

Risk of equipment damage

Alerts you to situations where there is a risk of equipment damage, service interruption, or data loss.

ATTENTION!

Provides information essential to the completion of a task.

Note: Describes the secondary results of procedures or commands, or special conditions under which a procedure or command must be used.

chapter 2

Getting started with installation

In this chapter

Determining requirements for installation

In this section

Site inspection checklist

Introduction

Before you start, ensure that the following items have been checked. Use this checklist to inspect the site for the MAS 702t installation.

Check	Description
	Area clean and clear of any debris
	Adequate space for all equipment
	Desk, shelf, or table space available for server SVGA monitor, keyboard, mouse, and modem
	Room around equipment for adequate air flow for ventilation
	No heat sources near equipment
	Adequate space for access to front, side, and rear panels of server
	Area isolated from strong electromagnetic fields and electrical noise sources (air conditioners, large fans, motors, radio or TV transmitters, or high-frequency security devices)
	Adequate grounded electrical outlets or power bars for all equipment. One outlet for each of the following: ■ server ■ monitor ■ modem power cord ■ ELAN hub power cord ■ CLAN hub power cord ■ PC client and monitor
	Optional customer-supplied UPS for the server

Check	Description
	Customer-supplied ELAN hub
	Customer-supplied CLAN hub

Customer-supplied equipment and data checklist

Introduction

Use this checklist to ensure that you have the required equipment and information to be supplied by the customer.

Check	Description
	Each MAS 702t has the following: ■ Pentium II, 350 Mbytes ■ minimum memory 64 Mbytes, or higher if required by the application ■ minimum appropriate free disk space available for the system ■ SVGA monitor ■ keyboard ■ mouse ■ CD-ROM drive ■ CLAN connection
	Ethernet connections ready at M1 switch (cables and Ethernet transceivers/MAUs)
	Customer-supplied hub for the ELAN
	(Optional) One MAT PC, equipped with VT220 emulation software and serial cable for Meridian Mail connection, if required
	Customer-supplied UPS for the server
	Jacks and cable ready to connect server to the CLAN
	Optional cable ready to connect ELAN to customer WAN

Check	Description
	Modem, power cable, and serial cable available
	User name, password, and Domain name for access to CLAN (See the following checklists.)
	List of unique names and IP addresses for all equipment on both CLAN and ELAN
	Analyze customer LAN bandwidth.

Nortel Networks software feature key adapter

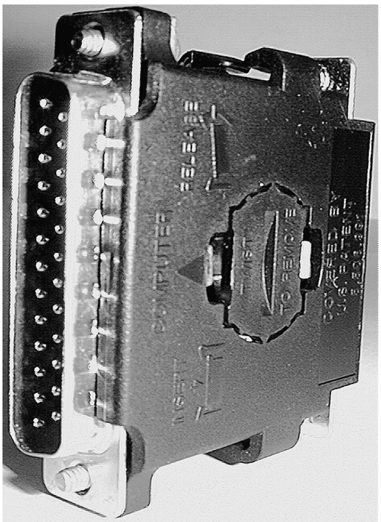
Overview

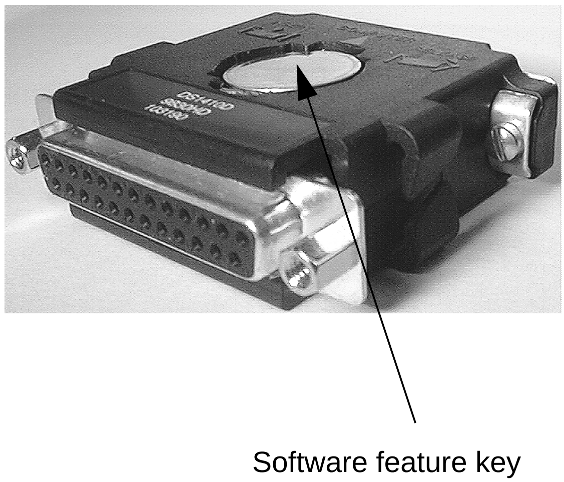
The software feature key is a software security device which stores the unique serial number of the server.

The feature key is embedded in the Nortel Networks software feature key adapter which plugs into the parallel port.

Software feature key adapter

The following illustrations show the software feature key adapter. The actual software feature key is placed in the adapter, as shown below.





Requirements

All that is required for installation is a Phillips No. 1 screwdriver.

To install the software feature key adapter

1 Ensure that there is no cable connected to the parallel port.

Note: The parallel port is also known as the printer port or LPT1. It is located on the rear of the chassis. See the diagram of the rear panel in "Connecting the CLAN" on page 59.

2 Plug the male end of the adapter, shown in the illustration on page 24, into the parallel port.

Required setup data

Introduction

Use the information you record in this section in the initial Windows NT configuration, during the server software installation, and during the client software installation.

Keycode and serial number

This information is contained in the keycode data supplied for this installation. For additional information regarding the Nortel Networks software feature key adapter, refer to page 24.

IP addresses and names

Record the IP addresses and names supplied for the customer MAS 702t and (optional) MAT PC, the server, the M1 switch, Meridian Mail, and other equipment that is accessible through the CLAN, and the ELAN for Nortel Networks equipment. Include the name and number for the M1 switch.

If the CLAN uses the compatible protocol, record the addresses for the CLAN.

The customer's LAN administrator is the source for addresses, subnet masks, and gateways.

Name	**IP address**	**Subnet mask**	**Gateway, description, equipment name, or comments**
ELAN M1 Primary IP address			
ELAN M1 Secondary IP address ***Note*:** The Option 11 switch uses only the Primary IP address.			

Name	**IP address**	**Subnet mask**	**Gateway, description, equipment name, or comments**
ELAN server			
ELAN router/ gateway IP address (optional WAN connection)			
CLAN server			
CLAN router/ gateway IP address (if used)			
RAS 1			
RAS 2			
CLAN client			
CLAN client			
CLAN client			
CLAN client			

Note: Add as many CLAN client addresses as required.

Required setup media checklist

Installation items

Check	Qty	Description
	1	The emergency repair disk which holds the configuration data for Windows NT. This will be updated by the installer during each stage of the MAS 702t installation.
	3	Meridian Application Server - Server Operating System Installation Diskettes. These are used to update the software drivers if required.
	1	Meridian Application Server - Server Operating System CD-ROM.

Maintenance and diagnostics media

Check	Qty	Description
	3	Microsoft DOS 6.20 disks. These are used for reinstalling the operating system for maintenance and diagnostics.
	6	Intel PCDIAGS disks. These are used for maintenance and diagnostics.
		Driver disks for LAN cards, SSU utility
	2	(optional) RAID driver disk, configuration disk
	1	If RAID not used, SCSI driver disk

Preparing for installation

In this section

About preparing for installation or maintenance activities

Installation activities

Installation activities are required to set up and start your MAS 702t. Before you begin any installation activities, collect all the tools you will need, and follow all recommended safety precautions.

Maintenance activities

Maintenance activities are those tasks which you perform to ensure the proper functioning of your server or to fix any problems that may occur. Before you begin any maintenance activities, collect all the tools you will need, and follow all recommended safety precautions.

This section discusses the tools and equipment required for performing maintenance procedures in the field. Recommended safety precautions for electrostatic discharge (ESD), handling cards, and handling your server are also included.

Required tools and safety precautions

Introduction

If you need to replace or upgrade any system parts, follow the recommended safety precautions to prevent personal injury and damage to the server or replacement parts.

CAUTION!

Risk of equipment damage

Ensure that field maintenance is always performed by fully qualified, trained personnel.

Tools needed

Use this checklist for the tools and materials you require for maintenance activities.

Check	Description
	Phillips screwdriver with a #1 and #2 bit
	Standard (slot head) screwdriver (1/4”–1/2”)
	Jumper removal tool or needle nose pliers
	Sidecutters
	ESD wrist strap for handling circuit boards (recommended)
	Tweezers
	Pen or pencil for notes and for recording cable identifications
	Equipment log
	Flashlight for examining interior of chassis
	Windows NT emergency repair disk
	Cable tie wraps
	Cable identification labels
	Labels for server IP ELAN and CLAN addresses

As you integrate new parts into the system, add information about them into your equipment log. Record the model and serial number of the system, all installed options, and any other pertinent information specific to the system. You need this information when running the System Setup Utility (SSU).

Approved replacement parts

Before replacing any parts on your server, contact your Nortel Networks sales representative or dealer for a list of approved add-in boards and peripheral devices. Using non-approved replacement parts may cause serious system problems or void your Nortel Networks warranty.

Safety precautions

Before you begin maintenance activities inside the system, follow these safety guidelines:

1. Turn off all peripheral devices connected to the server.
2. Turn off the system by using the push-button on/off power switch. Unplug the AC power cord from the system or wall outlet.
3. Label and disconnect all peripheral cables and all telecommunication lines connected to the I/O connectors or ports on the back of the system.
4. Provide electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to the chassis ground of the system—any unpainted metal surface—when handling components.

CAUTION!

Risk of equipment damage

Disk drives are susceptible to mechanical damage as well as ESD, and must be handled gently.

When they are not installed in the server, place disk drives on a conductive foam pad.

Nortel Networks recommends that you observe these safety guidelines as you work on your server:

- Plug the computer and peripheral devices into properly grounded power sources to prevent electric shock.

- Use a surge protector or uninterruptible power supply to protect your system from sudden increases and decreases in electrical power.
- Ensure that nothing rests on your server’s cables, and that cables will not be tripped over or stepped on.
- Do not spill food or liquid in the server.
- Do not push any objects into the openings of your server.

Cooling and airflow

For proper cooling and airflow, always install the chassis side cover before turning on the system. Operating the system without the cover in place can damage system parts.

Avoiding electrostatic discharge

Introduction

Electrostatic discharge (ESD) can seriously damage component parts such as disk drives. Nortel Networks recommends that the maintenance procedures described in this section be performed at an ESD workstation.

CAUTION!

Risk of equipment damage

Electrostatic discharge due to improper handling may cause components to be damaged or rendered unusable.

Antistatic wrist strap

If an ESD workstation is not available, provide some ESD protection by wearing an antistatic wrist strap. Ground the ESD wrist strap by attaching it to any unpainted surface on your system chassis.

While you work

As you work inside the server, periodically touch an unpainted surface to discharge any static your body may have accumulated.

Conductive foam padded in-boards

Motherboards and add-in boards are extremely sensitive to ESD. After removing a board from its protective wrapper or from the system, place it component-side up on a conductive foam pad. If possible, use antistatic floor pads and workbench pads.

CAUTION!

Risk of equipment damage

Do not place a motherboard or an add-in board down on its packaging wrapper.

Do not slide a motherboard or an add-in board over any surface.

Handling cards

Introduction

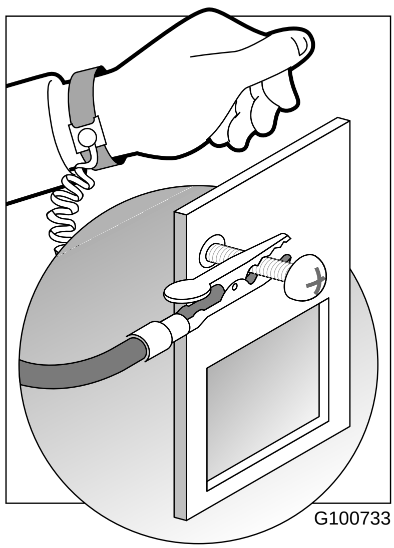
Electronic components are sensitive to the environment and to electrostatic discharge. To protect equipment and prolong the useful life of components, Nortel Networks recommends that you follow the precautions described below.

Avoid electrostatic discharge

Electrostatic discharge (ESD) affects the performance of and decreases the useful life of system components. Use caution when handling memory modules, CPU modules, and add-in boards to prevent damage. Wear an ESD wrist strap when handling system parts.

ESD wrist strap

This diagram shows the lead from the ESD wrist strap clipped to an exposed screw on the chassis.



Precautions for handling cards

These precautions are recommended for any procedure that includes an add-in board:

- After removing a board from its protective wrapper, or from the server, place it component-side up on a grounded, static-free surface.
- Do not slide a board over any surface.
- Do not touch board components or gold-edge connectors on the board.
- Hold a board by the top edge, or by the side edges.

Precautions for installing boards

When installing boards on the server, remember the following:

- The backplane is flexible and supported with stand-offs.
- Board slots resist connector insertion.
- Firm, steady force seats a board in its slot properly.
- Boards seat with friction followed by a solid stop.
- External connector plates, attached to add-in boards, are seated in the rear panel and secured with a screw.

Handling hard disks

Introduction

Hard disks are extremely sensitive to vibration and physical shock. To protect equipment and prolong the useful life of hard drives, Nortel Networks recommends the following precautions.

Avoid vibration or physical shock

Hard disks are susceptible to even slight vibrations. A hard disk could be damaged if it is placed on a table that is accidently knocked or moved. Use caution when handling hard disks to prevent damage.

Handle hard disks with care

After removing a hard disk from its protective wrapper or from the server, place it on an antistatic, padded workbench or workstation to avoid movement or jarring.

Check for shipping damage

If your hard disk is shipped independently for either an upgrade or a replacement, note any dents or damage on the padded container and packaging. Keep the container to prove that the part was damaged during shipping and handling.

Store hard drives carefully

If you purchase extra hard disks, store these hard disks in the original padded container. Store the disks away from places where they might be moved or jarred.

chapter 3

Installing hardware

In this chapter

System hardware

Overview

The MAS 702t server platform utilizes a Pentium II active backplane, capable of supporting up to two Pentium II processors.

For single processor configurations, a processor terminator card must be installed in the Secondary Slot 1 Connector.

Jumper settings

There is a jumper block on the motherboard which can be used to customize certain settings. The jumper block is located on the bottom right corner of the motherboard. Default settings should be used, unless otherwise noted.

The jumper settings for the MAS 702t system are shown on the following table. Default settings are shown in bold.

Jumper	Pins		Function
CMOS Clear (CMOS Clr)	**1-2**	**Protect**	Preserves BIOS settings
	2-3	Erase	Reset BIOS settings to Intel defaults
Password Clear (Pswd Clr)	**5-6**	**Protect**	Preserves the system password
	6-7	Erase	Clears the system password
Recovery Boot (Rcvry Boot)	**9-10**	**Normal**	System attempts to boot using BIOS in Flash memory
	10-11	Recovery	Loads BIOS from floppy if Flash version has been corrupted
Boot Block Write Protect (Boot Block WR EN)	13-14	Protect	BIOS boot block is write protected
	14-15	**Open**	BIOS can be flash updated

Jumper	Pins		Function
FRB Timer Enable (FRB DIS)	**1-2**	**Enable**	FRB operation enabled. (System can boot from CPU 1 if CPU 0 fails.)
	2-3	Disable	FRB operation disabled
Chassis Intrusion Detection (Intrud det dis)	**5-6**	**Enable**	Switch indicates cover removal and replacement
	6-7	Disable	Intrusion switches are disabled.
Host Bus In-Order Queue (BMC Forced Update Mode)	**13-14**	**Max**	Set at maximum to increase system performance
	14-15	Min	Set to minimum for debugging older, slower ISA/Legacy cards

Slot assignments

Expansion cards for the 702t server should be installed in the expansion slots described in the following table. The System Setup Utility (SSU) is used to configure the resources used by each PCI slot, the SSU labels for all the PCI slots are also shown on the table.

Note: The slots listed from top to bottom match the orientation of slots on the motherboard. For example, PCI slot 1 is the top PCI slot in the chassis, if the chassis is standing on its feet.

Expansion slot	SSU label	Expansion card
PCI slot 1	Bus 0 Dev 0B	RAID (if installed)
PCI slot 2	Bus 0 Dev 0C	CLAN (if PCI) or vacant
PCI slot 3	Bus 0 Dev 0E	MPB-16 # 1(optional)
PCI slot 4	Bus 0 Dev 10	MPB-16 # 2(optional) or vacant
ISA slot 1	N/A	None (If used, no PCI card can be installed in PCI slot 4.)
ISA slot 2	N/A	CLAN (if ISA), or Digi PC/8e

IRQ mapping table

The following table displays the assignments for each Interrupt Request Line (IRQ) with the associated slot or device.

IRQ	Slot/device
0	Timer
1	Chipset
2	System/unused
3	Serial Port 2 (COM2)
4	Serial Port 1 (COM1)
5	CLAN Network interface
6	Floppy controller
7	Parallel port (LPT1)
8	Real Time Clock
9	ACPI SCI Interrupt
10	ELAN Network interface
11	Available for application
12	PS/2 Mouse
13	Math coprocessor
14	Primary EIDE controller
15	RAID/On-Board SCSI controllers **Note:** Both SCSI controllers are to be placed on IRQ 15, which allows the SSU to automatically resolve any IRQ conflict.

Unpacking and inspecting hardware

In this section

Unpacking procedure

Introduction

Follow this procedure to unpack the server and peripherals.

CAUTION!

Risk of personal injury

The MAS 702t weighs approximately 34.1 kg (75 lb) as shipped from manufacturing. To prevent personal injury, ensure that you have someone to help you unpack and position the server.

To unpack the equipment

1. Carefully open the cardboard carton containing the server.
2. Remove the server from the carton and set it on the floor.
3. Carefully open the cartons containing the monitor, keyboard, mouse, modem, and ELAN hub (if supplied), and set the peripherals aside.
4. Put all manuals, CD-ROMs, operating system disks, any disks for peripherals, and the Windows NT emergency repair disk in a safe place.
5. Save all packing materials and cartons in case any equipment has to be returned to the carrier.
6. Check off each item against the packing list as it is unpacked.

Damaged or missing components

If	Then
components are damaged	notify the shipping company and the distributor.
components are missing	notify the distributor.

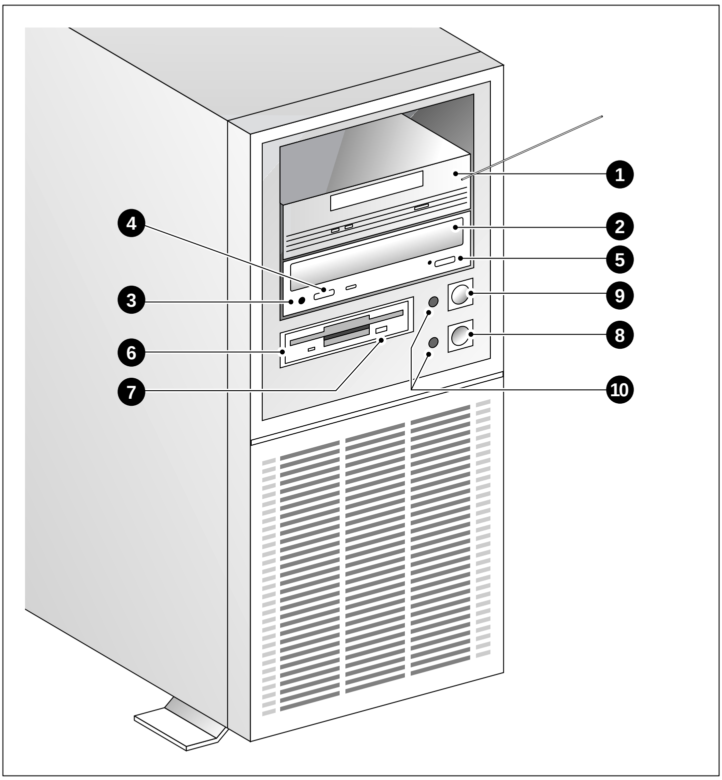
Front panel features

Introduction

The following diagram and table identify the controls, indicators, and front panel features of the MAS 702t.

MAS 702t front view

This diagram shows the front panel features of the MAS 702t. The legend for this diagram is on the following page.



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Front panel features

This table describes the details shown in the preceding diagram.

Part	Function
1. Backup tape drive	Allows backup of hard drive data.
2. CD-ROM drawer	Holds CD-ROM disk.
3. Headphone jack	Jack for audio output from CD-ROM.
4. Volume control	Controls headphone volume for audio output.
5. Drawer push button	Push in to open CD-ROM drawer; push again to close drawer.
6. Floppy drive	Drive for 3 1/2” disks.
7. Floppy eject button	Ejects floppy disk.
8. Reset push button	Momentarily disconnects power to the server. Do not use for reboot; use software reboot instead.
9. ON/OFF push button	Turns power to server on and off.
10. Indicator lights	Indicate when server is powered on, and when disk drives are active.

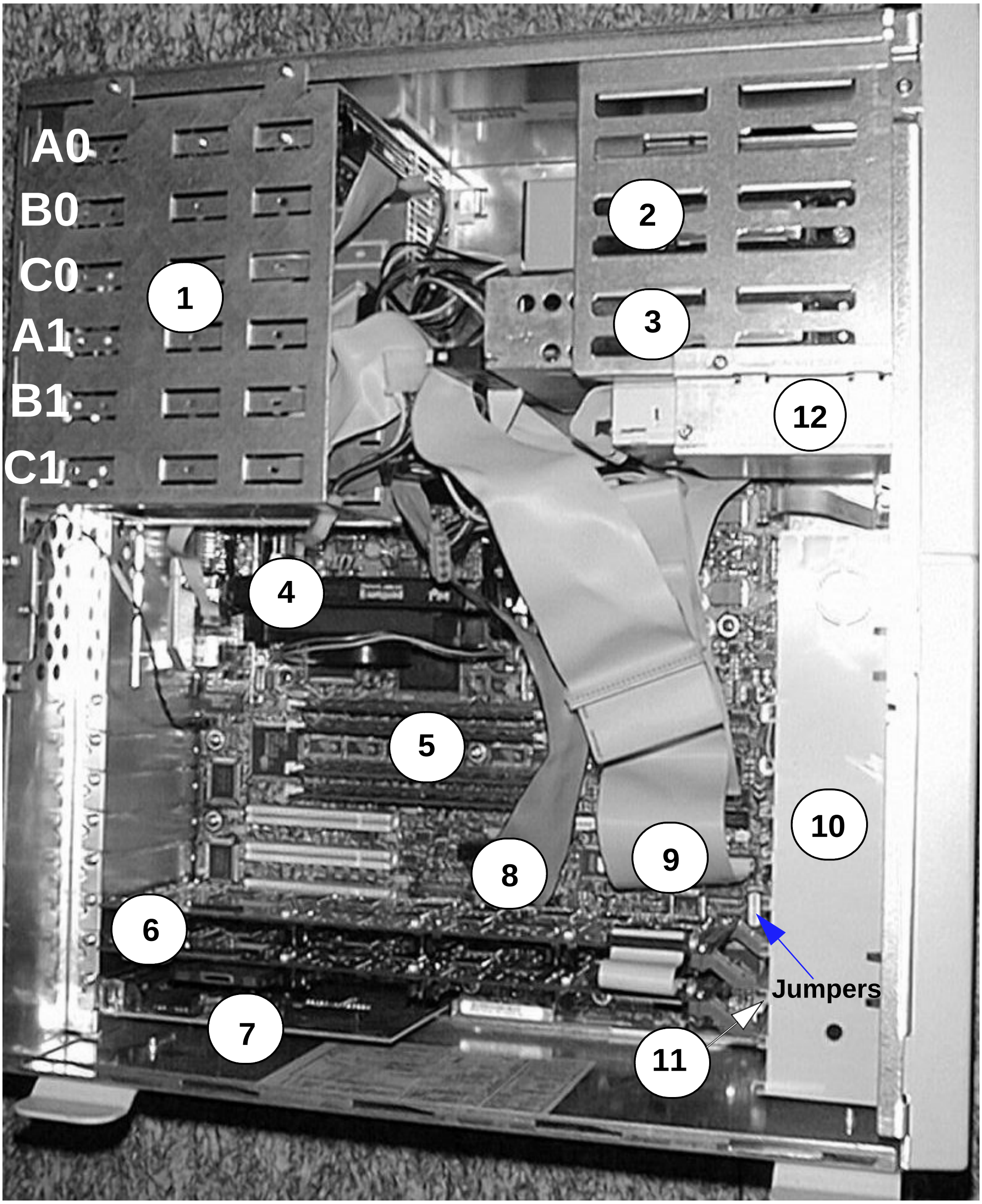
Inspecting the chassis

Introduction

Follow this procedure to perform a visual check for loose boards or foreign matter in the chassis before applying power to the unit.

Interior of the chassis

This diagram identifies the interior features of the MAS 702t chassis. The legend for this diagram is on the following page.



Interior features

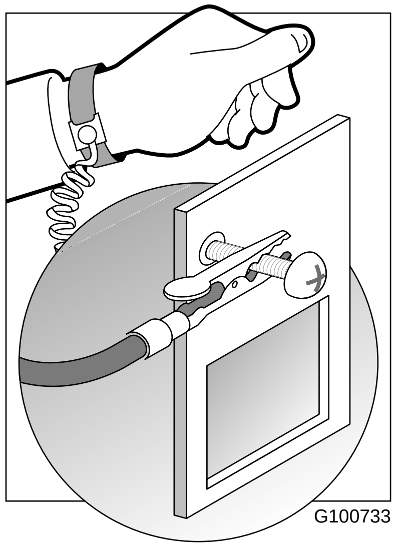
This table describes the details shown in the preceding diagram.

Index	Description
1	Internal SCSI hard drive bays (From the top, A-0, B-0, C-0, A-1, B-1, C-1)
2	Tape drive
3	CD-ROM
4	CPU
5	Dual Inline Memory Modules (DIMMs) - memory slots
6	Multimedia processing boards (MPB-16) two available slots
7	CLAN card
8	Wide SCSI Connector
9	Narrow SCSI Connector
10	Fan assembly
11	Jumpers for Baseboard Jumper settings These are located along the right-hand edge on the backplane.
12	Floppy disk

Refer to “Slot assignments” on page 41 for the slot assignments for expansion cards.

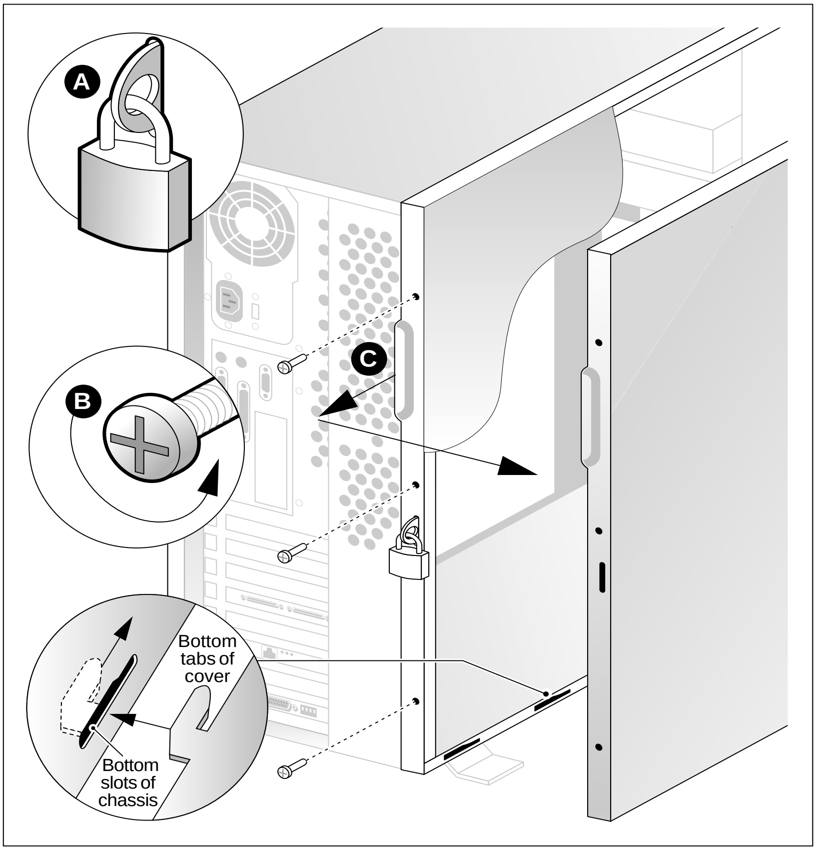
ESD wrist strap

This diagram shows the lead from the ESD wrist strap clipped to an exposed screw on the chassis.



Removal of side panel

This diagram identifies the screws to remove in order to remove the side panel cover of the chassis.



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Note: The illustration shows a customer-supplied padlock (A).

To inspect the interior

To remove the server chassis cover and inspect the interior, follow these steps.

CAUTION!

Risk of equipment damage

Use an ESD wrist strap to protect static-sensitive components.

DANGER!

Risk of personal injury

Be careful when you handle the sharp edges of the side panel and chassis to prevent personal injury.

1 If a padlock is installed on the back of the system, unlock and remove it. Refer to “A” shown in the diagram on page 51.

2 Remove and save the three screws from the back of the side cover. Refer to “B” shown in the diagram on page 51.

Note: You need the screws to reattach the side cover.

3 Place the fingertips of your left hand under the built-in handle on the back of the cover.

4 Pull the cover approximately an inch away from the front of the server until it stops. Refer to “C” shown in the diagram on page 51.

5 Using your left hand, pull the back end of the cover toward you to disengage the bottom row of tabs from the notches in the chassis, as shown in the diagram on page 51.

6 Using both hands, lift the cover upward to disengage the top row of tabs from the notches in the top edge of the chassis.

7 Set the cover aside.

8 Clip the lead from your ESD wrist strap to an unpainted section of the chassis or an exposed screw.

9 Carefully check the network adapter card to ensure it is fully seated on the motherboard. Identify the network card by its LAN jacks.

10 Check for any loose wires or foreign objects (for example, loose screws) inside the chassis.

11 When you finish your inspection, remove the ESD clip and reinstall the cover. Secure it with the screws.

Adding peripherals to the server

In this section

Adding peripherals to the server

Introduction

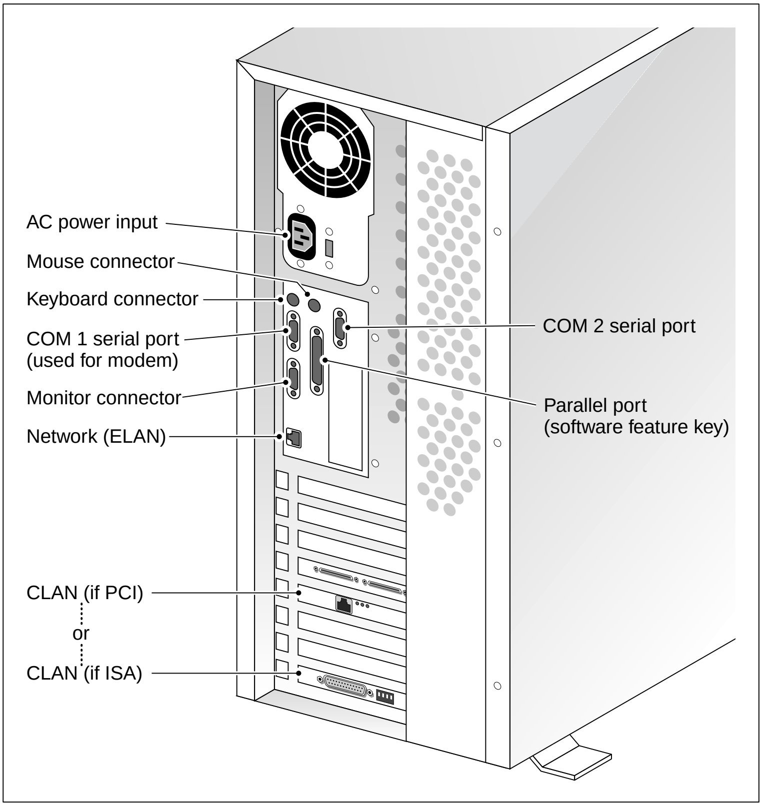
You need to add peripheral devices to your server. This procedure helps you to add the mouse, keyboard, and monitor.

Before you begin

A legend is located adjacent to the peripheral connector panel at the back of the server. This legend shows the symbol for each peripheral and which connector to use.

Rear panel

This diagram shows the server connections for the power cord and peripherals.



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Other peripheral devices

Only Nortel Networks-approved peripheral devices may be installed or used on your server. Installation or use of unapproved peripheral devices may result in system failure.

To connect peripherals

1. Make sure the machine is not plugged in to a power source.
2. Plug the keyboard connector into the keyboard PS/2 connector at the rear of the chassis.
3. Plug in the mouse connector into its PS/2 connector. Check the legend for correct connections.
4. Plug in the monitor connector. Tighten the screws on the connector.
5. Plug the AC cord into the back of the panel. Plug the other end into a wall receptacle or power bar.

   Note: *Do not* turn on the server at this time.

Adding a modem for Remote Access Service (RAS)

Introduction

Follow this procedure to add a modem to the server. This modem is used for access to the server by a remote service PC.

To add a modem

1. Make sure the AC cord is not plugged in.
2. Connect the 25-pin plug connector to the back of the modem. Tighten the connector screws.
3. Connect the 9-pin receptacle connector to COM port 1 at the rear of the server. Tighten the connector screws.
4. Connect one end of the telephone cable to the modem RJ-11 jack labeled LINE.
5. Connect the other end of the telephone cable to the RJ-11 jack in the wall.
6. Connect the power cord to the modem, and plug the other end into a wall receptacle or power bar. Turn the modem on.

Connecting the ELAN

Introduction

An Embedded Local Area Network (ELAN) card is a minimum system requirement. It is the private LAN used to connect Nortel Networks equipment at the customer site. The Ethernet hub may be supplied with the server, or it may be supplied by the customer.

The ELAN is the on-board, embedded network card. See the diagram, "Rear panel" on page 60.

To connect the ELAN

1 Connect the ELAN network cables from Nortel Networks equipment to the Ethernet hub.

2 Connect the LAN cable from the ELAN card in the server to the hub.

3 Plug in the power cord for the hub.

For instructions on configuring the ELAN, refer to the configuration procedure "Performing software installation and configuration."

Identifying the ELAN and CLAN network cards

In some cases, both the ELAN and CLAN cards may be from the same manufacturer. If the system needs to be reinstalled, it is necessary to determine which card is for the ELAN or CLAN because they are identical in appearance.

You can identify the network cards through the system, or by directly viewing the back of the server, as outlined below.

- Windows NT detects cards in the order of the interrupt level. Since the CLAN is typically IRQ 5, and the ELAN is typically IRQ 10, the CLAN should be the first card detected.
- Look at the back of the system to determine the physical location of the CLAN card, as specified in "Slot assignments" on page 41. For the ELAN card, the network connector (NIC) on the I/O panel must be plugged in to directly connect to the onboard ELAN.

Connecting the CLAN

Introduction

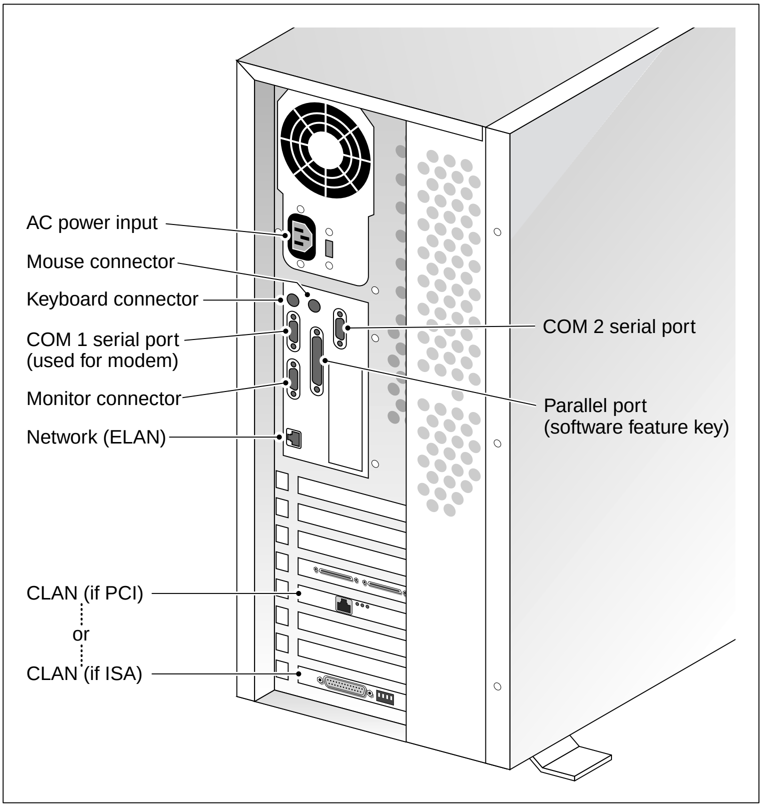
Customer’s Local Area Network (CLAN) is the card used to connect the MAS to the customer’s internal LAN. It may be Token Ring or Ethernet. This card will be installed only in dual network configurations.

To connect the CLAN

1. Refer to the following slot assignment table on page 41 to locate the slot assigned to the CLAN card for that configuration.
2. Make a note of the slot, as appropriate.
3. In dual network configurations you have already determined the ELAN card and connected it; therefore, the remaining network card is the CLAN card to be connected.
4. Connect the cable from the CLAN to the CLAN card in the server in accordance with customer site networking guidelines.

Rear panel

This diagram identifies cable connections to the server.



G100809

Starting the server

In this section

Starting up the server

Introduction

When all cables are connected for the installation, follow this procedure to turn on the server and peripherals.

To turn on the system

1. Ensure the modem power switch is On.
2. Turn the monitor power switch to On.
3. Press the server power switch On.
4. Observe the Power-On Self-Test (POST) and initialization messages as the server starts.

Boot sequence

The following is the sequence for the server start-up.

Stage	Description
1	POST messages display.
2	SCSI (or RAID) initialization messages display.
3	Allow selection of Windows NT/DOS.
4	Server boots to DOS. Runs High Memory Test and PC Diags.
5	Server boots to Windows NT and displays the login screen.
6	Press Ctrl + Alt + Delete.
7	Login as the administrator with the appropriate password.

To interpret the POST beep codes that your MAS 702t emits, refer to “Interpreting POST diagnostics” on page 262.

Shutting down the server

Introduction

This topic outlines the proper method for shutting down the MAS 702t for both the Windows NT 3.51 and Windows NT 4.0 operating systems.

To shut down the server from Windows NT 3.51

1. On the server, in the Windows NT Program Manager, select Shutdown from the File menu.
2. Click the Shutdown button.
3. Click OK.

   Result: The server is shut down.

To shut down the server from Windows NT 4.0

1. On the server, select Start > Shut Down from the main task bar.
2. Click the Shut down radio button on the Shut Down Windows pop-up window.
3. Click OK to shut down the server.

   Result: The server is shut down.

To reboot to Windows NT 3.51

1. In the Windows NT Program Manager, double-click the Main icon.

   Result: The Main window appears.
2. Double-click the Command Prompt icon.

   Result: The MS-DOS Command line prompt window appears.
3. At the MS-DOS prompt, type **BootNT.**

   Result: The following message appears:
   ```
   1 file(s) copied. Boot to Windows NT after the next
   system reboot.
   ```
4. Type **Exit** to return to Windows NT 3.51.

5 Access the Windows NT Program Manager.

6 Select Shutdown from the File menu.

7 Click the Shutdown and Restart button.

8 Click OK.

Result: The server shuts down and restarts in Windows NT 3.51.

To reboot to Windows NT 4.0

1 On the server, select Start > Shut Down from the main task bar.

2 Click the Restart radio button on the Shut Down Windows pop-up window.

3 Click OK to restart the server.

Result: The server restarts in Windows NT 4.0.

chapter 4

Performing software installation and configuration

In this chapter

Overview

Introduction

This chapter provides the installation and configuration procedures for the server's base software. The software installed on the server includes

- MS-DOS (6.20) (must be installed first)
- Windows NT

Before you begin

Set up all server hardware properly before installing any software.

Disable console redirection

Disable console port redirection during the installation of MS-DOS and Windows NT operating systems. Set the console port redirection functionality by using the CMOS Setup Utility.

Run the SSU

Run the SSU to configure the hardware on the motherboard as well as in any adapter cards that are being used (for example, Ethernet, Token Ring, controller).

Reboot the system and modify BIOS settings

In addition to the SSU settings, reboot the system from power up and press F1 when prompted to enter the BIOS SETUP utility.

Select “BIOS settings” from the utility menu to load the default BIOS settings, then make the following changes to the default settings:

Main	CPU Speed Setting: 350 Mhz
Advanced	Use Multiprocessor Spec: 1.4
Server	PCI IRQs to IO-APIC Mapping: Disabled

When the changes are complete, select Save, then Exit to save the changes and exit the utility.

Note: If the BIOS upgrade or SSU has not been run properly, you may expect problems with the Windows NT installation (such as incompatible hardware abstraction layer [HAL] DLLs installed for the MPS specifications, or an incorrect Windows NT kernel version installed for Multiprocessor configurations).

Installing MS-DOS

Introduction

MS-DOS software installation procedures are performed on a new hard drive that contains no partitions. In a dual boot system with MS-DOS and Windows NT, MS-DOS is installed on one partition and Windows NT is installed on another. MS-DOS must always be installed first.

Software requirements

You require the following items to install MS-DOS:

- MS-DOS 6.20 installation kit (a set of three setup disks, supplied by Nortel). Do not use other MS-DOS 6.2 disks.

To partition and format hard drives

To partition the new drive, follow these steps.

1. Insert the disk labeled MS-DOS Install Disk number one into drive a: and restart the system.

   Result: A message indicates that the system is starting MS-DOS. The MS-DOS 6.20 setup menu appears.

2. Press F3 at the Welcome screen.

   Result: The system asks you to confirm that you want to perform the procedure.

3. Press F3 to indicate yes.

   Result: The DOS prompt appears.

4. Type **fdisk** and press Enter.

   Result: The fdisk main menu appears.

5. Select `Option 1: Create DOS partition`, and press Enter.

6 Select `Option 1: Create primary DOS partition`, and press Enter.

Result: The system prompts you with the following message: `Do you wish to use the maximum available size for a primary DOS partition and make the partition active? [Y/N]`

7 Type **N** and press Enter.

Result: A message displays which lists the amount of total disk space, and the maximum disk space available for a partition. The system prompts you to enter the partition size in Mbyte or percent of disk space to create a primary DOS partition.

8 Change the initial value that appears in the square brackets to **100**. Press Enter.

Result: A message indicates that a primary DOS partition was created.

9 Press Escape.

Result: The fdisk options menu appears.

10 Select `Option 2: Set active partition`, and press Enter.

Result: The Set Active Partition screen appears. The system prompts you to enter the number of the partition you want to make active.

11 Type **1** and press Enter.

Result: A message appears that partition 1 was made active.

12 Press Escape twice.

Result: The system exits fdisk and prompts you with the message to press any key to reboot the server.

13 Press any key to reboot.

Result: The system reboots.

14 Press F3, and when prompted. Then press F3 again.

Result: The `a:\>` prompt displays.

15 Type **format c:** and press Enter.

Result: You are prompted to confirm the format.

16 Type **Y** and press Enter.

Result: The formatting progress displays. When complete, you are prompted for a label for the disk.

17 Press Enter to indicate no label.

Result: The format summary displays. You are returned to the `a:\>` prompt.

To install MS-DOS 6.20

CAUTION!

Risk of equipment damage
Do *not* enable the MS-DOS DoubleSpace disk compression feature.

1 Insert MS-DOS Setup Disk number one in the floppy drive. Reboot the system.

Result: The system boots to the MS-DOS Setup screen.

2 Press Enter to begin the installation process.

Result: You are prompted to configure unallocated disk space.

3 Highlight `Do not configure unallocated disk space` using the arrow keys and press Enter.

Result: You are prompted with common system settings.

4 Press Enter to select `The settings are correct`.

Result: You are prompted for the path to install DOS.

5 Accept the default path (C:\DOS) by pressing Enter.

Result: Setup starts to copy files. You are prompted to insert Disk 2.

6 Insert MS-DOS Setup Disk number two and press Enter.

Result: Setup continues to copy files. You are prompted to insert Disk 3.

7 Insert MS-DOS Setup Disk number three and press Enter.

Result: Setup finishes copying files.

8 Remove Setup Disk number three as prompted and press Enter to finish setup.

Result: The system confirms that the operating system was installed.

9 Press Enter to restart the computer with MS-DOS.

Result: The computer boots to a clean MS-DOS installation.

Installing Windows NT 3.51 server

Introduction

Windows NT 3.51 is installed after MS-DOS is successfully installed on the server.

Software requirements

You require the following item to install Windows NT:

- MAS Server Operating System Setup media (1 CD, 3 disks)

To prepare to install the Windows NT 3.51 server operating system

1 Insert the Windows NT Setup Disk number one, and power on the computer or restart.

2 Insert the Windows NT Setup Disk number two when prompted, and press Enter.

Result: Setup loads files from disk number two, and displays the Windows NT Setup screen.

3 Press Enter when prompted to begin installation of Windows NT.

4 Type **C** to specify Custom setup.

5 Type **S** to skip the mass storage controller detection.

6 Type **S** to select a controller.

Result: A list of controllers displays.

Note: Skip to Step 10 if the platform is configured with a SCSI CD-ROM.

7 Select the item titled `IDE CD-ROM (ATAPI 1.2)/Dual-channel PCI IDE`, and press Enter.

Result: This loads the IDE CD-ROM driver.

8 Insert the Windows NT Setup Disk number three when prompted.

9 Type **S** to select another disk controller.

Result: A list of controllers displays.

10 Select the item titled `Other (Requires disk provided by a hardware manufacturer)`, and press Enter.

11 Insert the manufacturer-supplied hardware support disk, and press Enter.

Result: You are prompted to select the correct driver for the installed hardware.

12 Highlight the appropriate SCSI/ driver for the platform and operating system version, and press Enter.

Result: The SCSI driver is loaded from the disk.

13 Press Enter to continue with the setup.

14 Insert the Windows NT Setup Disk number three when prompted, and press Enter.

15 Press Enter to choose “To install Windows NT from CD-ROM.”

Result: The list of installed hardware components is shown.

16 Press Enter to select “The above list matches my computer.”

Result: The Windows NT disk partitioning screen is shown.

17 Create the partitions based on the appropriate disk size, as outlined in the sub-steps below. Note that there is a 100 Mbyte FAT partition on the disk already.

a. For 2 Gbyte hard disks:

- Highlight the “Unpartitioned space” on the primary hard disk (Disk 0).
- Press **C** to create a second partition.
- Enter 1945 Mbytes as the size of the partition.
- Highlight the 1945 Mbyte partition you just created, and press Enter to select this partition to install WinNT.

b. For 4 Gbyte hard disks:

- Highlight the “Unpartitioned space” on the primary hard disk (Disk 0).
- Press **C** to create a second partition.
- Enter 3993 Mbytes as the size of the partition.
- Highlight the 3993 Mbyte partition you just created and press Enter.

c. **For 9 Gbyte hard disks:**

- Highlight the "Unpartitioned space" on the primary hard disk (Disk 0).
- Press **C** to create a second partition.
- Enter 3993 Mbytes as the size of the partition.
- Press **C** to create a third partition.
- Enter 4087 Mbytes as the size of the partition.
- Highlight the 3993 Mbyte partition you just created and press Enter to select this partition to install WinNT.

18 Use the arrow keys to select `Format the partition using the NTFS file system,` and press Enter.

Note: Setup formats the new partition and takes approximately 15 minutes. You are prompted for the installation path.

19 Press Enter to accept the default installation path (\WINNT35).

Result: The setup prompts to perform a comprehensive disk check.

20 Press Enter to perform the comprehensive disk check.

Result: You are prompted for the Windows NT Server CD-ROM.

21 Insert the Windows NT Server CD-ROM, and press Enter.

Result: Setup checks the hard disks. You are prompted for the manufacturer-supplied SCSI driver disk.

22 Insert the manufacturer-supplied SCSI driver disk, and press Enter.

Result: Installation files are copied to the hard disk. You are prompted to reboot the system.

23 Remove the Windows NT Server CD-ROM from the CD-ROM drive, and remove the manufacturer-supplied SCSI driver disk from the floppy drive, and press Enter.

Result: The system reboots and begins the graphical portion of Windows NT setup.

To complete the Windows NT 3.51 setup

Continue the installation as outlined in the following procedure.

24 Enter **Nortel** for the name, and **Northern Telecom** as the company, then click Continue to proceed.

25 If the information you entered is correct, click Continue to proceed; otherwise, click Change to reenter the information.

26 Enter your assigned Product ID, then click Continue.

27 If the information you entered is correct, click Continue to proceed; otherwise, click Change to reenter the information.

28 Select the Server radio button, then click Continue to proceed.

29 Select `Per server` and specify **5** as the number of concurrent connections. Click Continue to proceed.

30 Select the check box labeled “I agree that” to accept the client licensing choice, and click `OK` to continue.

31 Enter the computer name and click Next.

Note: This information should be obtained from your Network Administrator.

32 If the information you entered is correct, click Continue to proceed; otherwise, click Change to reenter the information.

33 Select “English (United States)” from the drop-down list for the language/locale of the platform, then click Continue.

34 Ensure the check boxes for the optional setup tasks are in the following state:

- `Set Up Only Windows Components You Select`: Checked
- `Set Up Network`: Checked
- `Set Up Printers (locally connected printers only)`: Un-checked
- `Set Up Applications on the Hard Disk(s)`: Checked

35 Click Continue.

36 Ensure the checkboxes for the optional Windows Components are in the following state:

- `Read-Me Files`: Un-checked
- `Accessories`: Checked
- `Games`: Un-checked
- `Screen Savers`: Un-checked
- `Wallpapers, Misc.`: Un-checked

37 Click Continue.

Result: Windows NT Setup starts the network configuration.

Configuring for network use

Continue the installation procedure by configuring the Windows NT server for network use by following these steps.

38 Click the “Do Not Detect” button to ensure Windows NT network card drivers are not loaded.

Result: You are prompted to choose whether the server will participate on a LAN or remotely (over telephone lines).

39 Click Continue to pick a network card manually.

40 Choose “<Other> Required disk from manufacturer” from the drop-down list of network cards.

41 Insert the CLAN network card driver disk in the floppy drive and click OK to continue. Specify the path, if other than a:\.

42 Select the network card driver that appropriately describes the installed network adapter, and click OK to accept the selection.

43 Insert the Windows NT 3.51 Server CD-ROM in the CD-ROM drive, then click OK.

Result: Files are copied to the system. You may be prompted with a dialog box indicating the network card driver was successfully loaded, and be offered a chance to run diagnostics.

44 Choose “<Other> Required disk from manufacturer” from the drop-down list of network cards.

45 Insert the ELAN network card driver disk (Intel 82557 Fast Ethernet) that is shipped with the system.

46 Use the default path on the screen, a:\, then press Enter.

47 Select the ELAN driver (Intel 82557-based 10/100 Ethernet PCI Adapter), then click OK.

If a message appears indicating that the network card is already installed, click OK to continue.

Result: The adapter information dialog box appears.

48 Click Test to test the adapter.

Result: The Network Settings dialog box appears.

49 Click OK to continue with Windows NT Setup.

Note: You may run diagnostics at this point, if you wish, and continue the setup procedure when the diagnostics are complete.

50 Ensure the network protocols check boxes are in the following state, then click Continue:

- `NWLink IPX/SPX Compatible Transport`: Un-checked
- `TCP/IP Transport`: Checked
- `NetBEUI Transport`: Checked

51 Ensure the optional TCP/IP components check boxes are in the following state, then click Continue.

- `Connectivity Utilities`: Checked
- `SNMP Service`: Checked
- `TCP/IP Network Printing Support`: Checked
- `FTP Server Service`: Un-checked
- `Simple TCP/IP Services`: Checked
- `DHCP Server Service`: Un-checked
- `WINS Server Server`: Un-checked
- `Enable Automatic DHCP Configuration`: Un-checked

Result: You are prompted to configure the SNMP service. As the SNMP service is only being added to provide additional Performance Monitor counters, no configuration is necessary.

52 Click OK to accept the default SNMP Configuration.

53 Click OK to accept the network configuration.

54 Enter the TCP/IP configuration parameters for the following values which are obtained from the Network Administrator:

- IP Address
- Subnet Mask
- Default Gateway
- Primary WINS Server

55 Click OK to continue.

56 Enter the workgroup name, provided by the Network Administrator, then click OK to continue.

Result: Windows NT Setup creates program manager icons.

Note: The computer **must not** belong to a Windows NT domain.

57 Enter the Administrator account password for the MAS server:

- Password: **<as specified>**
- Confirm Password: **<as specified>**

Note: Passwords are case-sensitive. Ensure CAPS LOCK is not left on accidentally.

58 Click OK to continue.

59 Click Cancel to avoid setting up additional Windows NT accounts.

60 Click OK to accept the message that no local account will be set up.

61 Click Continue to accept the default values provided by Windows NT for configuring virtual memory for the server.

62 Click Search Now to search the Path for pre-installed applications for which Windows NT will create icons.

63 Choose “None of the Above” from the displayed list of prompts for the file C:\DOS\EDIT.COM, then click Continue.

64 Choose “MS-DOS Editor” from the displayed list of prompts for the file D:\WINNT35\system32\EDIT.COM, then click Continue.

65 Click Continue to skip creating icons for other programs.

66 Enter the correct date and time.

67 Select `(GMT -05:00) Eastern Time (US & Canada)`.

68 Ensure the check box for `Automatically adjust clock for daylight saving changes` is checked.

69 Click OK to continue.

Result: Windows NT Setup detects the installed display adapter.

70 Click OK to accept the detected display adapter.

Result: You are prompted to configure the display adapter.

71 Ensure the following values have been selected:

- `Color Palette`: 256 colors
- `Desktop Area`: 800x600
- `Font Size`: Small Fonts
- `Refresh Frequency`: 60 Hertz (or default)

72 Click Test to test the settings.

Result: The testing mode dialog appears.

73 Click OK.

Result: A test screen displays. After five seconds, the system asks you to verify that the colors and images on screen match the text. A window appears with the question, “Did you see the test bitmap properly?.”

74 Click Yes to verify that you saw the test screen.

75 Click OK to save the display settings you just tested and continue.

76 Click OK to close the Display Properties property page.

Result: Setup copies the remaining files from the CD-ROM and saves the configuration.

77 Click Yes to generate an Emergency Repair Disk.

Note: This disk will need to be updated using the RDisk.exe utility after the platform installation has been finalized, and before the system goes into service.

78 Remove any disk from the a: drive when you are prompted to restart the server.

79 Remove the Windows NT CD-ROM from the CD-ROM drive.

80 Click Restart Computer.

Result: The system reboots to Windows NT.

Finalize the installation by completing the following additional procedures:

- "Installing the tape device driver" on page 81
- "Formatting the remaining disk space" on page 82

Installing the tape device driver

To install a tape device driver, follow these steps.

Note: You should perform this procedure after installing MS-DOS and the Windows NT 3.51 Server. If you have just completed the procedures for installing the Windows NT 3.51 Server, skip to step number 2.

1 Start Windows NT on the server.

2 Log on to the system as Administrator.

Result: The Program Manager displays.

3 Open the “Main” program group.

4 Double-click the “Windows NT Setup” icon.

5 Select `Add/Remove Tape Devices...` from the Options menu.

Result: The Tape Device Setup dialog is displayed.

6 Click Add to display a list of tape drive device drivers.

7 Select the desired tape drive device driver from the drop-down list. In most cases, this is the standard “4millimeter DAT drive.”

8 Click Install to install the selected driver.

9 Insert the Windows NT Server 3.51 CD-ROM in the CD-ROM drive, and click Continue.

Note: If you have a device driver disk for the tape drive, insert the diskette in the floppy drive, enter **a:** as the path to the driver, then click Continue.

Result: Files are copied to the system. You are returned to the Tape device Setup dialog box, and the newly installed driver should be listed.

10 Click Close to save these settings, then exit the Windows NT Setup dialog box.

Result: You are prompted that the changes will not take effect until the next system restart.

11 Click OK to close the message box, and restart the server to load the tape drive device driver.

Formatting the remaining disk space

To finalize the Windows NT 3.51 installation, use the following steps:

1 Press CTL ALT DEL to display the Windows NT login box.

2 Log on to the system as Administrator.

3 Open the Administrative Tools program group.

4 Double-click the Disk Administrator icon.

Result: The Disk Administrator advises you that this is the first time this program has been run.

5 Click OK to acknowledge the message.

6 Click Yes to each of the following requests to write a signature to each hard disk.

Result: When a signature has been written to all disks, the main program screen displays.

Each disk has a number (Disk 0, Disk 1, and so on) Disk 0 has two partitions — a 100 Mbyte FAT partition and an NTFS partition that uses the remainder of Disk 0. Each of the remaining disks should be listed as “Free Space.”

7 Select the “Free Space” on one of the remaining disks (for example, Disk 1), by pointing and clicking.

Result: Disk Administrator highlights the free space with a thick, black border.

8 Select `Create Extended` under the Partition menu.

9 Select the “Free Space” on the same disk again by pointing and clicking.

Result: Disk Administrator highlights the free space with a thick, black border.

10 Select `Create...` under the Partition menu.

Result: You are prompted for the size for the logical drive (whole disk).

11 Create partitions on the remaining disks by entering the maximum size for the disk, as follows:

- For a 4 Gbyte disk, create a partition at 4087 Mbytes.
- For a 9 Gbyte disk, create two partitions at 4087 Mbytes each.

12 Click OK to create the logical drives.

13 Select `Commit Changes Now...` under the Partition menu.

Result: You are prompted to confirm your changes.

14 Click Yes to commit the changes to disk.

Result: You are prompted to update your Emergency Repair Disk.

15 Click OK to proceed.

16 Select the newly created partition on the Disk Administrator program screen.

17 Select `Format...` under the Tools menu.

18 Select `NTFS` as the File system, and check the box labeled “Quick Format,” then click OK.

19 Click Yes to confirm the format and continue.

Result: Windows NT formats the disk. A message box with the format summary information displays when the format is complete.

20 Click OK after viewing the disk format summary information.

Result: You are returned to the Disk Administrator program screen.

21 Repeat Steps 7 to 20 to format the remaining disks (or system packs) in the server platform.

Installing Windows NT 4.0 server

Requirements

- a prepared system with MS-DOS installed in a 100 Mbyte FAT partition. Power is off.
- Windows NT 4.0 installation media
- relevant device driver disks. This depends on make, manufacturer, and type of cards installed.

Note: All relevant disks for your platform have been shipped with your server.

- customer details, such as name, company's name, administrative account password.

To prepare to install the Windows NT server operating system

1 Insert the Windows NT Setup disk number one in the floppy drive and power on the computer.

Result: The system boots, disk loads, and prompts for disk # 2.

2 Insert the Windows NT Setup disk number two when prompted, and press Enter.

Result: Setup loads files from disk number two. The Windows NT Setup screen displays.

3 Press Enter when prompted to begin installation of Windows NT.

Result: You are prompted to select automatic or manual detection of mass storage devices in the server.

4 Press **S** to specify manual detection.

Result: You are prompted to select the mass storage controllers.

5 Type **S** to select a disk controller.

Result: A list of controllers displays.

Attention: The default Windows NT SCSI drivers are not supported. Using them may cause system errors.

6 Use the arrow keys to scroll through the list and highlight “Other (Requires disk provided by the hardware manufacturer).”

7 Press Enter.

Result: You are prompted to insert the Manufacturer-supplied hardware support disk into drive a:

8 Remove Windows NT 4.0 Setup disk from drive a: and insert the manufacturer-supplied SCSI driver disk.

9 Press Enter.

10 Highlight the driver listed which matches your SCSI card and press Enter.

Note: The next six steps are for installing a RAID driver. Perform them only if you have a RAID card installed.

11 Press S to load another driver.

12 Use the arrow keys to scroll through the list and highlight ”Other (Requires disk provided by the hardware manufacturer).”

13 Press Enter.

Result: You are prompted to insert the manufacturer-supplied hardware support disk into drive a:.

14 Remove the SCSI driver disk from drive a: and insert the Manufacturer supplied Mylex RAID driver disk.

15 Press Enter.

16 Highlight the driver listed that matches your RAID card and press Enter.

Note: If the system has a SCSI CD-ROM, skip to step 20.

17 Press S to select the IDE CD-ROM driver.

18 Use the arrow keys to select IDE CD-ROM (ATAPI 1.2) PCI IDE Controller.

19 When prompted, remove the driver disk from drive a: and insert Windows NT Setup Disk number three.

20 Press Enter.

Result: This loads the IDE CD-ROM driver.

21 Press Enter to continue with Windows NT setup.

Result: The system loads files and prompts you to insert the Windows NT Server CD-ROM into the CD-ROM drive.

22 Insert the CD-ROM and press Enter to install Windows NT.

Result: The licensing agreement appears.

23 Scroll down to the end of the text with the Page Down key. Press F8 to agree with the licensing agreement.

Result: The list of installed hardware components is shown.

To format the hard drive

24 Verify that the devices do match your computer. Highlight “the above list matches my computer”, and press Enter.

Result: The Windows NT disk partitioning screen is shown.

25 Perform the appropriate substep below:

a. For 2 Gbyte primary hard disks:
Highlight the “Unpartitioned space” on the primary hard disk (disk 0) and press “C” to create a partition. Enter 1945 Mbytes as the size and press Enter. Highlight the 1945 Mbyte partition you just created and press Enter.

Result: You are prompted to select the format type, NTFS or FAT.

b. For 4 Gbyte primary hard disks:
Highlight the “Unpartitioned space” on the primary hard disk (Disk 0) and press “C” to create a partition. Enter 3993 Mbytes as the size and press Enter. Highlight the 3993 Mbyte partition you just created and press Enter.

Result: You are prompted to select the format type, NTFS or FAT.

c. For a 9 Gbyte primary hard disk:
Highlight the “unpartitioned space” on the primary hard disk (Disk 0) and press “C” to create a partition. Enter 3993 Mbytes as the size. Highlight the remaining “unpartitioned space” on the primary disk and press “C”. Enter 4087 Mbytes or accept the default size, whichever is lower. Now, highlight the first 3993 Mbytes partition you created and press Enter.

Result: You are prompted to select the format type, NTFS or FAT.

26 Use the arrow keys to select “Format the partition using the NTFS file system”, and press Enter.

Result: Setup formats the new partition.

Note: A 2 Gbyte hard drive will be formatted in approximately 30 minutes on a non-RAID system. It will take approximately one minute to format on a RAID system.

To install to the formatted drive

27 Press Enter to select the default directory for installing Windows NT, which is \WINNT.

Result: Setup prompts to perform a comprehensive disk check.

28 Press Enter for the setup program to perform a comprehensive disk check.

Result: The hard disks are examined and you are prompted to insert the Manufacturer-supplied SCSI driver disk(s) into drive a: in order to copy the driver(s) to the hard disk.

29 Remove Windows NT 4.0 Setup disk # 3 from drive a: and insert the manufacturer-supplied SCSI driver disk.

30 Press Enter.

Result: Setup copies files to the hard disk. You are prompted to restart.

31 Remove the SCSI driver disk from drive a: and the CD-ROM from the CD-ROM drive.

32 Press Enter.

Result: The system often reboots more than once before launching the Windows NT graphical interface. The system prompts you to insert the CD-ROM.

33 Insert the Windows NT 4.0 CD-ROM in the CD-ROM drive.

Note: You may be prompted to click OK for the system to locate files on the CD.

34 Click OK.

Result: Files are copied to the system and the next three parts of setup are displayed on the screen.

35 Click the Next button to continue.

Result: You are prompted to enter the name and company name.

Note: The customer should supply the name and company name to be entered.

36 Enter the data requested (name and company name).

37 Click Next.

Result: You are prompted to enter the CD-Key.

38 Enter the assigned product identification in the space provided.

39 Click the Next button to continue.

Result: You are prompted to choose the Windows NT 4.0 licensing mode.

40 Under the licensing mode screen, select Per server and specify 5 as the number of concurrent connections.

41 Click the Next button to continue.

Result: You are prompted to enter the computer name.

42 Enter the computer name.

Note: Obtain this information from the customer or the Network Administrator.

43 Click the Next button to continue.

Result: You are prompted to select the server's role or server type.

44 Ensure that the radio-button for Stand-Alone Server is selected.

Attention: If any other option is chosen at this step, the procedure must be repeated from the beginning.

45 Click the Next button to continue.

Result: You are prompted to enter the password for the Administrator account.

46 Enter the Administrator account password and confirm it. The password must be specified by the customer or the customer's Network Administrator.

Note: Passwords are case-sensitive. Ensure that the CAPS LOCK key on the keyboard is not on accidentally.

47 Click the Next button to continue.

Result: You are prompted to create an Emergency Repair Disk.

48 Ensure that the radio button for “No, Do not create an emergency repair disk” is selected.

49 Click the Next button to continue.

Result: You are prompted to select the optional Windows components to be installed.

50 Click the Next button to install the default accessories for Windows NT.

Result: You are prompted to begin the setup of Windows NT Networking.

51 Click Next to install Windows NT networking.

Result: You are prompted to select how Windows NT participates on the network.

To configure the server for network use

52 Click the radio button to select “This computer will participate on a network”.

53 Ensure that “Wired to the network” is checked and “Remote access to the network” is checked.

54 Click Next to continue.

Result: You are prompted to install Internet Information Server.

55 Deselect the “Install Microsoft Internet Information server” option by clearing the check box. Click Next.

Result: You are prompted to install the network card drivers.

56 Click the Select from List button to select the ELAN network card driver from the disk in drive a:.

Result: You are prompted to choose a network adapter from a list.

57 Click the Have Disk... button to load the ELAN network card driver from the disk in drive a:.

Result: You are prompted to insert the network card driver disk for the ELAN card in drive a:.

58 Insert the ELAN network card driver disk in the floppy drive and click OK to continue. Specify the path if other than a:.

Example: Some drivers reside in a:\winnt\.

Result: You are prompted to select the appropriate network card driver from a list.

59 Click on the network card driver that appropriately describes the installed network adapter, and click OK to accept the selection.

Result: You are returned to the Network Adapter setup screen. The driver you loaded from the floppy disk should be listed and checked.

Note: You have now installed the ELAN driver and have to continue with installing a CLAN driver if it is installed.

60 Click the Select from List button to select the CLAN network card driver from the disk in drive a:.

Result: You are prompted to choose a network adapter from a list.

61 Click the Have Disk... button to load the CLAN network card driver from the disk in drive a:.

Result: You are prompted to insert the network card driver disk for the CLAN card in drive a:.

62 Insert the CLAN network card driver disk in the floppy drive and click OK to continue. Specify the path if other than a:.

Result: You are prompted to select the appropriate network card driver from a list.

63 Click on the network card driver that appropriately describes the installed network adapter, and click OK to accept the selection.

Result: You are returned to the Network Adapter setup screen. The driver you loaded from the floppy disk should be listed and checked.

Note: Ensure that both the ELAN card and the CLAN card are listed and checked.

64 Click Next to continue.

Result: You are prompted to select the network protocols to install.

65 Ensure that the check box for
TCP/IP Protocol is checked
NetBEUI Protocol is checked and
NWLink IPX/SPX Compatible Transport is unchecked.

66 Click Next to continue.

Result: You are prompted to select which network services should be installed.

67 From the Network Services screen, click Select from List....

Result: You are shown a list of network services to choose from.

68 Use the arrow keys to scroll to SNMP Service in the Network Service Window. Click OK.

Result: You are returned to the Network Services Installation screen.

69 Click the Select from List.. button to add additional network services.

Result: You are shown a list of Network Services to choose from.

70 Scroll to Microsoft TCP/IP Printing and click OK.

Result: You are returned to the Network Services Installation screen.

71 Click Next to continue.

Result: You are prompted to confirm the installation of network components.

72 Click Next to install the selected networking components.

Result: Files are copied to the system.

Note: At this point, the system may prompt users to test the card. Follow the instructions on screen to perform the test. A setup message may display: “`A network card of this type is already installed in the system, do you want to continue?`” Click OK to continue. This message displays when both the ELAN and CLAN cards are of the same make/model/manufacturer. Click OK to complete the tests, then click OK to continue with the installation process.

73 You are given the option to use DHCP to configure the Network. Click NO to using DHCP.

Result: The Remote Access Setup screen message displays the following message: “`There are no RAS capable devices to Add. Do you want RAS setup to invoke the Modem Installer to enable you to add a modem?`”

74 Click Yes.

Result: The Install New Modem screen displays.

75 Check the box “Don’t detect my modem, I will select it from a list”.

76 Click Next.

Result: Manufacturers and Models display in the Install New Modem screen.

77 Select the appropriate Manufacturer first, then select the Model.

Note: If the manufacturer and model is not listed, select “Standard Modem types” as the Manufacturer and “Standard 28,800 bps Modem” as the Model.

Attention: If your modem is not listed and you have the manufacturer’s installation disk, then click “Have disk...” and follow the instructions on screen.

78 Click Next on the Install New Modem screen showing manufacturers and models.

Result: The port selection screen displays.

79 Ensure that the radio button for Selected ports is checked and then click COM1.

80 Click Next.

Result: The Location Information screen displays.

81 Select the appropriate Country, Area Code and dialing information and click Next.

Result: The message `“Your modem has been setup successfully”` displays.

Note: The information entered at this step can be changed later by double-clicking the Modems icon in Control Panel, selecting this modem and then clicking properties.

82 Click Finish to complete installation.

Result: The Add RAS device screen displays.

83 Click OK.

Result: The screen closes and you are at the RAS screen.

84 Click Configure.

Result: The Configure Port usage screen displays.

85 Ensure that Dial Out and Receive Calls is selected.

86 Click OK.

87 Back at the RAS screen, click Network.

Result: The Network configuration screen displays.

88 For Dial out Protocols, check
NetBEUI and TCP/IP
For Server Settings, check
NetBEUI and TCP/IP

89 Click the Configure button beside NetBEUI in Server Settings.

Result: The RAS Server NetBEUI Configuration screen displays.

90 Ensure that This computer only is selected.

91 Click OK to close the screen.

92 Back at the Network Configuration screen, click Configure beside TCP/IP in Server Settings.

Result: The RAS TCP/IP Configuration screen displays.

93 Select This Computer only under Allow remote TCP/IP clients to access.

94 Select Use static address pool. Enter Begin and End addresses, From and To addresses, and excluded ranges, if any.

Note: The Customer must provide these addresses.

95 Click OK when complete to close the screen.

Result: You are returned to the Network Configuration screen.

96 Click OK to close the Network Configuration screen.

Result: You are back at the RAS screen.

97 Click Continue on the RAS screen.

Result: You are prompted to configure the SNMP service.

98 Click OK to accept the default SNMP configuration and continue.

Note: SNMP is installed only for performance monitor counters.

Result: Files are copied to the system. You are prompted to enter the TCP/IP parameters.

99 Enter the values for IP Address, Subnet Mask, Default Gateway, and Primary WINS Server that the Customers Network Administrator provides.

100 Click OK.

Result: You are returned to the Windows NT Server Setup screen showing bindings.

101 Ensure that All Services is selected.

102 Configure the binding order so that the CLAN comes first, then the ELAN card, then the Virtual Adapters for RAS.

a. Click the plus sign next to each service to display the protocols beneath that service.

b. Click the plus signs next to the protocols to display the adapters.

c. Click the up and down arrow buttons to arrange the binding order. Click Next.

103 Click Next to start the network.

Note: The name of the workgroup must be supplied by the Customer's Network Administrator.

104 Click Next to add the computer to the workgroup.

Attention: The computer must not belong to a Windows NT domain.

Result: Windows NT prepares to complete setup.

105 Click Finish to proceed.

Result: You are prompted for date/time configuration settings.

106 Enter the correct date, time, and time zone. Ensure that the check box for "Automatically adjust clock for daylight saving changes" is checked.

107 Click Close.

Result: Windows NT Setup detects the installed display adapter.

108 Click OK to accept the display adapter Windows NT has detected.

Result: You are prompted to configure the display adapter.

109 Ensure that the following values have been selected:
Color Palette: 256 Colors
Desktop Area: 800x600
Font Size: Small Fonts
Refresh Frequency: 60 Hertz (or default)

Note: You must test these settings before Windows NT Setup will allow you to proceed.

110 Click the Test button to start the test.

Result: You are prompted to continue with the test.

111 Click OK to proceed with the display settings test.

Result: A test screen displays. After five seconds, you are prompted to select whether you saw the bitmap properly.

112 Click Yes.

Result: You are prompted to save the display settings.

113 Click OK to save the display settings you just tested and continue.

Result: You are returned to the display settings configuration screen.

114 Click OK to finalize the display settings and continue with Windows NT setup.

Result: Files are copied to the system. Windows NT Setup sets security on system files, and saves the system configuration.

115 Remove the CD-ROM from the CD-ROM drive and the floppy disk from the floppy disk drive.

116 Click the Restart Computer button to complete Setup.

Result: Windows NT Setup restarts the server and boots to Windows NT.

Finalize the installation by completing the following additional procedures:

- “To install the tape device driver” on page 96
- “To install the service pack” on page 97

Installing the tape device driver

Overview

Perform this procedure after installing MS-DOS and the Windows NT Server. If you have just completed the procedures for installing the Windows NT Server, skip to step number 2.

To install the tape device driver

1 Start the computer into Windows NT.

2 Log on to the system as Administrator.

3 In the Control Panel window, double-click the Tape Devices icon.

4 Install the driver that is appropriate for the tape drive.

Note: The system sometimes automatically detects this device. Obtain tape drivers from either the tape drive manufacturer’s disk, or from the Windows NT CD-ROM.

5 Click OK.

What’s next?

Install Windows NT 4.0 Server service pack 3.

Installing Windows NT 4.0 Server service pack 3

Overview

You must perform this procedure immediately after you install Windows NT 4.0. Install Service Pack 3 from the Meridian Application Server Operating System CD-ROM. The Service pack is in subdirectory ‘sp3’. The procedure below is applicable only if you are installing from subdirectory ‘sp3’ on the Meridian Application Server Operating System CD-ROM.

Requirements

- Meridian Application Server Operating System CD-ROM
- a 702t server powered on with Windows NT 4.0 Server installed

To install the service pack

1. Insert the CD-ROM in the CD-ROM drive.

   Result: The Windows NTSetup Splash screen displays.

2. Close the screen using the [x] in the upper right corner of the window.
3. Click the Start Menu, and, under Programs, click the Windows NT Explorer to launch.

   Result: The Windows NT Explorer screen displays.

4. Click the plus sign (+) next to the CD-ROM drive to display its subdirectories.
5. Select the directory named sp3.
6. Locate the file, Update.exe, and double-click to run it.

   Result: A welcome screen displays.

7. Click the next button at the bottom of the displayed screen.
8. Click Yes to accept the licence agreement.
9. Click Next to Install the service pack.

10 Select “Yes, I want to create an uninstall directory”, and click Next to continue.

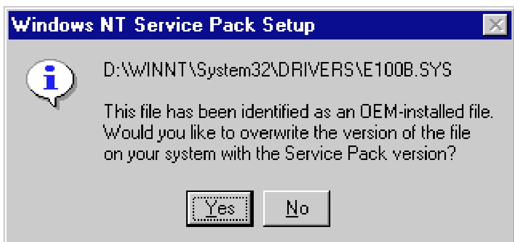
11 Click Finish to finish installing the service pack.

Result: The program examines the system, selects the files to copy, and then copies them. If messages display, refer to the next three steps for the action to take in response.

12 The existing file D:\Winnt\System32\schannel.dll contains domestic grade 128-bit security. The updated service pack file D:\Sp3\schannel.dll contains only export-grade 40 bit security. You can choose to replace the 128-bit secuity file with the updated 40-bit secuity file now, or you can skip this file to retain the existing file containing domestic grade 128-bit security. See the readme.txt file for information on obtaining the updated domestic grade 128 bit security components.

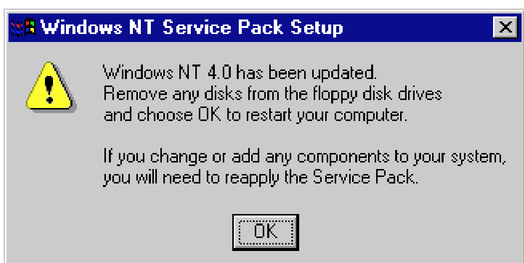
13 As the files are installed, the following message may display: `The target file exists and is newer than the source. Overwrite the newer file?`
Click NO in response.

14 The following screen may also display:



15 Click NO in response.

16 When the message below displays, remove the CD-ROM from the CD-ROM drive and click OK.



What's next?

Configure the Virtual Memory. For details, refer to the next procedure.

Configure the Virtual Memory

Overview

Perform this procedure after you install the Windows NT service pack. To operate efficiently, the server must be configured to use an initial size of 64 Mbytes and a maximum size of 128 Mbytes.

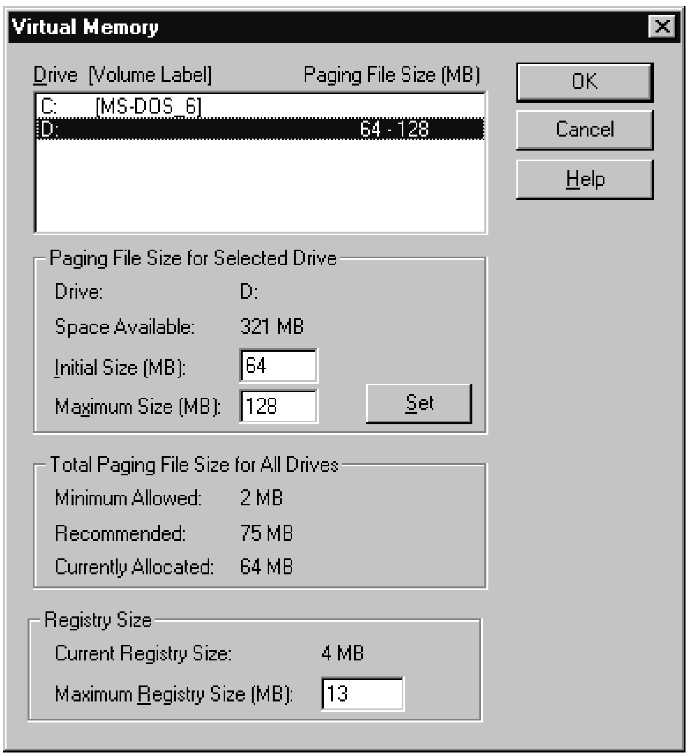
To configure the Virtual Memory

1 Click to open the Control Panel.

2 Double-click to open the System icon.

3 Click the tab to display the Performance properties page.

4 Click the Virtual Memory - Change button to display the Virtual Memory window.



5 Select drive D.

6 Under Paging File Size for Selected Drive, enter 64 for Initial Size (MB) and 128 for Maximum Size (MB).

7 Click the Set button to set the paging file size.

Result: A message displays informing you that If the pagefile on volume D: has an initial size of less than 256 megabytes, the system is unable to create a debugging information file if a STOP occurs. You have to click OK to disable the feature.

8 Click the OK button to save the change.

9 Click the Close button to exit system properties.

Result: A message displays which prompts you to restart the machine.

10 Click Yes to restart the machine.

To make an emergency Start-up disk

Introduction

A Windows NT Repair Disk saves critical system information (such as the Windows NT Registry, containing all your system software settings) to a floppy disk, allowing you to recover your system in the event of a system failure.

The repair disk must be created manually, and should be updated each time you update either your software or hardware configuration.

Procedures to create an emergency repair disk using Windows NT 4.0, or Windows NT 3.51 are provided below.

Creating an emergency repair disk using Windows NT 4.0

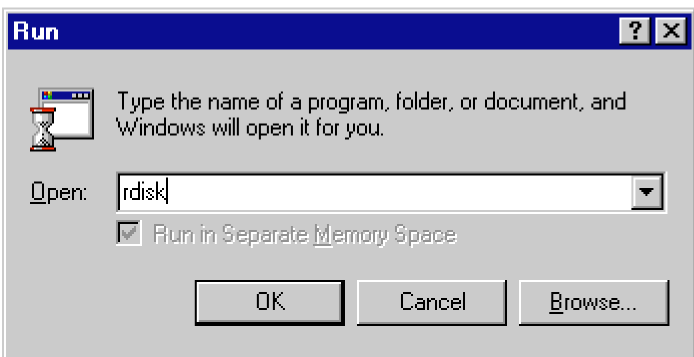
1 Power on the server.

2 Log into Windows NT as an Administrator.

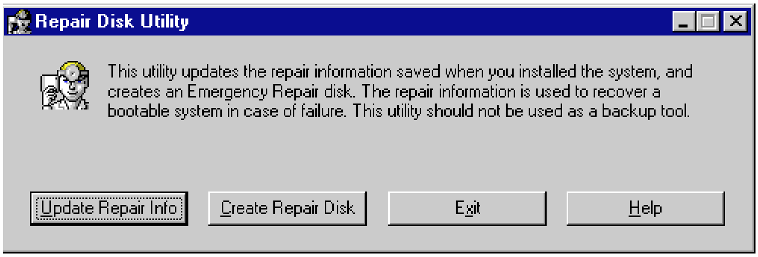
3 Insert the blank disk in drive a:\.

4 Click Start, then click Run.

5 When prompted type in “rdisk” and click OK.



6 Click Update Repair Info button



7 Click Yes to continue.

8 You are prompted to create the Repair disk. Click Yes.

9 Click OK at the prompt.

Result: The disk will be formatted and configuration files will be copied to the disk being created.

10 When complete, remove the disk from drive a:\.

11 Click Exit on the Repair Disk Utility.

Creating an emergency start-up disk using Windows NT 3.51

Use the following procedure to create a repair disk using Windows NT Server 3.51:

1 Log on to the server using an Administrative account.

2 Choose File/Run... from the menu in the Program Manager.

3 Type **rdisk.exe** into the Command Line text box, and click OK.

Result: The Repair Disk utility is displayed.

4 Click the “Update Repair Info” button to ensure your system will be up-to-date.

5 Click Yes to acknowledge the operation.

Result: You are prompted to create a repair floppy.

6 Click Yes to proceed.

7 Insert a blank 3.5" 1.44MB floppy in the floppy drive, and click OK to create the repair disk.

Result: The diskette will be formatted, and the critical system files will be backed up as well. Store the floppy in a safe, but accessible location. You will need to update this disk each time your hardware or software configuration changes.

8 Click the “Exit” button to close the repair disk utility.

chapter 5

Performing hardware maintenance

In this chapter

Expanding hardware

In this section

Overview of hardware expansion

Introduction

Four PCI expansion slots and two ISA expansion slots are available for add-in boards to enhance the hardware. The following table shows server standard (embedded) devices and optional enhancements.

	Standard devices	Optional enhancements
PCI	video network interface controller SCSI and IDE disk controllers	RAID controller network interface controller
ISA	PC support (serial, parallel, mouse, keyboard, and disk)	network interface controller

Powering down the server

Introduction

If you need to install, reinstall, or replace hardware components, power down the server.

CAUTION!

Risk of data loss

Exit applications and shut down Windows before powering down the server, or you may lose data or corrupt files.

To power down the server

1. Exit all applications.
2. Shut down Windows.
3. Turn off all peripheral devices connected to the server.
4. Turn off the server using the AC push-button switch on the front panel.
5. The green power light and LCD indicator power out.
6. Unplug the AC power cord from the wall outlet.

DANGER!

Risk of electric shock

The AC push-button on/off switch on the front panel *does not* turn off the system AC power. To remove power from the system, you must unplug the AC power cord from the wall outlet or the system.

Disconnecting peripheral cables

Introduction

Before you access the server chassis, you must remove all peripheral cables from the server (for example, mouse or keyboard).

To disconnect peripheral cables

Label and disconnect all peripheral cables attached to the I/O panel on the back of the server. Refer to the diagram on page 141 for the exact names of the cables.

Configuring the SCSI subsystem

Hard disk subsystem configuration

A 702t platform can be configured as either a RAID or non-RAID server. The configurations offer differing capacities of 4 Gbyte and 9 Gbyte hard drives.

Getting started

The process of configuring the SCSI subsystem includes the following procedures:

1. Connecting the IDE CD-ROM
   This procedure applies to both RAID and non-RAID systems.
2. Configuring SCSI devices
   Steps relevant to RAID and non-RAID systems are included in this procedure.
3. Configuring the RAID system
   A series of four procedures explains the steps for configuring the RAID system.

Cabling and termination

The following figures illustrate the cabling and termination of the SCSI devices in the system. SCSI devices include hard disks and optional disk drives.

Note: The tape drive MUST be installed using only one narrow-to-wide adapter in its cabling chain. Also, unless there is no other option, the tape drive must be connected to a SCSI bus other than the SCSI bus being used for the disk drives. If at all possible the tape drive must use the same connector and cable type when connecting it to the baseboard.

For example, if the tape drive has a narrow connector, please use a narrow-to-narrow cable. If the tape drive has a wide SCSI connector, use a wide-to-wide cable. If necessary, you may use one narrow-to-wide adapter.

Tape drive settings

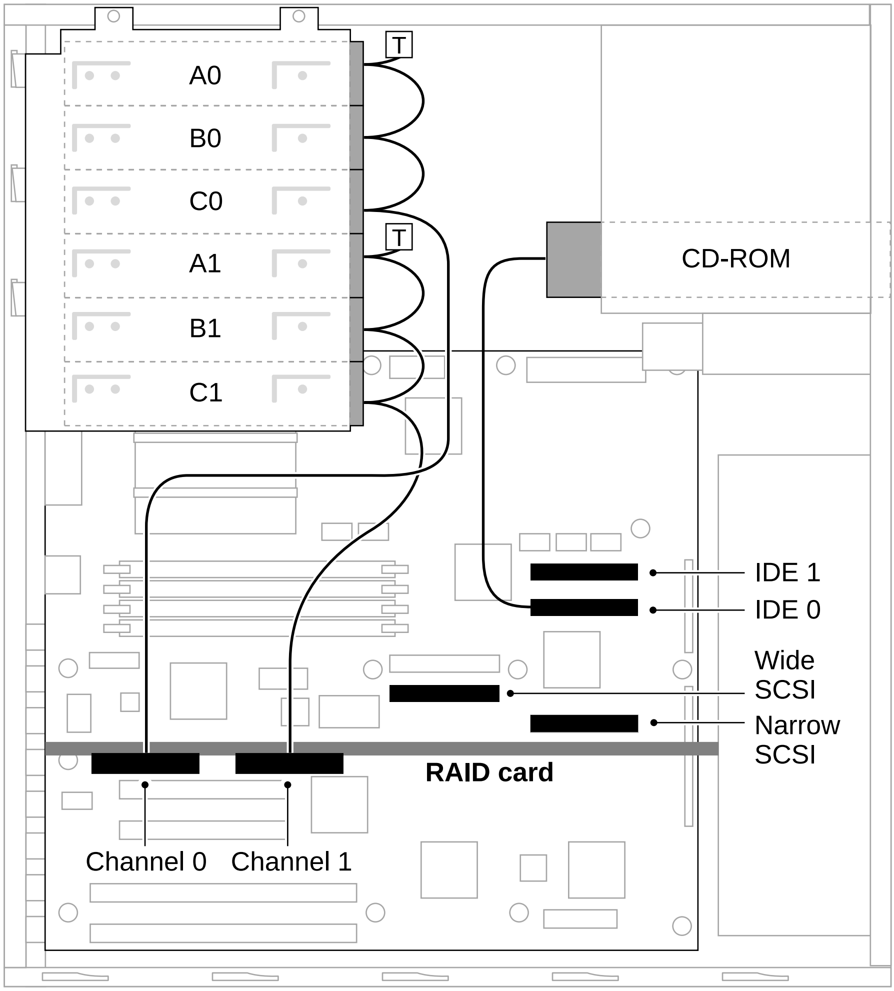
Settings for the tape drive must be set to the following values:

1. Tape drive terminator is added to end of tape drive, as outlined in the diagrams “Cabling for a RAID system with IDE CD-ROM and SCSI tape drive” on page 114, and “Cabling for a non-RAID system with CD-ROM and tape drive” on page 116.
2. SCSI ID is set to 2.
3. parity must be enabled.
4. Termination power must be enabled. (TPWR)
5. Termination is Disabled.
6. Parity is Enabled.

The tape drive requires an active SCSI terminator to terminate its SCSI bus, on both the system’s wide or narrow SCSI controller, as illustrated in the following diagrams. The appropriate active terminator is required, as follows:

- Wide Active Terminator (A0766997)
- Narrow Active Terminator (A0767002)

Cabling for a RAID system with IDE CD-ROM



Note 1: A "T" indicates an active terminator.

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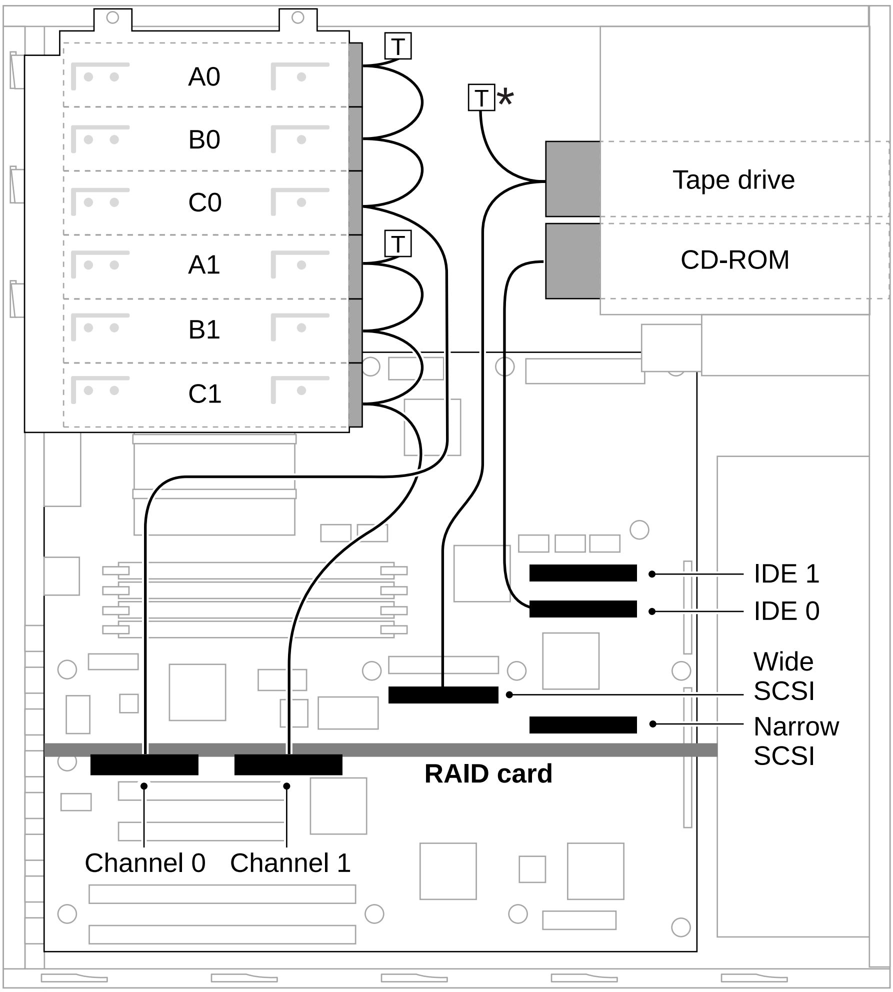
Note: The CD-ROM is connected to IDE0 (PRI IDE).

Cabling for a RAID system with IDE CD-ROM and SCSI tape drive

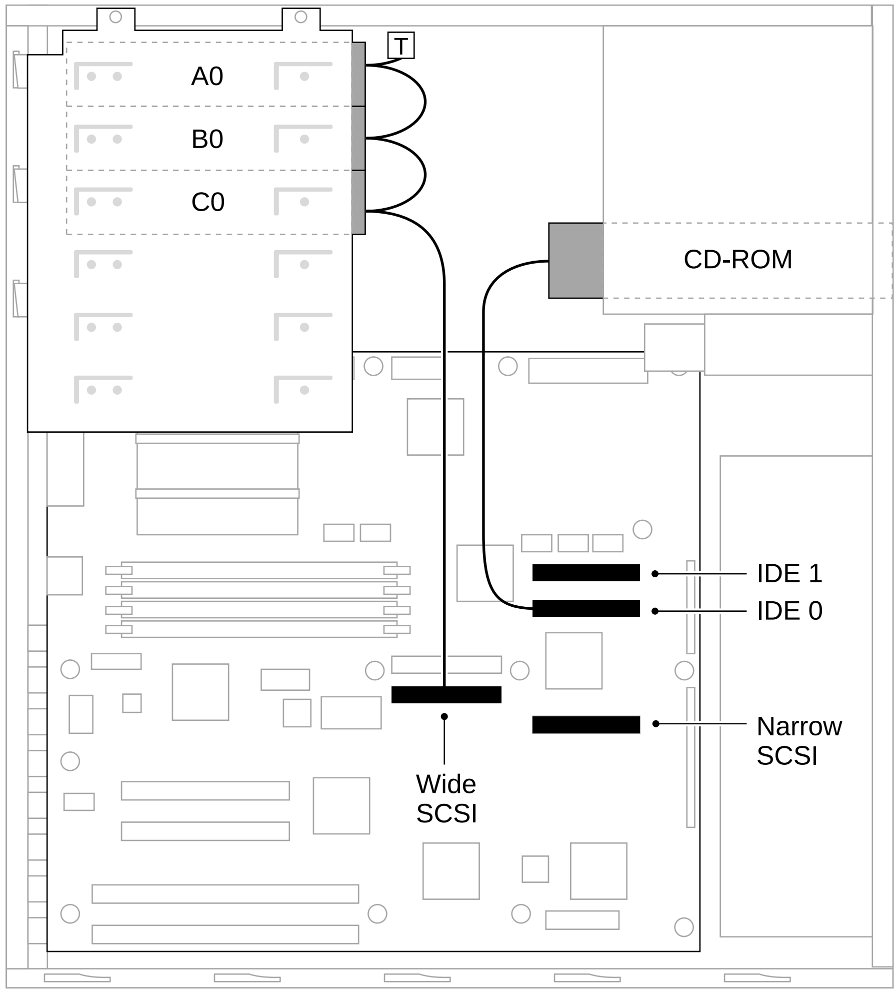


Note 1: A "T" indicates an active terminator.
Note 2: *A wide SCSI active terminator (A0766997) must be the last device on the SCSI bus.

G100812

Note: The CD-ROM is connected to IDE0.

Cabling for a non-RAID system with CD-ROM

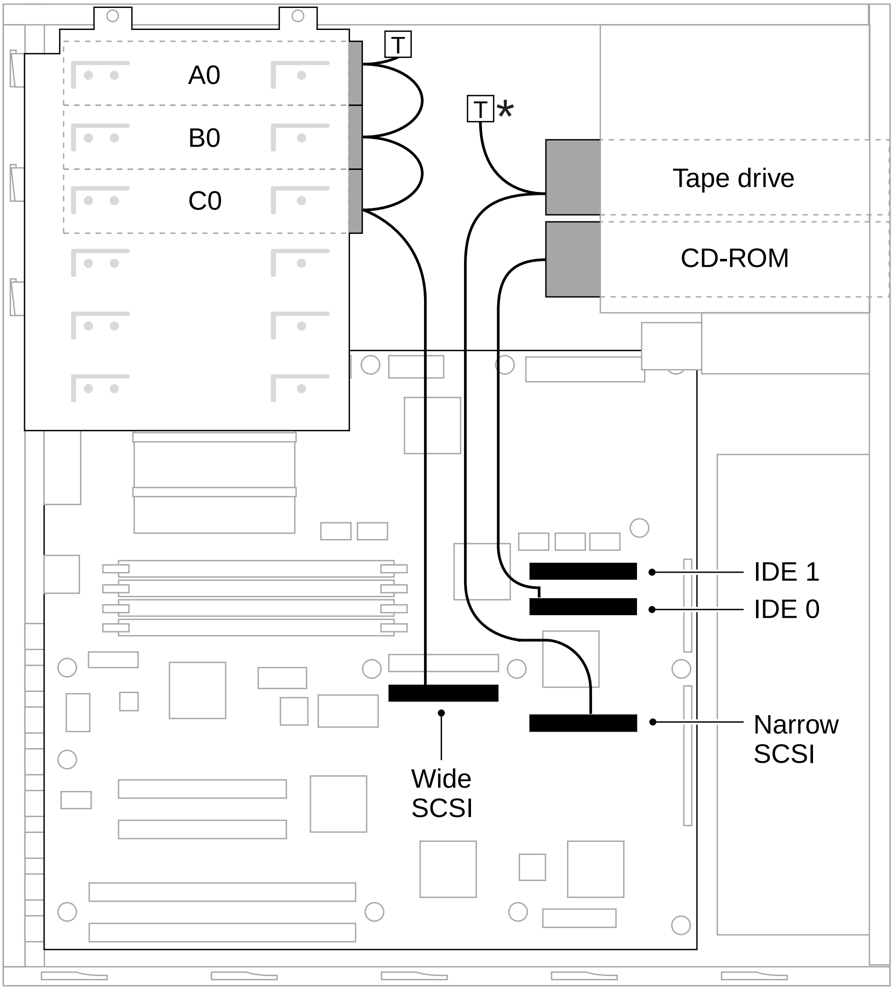


Note: A "T" indicates an active terminator.

G100815

Note: The CD-ROM is connected to IDE0.

Cabling for a non-RAID system with CD-ROM and tape drive



Note 1: A "T" indicates an active terminator.
Note 2: *A narrow SCSI active terminator (A0767002) must be the last device on the SCSI bus.

G100814

Note: The CD-ROM is connected to IDE0.

Connecting the IDE CD-ROM

Introduction

The CD-ROM is an IDE device that is not part of the SCSI chain.

To connect the IDE CD-ROM

1. Remove the side cover. Refer to “Cabling for a RAID system with IDE CD-ROM” on page 113 and “Cabling for a non-RAID system with CD-ROM and tape drive” on page 116 for the proper connections.
2. Set the CD-ROM jumper settings to indicate “Master/Single.”

   Note: Refer to the CD-ROM drive manufacturer’s documentation for specific jumper settings.
3. Connect the CD-ROM to the Primary IDE (IDE 0) interface on the baseboard.

Configuring SCSI devices

Introduction

See the figures on page 113 and page 115.

Hard drives are connected to a wide SCSI bus, or the wide SCSI channels on the RAID controller.

SCSI termination

RAID systems

Hard Disks should be cabled to the RAID card using two wide SCSI cables. The last two disk drives on each of the SCSI cables should have termination power applied to the SCSI Bus and to the internal terminators. Terminators on the disks themselves must be disabled. Wide SCSI Active Terminators must be used to terminate these SCSI buses at the very end of the cable.

Non-RAID systems

Hard Disks should be cabled to the on-board wide SCSI controller using a wide SCSI Cable. The last two disk drives on the SCSI cable must have termination power applied to the SCSI Bus, and to the internal terminators. Terminators on the disks themselves should be disabled. A Wide SCSI Active Terminator should be used to terminate this SCSI bus at the very end of the cable.

Tape drives

For all Meridian Application Servers, the NTRH9036 tape drive, must have an Active SCSI Terminator as the last device on the SCSI cable, as this tape drive is incapable of providing SCSI bus termination. You will need to purchase an appropriate active terminator as specified below:

- Wide Active Terminator (Part Number A0766997)
- Narrow Active Terminator (Part Number A0767002)

If the tape drive is on a wide SCSI cable, ensure the jumper labeled TPWR (or "Termination Power to the SCSI bus") is enabled on the tape drive, and that the tape drive is the attached to the second last connector on the SCSI cable. Attach a Wide SCSI Active Terminator to the last connector at the very end of the SCSI cable.

If the tape drive is on a Narrow SCSI cable, ensure the jumper labeled TPWR (or "Termination Power to the SCSI bus") is enabled on the tape drive, and that the tape drive is attached to the second last connector on the SCSI cable. Attach a Narrow SCSI Active Terminator to the last connector on the SCSI cable.

One end of the SCSI bus is terminated on the baseboard with active terminators that are permanently enabled. The other end(s) of the SCSI bus(es) must be terminated using one of the active terminators.

SCSI IDs

Each SCSI device on a SCSI bus must have a unique SCSI ID. IDs for narrow (8-bit) SCSI devices must be in the range from 0 to 7. IDs for wide (16-bit) SCSI devices also include the range from 8 to 15. Typically, an ID of 7 is used by the host adapter.

Note: To minimize potential problems, the boot drive (A-0) must have SCSI ID 0, and the tape drive must have SCSI ID 2. Hard disk drive jumpers must be set so that the disk drives use the IDs 0, 1, 3, 4, 5, and 6, as shown at the end of the following procedure.

If it is not clear from the disk drive manufacturer's documentation how to set disk drive jumpers for SCSI ID and bus termination, call your Nortel Networks support organization.

To configure SCSI devices

Disk drives

1 To configure the drives in specific systems, do the following:

a. In RAID systems:

Drives labeled A0, B0, and C0 terminate on channel 0 of the SCSI RAID card. Set the SCSI ID for A0 to 0, B0 to 1, and C0 to 3. Drives labeled A1, B1, and C1 terminate on channel 1 of the SCSI RAID card. Set the SCSI ID for A1 to 4, B1 to 5, and C1 to 6.

The last two disk drives on each of the SCSI cables should have termination power applied to the SCSI Bus, and also to Internal Terminators. Terminators on the disks themselves should be disabled. Wide SCSI Active Terminators should be used to terminate these SCSI buses at the very end of the SCSI cable.

Refer to the diagrams, “Cabling for a RAID system with IDE CD-ROM” on page 113 and “Cabling for a RAID system with IDE CD-ROM and SCSI tape drive” on page 114. Refer to the manufacturer’s manual for specific disk drive settings.

b. In non-RAID systems:

Drives labeled A0, B0, and C0 terminate on the wide SCSI connector on the baseboard. Set the SCSI ID for A0 to 0, B0 to 1, and C0 to 3. The last two disk drives on the SCSI cable must have termination power applied to the SCSI Bus, and also to internal terminators. Terminators on the disks themselves should be disabled. A Wide SCSI Active Terminator should be used to terminate this SCSI bus at the very end of the cable.

Refer to the diagrams on “Cabling for a non-RAID system with CD-ROM” on page 115 and “Cabling for a non-RAID system with CD-ROM and tape drive” on page 116.

c. For all other drives.

Disable Termination and use the following SCSI IDs:

Drive	SCSI ID
A0	0
B0	1
C0	3
A1	4
B1	5
C1	6

Refer to the manufacturer’s manual for specific disk drive jumper settings.

Tape drive

2 Remove the side cover to expose the drive bays. Refer to the diagram "Cabling for a RAID system with IDE CD-ROM and SCSI tape drive" on page 114 or "Cabling for a non-RAID system with CD-ROM and tape drive" on page 116 for the location of the drive bays.

3 Set the SCSI ID on the tape drive to 2.

4 Set the tape drive parity checking to Enabled.

Note: You may have to move or insert a jumper. Refer to the manufacturer's manual for specific jumper settings.

5 Remove the SCSI Termination from the tape drive if it is installed.

Note: Do not set the jumper for applying termination power to the bus. Refer to the manufacturer's manual for specific tape drive jumper settings.

6 Using either a narrow or wide SCSI cable, depending on your system configuration, connect the tape drive to the on-board SCSI controller not used by the hard disks. Refer to the diagrams on pages 113 to 116 for the exact cabling.

Note: Use a wide (68-pin) to narrow (50-pin) SCSI connector that is shipped with the system, if required.

Replacing the RAID controller

Introduction

Note: The MAS 702t cannot be upgraded in the field from non-RAID to RAID. The RAID controller must be installed in the factory.

Add a Mylex PCI RAID controller (model DAC960) to provide high-performance disk mirroring. It can be configured for a single bus or for two SCSI buses.

CAUTION!

Risk of reduced performance
Do not use the software-only approach provided by Windows NT for RAID.

RAID cabling and configuration

After the RAID controller is installed, it must be connected and configured.

To add the RAID controller

1. Power down the server, and unplug the AC power cords.
2. Insert the DAC960 card in PCI Slot 4 (top PCI slot).
3. Connect RAID channel 0 on the controller to the upper drives. See the figures on page 113.
4. Connect RAID channel 1 on the controller to the lower drives. See the figures on page 113.

Configuring the RAID system

Introduction

To configure the RAID system, follow these procedures:

1. creating and arranging System Packs
2. specifying system drive sizes
3. initializing the system drive
4. backing up the RAID configuration

Requirements

Before you configure the RAID system, ensure that the file \daccfg\daccf.exe, on configuration disk DAC960 Configuration & Utilities, is dated 08/04/98 (August 4, 1998), or later (version 4.78 or better). Also, ensure that the file \NT\dac960nt.sys, on the Windows NT driver disk (DAC960 Software Kit), is version 4.18.

Note: If your disks are outdated, you must obtain the latest version from Nortel Networks customer support.

CAUTION!

Risk of loss of system functionality

You must use the DAC960 Utility and Driver provided by Nortel Networks. Loading other software may cause a loss of system functionality.

RAID System Packs

The following example displays the requirements for configuring and arranging System Packs on a RAID system for the server. Depending on the system, you may be required to configure two or three System Packs.

Note: Both drives A-0 and A-1 provide the termination for the SCSI channels.

System pack	Location of drives in internal drive bays	Physical drive capacity	System pack capacity	SCSI channel	SCSI ID	System pack label
A	Top	4096 Mbytes	8192 Mbytes	0	0	A-0
	Fourth slot from top	4096 Mbytes		1	4	A-1
B	Second slot from top	8192 Mbytes	16384 Mbytes	0	1	B-0
	Fifth slot from top	8192 Mbytes		1	5	B-1
C	Third slot from top	8192 Mbytes	16384 Mbytes	0	3	C-0
	Sixth slot from top (bottom slot)	8192 Mbytes		1	6	C-1

To create and arrange System Packs

1. Insert the bootable DAC960 Configuration & Utilities disk in drive a:\ and power on the computer.

   Result: The system boots to the a:\> prompt.

2. At a:\>, type **cd \daccfg**.

   Result: The prompt at a:\daccfg\> appears.

3. Type **daccf** to run the utility.

   Result: The DAC960 main menu appears.

4. Select New Configuration, and press Enter.
5. Select Define Pack, and press Enter.
6. Select Create Pack, and press Enter.
7. Select the first device (Channel and SCSI ID) for System Pack A.

   Choose Channel 0 and SCSI ID #0.

   Result: The device is labeled A-0.

8. Select the second device for System Pack A.

   Choose Channel 1 and SCSI ID #4.

   Result: The device is labeled A-1.

9. Press ESC to close this pack.
10. Repeat steps 7 to 9 for System Packs B and C (if applicable). Substitute the appropriate Channel and SCSI ID references for the drives. Refer to “RAID System Packs” on page 124.
11. Select Arrange Pack, and press Enter.
12. Select a drive from System Pack A (for example, A-0), then press Enter.
13. Repeat step 12 for a drive in System Packs B and C (if applicable).
14. Press Enter to continue.
15. Select Define System Drive, and press Enter.
16. Select Create System Drive, and press Enter.

RAID System Pack Sizing

The RAID system limits the actual capacity of any System Pack to the size of the smallest drive in its pack. As drives are replaced, a mirrored set might consist of two drives of different sizes, possibly from different manufacturers. To support the replacement of a failed disk drive with that of another manufacturer, an engineering restriction specifies the size of the system pack.

To continue configuring the RAID system, calculate the drive size as follows:

2 x smallest drive in the pack

For example, if System Pack A has a nominal capacity of 4 Gbytes (2 x 2 Gbytes), enter a system drive size of 4096. Since RAID Level 1 (mirroring) is used, the resulting capacity is half of what you calculated.

The following table specifies the system drive sizes to enter when you configure RAID systems. These sizes apply for currently qualified disk drives and may change in the future.

Qualified disk drive make/model	Physical drive capacity	Size of RAID system drive to specify	Resulting RAID level 1 capacity
Seagate ST32155	2048 Mbytes	4096 Mbytes	2048 Mbytes
Seagate ST32272	2048 Mbytes	4096 Mbytes	2048 Mbytes
Seagate ST34371	4096 Mbytes	8192 Mbytes	4096 Mbytes
Seagate ST34573	4096 Mbytes	8192 Mbytes	4096 Mbytes
Seagate ST39173	8192 Mbytes	16384 Mbytes	8192 Mbytes

Note: The DAC Config software is generic. Ignore trailing letters of the disk drive models.

To specify system drive size

17 On the Create System Drive screen, from the DAC960 Main Menu, select RAID 1, and press Enter.

18 Enter the size of the system drive as specified in “RAID System Pack Sizing” on page 126, and press Enter.

Result: You are prompted to confirm that you want to create this System Drive.

19 Select Yes.

20 Repeat steps 17 to 19 for the remaining packs. When finished, press Esc to exit to the Create System Drive screen.

21 Press ESC to return to the Define System Drive screen.

22 When prompted, select Yes to save the configuration.

Result: The Main Menu appears.

To initialize the system drive

The initialization of the drives completes the configuration of the RAID system. This takes one to several hours, depending on the size of the hard disks.

23 From the DAC960 main menu, select Initialize System Drive, and press Enter.

24 Use the arrow keys to select each system drive. Press Enter to toggle your selection.

Result: A check mark indicates a selected drive.

25 Press ESC to return to the previous screen.

Result: The main menu appears.

26 Select Start Initialize, and press Enter.

Result: You are prompted to confirm that you want to initialize this System Drive.

27 Select Yes.

28 Press any key to continue when the initialization is complete.

To back up the RAID configuration

29 Press ESC to go to the daccfg Main Menu.

30 Select Tools from the daccfg Main Menu, and press Enter to display the Tools menu.

31 Select “Backup/Restore conf,” and press Enter.

Result: A cautionary message displays.

32 Press any key to acknowledge the cautionary message.

Result: The system displays the Backup and Restore Configuration submenu.

33 Select “Backup Configuration,” then press Enter.

Result: The system displays the “Enter File Name” pop-up window.

34 Type **a:** and the name of the backup file (for example, **a:\raidback**) then press Enter.

CAUTION!

Risk of data loss

You must save this file to the a: drive on floppy disk; otherwise, you may not be able to restore the RAID configuration if the RAID card fails.

Ensure the floppy disk is stored in a safe and accessible location.

Result: The system displays a warning, `Existing file, if any will be overwritten`.

35 Enter Yes.

Result: The RAID configuration is backed up on the floppy disk. A message displays when the backup has been successfully completed.

36 Press ESC to return to the Main Menu.

Installing the CLAN network card

Introduction

The server has a built-in Ethernet network controller, the ELAN (embedded LAN) controller. You must install a secondary controller for the CLAN (customer LAN).

To install the CLAN network card

1 Power down the server.

2 Install the CLAN card.

- If the card is PCI, install it in PCI slot 2 (bottom PCI slot).
- If the card is ISA Ethernet, install the card in ISA slot 2 (bottom ISA slot).
- If the card is ISA Token Ring, set the DIP switches to

1: OFF
2: OFF
3: OFF
4: ON (where OFF is up, and ON is down)
then install the card in ISA slot 2 (top ISA slot).

Replacing CLAN Ethernet cards

Introduction

Two kinds of Ethernet cards may be used in the server for CLAN connections: PCI and ISA. The installation procedures for the two cards are similar.

To replace Ethernet cards

1 Power down the server.

2 Unplug the AC power cord.

3 Remove the chassis cover.

4 To make access to the internal components easier, turn the server over on its side.

5 Locate the CLAN Ethernet card to be removed, and unplug its network cabling.

6 Remove the screw that fastens the card in the chassis.

7 Gently pull the card out (use a slight rocking motion).

8 Remove the new Ethernet card from its protective packaging.

Note: Place the old Ethernet card into the protective packaging.

9 Line up the new Ethernet card with the slot (PCI or ISA, as appropriate).

Note: Make sure the end-plate tab is lined up with the opening in the chassis.

10 Press the card into the slot.

CAUTION!

Risk of equipment damage
Ensure that the card is completely seated or the card will short-circuit.

11 Secure the card to the server chassis with the fastening screw.

12 Stand the server up and replace the chassis covers.

13 Plug in the AC power cord.

14 Power up the server.

15 Remove the old network card driver if appropriate.

16 Install the network adapter software.

17 Optimize the binding order.

Replacing the PCI Token Ring card

Introduction

The system may use a PCI bus Token Ring adapter for CLAN connectivity.

To replace the PCI Token Ring card

1 Power down the server.

2 Unplug the AC power cord.

3 Remove the chassis covers.

4 To make access to the internal components easier, turn the server over on its side.

5 Locate the PCI Token Ring card to be removed, and unplug its network cabling.

6 Remove the screw that fastens the card in the chassis.

7 Gently pull the card out (use a slight rocking motion).

8 Remove the new PCI Token Ring card from its protective packaging.

Note: Place the old PCI Token Ring card into the protective packaging.

9 Line up the new PCI Token Ring card with the PCI slot.

Note: Make sure the end-plate tab is lined up with the opening in the chassis.

10 Press the card into the slot.

CAUTION!

Risk of equipment damage

Ensure that the card is completely seated or the card will short-circuit.

11 Secure the card to the server chassis with the fastening screw.

12 Stand the server up, and replace the chassis covers.

13 Plug in the AC power cord.

14 Power up the server.

15 Install the network adapter software.

16 Optimize the binding order.

Replacing the ISA Token Ring card

Introduction

The system may use a Token Ring ISA card for CLAN connectivity.

To replace the ISA Token Ring card

1 Power down the server.

2 Unplug the AC power cord.

3 Remove the chassis covers.

4 To make access to the internal components easier, turn the server over on its side.

5 Locate the ISA Token Ring card to be removed, and unplug its network cabling.

6 Remove the screw that fastens the card in the chassis.

7 Gently pull the card out (use a slight rocking motion).

8 Remove the new MADGE SMART 16/4 AT PLUS RINGNODE (bm) ISA card from its protective packaging.

9 Change dip switches to

1: OFF
2: OFF
3: OFF
4: ON

Note: The up position is OFF, and the down position is ON.

10 Press the card into the top ISA slot.

CAUTION!

Risk of equipment damage
Ensure that the card is completely seated or the card will short-circuit.

11 Secure the card to the server chassis with the fastening screw.

12 Stand the server up and replace the chassis covers.

13 Plug in the AC power cord.

14 Power up the server.

To install the ISA Token Ring card

1 Insert the System Setup Utility (SSU) Release 2.0 Disk #1 in the floppy drive and boot the system.

2 Select “Booting from MS-DOS” from the MS-DOS Start-up menu, and press ENTER.

Result: The system prompts you to insert SSU Disk #2.

3 Remove SSU Disk #1, insert Disk #2, and press ENTER.

Result: The system prompts you to insert SSU Disk #3.

4 Remove SSU Disk #2, insert Disk #3, and press ENTER.

Result: The system prompts you to “Press any key to continue...”.

5 Press ENTER to display the SSU splash screen.

6 Press ENTER to display the main SSU graphical interface which provides access to all SSU features.

7 Double-click the “Resources” task listed under the RCA heading in the Available Tasks list.

Result: The system displays the message, “Would you like to restore the configuration from a backup file?”

8 Click No.

Result: All system hardware components are listed, as well as installed PCI devices. The resources for the ISA Token Ring card must be reserved to ensure there are no conflicts with existing hardware.

9 Click the “Define ISA Card” button.

10 Fill in the following information in the form. When complete, click the Save button.

Board Name: **SMART 16/4 AT PLUS RINGNODE**
Type: **Network Device**
Slot: **8 or 16-Bit Slot**
Resources
DMA: **DMA: 5, Width: 16-Bit, Timing: Default**
IRQ: **IRQ: 5, Trigger: Edge**
Memory: **<leave as is>**
Ports: Hex Start: **0A20h, Hex length: 0010h, Width: 16-Bit**

Result: The system prompts you for the location to save the file.

11 Insert a new blank floppy disk and save the file to **a:\!ISA9991.cfg**, to save this information for use at a later date.

12 Click the Close button.

13 Click the Add ISA Card button.

Result: The system prompts you to select the configuration file for the device.

14 Select **a:\!ISA9991.cfg** and click OK.

15 Choose to run “Automatic Conflict Resolution,” if there is a conflict detected. After this is complete, you will need to verify the resources of the installed hardware to ensure the resources are assigned as described in the IRQ table for this system.

16 Click Save to save the configuration when you are satisfied.

17 Click Yes to save the configuration to non-volatile storage (NVRAM).

Result: The system warns you to restart the SSU before making further changes.

18 Click OK to acknowledge.

Result: The system displays the prompt, “Would you like to make a backup of this configuration?”

19 Click Yes.

Result: The system prompts you for a file name and location to save the configuration.

20 Type **a:\702t.cfg**, then press Enter to save the configuration on the floppy disk containing the Token Ring configuration file. You may need this diskette later.

Result: The system displays a message to inform you that the backup was successful.

21 Click OK to continue.

22 Click the Close button to exit the Resources feature.

23 From the File menu, choose Exit.

Result: The system prompts you to exit the SSU.

24 Click OK to continue.

25 Reboot to the Madge Install Disk.

26 Press any key when the title screen appears.

27 Press F3 to configure any software-configurable ring nodes.

28 Select SMART 16/4 AT PLUS RINGNODE, and press Enter to configure.

29 Enter the following data into the fields:

Transfers: **16 bit Bus Master**
I/O Port: **0A20**
Ring Speed: **16 Mb/s**
Interrupt: **5**
Smartrom: **Disabled**

30 Press F5 to ensure that the hardware profile matches the information above.

31 Press F8 to continue customizing the installation. Enter the following information into the fields:

DMA: **5**
I/O Width: **16 bit**
Bus Timing: **Normal**
Bus Mode: **Asynch**

32 Press F4 to complete the configuration.

33 Install the network adapter software.

34 Optimize the binding order.

Replacing hardware

In this section

Powering down the server

Introduction

If you need to install, reinstall, or replace hardware components, power down the server, but do not shut down the hub.

To power down the server

1 Turn off all peripheral devices connected to the server.

2 Turn off the server using the AC push-button switch on the front panel.

Result: The green power light and LCD indicator go out.

3 Unplug the AC power cord from the wall outlet.

Risk of electric shock

The AC push-button on/off switch on the front panel *does not* turn off the system AC power. To remove power from the system, you must unplug the AC power cord from the wall outlet or the system.

Disconnecting peripheral cables

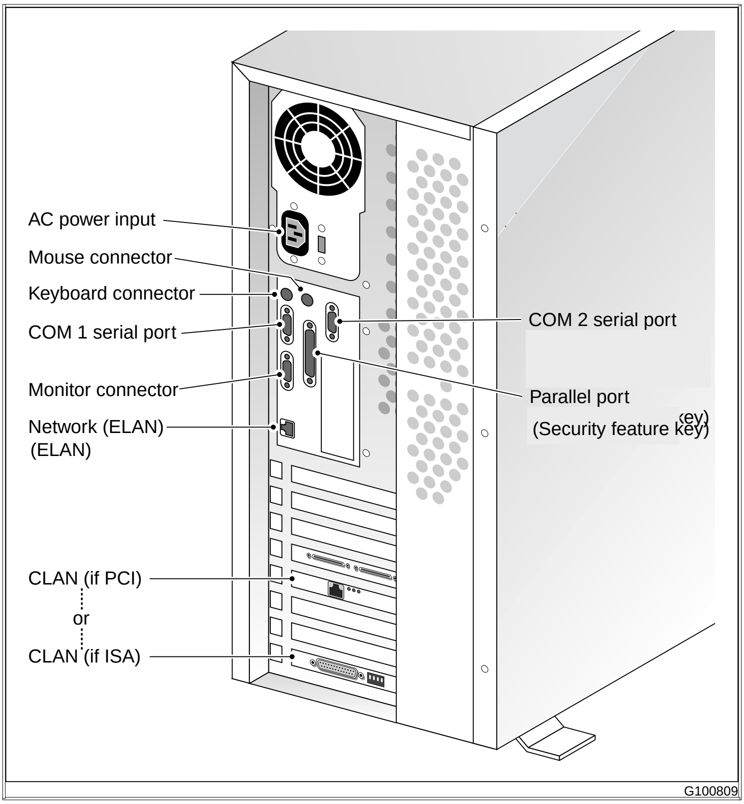
Before you begin

Before you access the server chassis, you must remove all peripheral cables from the server (for example, mouse or keyboard).

To disconnect peripheral cables

Label and disconnect all peripheral cables attached to the I/O panel on the back of the server. For the names of the cables, refer to the following diagram.

Peripheral cable connections



Removing the side cover

To remove the side cover

1. If a padlock is installed on the back of the system, unlock and remove it. Refer to “A” shown in the diagram on page 143.
2. Remove and save the three screws from the back of the side cover. Refer to “B” shown in the diagram on page 143.

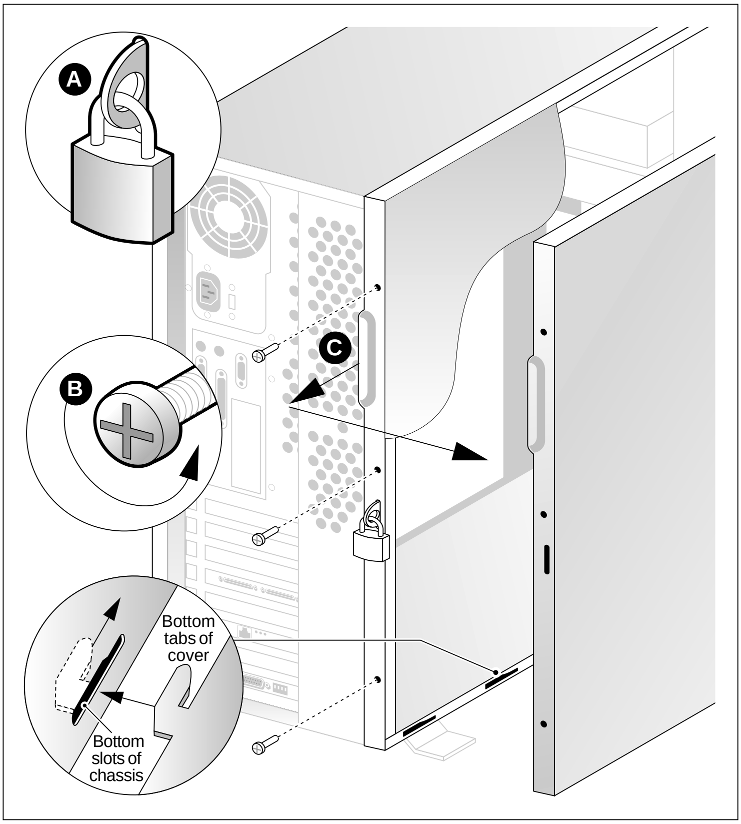
   Note: You need the screws to reattach the side cover.
3. Place the fingertips of your left hand under the built-in handle on the back of the cover.
4. Pull the cover approximately an inch away from the front of the server until it stops. Refer to “C” shown in the diagram on page 143.
5. Using your left hand, pull the back end of the cover toward you to disengage the bottom row of tabs from the notches in the chassis, as shown in the diagram on page 143.
6. Using both hands, lift the cover upward to disengage the top row of tabs from the notches in the top edge of the chassis.
7. Set the cover aside.

CAUTION!

Risk of personal injury

Do not touch the sharp metal edges of the cover as they may cause personal injury.

Removing the side cover



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Replacing the side cover

To replace the side cover

CAUTION!

Risk of equipment damage
Ensure that there are no tools or loose parts inside the server chassis before replacing the side cover.

1. Position the cover over the chassis so the top row of tabs aligns with the slots in the top of the chassis.
2. Repeat for the bottom row of tabs.
3. Slide the cover toward the front of the system until the cover tabs firmly engage in the chassis.
4. Attach the side cover to the chassis using the three screws you removed earlier, and tighten them firmly.
5. Replace the padlock through the metal loop that protrudes through the slot in the back of the side cover.
6. Connect all external cables and the power cord to the back panel.

Removing the front cover

Before you begin

Before you remove the front panel assembly, disconnect all peripheral devices from the server except the hub, and remove the side panel.

To remove the front cover

1. Remove and save the screw from the front cover.
2. Squeeze the two plastic tabs inside the front cover, and push them in to unlatch the cover from the slots in the chassis.
3. Pull the left side of the cover out slightly, about 15°, until the cover clears the power and reset buttons.
4. Slide the cover to the right until the tabs disengage from the chassis slots.
5. Set the cover aside.

Replacing the front cover

To replace the front cover

1. Insert the metal tabs on the front cover into the slots on the right of the chassis.
2. Align the front panel with the server by lining up the CD-ROM drive with its cutout.
3. Flex and snap the right edge of the panel to insert the four metal tabs into their slots.
4. Squeeze the front panel and chassis together along the left side until the plastic tabs snap into their slots.
5. Reinstall and firmly tighten the screw.

Removing the floppy disk drive

Before you begin

Before you remove the floppy disk drive, power down and unplug the server, and remove the side panel.

To remove the disk drive

1. Disconnect the disk drive's power and signal cables.

   Note: The connectors are usually keyed to allow you to easily reconnect them to the drive. If they are not, insert both cables so that the red wires are nearest to the center of the drive.

2. Remove and save the screw securing the drive and carrier assembly to the 5.25 in. drive bay.
3. Slide the assembly back toward the power supply to disengage the tabs from the slots in the bottom of the 5.25 in. drive bay.
4. Remove the assembly from the chassis, and place it component-side up on an antistatic surface.
5. Remove the four screws that hold the bracket to the drive, and set them and the bracket aside.
6. Place the drive in an antistatic protective wrapper.

Installing the floppy disk drive

To install the floppy disk drive

1 Remove the disk drive from its protective wrapper, and place it component-side up on an antistatic surface.

2 Record the drive model and serial numbers in your equipment log.

3 Place the drive carrier on the component side of the drive to align the four mounting holes.

4 Attach the brackets to the drive with four screws of the appropriate size and length (reuse the screws you removed before). Tighten the screws firmly. Refer to "A" in the diagram on page 149.

5 Position the drive/bracket assembly under the bottom 5.25 in. bay.

6 Slide the assembly toward the front of the system, and engage the bracket tabs in the slots under the bottom bay. Refer to "B" in the diagram on page 149.

Note: The bottom of the drive/bracket assembly must accept the tab that sticks out from the inside of the front panel. Make sure that the front of the drive fits flush in the front opening of the system.

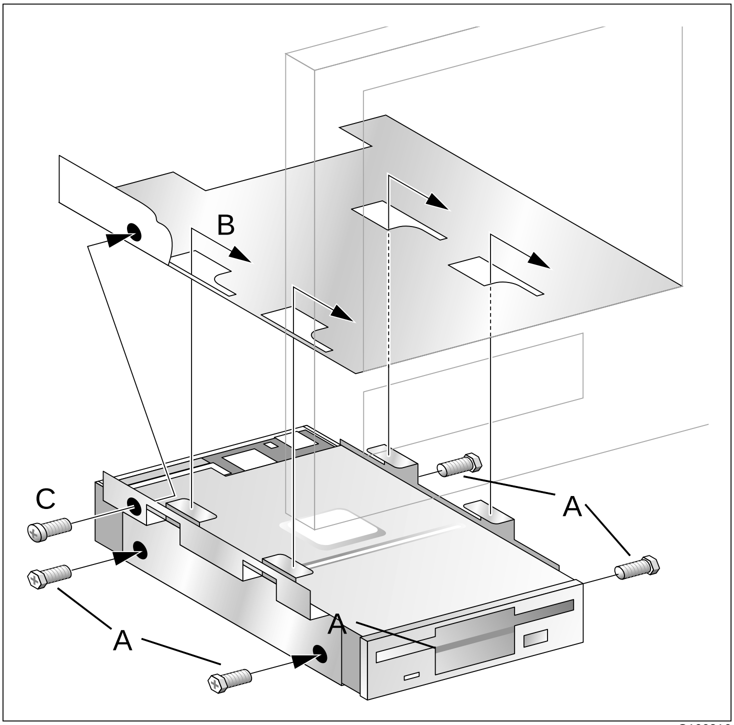
7 Secure the assembly to the 5.25 in. bay with the screw you removed earlier. Refer to "C" in the diagram on page 149. Tighten the screw firmly.

8 Connect the signal and power cables to the drive.

Note: The red stripe on the signal cable must face toward the center of the drive.

9 Reinstall the side cover.

Installing the disk drive



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IDE cabling requirements

Introduction

A 45 cm (18 in.) IDE cable that supports two drives is standard in the system. If you install an IDE hard drive, place it in the lowest internal drive bay to make cabling easier, particularly if you also have an IDE device in the externally accessible bay.

If no drives are present on an IDE channel, the cable must be removed.

Disable either IDE controller

If you plan to disable either IDE controller to reuse the interrupt for that controller, you must physically unplug the IDE cable from the board connector (IDE0 or IDE1) if a cable is present. Simply disabling the drive by configuring the SSU option does not free up the interrupt.

- When you have only the IDE CD-ROM installed, you can disable only the secondary PCI IDE controller (since the primary IDE controller runs the CD-ROM), which makes one IRQ available.
- You can disable both the primary and the secondary IDE, if there is a SCSI CD-ROM, which makes two IRQs available (IRQ 14 and IRQ 15).

Preparing to install a mass storage device

Introduction

Three 5.25 in. half-height bays provide space for tape backup, CD-ROM, or other removable media drives.

CAUTION!

Risk of electrical damage

The internal SCSI interface in this system supports only single-ended SCSI devices. Connecting differential SCSI drive types to this interface can result in electrical damage to the baseboard and peripherals.

Nortel Networks recommends that you do *not* install hard drives in the 5.25 in. bays because

- the drives cannot be properly cooled in this location
- a hard drive generates EMI and is more susceptible to ESD in this location

Filler panels and EMI shields

System EMI integrity and cooling are both protected by drives installed in the bays or by filler panels and EMI shields covering the bays. When installing drives, save the panel and shield to reinstall later, in case you remove the drive and do not reinstall one in the same bay.

Bus termination when installing SCSI devices

Your cabling and connections must meet the SCSI bus specification. Otherwise, the bus could be unreliable and data corruption could occur or devices may not work at all. Terminate the SCSI bus at each end of the cable.

To prepare the server for mass storage device installation

1. Remove the side and front system covers and place the front cover on a flat surface.
2. Remove the screws and filler panel from the bay and set them aside.
3. Push the tab on the left side of the EMI metal shield to the right to disengage it from the chassis, and save the shield.

Removing mass storage

Before you begin

Before you remove a drive, power down the server and remove the front and side system covers.

To remove the removable media drive

1. Disconnect the drive’s power and signal cables.
2. Squeeze the plastic rail tabs toward each other as you carefully slide the drive forward out of the bay.
3. Place the device on an antistatic surface.
4. Remove and save the four screws and two slide rails.
5. If you plan to leave the bay empty, install a filler panel and stainless steel EMI shield on the bay.
6. If you do not replace the device with another SCSI device and it was installed at the end of the SCSI signal cable, modify the cable and termination arrangement so that a proper termination exists at the end of the cable (it can be a termination device only, not necessarily a SCSI peripheral).
7. Replace the system covers.

Installing an add-in board

Introduction

The baseboard has four PCI bus master slots and two ISA bus master slots. The slots accept any add-in PCI and ISA boards. They also accept any add-in board that is compatible with an IBM PC AT or PC XT system (except for an 8-bit drop card that fits only in an 8-bit PC XT connector).

CAUTION!

Risk of equipment damage

Install Nortel Networks-authorized expansion cards only.

Add-in boards can be extremely sensitive to ESD and always require careful handling. Before handling add-in boards, wash your hands and leave them slightly damp. Touch a large metal object to ensure that you are not charged.

After removing the board from its protective wrapper or from the baseboard, place it component-side up on a grounded, static-free surface or conductive foam pad if available. Do not slide the board over any surface.

Before you begin

Before you install or remove an add-in board, power down the server and remove the side cover.

To install an add-in board

1 Remove and save the expansion slot screw and cover. Refer to “A” shown in the diagram on page 155.

2 Remove the add-in board from its protective wrapper.

Note: Do not touch the components or gold -edge connectors. Place the board component-side up on an antistatic surface.

3 Record the serial number of the add-in board in your equipment log.

4 Set jumpers or switches according to the manufacturer’s instructions.

5 Hold the board by its top edge or upper corners. Press it firmly into an expansion slot on the baseboard. Refer to “B” shown in the diagram on page 155.

Note: The tapered foot of the board’s retaining bracket must fit into the mating slot in the expansion slot frame. Refer to “C” shown in the diagram on page 155.

CAUTION!

Risk of equipment damage

Ensure that the board is completely seated.

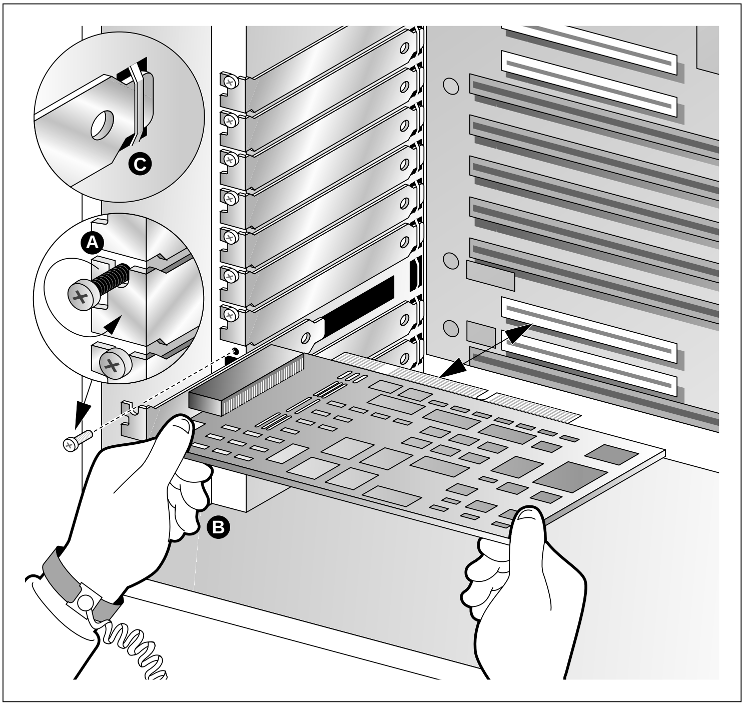
6 Align the rounded notch in the retaining bracket with the threaded hole in the frame.

Result: The bracket fits the space that was occupied by the slot cover.

7 Use the screw removed earlier. Insert it into the threaded hole, and push the rounded notch against the screw. Tighten it firmly to prevent the bracket from interfering with adjacent brackets. Attach cables if necessary.

8 Reinstall the side cover.

Installing an add-in board



G100725

System configuration utility

If you install an ISA board, you must run the SSU to reconfigure the system to reserve the resources required by that board. Run the SSU to configure any board that you install in a system.

In PCI cards, run SSU to ensure the card’s resources are correctly allocated, according to the IRQ tables.

Removing an add-in board

To remove an add-in board

CAUTION!

Risk of equipment damage

Install slot covers on all vacant expansion slots. This maintains the electromagnetic emissions characteristics of the system and ensures proper cooling of system components.

1. Label and disconnect any cables attached to the board.
2. Remove the add-in board retaining screw.
3. Hold the board by its upper corners and rock it gently until the edge connectors pull free.
4. Store the board in an antistatic wrapper.
5. Run the System Setup Utility after you change a PCI or ISA board to ensure that the resource assignments are correct.

Replacing the fan

Introduction

For cooling and airflow, the system contains two removable chassis fans to cool the boards and removable media drives. The integrated power supply fan provides additional cooling and airflow.

Before you begin

Before you remove the fan, power down the server, detach the power cord, and remove the side cover.

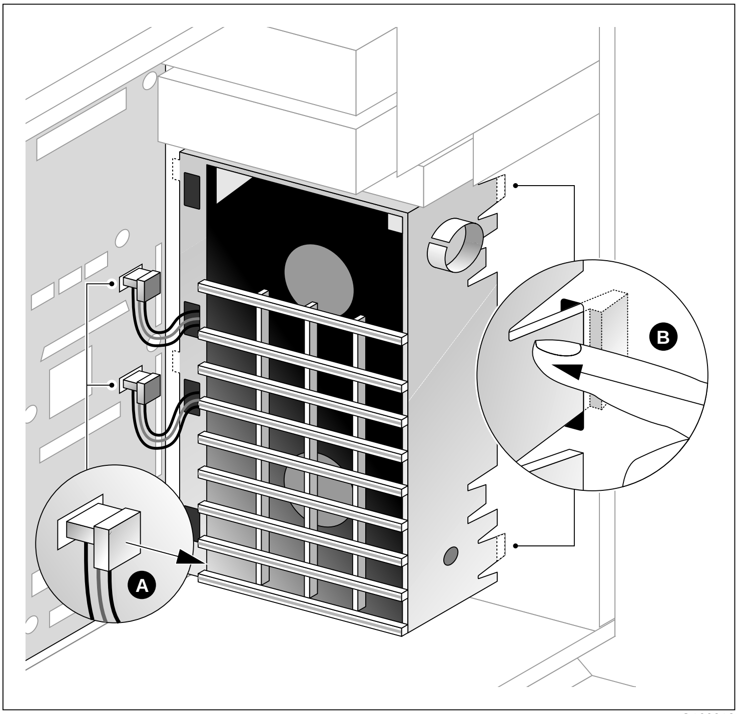
To replace the fan

1. Label and disconnect any cables attached to add-in boards.
2. Remove all add-in boards.

   Note: As you remove a board, label it with its slot number so that you can reinstall the board in the same slot.
3. Disconnect the fan power cable connector(s) from the fan header on the baseboard. Refer to “A” in the diagram on page 158.
4. Remove the plastic “snap-on” fan housing assembly by firmly pressing the plastic tabs on the assembly inward until you can pull the tabs out of the slots in the chassis. Refer to “B” in the diagram on page 158.

   Note: The plastic tabs are actually sections of the housing that were created by cutting slots into the housing. There are three of them.
5. Swing the assembly to the left until you disengage the plastic tabs on the other edge of the assembly from the slots in the chassis. Remove the assembly from the chassis, and place it on a flat surface.
6. Unsnap the fan from the housing by pressing out on the plastic tabs that hold the fan in place. Remove the fan from the housing, and set it aside.

Replacing the fan



G100818

Installing the fan

Introduction

Replace a failed fan with the same type as the one removed. For more information about replacing a fan, contact your Nortel Networks customer service representative.

Correct airflow direction

The removable fan pulls air from outside of the chassis so that it flows across the boards and out the back. Orient the fan for the correct airflow direction.

To install the fan

1. Position the cable side of the fan, label-side facing the card guides, over the plastic guide posts in the fan housing.
2. Thread the fan power cable through the two openings on the side of the housing.

   Note: Do not pinch the cable as you snap the fan into the housing.
3. Insert the assembly's inner edge plastic tabs, the ones near the fan cable, into the slots in the chassis.
4. Carefully swing the assembly to the right until the outer edge tabs on the fan housing snap into the slots in the front of the chassis.
5. Reconnect the fan power cable connector on the baseboard.

   Note: A fan in the bottom of the housing connects to the Fan 1 header. A fan in the top of the housing connects to the Fan 0 header. Orient the cables so that the red wires are nearest the middle of the baseboard.
6. Reinstall the add-in boards.
7. Reconnect any cables to the add-in boards.
8. Reinstall the side and front covers.

Installing a SCSI drive in the internal bay

Introduction

The internal peripheral bay has space for six drives, each 1 in. high.

You can install 1-inch high peripherals that consume up to 11 W of power and run at a maximum ambient temperature of 50°C in this bay.

The system supports a variety of single-ended SCSI devices. As shipped from your supplier, the system contains at least one 4 Gbyte wide SCSI hard drive. The wide SCSI cable supplied with the system has connectors for eight devices, and the wide SCSI bus supports only 14 peripheral devices in addition to the host adapter itself on the baseboard.

CAUTION!

Risk of equipment damage
The internal SCSI interface in this system supports only single-ended SCSI devices. Use Nortel Networks-authorized drives only.

SCSI drive cabling

If you are installing a SCSI drive, the system includes a standard 68-pin wide (16-bit) SCSI ribbon cable that supports up to eight SCSI devices. The system also includes a wide-to-narrow adapter used to connect the tape drive cable to the 68-pin wide SCSI connector on the baseboard, if required.

Unique SCSI ID

You must assign a unique SCSI ID to the SCSI drive. Use the configuration jumpers on the front of the drive to change the ID of the drive. The SCSI microcontroller on the baseboard is always set to SCSI ID 7.

Active termination of SCSI cables

Hard drives generally provide active termination; if a SCSI hard drive (presumably in the 3.5 in. internal bay) is the last device, it must terminate the bus. Otherwise, you *must* disable termination.

Bus termination for SCSI drives

If you install a SCSI cable, you must provide active SCSI bus termination at the end of the cable. If you leave the cable installed without active termination, this may cause the SCSI bus to be unreliable. You must also ensure that termination is removed or disabled in all other devices on the bus.

The last SCSI device on the cable must be either a drive that includes active bus termination, or a separate active termination device.

Before you begin

Before you install a SCSI drive, power down the server and remove the side cover.

To install a SCSI drive

1. Disconnect power and signal cables from all drives installed in the bay.
2. Remove and save the three screws holding the bay to the chassis.
3. Swing the bay out to the left of the chassis.
4. Slide the bay upward to disengage its tabs from the chassis.
5. Remove the bay from the chassis, and place it on an antistatic surface.
6. Remove the new drive from its protective wrapper, and place it on an antistatic surface.
7. Record the drive model and serial numbers in your equipment log.
8. Set the SCSI ID by setting any jumpers or switches, referring to Nortel Networks specifications and the drive manufacturer’s instructions. See the following tables for jumper settings:

SCSI ID configuration with RAID installed	Page 164
Non-RAID SCSI hard drive configuration	Page 165

9. To terminate the SCSI bus, do the following:

   If the drive is *not* the last device on the SCSI cable, disable the SCSI termination.

   If the drive *is* the last device on the SCSI cable, ensure that the SCSI termination is enabled.

10 Starting with the space at the top of the bay, position SCSI hard drive 0, component-side facing down, in the bay. Align the screw holes in the drive with those in the bay, and secure the drive to the bay with four screws.

Install the other drives as shown in the diagram on page 163.

11 To reinstall the bay in the chassis, insert the tabs on the bay into their slots in the chassis. Refer to “A” in the diagram on page 163. Slide the bay downward until the tabs interlock with the slots.

12 Swing the bay to the right into the chassis. Refer to “B” in the diagram on page 163.

13 Secure the bay with the screws you removed earlier, and tighten the screws firmly. Refer to “C” in the diagram on page 163.

14 Attach power and signals cables to all drives installed in the bay. Connect the SCSI signal cable to the wide connector on the baseboard, or to the RAID controller, as appropriate. See the diagram “Installing a SCSI drive” on page 163.

For proper cooling and air flow, neatly fold and secure the excess signal cable so that the cable does not drape across the baseboard or add-in boards. Use a tie wrap or cable clip to tie back the cable.

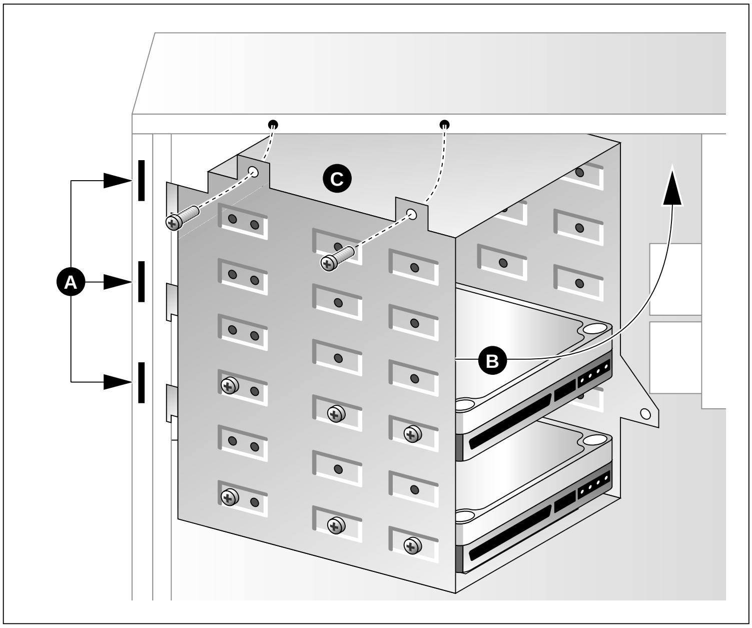
15 Reinstall the side cover.

16 Run the SCSI Select utility to configure the SCSI hard disk drives installed in the server.

Result: For RAID systems, software configuring is required. Configure non-RAID systems in WINNT before initializing the drives.

Note: Each drive upgrade for a RAID system consists of two physical drives.

Installing a SCSI drive



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SCSI ID configuration with RAID installed

RAID Channel (Wide)	SCSI ID	Device and recommended disk size	Comments
A (Ch 0)	**0**	First Disk (4 Gbytes)	Should always be located in the top slot of the internal bay area, with drive jumper set to assigned SCSI ID.
	1	Second Disk (9 Gbytes)	Set drive jumper to assigned SCSI ID.
	3	Third Disk (9 Gbytes)	Set drive jumper to assigned SCSI ID.
	7	SCSI Controller	PCI RAID Controller
B (Ch 1)	**4**	Fourth Disk (4 Gbytes)	Should be located in the fourth slot of the internal drive area, with drive jumper set to assigned SCSI ID.
	5	Fifth Disk (9 Gbytes)	Set drive jumper to assigned SCSI ID.
	6	Sixth Disk (9 Gbytes)	Set drive jumper to assigned SCSI ID.
	7	SCSI Controller	PCI RAID Controller

Non-RAID SCSI hard drive configuration

SCSI ID	Device and recommended disk size	Comments
0	First Disk (4 and 9 Gbytes)	Should always be located in the top slot of the internal bay area. (Wide SCSI distribution)
1	Second Disk (4 and 9 Gbytes)	Second bay slot from top.
3	Third Disk (9 Gbytes)	Third bay slot from top.
4	Fourth Disk (4 and 9 Gbytes)	Fourth bay slot from top.
5	Fifth Disk (4 and 9 Gbytes)	Fifth bay slot from top.
6	Sixth Disk (4 and 9 Gbytes)	Sixth bay slot from top.
2	Tape Drive	Narrow SCSI distribution (RAID or Non-RAID)
7	SCSI Controller	PCI Symbios Controller

Removing a SCSI drive from the internal bay

To remove a SCSI drive from the internal bay

1. Power down the server.
2. Remove the side cover.
3. Disconnect the power and signal cables from the drives in the 3.5 in. bay.
4. Remove and save the three screws holding the bay to the chassis.
5. Swing the bay out to the left of the chassis.
6. Slide the bay upward to disengage its tabs from the chassis.
7. Remove the bay from the chassis, and place it on an antistatic surface.
8. Remove the screws that attach the drive to the bay.
9. Remove the drive from the bay, and place the drive on an antistatic surface.
10. If you removed the drive that was installed at the end of the SCSI cable, ensure that the device that is now the last SCSI device on the cable is properly terminated.
11. To reinstall the internal bay, insert the tabs on the bay into their slots in the chassis. Slide the bay downward until the tabs interlock with the slots.
12. Swing the bay to the right into the chassis.
13. Secure the bay to the chassis with the screws you removed earlier, and tighten the screws firmly.
14. Replace all cabling.
15. Reinstall the side cover.

Removing baseboard DIMMs

Before you begin

Before you remove baseboard Dual Inline Memory Modules (DIMMs), power down the server and remove the side panel.

CAUTION!

Risk of equipment damage

Use extreme care when removing a DIMM. Too much pressure can damage the socket slot. Apply only enough pressure on the plastic ejector levers to release the DIMM.

To remove baseboard DIMMs

1. Gently push the plastic ejector levers out and down to eject a DIMM from its socket.
2. Hold the DIMM only by its edges; be careful not to touch its components or gold -edge connectors. Carefully lift it away from the socket, and store it in an antistatic package.
3. Repeat to remove other DIMMs as necessary.

Installing baseboard DIMMs

Introduction

The baseboard supports either fast page mode (FPM) DRAMs or extended data out (EDO) 3.3 V 60 ns. DRAM DIMMs:

- from 8 Mbytes to 512 Mbytes of memory, using up to four single-banked DIMMs
- from 16 Mbytes to 1 Gbyte of memory, using up to four double-banked DIMMs

DIMM sizes and compatibility

Contact your Nortel Networks sales representative or service technician for a list of approved, Nortel Networks-qualified DIMMs for the platform you are using.

Before you begin

Before you install baseboard DIMMs, power down the server and remove the side cover.

CAUTION!

Risk of equipment damage and data corruption

Use extreme care when installing a DIMM. Too much pressure can damage the socket. DIMMs are keyed and can be inserted in only one way.

Mixing dissimilar metals may cause later memory failures, resulting in data corruption.

To install baseboard DIMMs

1. Holding the DIMM only by its edges, remove it from its antistatic package.
2. Orient the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket.

Installing a CPU

Introduction

The CPU is an Intel Pentium II processor running at up to 450 MHz. The baseboard has two single-edge connectors (SEC) for two Intel Pentium II processors. The processor can be upgraded in the future.

For Dual CPU Servers

Each release of a processor model is accompanied by a stepping number (or version number).

For 702t servers which are to run with dual processors, the second processor must be within one release (either plus or minus) of the stepping of the installed CPU.

For example, if the installed server is stepping 3, the second processor must be a stepping 2, 3, or 4 only.

Before you begin

Before you install the new CPU, power down the server and remove the side cover.

DANGER!

Risk of personal injury

If the system has been running, any installed processor and heat sink on the processor board(s) is hot. To avoid a burn, be careful when removing or installing baseboard components that are located near processors.

Precaution

Make sure that you are not statically charged by grounding yourself to a large metal object, then to the server itself.

To install a CPU

1. Pinch the latches at either side of the existing CPU, and press in until they snap into the closed (unlocked) position.
2. Pull the processor straight out.
3. Remove the new CPU from its protective package.
4. Pull the latches gently out to the open (locked) position.
5. Align the CPU with the SEC on the baseboard.
6. Press the CPU firmly into place until you hear the snap which indicates the processor is in place. The latches automatically click open to hold the CPU locked in place.

Troubleshooting

After you power up the system, if the server does not start, remove the CPU. Try another baseboard.

Removing the CPU

Before you begin

Before you remove the CPU, power down the server and remove the side cover. Before you begin this procedure, ground yourself to a large metal object, and then to the server.

To remove the CPU

1 Pinch the latches at either side of the existing CPU, and press in until they snap into the closed (unlocked) position.

2 Pull the processor straight out.

Upgrading and using the SSU and BIOS

In this section

Overview of upgrading the BIOS and SSU

Introduction

BIOS defines the compatibility of your PC with expansion hardware. Each BIOS has a corresponding SSU release. The proper SSU floppy disk is identified by the Intel software version number.

All systems configured by Nortel Networks manufacturing are shipped with at least the minimum vintage BIOS and corresponding SSU. However, new BIOS may be issued to fix discovered bugs or to support new hardware standards and options.

Minimum vintage

If the SSU/BIOS firmware does not meet minimum vintage requirements, it must be updated.

To determine BIOS vintage

1. Power on the server.
2. Read the BIOS version on the display.

BIOS and SSU releases

The following are tested and supported releases of BIOS and SSU for the server.

Server	Intel SSU/ Release	Intel BIOS Release	When to use
702t	2.0	6.4	No upgrade required if already at this release.

Backing up the BIOS and SSU upgrade disks

Introduction

Because the SSU software holds server configuration for individual systems, make a backup copy of the BIOS and SSU upgrade software.

Before you begin

Before you can back up the BIOS/SSU upgrade, you must have the BIOS and SSU upgrade software on floppy disk.

You also need two blank floppy disks for the backup copies.

To backup the BIOS and SSU

1. Write-protect the BIOS upgrade floppy disk.
2. Insert the BIOS upgrade floppy disk into drive a:\.
3. Type **diskcopy a: b: /V**

   and press Enter.
4. When prompted to insert the destination disk, insert a blank floppy disk, and press Enter.

   Note: If prompted to insert the source disk, insert the original upgrade disk.
5. When prompted, "`Copy another disk (Y/N)?`", press N.
6. Remove the disk from the disk drive.
7. Label the backup copy with the information on the original disk.
8. Repeat the procedure for the SSU upgrade.

Recovering the BIOS

Flash memory description

Flash memory contains a protected area that, in most cases, cannot be corrupted. Code in this area starts the server from drive A when the BIOS is corrupted. BIOS corruption is generally detected by the POST diagnostics at system start-up.

BIOS recovery description

The recovery procedure automatically loads flash memory from the BIOS files on the BIOS recovery disk.

To recover the BIOS

1. Insert the BIOS recovery disk in drive a:\.

   Note: The disk is shipped with the server. Call Nortel Networks support if you need a disk.

2. Power up the server.
3. Type option **1**, then press Enter.

   Result: The BIOS is updated, and the server will reboot.

4. Power down the server, and remove the power cord from the system for 60 seconds.
5. Remove the server side cover.
6. Move the CMOS Clear jumper to the Erase position (from pins 1-2 to pins 2-3).

   Result: This replaces the contents of the NVRAM with the manufacturing default settings.

7. Reboot the system.

   Result: The system displays a message that the CMOS area has been cleared when the operation is complete.

8. Power down the server.

9 Move the CMOS Clear jumper to the Protect position (from pins 2-3 to pins 1-2).

Result: This protects the contents of the NVRAM.

10 Replace the side cover.

11 Power up the server.

12 Reconfigure the system with SSU, as outlined in “Configuring your system using SSU” on page 183.

Upgrading and configuring the BIOS

BIOS update availability

Obtain BIOS upgrades from your Nortel Networks distributor.

BIOS upgrade floppy disk

You must perform the Intel server BIOS upgrade using a bootable floppy disk. This disk must load the MS-DOS extended memory driver, himem.sys.

Before you begin

The process of upgrading the BIOS includes four steps:

1. making the BIOS disk bootable
2. updating flash memory for BIOS upgrades
3. clearing the NVRAM
4. running SSU to reconfigure the system and memory

To make the BIOS upgrade disk bootable

1 From the C:\> prompt, type **sys a:** and press Enter.

2 Type **copy C:\dos\himem.sys a:** and press Enter.

3 Create a config.sys file on the floppy disk to load himem.sys. The config.sys file must contain the following line:
device=\himem.sys

To upgrade the BIOS

1. Power down the server.
2. Insert the update disk in drive a:\.
3. Power up the server.

   Result: The upgrade process starts automatically following the system start-up.
4. Follow the instructions, depending on which version of the BIOS is currently installed on the target machine.
5. Power down the server after the update process is complete.
6. Remove the BIOS update disk from the drive.
7. Continue with the next procedure to clear the NVRAM and update the flash memory.

To clear the NVRAM

1. Power down the server.
2. Move the BIOS recovery jumper from pins 1–2 to pins 2–3.
3. Insert the BIOS recovery disk in drive a:\.
4. Power up the server.

   Result: When the recovery process has run its course, the system displays a message to state that the NVRAM has cleared.
5. Power down the server.
6. Remove the disk from drive a:\.
7. Set the BIOS recovery jumper from pins 2–3 back to pins 1–2.
8. Replace the side cover.
9. Power up the server.
10. Reconfigure the system with SSU.
11. Start up from the hard disk
12. Continue with the next procedure to configure the BIOS.

To configure the BIOS

1 Power on the server.

Result: The system displays server start-up messages.

2 Press F2 to display the Setup screen.

3 Press BIOS Default (F9) to load the default BIOS settings.

4 Ensure the BIOS settings are set to the following values:

	Setting:	**Set To:**
Main	CPU Speed Setting	350 Mhz
Advanced	Use Multiprocessor Spec	1.4
Server	PCI IRQs to I/O APIC Mapping	Disabled

5 Select Save and Exit to save the correct BIOS settings and return to the Main Menu.

SSU overview

Introduction

The System Setup Utility (SSU) configures computer systems with ISA and PCI cards.

Purpose of the SSU

The SSU automates the configuration process for systems, maintains system parameters, and stores those parameters in non-volatile RAM. If the SSU is used to assign all system resources, there should be no conflicts between adapter cards.

When to use the SSU

You must execute the SSU every time ISA or PCI adapter cards are physically added, removed, or moved in your system. Use SSU when you

- initially set up and configure the system
- encounter a configuration error message at power on
- add or remove system hardware

The SSU operates on information provided by the configuration files, configuration registers on PCI cards, and NVRAM in the system memory.

Record the SSU settings

Record the SSU settings in the system log. If the default values ever need to be restored, you must run the SSU to reconfigure the system.

SSU upgrade floppy disk

The SSU must be run from a bootable floppy disk. This disk must load the MS-DOS extended memory driver, as well as a mouse driver.

To make the SSU disk bootable

1. From the C:\> prompt, type **sys a:** and press Enter.
2. Type **copy C:\dos\himem.sys a:** and press Enter.
3. Create a config.sys file on the floppy disk to load himem.sys. The config.sys file must contain the following line:

   device=\himem.sys

Configuring your system using SSU

Overview

In order to run the SSU, restart your system using the Nortel Networks 702t Meridian Application Server System Setup Utility disks (Version 2.0). There are three disks.

To configure the system using SSU

1 Insert Disk 1 of the System Setup Utility (SSU) disks in the floppy disk drive.

Note: Ensure that the write protection is turned off the SSU disk.

2 Reboot the system from the SSU disk.

Result: The MS-DOS 6.2 Start-up Menu displays.

3 Select “1. Booting from MS-DOS,” then press Enter.

Result: The system displays a variety of messages. When the reboot is complete, the system prompts you to insert Disk 2.

4 Insert Disk 2 of the SSU disks in the floppy disk drive, then press any key to continue.

Result: The system prompts you to insert Disk 3.

5 Insert Disk 3 of the SSU disks in the floppy disk drive, then press any key to continue.

Result: The following message is displayed: `“No Mouse Language File Found. Press any key to continue...”`

6 Press any key to display the SSU Main Screen.

7 Press any key to display the System Setup Utility screen.

8 Select RCA/Resources in the Tasks window, then select OK.

Result: The system displays the Resource Configuration Add-In screen.

9 Highlight Baseboard: System Board in the Devices window, then double-click to select this option.

10 Press the Resource Use button on the baseboard: System Board screen.

Result: The system displays the System Resource Usage screen. The following table shows the Resource List with the IRQs.

IRQ	Resource	
0	Baseboard: System Board	Timer
1	Baseboard: System Board	Chipset
2	Unused	
3	Baseboard: System Board	Serial Port 2
4	Baseboard: System Board	Serial Port 1
5	PCI Card: Bus 00 Dev 0C	Ethernet Controller (CLAN)
6	Baseboard: System Board	On-Board Floppy Controller
7	Baseboard: System Board	Parallel Port
8	Baseboard: System Board	RTC (Real Time Clock)
9	Baseboard: System Board	ACPI SCI Interrupt
10	PCI Card: Bus 00 Dev 0F	Ethernet Controller (ELAN)
11	PCI Card: Bus 00 Dev 0E	Determined by application
12	Baseboard: System Board	Mouse Interrupt
13	Baseboard: System Board	Math Co-processor
14	Baseboard: System Board	On-Board IDE Controller
15	PCI Card: Bus 00 Dev 0D	Multi-function Controller - SCSI Controller
15	PCI Card: Bus 00 Dev 0C	Multi-function Controller - SCSI Controller
15	PCI Card: Bus 00 Dev 12	Multi-function Controller - USB Controller

11 Compare the table to the IRQs on your system.

If the IRQs match the table	Go to Step 16.
If the IRQs need to be changed	Go to Step 12.

12 Double-click on the line which contains the IRQ to be changed.

Result: The system displays the screen that contains the details of the item.

13 Modify the parameters to match those on the table above.

14 Double-click on the IRQ number to change the IRQ.

15 Press OK to save the change to the configuration.

Result: The system displays the Resource Configuration Add-In screen.

16 Press Save to save the changes.

Result: The system displays the message, `“Save this configuration in system non-volatile storage?”`

17 Click Yes.

Result: An information window appears to confirm that the configuration has been saved. The SSU must be restarted before saving again.

18 Press OK to acknowledge the message.

Result: The system asks whether you want to make a backup of the configuration.

19 Press No.

20 Press Close to exist from the Resource Configuration Add-In screen.

Result: The system displays the SSU Main screen.

21 Select File>Exit.

22 Select OK to confirm you wish to exit the system.

23 Remove any diskette from the floppy drive.

24 Reboot the system.

Testing hardware components

In this section

Testing components with PC Diags

PC Diags

After you install any piece of hardware in your MAS 702t, you must perform diagnostics tests to ensure that the part functions properly. Nortel Networks recommends that you run PC Diags to conduct these tests. Refer to "Running PCDiags tests manually" on page 248 for this procedure.

Understanding multimedia processing hardware

In this section

Overview of multimedia processing hardware

Introduction

Processing of voice, fax and speech-recognition calls requires the installation and configuration of specialized multimedia processing hardware and software.

When a caller first places a voice, fax, or speech-recognition call, the call data is converted from analog to digital data on the switch. This digitized call data is forwarded from the switch to the multimedia processing board (MPB-16) on the server.

Upon reaching the MPB-16 board, the call data is forwarded to multimedia channels, which transport the call data to multimedia processing cards (MPC-8 cards), or to one of the two MPB-16 on-board multimedia processing sections. (Each of the on-board sections on the MPB-16 carrier board has the processing capability of one MPC-8 card.

These cards provide various multimedia processing services to the incoming call data such as voice compression, silence compression, and tone detection and generation.

Multimedia software

Multimedia software performs the real-time multimedia processing that is required to handle the incoming and outgoing voice, fax, and speech-recognition calls. Multimedia processing includes tasks such as voice compression, silence compression, and tone detection and generation.

Once new hardware has been added to the system, it must be configured in the software.

Multimedia hardware

Multimedia processing requires three main types of hardware, as outlined below.

Multimedia processing card (MPC-8)	These cards allow the server to process multimedia calls coming in from the switch by using a Digital Signal Processing (DSP) chip which is embedded in the card. Each card can handle 8 channels.
Multimedia processing board (MPB-16)	This printed circuit board contains two embedded DSP s, each possessing 8 multimedia channels (for a total of 16 channels for the board). Up to four more MPC-8 cards can be added to expand the processing capacity to 48 channels.
MGate card	This circuit board resides in the PBX switch and facilitates the transportation of data between the switch and the MAS server.

Refer to the following sections for detailed information on the multimedia processing hardware.

- “About MPC-8 cards” on page 195
- “Overview of the MPB-16 board” on page 204
- “About the MGate card” on page 210

Installing MPC-8 cards

In this section

Overview

Introduction

This section describes the procedures required to install MPC-8 cards. Each of the following procedures must be performed in the following sequence:

1. Taking MPC-8 cards out of service on page 198
2. Installing and replacing MPC-8 cards on page 199

Before you begin

When you install MPC-8 cards, you insert them into bays on a MPB-16 multimedia processing board. Each server has a maximum of two MPB-16 multimedia processing boards, at least one of which is installed in the server on delivery.

If the server has only one MPB-16 multimedia processing board installed and you want to install more cards than the board will hold, you must install a second MPB-16 multimedia processing board.

To install an MPB-16 multimedia processing board, see the section “Installing MPB-16 multimedia processing boards” on page 203.

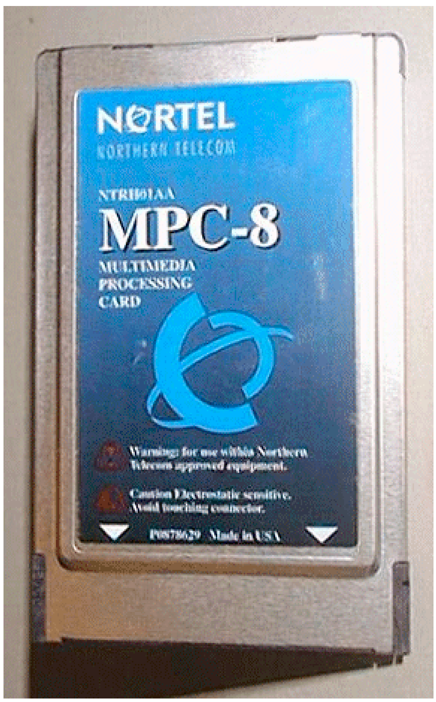
About MPC-8 cards

Introduction

A Multimedia Processing Card (MPC-8) card is a credit-card-sized PC-Card that plugs into a Multimedia Processing board (MPB-16) on the server. MPC-8 cards enable the server to process multimedia calls using a Digital Signal Processing (DSP) chip embedded in the card.

Note: Although MPC-8 cards are contained in PC-Card packages, they are not electrically PCMCIA-compliant. These cards work only in bays designated specifically for MPC-8 cards.

When MPC-8 cards have been installed, they are automatically detected during both the initial server start-up (new system) or subsequent reboots (for example, after a new MPC-8 card is installed); however, they must still be configured in the software.



What does an MPC-8 card do?

The primary functions of the MPC-8 card are to:

- receive digitized call data that comes in from the switch
- process the call data and the voice prompts that respond to the incoming call data.

Data is received by way of multimedia channels; call data and voice prompts are processed by a Signal Processing Component (SPC) on the MPC-8 card.

Each MPC-8 card can support a limited number of incoming voice, fax, or speech-recognition calls. This number varies depending on the type and volume of incoming calls because each type requires a different number of multimedia SPC resources to be processed. That is, each MPC-8 card must have enough unused processing power to receive the incoming call data from the multimedia channels; otherwise, the caller will hear a busy signal or the call will remain unanswered.

Multimedia channels

Multimedia channels queue call data coming into the MPB-16 multimedia processing and transport it to MPC-8 cards to be serviced. Multimedia channels also transport voice prompts from the server back to the switch in response to the incoming call data.

One MPC-8 card supports up to eight multimedia channels. Each channel is configured to support only one type of call data, or media type: voice, fax or speech-recognition.

Different types of calls require a different number of multimedia channels to be processed, as shown on the following table.

Type of call (media type)	Number of multimedia SPC resources required
Voice (V)	1
Fax (F)	2
Speech-recognition (S)	4

Possible channel combinations

One MPC-8 card can provide any combination of voice, fax, or speech-recognition calls that has a total of eight channels. For example, typical combinations may include the following:

- 2 speech-recognition calls
- 2 fax + 4 voice calls
- 8 voice calls
- 1 fax + 1 speech-recognition + 2 voice calls

Note: If the server cannot process the volume or the type of incoming calls, you must first determine whether the installed MPC-8 cards are working properly. If all MPC-8 cards are operating trouble-free, you must install additional MPC-8 cards to increase the number of multimedia channels. Contact Nortel Networks for assistance.

Maximum number of MPC-8 cards per server

Each MPC-8 card contains 8 channels. Two MPC-8 cards are embedded on the MPB-16 board, which gives each board 16 channels which are "built-in."

An additional four MPC-8 cards can be added to the slots on the MPB-16 board, which potentially provides an additional 32 channels (4 cards X 8 channels). With a fully loaded board, there are 48 channels.

The server supports up to a maximum of two fully loaded MPB-16 boards, which provides 96 channels, as shown on the following table.

	Maximum multimedia channels	**Optional MPC-8 cards**
One MPB-16 multimedia processing board	48 (16 of which are built in to the MPB-16 multimedia processing board)	4 (provides up to 32 additional channels)
Two MPB-16 multimedia processing boards	96 (32 of which are built in to the MPB-16 multimedia processing boards)	8 (provides up to 64 additional channels)

Taking MPC-8 cards out of service

Introduction

Before you power down the server to install or remove an MPC-8 card, you must shut down all call processing using the appropriate method of stopping.

CAUTION!

Risk of data loss

Stop all call processing, and power the server completely down before adding or removing MPC-8 cards from the server.

For detailed information on starting, stopping, or otherwise managing hardware components, see the *System Administration Guide* for your application.

Methods of stopping

The following methods of taking a component out of service, also called stopping, enable you to choose the way in which incoming calls are affected.

Courtesy stop/down

A courtesy stop prevents active calls from being dropped. It takes the component out of service only after it has finished processing current calls. This operation must be performed from a client using Application Tools (MAT) and client software.

Stop

A stop takes the component out of service immediately. It drops all active calls and disconnects callers.

This operation must be performed from a client using Application Tools (MAT) and client software.

Installing and replacing MPC-8 cards

Introduction

MPC-8 cards can be added to the system to increase the number of multimedia channels available to process voice, fax, or speech-recognition call data coming in from the switch.

You can also replace an MPC-8 card if it is defective, or if you want to install an upgrade. If you subscribe to General Release Bulletins, you will be notified of MPC-8 card upgrades.

Note: Although MPC-8 cards are contained in PC-Card packages, they are not electrically PCMCIA-compliant, and work only in bays designated specifically for MPC-8 cards.

CAUTION!

Risk of personal injury or equipment damage

Ensure that the power is turned off before you install the MPC-8 cards.

CAUTION!

Risk of data loss

Perform a courtesy down on the server before installing or removing any MPC-8 cards.

When to install

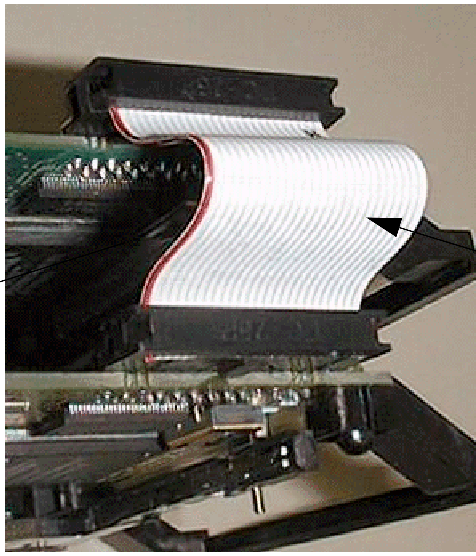
The number of multimedia channels and processing cards required for your system depends on call traffic and the type of calls being received, such as fax. To determine channel and card capacity requirements, refer to the Planning and Engineering Guidelines for your application.

SC Bus ribbon cable

In most cases, the MPC-8 cards can be installed on the MPB-16 multimedia processing board without disconnecting the SC bus ribbon cable.

If the server has two MPB-16 multimedia processing boards, access to MPC-8 card bay 4 on one of the MPB-16 multimedia processing board is blocked by the SC Bus ribbon cable, which connects the two boards. In this case, you must disconnect the SC Bus ribbon cable in order to install an MPC-8 card in bay 4.

Note: Be careful not to pinch the cable when sliding the chassis cover back on.



CAUTION!

Risk of personal injury or equipment damage

Ensure the power is turned off before installing the MPC-8 cards.

To install an MPC-8 card

CAUTION!

Risk of personal injury or equipment damage
Ensure the power is turned off before installing the MPC-8 cards.

1. Courtesy down the system from the MAS client administration terminal to stop all call processing gracefully.
2. Ensure that all connected clients are logged out of their Meridian Application Tool Administration session with the server.
3. Shut down Windows NT from the server, as outlined in “Shutting down the server” on page 63.
4. Power down the server.

CAUTION!

Risk of personal injury or equipment damage
Ensure the power is turned off before you remove the chassis cover.

5. Remove the chassis cover.
6. Slide the MPC-8 card into any available bay on the MPB-16 multimedia processing board with the label side up.
7. Press the MPC-8 card gently into the bay until you feel the card slide firmly into place. If the card is placed in upside down, it will not slide completely into the bay.

8 Replace the chassis cover.

9 Restart the server. Ensure the server boots up successfully into Windows NT. (This should take approximately 20 - 30 minutes.)

10 Configure the client software to recognize the new MPC-8 card. Refer to the *System Administration Guide* for your application for detailed instructions.

To replace an MPC-8 card

1 Courtesy down the system from the MAS client administration terminal to stop all call processing gracefully.

2 Ensure that all connected clients are logged out of their Meridian Application Tool Administration session with the server.

3 Shut down Windows NT from the server.

4 Power down the server.

CAUTION!

Risk of personal injury or equipment damage
Ensure the power is turned off before removing the chassis cover.

5 Remove the chassis cover.

6 Remove the faulty MPC-8 card as follows:

a. Pull the card to loosen it from the bay.

b. Pull the card out of the bay.

7 Slide the new MPC-8 card into the emptied bay on the MPB-16 multimedia processing board with the label side up.

8 Press the MPC-8 card gently into the bay until you feel the card slide firmly into place. If the card is placed in upside down, it will not slide completely into the bay.

9 Replace the chassis cover.

10 Restart the server.

11 Ensure the new MPC-8 card is recognized by the system. Refer to the *System Administration Guide* for your application for detailed instructions.

Installing MPB-16 multimedia processing boards

In this section

Overview of the MPB-16 board

Introduction

An MPB-16 multimedia processing board is a printed-circuit board that resides in the server. Typically, each server is shipped with up to two MPB-16 multimedia processing boards.

MPB-16 multimedia processing boards have four bays for optional MPC-8 cards and two “built-in” or embedded MPC-8 cards. For details concerning the MPC-8 cards and available channels, refer to “About MPC-8 cards” on page 195.

There are currently two supported varieties of MPB-16, as follows:

MPB-16 board		Associated MGate card version
NTRH20AA	Contains 2 RJ-45 DS30X connectors on the MPB-16 multimedia processing board	NTRB18BA
NTRH20AB	Contains a single DB-25 pin DS30X connector on the MPB-16 multimedia processing board	NTRHB18CA

CAUTION!

Risk of data loss

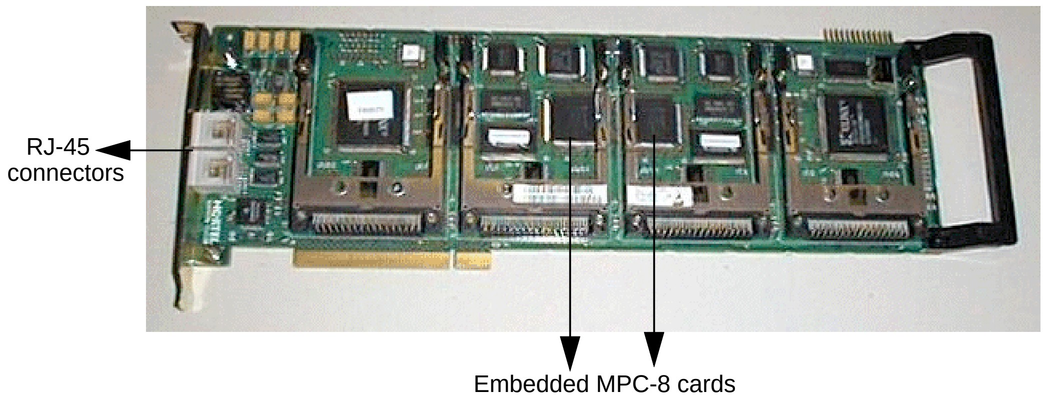
The MPB-16 multimedia processing board is shipped from the factory with the appropriate version MGate card and DS30X cables.

Do not substitute other versions of these cards and cables in the configurations specified in this documentation, as this may result in equipment damage.

Multimedia processing boards

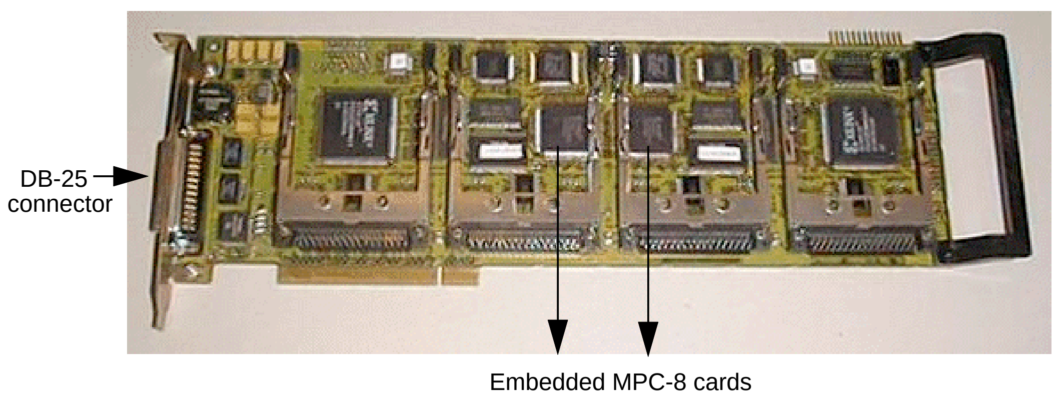
NTRH20AA multimedia processing board

Connections for configurations with the NTRH20AA version of the MPB-16 board are made using single cables equipped with RJ-45 DS30X connectors (NTRH2010). The cable is connected to the I/O connector panel on the switch for the associated MGate card (NTRB18BA) to carry voice, fax, or speech-recognition data between the switch and the server.



NTRH20AB multimedia processing board

The NTRH20AB MPB-16 is equipped with a D-shaped, 25 pin connector (DB-25). This cable is connected to the I/O connector panel on the switch for the associated MGate card to carry voice, fax, or speech-recognition data between the switch and the server.



Installing MPB-16 multimedia processing boards

Introduction

This section describes the procedures required to install MPB-16 multimedia processing boards in the MAS server. MPB-16 boards are shipped separately, and installed on-site.

If more than 48 channels are required, a second MPB-16 multimedia processing board can be installed to increase the number of DSP resources available to process calls. For more than 64 channels, a third MGate card must be installed.

CAUTION!

Risk of electrical damage

Wear an antistatic ESD wrist strap when handling multimedia processing boards and cables.

To install an MPB-16 multimedia processing board

1 Courtesy down the system from the MAS client administration terminal to stop all call processing gracefully for an existing system only.

2 Ensure that all connected clients are logged out of their Meridian Application Tool Administration session with the server.

3 Shut down Windows NT from the server.

4 Power down the client.

5 Power down the server.

CAUTION!

Risk of personal injury or equipment damage

Ensure the power is turned off before installing the MPC-8 cards.

6 Remove the server cover.

7 Remove the protective metal strip on the backplane behind the PCI slot which is intended for the MPB-16 board. Refer to the table in “Slot assignments” on page 41 to determine the correct PCI slot.

8 Press the MPB-16 multimedia processing board firmly into its slot in the backplane.

Note: Take care to slide the MPB-16 board carefully past the foil strips, as they are easily damaged.

9 If two MPB-16 boards are within the server, connect the boards with the SC Bus cable.

10 Connect the appropriate DS30X link cables to the I/O connector panel on the switch, to the connector for the associated MGate card(s), as outlined in “Supported configurations” on page 217.

11 Connect the DS30X connector(s) on the cable assembly to the MPB-16 multimedia processing board, as shown in “Supported configurations” on page 217.

12 Replace the server cover.

Note: Be careful not to pinch the cable when sliding the server cover back on.

13 Power up the server.

Installing MGate cards

In this chapter

About the MGate card

Introduction

The MGate card is installed in the PBX switch that provides call data to the MAS server. DS30X cables connected to the switch carry voice, fax, or speech-recognition data to the server.

Supported hardware

Based on system requirements, one of two types of MGate cards is shipped from the factory with the appropriate version of MPB-16 multimedia processing board and DS30X cables, as outlined in the following table.

MGate card version	MPB-16 board	DS30X cable
NTRB18BA	NTRH20AA	NTRH2010 cable Single RJ-45 to Telco connectors on the MPB-16 multimedia processing board
NTRHB18CA	NTRH20AB	Single (NTRH2012) Double (NTRH2013) DB-25 pin to a Telco connector on the MPB-16 multimedia processing board

CAUTION!

Risk of data loss

The MGate card is shipped from the factory with the appropriate version MPB-16 multimedia processing board and DS30X cables.

Do not substitute other versions of these cards and cables in the configurations specified in this documentation, as this may result in data loss.

For information on MPB-16 boards, refer to "Overview of the MPB-16 board" on page 204.

The number of channels supported

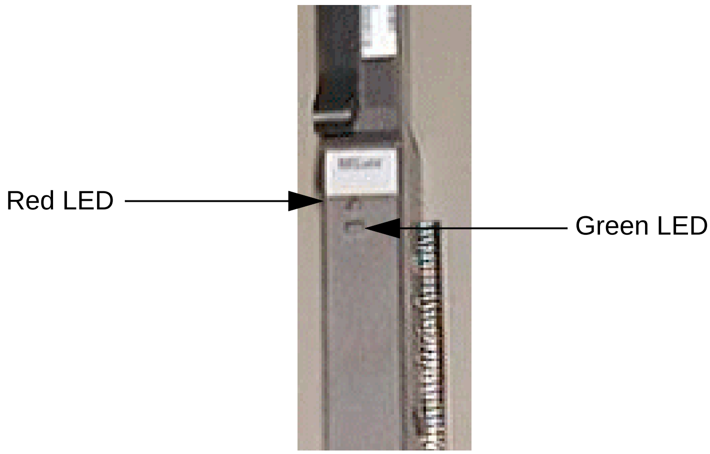
Each MGate card supports 32 channels. The number of channels supported is the same, regardless of the type of call data (fax or voice).

A second MGate card must be installed if more than 32 channels are required on the system.

A third MGate card must be installed if more than 64 channels are required on the system.

LED indicators

The MGate card has red and green LED indicators on the faceplate of the MGate card.



The red LED indicates software status, as follows:

- OFF, the card is software-enabled
- ON, the card is software-disabled

The green LED indicates the card status, as follows:

- ON, the card is operational
- OFF, the card is faulty.

The combined state of the red and green LEDs provides the important indicator. The LED states are described in the following table.

Combined LED states

Red LED	Green LED	Description
OFF	ON	Card is software-enabled, card is operational
ON	ON	Card is software-disabled, card is operational
ON	OFF	Software disabled, card is faulty
OFF	OFF	No power, or card is faulty
Winking	Winking	Self test

Installing the MGate card

Overview

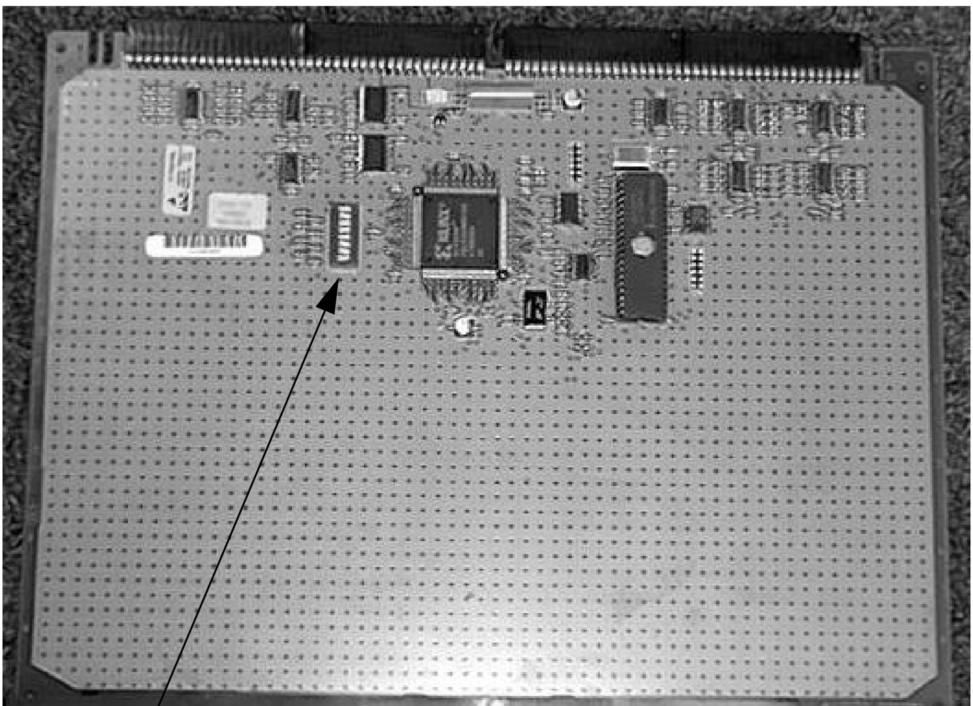
An MGate card is installed if additional voice channels are required, or if the existing MGate card is faulty.

If additional voice channels are required, install the MGate card as outlined in “To install the MGate card” on page 214.

If an MGate card is faulty, use the replacement procedure in this section to install a new MGate card.

The MGate card

The following photograph illustrates the MGate card, showing the location of the dip switches.



Dip Switches

To install the MGate card

Note: You do not need to power down the switch for this procedure as the MGate card is hot-swappable.

1 Remove the switch cover front panel to expose the shelf slots.

2 Remove the MGate card from its protective sleeve.

3 Set the DIP switches on the MGate card as shown in the following table:

	1	2	3	4	5	6	7	8
ON	X	X	X				X	
OFF				X	X	X		X

4 Press and pull the top and bottom latches on the MGate card outward to open the latches for installation of the card. A hook on the bottom of the latch has to clear a small pin in order to open.

5 Slide the MGate card into the assigned slot on the switch.

6 Ensure that the slot you choose is consistent with the switch programming (for example, the slot identified in the TN configurations).

Note: MGate cards can be placed in any slot on any shelf in Option 11C, Option 61C, and Option 81C switches that possess 24 tip and ring pair wiring connections to the I/O connector panel.

Slots that possess 16 tip and ring pair wiring connections require a cable kit extension in order to be used with MGate cards. (Sixteen tip and ring pair wiring is present on older vintage 8D37 backplanes.)

It is NOT required that cards be placed adjacent to one another within a single shelf/cabinet. It is NOT required that all cards be placed within a single common shelf/cabinet.

To determine whether a slot possesses 16- or 24-tip and ring pair wiring, refer to *Meridian 1, System Installation & Maintenance Guide* (P0868059).

7 Press the latches to close them, locking the card into position.

8 View the status of the LED indicators to ensure the card is software-enabled (Red LED is OFF), and the card is operational (Green LED is ON).

9 Connect the DS30X cables as illustrated in the diagrams of supported configurations on page 217, ensuring all screws and fasteners are secure.

Note: Try to place the cable in a location which will prevent its being stepped on or dislodged.

To replace an MGate card

1 Courtesy down the system from the MAS client administration terminal to stop all call processing gracefully.

Note: If your system has multiple MGate cards, you may choose to courtesy stop only the DS30 channels belonging to the MGate which is being replaced.

2 Remove the switch cover front panel to expose the shelf slots.

3 Open the latches to unlock the faulty MGate card.

4 Remove the faulty MGate card from the switch.

Note: You do not need to power down the switch for this procedure as the MGate card is hot-swappable.

5 Press the replacement MGate into the same slot that the faulty MGate card occupied.

Note: If you place the MGate card in a new slot, then you will have to reprogram the switch to account for the new slot number, move the DS30X cable to the new slot, and reconfigure the software from the MAS client administration terminal. Refer to the *System Administration Guide* for your application for detailed instructions.

6 Press the latches to close them, and lock the card into position.

7 View the status of the LED indicators to ensure the card is software-enabled (Red LED is OFF), and the card is operational (Green LED is ON).

8 Re-enable call processing or the specific DS30 channels that were disabled before the card was removed. Refer to the *System Administration Guide* for your application for detailed instructions.

Supported configurations

Overview

Only the MPB-DS30X cable system configurations detailed below are supported for the Meridian Application Server.

NTBUSx and DS30Xx are logical device names that are displayed on the MAS client graphical user interface. For the purposes of these configurations, please note that NTBUS 1 and NTBUS2 represent MPB-16 #1 and MPB-16 #2 respectively.

Also, please be aware that the MAS client interface displays actual NTBUS devices, but shows **all** possible DS30X devices, regardless of the actual cabling. For example, with a single MPB-16, the system displays NTBUS1, DS30X1, and DS30X2, even though only one DS30X cables is actually attached.

CAUTION!

Risk of data loss
Do not use a double cable in place of a single cable in any configuration.

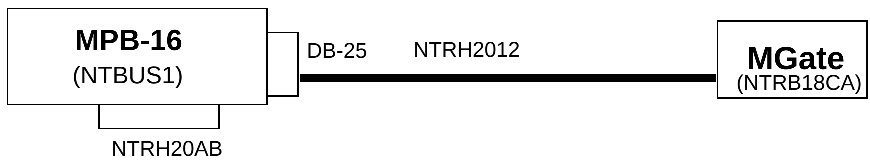
Note: The switch must be located within 30 feet of the MAS server.

Location of DSP cards and connectors

Supported configurations for MPB-16 (NTRH20AB)

1 MPB plus 1 MGate

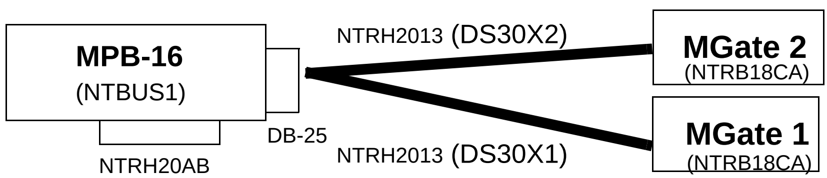
MGate card must be connected with a single cable (NTRH2012).



1 MPB plus 2 MGate cards

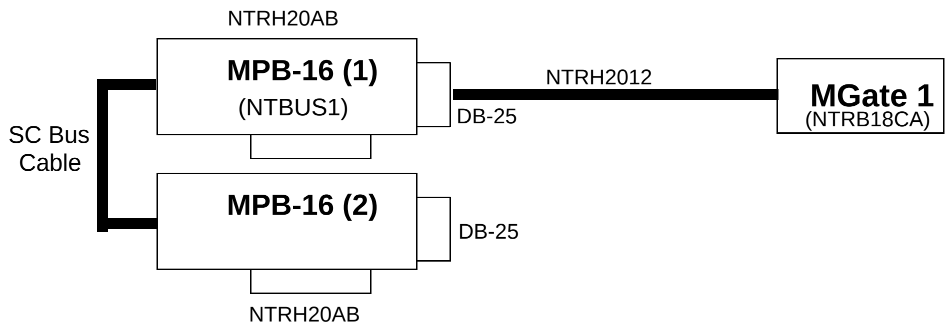
MGate cards are connected to the MPB-16 with a double cable (NTRH2013).

- Connect the DB-25 connector on the NTRH2013 cable to the MPB-16.
- Connect the MGate 1 card to the DS30X1 end of the NTRH2013 cable.
- Connect the MGate 2 card to the DS30X2 end of the NTRH2013 cable.



2 MPB's plus 1 MGate card

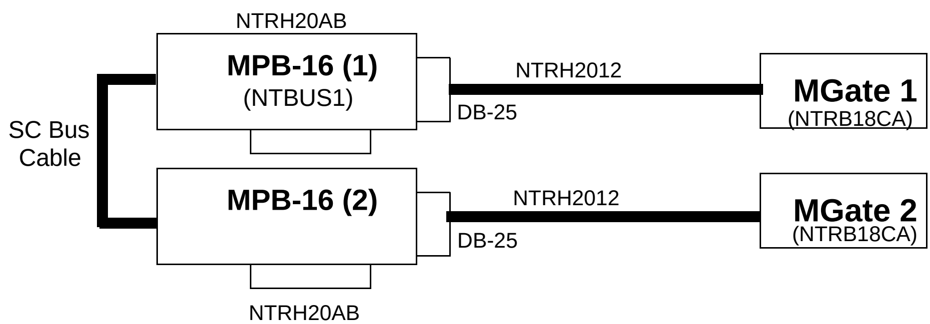
- MGate card is connected to MPB-16 (1) using the single cable (NTRH2012).



2 MPB's plus 2 MGate cards

MGate cards are connected to the MPB-16 cards with two single NTRH2012 cables.

- Connect MGate 1 to MPB-16 (1) with a single NTRH2012 cable.
- Connect MGate 2 to MPB-16 (2) with a single NTRH2012 cable.



2 MPB's plus 3 MGate cards

MGate cards are connected to the MPB-16 cards with one single NTRH2012 cable, and one double NTRH2013 cable.

- Connect the DB-25 connector on the NTRH2013 cable to MPB-16 (1).
- Connect the MGate 1 card to the DS30X1 end of the NTRH2013 cable.
- Connect the MGate 2 card to the DS30X2 end of the NTRH2013 cable.
- Connect the DB-25 connector on the NTRH2012 cable to MPB-16 (2).
- Connect the MGate 3 card to MPB-16 (2) with a single NTRH2012 cable. This is actually connection DS30X3, although this designation is implied, not actually labeled as such.

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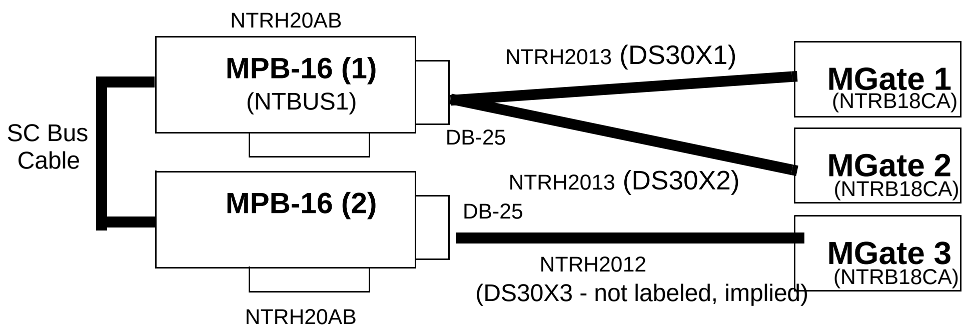
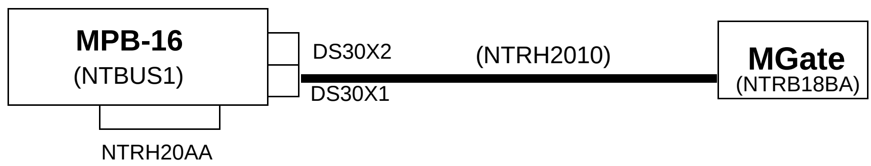


Supported configurations for MPB-16 (NTRH20AA)

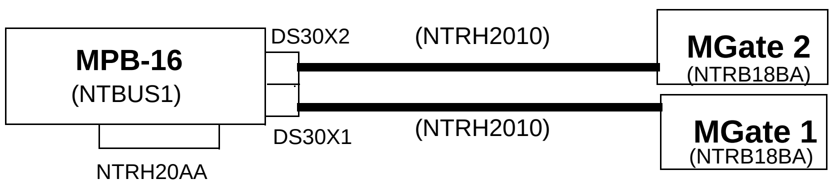
1 MPB plus 1 MGate

Connect the MGate card to the MPB-16 card's first (left) DS30X1 connector.



1 MPB plus 2 MGate cards

- Connect the MGate 1 card to the MPB-16 card's first (left) DS30X1 connector.
- Connect the MGate 2 card to the MPB-16 card's second (right) DS30X2 connector.

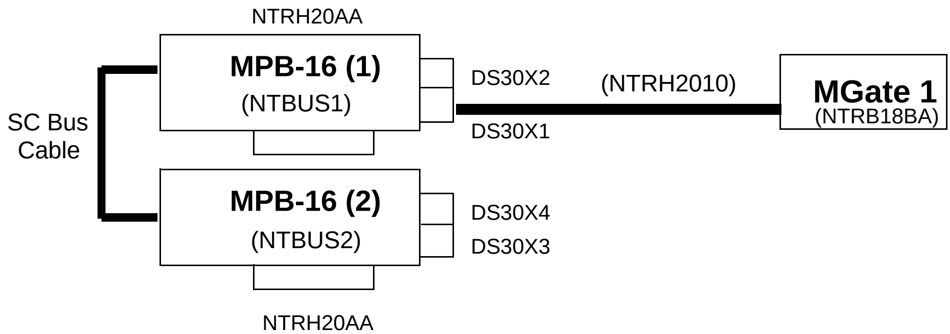


ATTENTION!

Refer to the pictures on page 218 for the location of the connectors.

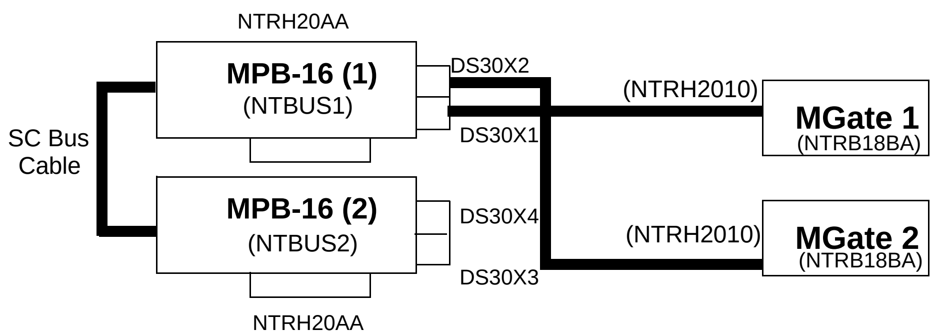
2 MPB's plus 1 MGate card

- Connect the MGate 1 card to the MPB-16 (1) card's first (left) DS30X1 connector.



2 MPB's plus 2 MGate cards

- Connect the MGate 1 card to the MPB-16 (1) card's first (left) DS30X1 connector.
- Connect the MGate 2 card to the MPB-16 (1) card's second (right) DS30X3 connector.



ATTENTION!

Refer to the pictures on page 218 for the location of connectors. The slot assignment table on page 41 also determines which is MPB 1 and MPB 2.

2 MPB's plus 3 MGate cards

- Connect the MGate 1 card to the MPB-16 (1) card's first (bottom) DS30X1 connector.
- Connect the MGate 2 card to the MPB-16 (1) card's second (top) DS30X2 connector.
- Connect the MGate 3 card to the MPB-16 (2) card's first (bottom) DS30X3 connector.

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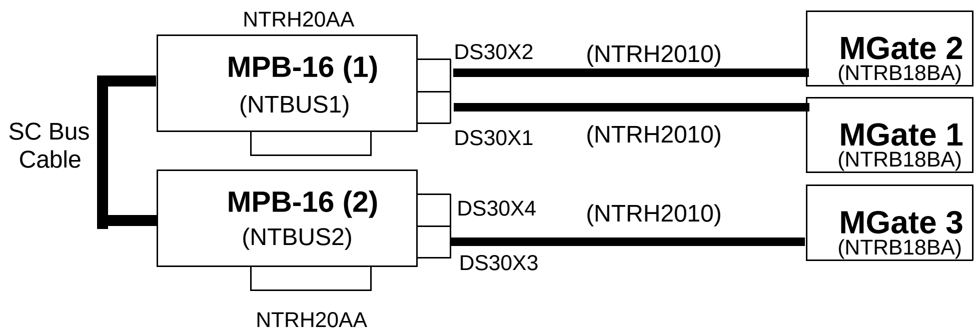


chapter 6

Troubleshooting

In this chapter

Identifying hardware problems

In this section

Overview of identifying hardware problems

Introduction

This section provides checklists for identifying possible hardware problems relating to

- fans and cooling
- power and power supplies
- hard and floppy disk drives
- starting up the server

Try the solutions in the order given. If you cannot correct the problem, contact your Nortel Networks service representative for assistance.

Powering up the server

Checklist

If the system does not power up, you may need to replace the motherboard or the front panel controller.

Corrupted BIOS

Checklist

- If the system does not power up, you may have a corrupted BIOS.
- If you hear the drives, or the power comes on but nothing appears on the display, try to recover the BIOS.
- If you suspect the BIOS is corrupt, use the Clear NVRAM jumper on the motherboard to reset the BIOS to a known state. After clearing the NVRAM, reconfigure the server using the SSU.

If these solutions do not work, contact your Nortel Networks service representative.

Fails to boot and no beep codes

Checklist

When you turn on the system, Power-On Self-Test (POST) displays messages that provide information about the system. If a failure occurs, POST emits beep codes to indicate whether the problem is hardware- or software-related. If the system fails to start and emits no beeps, check the following:

- If the system operates normally, but there is no beep, the speaker may be defective. Verify that the speaker is enabled by running the System Setup Utility (SSU).
- If the speaker is enabled but not functioning, contact your service representative or authorized dealer for assistance.
- Record the beep code emitted by POST and see "Interpreting POST diagnostics" on page 262.

Power light does not light

Checklist

If your power light is not operating, check the following:

- Is the system operating normally?

  If so, the power LED is probably defective, or the cable from the front panel to the motherboard is loose.

- Are there other problems with the system?

  If so, check the items listed under “System cooling fans do not rotate properly” on page 235.

If all items are correct and problems persist, contact your Nortel Networks service representative or authorized dealer for assistance.

No characters appear on-screen

Checklist

If no characters appear on the screen, check the following:

- Is the keyboard working?
- Are the keyboard and mouse plugged into the correct ports?
- Is the video monitor plugged in and turned on?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Is the video monitor signal cable properly installed?
- Is the onboard video controller enabled?
- If you are using an add-in video controller board, do the following:
  - With the server powered down, verify that the video controller board is fully seated in the motherboard connector.
  - Run the SCU to disable the onboard video controller, and specify that an offboard VGA/EGA adapter is installed.
  - Restart the system for changes to take effect.
  - If there are still no characters on the screen after you restart the system, write down the POST beep code that you hear. This information is useful for your service representative.

  Note: POST emits one long beep and four short beeps, or a long-short-long-short pattern, to indicate a possible problem with the video display controller.

  - If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. Contact your Nortel Networks service representative for assistance.

Characters are distorted or incorrect

Checklist

If characters are distorted or incorrect, check the following:

- Are the brightness and contrast controls properly adjusted on the video monitor?
- Are power supply and cables the right type (in Europe only)?
- Are the video monitor signal and power cables properly installed?

If the problem persists, the video monitor may be faulty, or it may be the incorrect type. Contact your Nortel Networks service representative for assistance.

System cooling fans do not rotate properly

Checklist

If the system cooling fans do not operate properly, system components may be damaged.

Check the following:

- Is AC power available at the wall outlet?
- Is the system power cord properly connected to the system and the wall outlet?
- If present, is the fuse in the system AC power cord plug okay?
- Did you press the power on/off push-button switch?
- Is the power-on light lit?
- Have any of the fan motors stopped?
- Are the fan power connectors properly connected to the motherboard?
- Is the cable from the front panel board connected to the motherboard?
- Are the power supply cables properly connected to the motherboard?
- Is the power supply cable with the two-pin enable connector properly connected to the motherboard?
- Are there any shorted wires caused by pinched cables or power connector plugs forced into power connector sockets the wrong way?

If the switches and connections are correct and AC power is available at the wall outlet, contact your Nortel Networks service representative for assistance.

Floppy disk drive activity light does not light

Checklist

If the floppy disk drive activity light does not light when the drive is being used, check the following:

- Are the disk drive power and signal cables properly installed?
  - Are they properly seated?
  - Are they flipped?
- Are all relevant switches and jumpers on the disk drive set correctly?
- Is the disk drive properly configured?
  - If you are using the onboard disk controller, use the SCU to make sure that onboard floppy is set to Enabled.
  - If you are using an add-in disk controller, ensure that the onboard floppy disk is set to Disabled.

If the problem persists, there may be a problem with the disk drive, motherboard, or drive signal cable. Contact your Nortel Networks service representative for assistance.

Hard disk drive activity light does not light

Checklist

If you have installed one or more hard disk drives in your system, check the following:

- Are the power and signal cables to the drive properly installed?
  - Are they properly seated?
  - Are they flipped?
- Are all relevant switches and jumpers on the hard drive and adapter board set correctly?
- Is the hard disk drive properly configured?

  Has the drive been
  - registered with the BIOS?
  - properly partitioned?
  - formatted (both low level and high level)?
- Did you set a jumper or switch so that a SCSI device waits for the Send Start Unit Command at power-on, but the SCSI BIOS is disabled or you have set the command option to No? If so, the device will not start.

Notes:

1. Nortel Networks does not support add-in SCSI cards apart from the RAID controller.
2. If you have a system with RAID, drive activity may not be shown by the front-panel LED.

If the problem persists, there may be a problem with the drive, add-in controller board, motherboard, drive signal cable, or LED connector. Contact your Nortel Networks service representative for assistance.

CD-ROM drive activity light does not light

Checklist

If the CD-ROM drive activity light does not light, check the following:

- Is the LED connector properly connected and working?
- Are the power and signal cables to the CD-ROM drive properly installed?
  - Are they properly seated?
  - Are they flipped?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?
- Is the onboard IDE controller enabled?

If the problem persists, there may be a problem with the drive, add-in controller board, motherboard, drive signal cable, or LED connector. Contact your Nortel Networks service representative for assistance.

Tape drive activity light does not light

Checklist

Check the following:

- Is the LED connector properly connected and working?
- Are the power and signal cables to the tape drive properly installed?
  - Are they properly seated?
  - Are they flipped?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?

If the problem persists, there may be a problem with the drive, add-in controller board, motherboard, drive signal cable, or LED connector. Contact your Nortel Networks service representative for assistance.

Controller fuse burns out

Checklist

If the system fails to power up once you press the power switch, you may have a problem with either your controller fuse or the motherboard.

If the controller fuse or the circuit board burns out, you must replace the part. Contact your Nortel Networks representative for more information.

Running PCDiags

In this section

Overview of test diagnostics

Introduction

The MAS 702t provides four ways to diagnose system faults:

- from start-up, through Power-On Self-Test (POST) diagnostic reporting, as discussed in“Performing and interpreting start-up diagnostics” on page 259
- using the TSTSERIO command line utility to test serial ports under Windows NT, as discussed in “Performing and interpreting online diagnostics” on page 281
- from the DOS start-up PCDiags diagnostics package, as discussed in “Checking hardware using Windows NT 3.51 diagnostics” on page 283
- from the Windows Start Menu for Window NT 4.0, as discussed in “Checking hardware using Windows NT 4.0 diagnostics” on page 285

This section focuses on the PCDiags diagnostics package for Windows NT.

Testing the motherboard components

Introduction

The following procedure outlines how to test motherboard components using the supplied PCDiags package. The following list contains diagnostics that run using this procedure:

- real-time clock/calendar (RTC) chip
- programmable interrupt controller (PIC)
- programmable interval timer (PIT)
- custom Intel integrated circuit
- direct memory access (DMA)
- serial controller (COM_1 and COM_2)
- parallel port (PARALLEL_1)
- video generic VGA
- RAID
- disks, CD-ROM, and tape drives
- Power-On Self-Test (POST)
- serial and serial port tests
- memory
- cache tests
- desktop and server management, and configuration tools
- plug and play tools
- math and central coprocessors
- PCI bus
- keyboards
- snoop

To test the motherboard components

1 Start the server.

Note: You have a 10-second time delay before the system defaults to Option 1 – Windows NT version.

Result: The following menu appears after start-up:

```
Windows NT version x
MS-DOS
```

2 Move the cursor to MS-DOS and press Enter.

3 Type **Y** at the prompt for running diagnostic procedures.

Result: A series of color and system tests occurs. This series of tests takes up to one hour to complete.

Running PCDiags from a floppy disk

Introduction

If your hard disk is not installed or not booting, you may need to run PCDiags from a bootable floppy disk.

Note: When you run PCDiags from a disk, all of the manufacturer's tests are available.

PCDiags disks

PCDiags disks are supplied with the system. Version 3.50 or later includes the following six disks:

- three disks that contain the DIAGS files
- three disks that contain the Help files

The PCDiags disks should be labeled as follows:

Intel PC Diags 3.50 or later

Disk 1 of 6

The first of the DIAGS disks should be bootable.

To make any floppy disk bootable

If the system does not boot from the hard drive, you must start it from a bootable floppy disk. Follow this procedure to make any floppy disk bootable using the MS-DOS installation disk.

Note: For this procedure, you must switch the disks between disk drives A and B. Disk drives A and B are the same drive. Therefore, you must switch the disks for this *one* drive.

1. Insert the MS-DOS installation disk into the floppy disk drive, and restart the system.

   Result: The MS-DOS Setup screen is displayed.

2. Press F3 twice to exit.

   Result: The system displays the a:\ prompt.

3 Type **sys b:**

Result: The system asks you to insert a disk into drive b:.

4 Place the target disk into the disk drive and press Enter.

Result: The system asks you to insert a disk into drive a:.

5 Remove the target disk from the disk drive.

6 Place the source disk back into the disk drive and press Enter.

Result: The system asks you to insert a disk into drive b:.

7 Reinsert the target disk into the disk drive and press Enter.

8 Continue to remove and insert the target and source disks as prompted until the following message appears: `System transferred`.

9 Reinsert the source disk and press Enter.

Result: The system returns to the a:\ prompt.

10 Type **expand himem.sy_ b:\himem.sys**

11 Reinsert the target disk.

Result: The system responds with this message:
`himem.sy_ --> b:himem.sys`

12 Insert the source disk and press Enter.

Result: The system responds with this message:
`1 file expanded`.

13 Once the system returns to the a:\ prompt, restart.

To run PCDiags from a bootable floppy

ATTENTION! Before running PCDiags from a disk, access CMOS Setup to disable the console port direction. Otherwise, some tests may report a false error.

1. Boot with PCDiags floppy disk #1 installed in the a:\ drive.

   Result: You are prompted to insert PCDiags disk #2.

2. Insert PCDiags disk #2.

   Result: The Testview main menu appears.

3. Insert PCDiags disk #3.

4. Use the menu to navigate through the interactive system tests.

   Note: By default, all of the tests that apply to the hardware installed on the platform are enabled.

5. Use the arrow keys and spacebar to disable specific subtests. Enabled tests are highlighted in light blue. Disabled subtests appear in dark blue.

Error reporting

When you run PCDiags from a disk, the results of the tests are stored only on RAM and are removed if you restart the server.

To view error logs

1. From the PCDiags menu on the server PC, select the Options menu.

2. Select Edit Run-Time Flags.

   Result: The /RE flag allows you to redirect error messages to a file. The /RS flag allows you to redirect status messages to a file.

Running PCDiags tests manually

To run tests manually

Note: Read all instructions thoroughly before proceeding with this procedure. Several time delays give you very little time to make selections.

1 Start up the server.

Note: You have a 10-second time delay before the system defaults to Option 1–Windows NT version.

Result: The following menu appears after start-up:

```
Windows NT version x
MS-DOS
```

2 Move the cursor to MS-DOS and press Enter.

Result: A prompt appears asking you to run diagnostic tools.

Note: You have a five-second time delay before the system defaults to Yes.

3 Type **N**.

Result: The following menu appears:

```
1. Boot Windows NT (default in 5 seconds)
2. Reboot DOS
3. Menu driven test interface
4. Exit to DOS
```

Note: If the system restarts, repeat steps 1–3 of this procedure.

4 Type **3**.

Result: A full-screen menu appears displaying your system hardware.

5 Press the ESC key to continue.

6 Use the arrow keys and spacebar to disable specific subtests if you want to limit the testing. By default, all subtests applicable to the installed hardware are selected.

Result: The subtests highlighted in light blue are enabled. The subtests in dark blue are disabled.

7 Select Run All Tests from the Options menu.

8 Press F2.

Result: A dialog box appears.

9 Press the spacebar to change the Loop Count to 1 Pass.

10 Press Enter to run tests.

Result: A message appearsindicating that the tests are complete.

11 Press Enter.

12 Press Escape.

Result: A message appears asking whether you want to exit Testview.

13 Type **Y**.

To read error files created with PCDiags

1 From the PCDiags menu-driven test interface (accessed in “To run tests manually” on page 248), select View Errors from the Error menu.

2 Press Enter.

Note: The error and summary reports are also directed to the following files:

- c:\testview\test.out
- c:\testview\test.sum

If the files are empty, no errors occurred.

Running any single PCDiags test manually

To run any single test from the Test menu

Note: Read all instructions thoroughly before proceeding. Several time delays in this procedure give you very little time to make selections.

1 Start the server.

Note: You have a 10-second time delay before the system defaults to Option 1–Windows NT version.

Result: The following menu appears after start-up:

```
Windows NT version x
MS-DOS
```

2 Move the cursor to MS-DOS and press Enter.

Tip: A prompt appears asking you to run diagnostic tools.

Note: You have a five-second time delay before the system defaults to Yes.

3 Type **N**.

Result: The following menu appears:

```
1. Boot Windows NT (default in 5 seconds)
2. Reboot DOS
3. Menu driven test interface
4. Exit to DOS
```

Note: If the system restarts, repeat steps 1–3 of this procedure.

4 Type **3**.

Result: A full-screen menu appears displaying your system hardware.

5 Press the ESC key to continue.

6 Use the arrow keys and spacebar to select any single test module.

7 Press F2.

Result: A dialog box appears.

8 Press the spacebar to change the Loop Count parameter from Unlimited to 1 Pass.

9 Press Enter to run tests.

Result: A message appears indicating that the tests are complete.

10 Press Enter.

11 Press ESC.

Result: A message appears asking whether you want to exit Testview.

12 Type **Y**.

To enable subtests within a test group

Note: Read all instructions thoroughly before proceeding. Several time delays in this procedure give you very little time to make selections.

1 Start the server PC.

Note: You have a 10-second time delay before the system defaults to Option 1–Windows NT version.

Result: The following menu appears after start-up:

```
Windows NT version x
MS-DOS
```

2 Move the cursor to MS-DOS and press Enter.

Result: A prompt appears asking you to run diagnostic tools.

Note: You have a five-second time delay before the system defaults to Yes.

3 Type **N**.

Result: The following menu appears:

```
1. Boot Windows NT (default in 5 seconds)
2. Reboot DOS
3. Menu driven test interface
4. Exit to DOS
```

Note: If the system starts, repeat steps 1–3 of this procedure.

4 Type **3**.

Result: A full-screen menu appears displaying your system hardware.

5 Press the ESC key to continue.

6 Select a test group from the main menu list.

7 Select Enter to select any tests from the subtest menu.

8 Use the cursor keys and spacebar to enable individual subtests.

Result: The subtests highlighted in dark blue are disabled. The subtests highlighted in light blue are enabled. Use the spacebar to toggle between enabled and disabled.

Note: You can run any enabled subtest once by selecting it and pressing the Enter key. To run all enabled subtests within a test group, go to step 11.

9 Press ESC to return to the main menu.

10 Press F2.

Result: A dialog box appears.

11 Press the spacebar to change the Loop Count to 1 Pass.

12 Press Enter to run tests.

Result: A message appears indicating that the tests are complete.

13 Press Enter.

14 Press Escape.

Result: A message appears asking whether you want to exit Testview.

15 Type **Y**.

Stopping PCDiags tests

Introduction

You may need to stop PCDiags tests when they are running. Follow this procedure to stop testing.

To stop PCDiags tests

To stop any tests, press CTRL+BREAK. All testing stops and any temporary files the test may have created are deleted.

ATTENTION! Do not use CTRL + C to stop tests. Temporary files are not removed.

ATTENTION! Do not break out of Real-Time Clock tests. This could cause system errors. A message is displayed that says the `RTC.* tests are running`.

Using PCDiags online Help

Introduction

The PCDiags diagnostics package provides thorough online Help for all test groups, including test descriptions and troubleshooting hints.

You can also access Help for the following specific PCDiags functions:

- running tests
- stopping tests
- using menus
- command-line arguments
- run-time flags

To invoke Help for a specific test group

1. On the server, in the PCDiags menu-driven test interface, select the specific test group for which you seek information.
2. Press F1.

   Result: The Help for that topic appears in a box on the screen.
3. Press ESC to exit the Help topic.

To invoke Help for specific PCDiags functions

1. On the server, in the PCDiags menu-driven test interface, select the specific PCDiags function for which you seek information.
2. Press F1.

   Result: The Help for that topic appears in a box on the screen.
3. Press ESC to exit the Help topic.

Testing SCSI CD-ROM and SCSI tape drives

Introduction

Use PCDiags to test SCSI removable media devices in your system, such as SCSI CD-ROM and SCSI tape drives.

Device driver required

Verify that the following lines are included in your config.sys files:

For config.sys file on a floppy disk	DEVICE=himem.sys DEVICE=ramdrive.sys
For config.sys file on the hard disk	DEVICE=c:\dos\himem.sys DEVICE=c:\dos\ramdrive.sys

Note: The manufacturing and floppy disk versions of PCDiags have these tests fully enabled to expect CD-ROM and tape media in the drives. The diagnostics installed by the installation script are configured so subtests that expect CD-ROM and tape media are disabled.

To test the SCSI CD-ROM drive

ATTENTION!	**PCDiags cannot test an IDE CD-ROM drive. Do not use the SCSI CD-ROM test for an IDE CD-ROM.**

Note: Read all instructions thoroughly before proceeding. Several time delays in this procedure give you very little time for to make selections.

1 Start the server.

Note: You have a 10-second time delay before the system defaults to Option 1–Windows NT version.

Result: The following menu appears after start-up:

```
Windows NT version x
MS-DOS
```

2 Move the cursor to MS-DOS and press Enter.

Result: A prompt appears asking you to run diagnostic tools.

Note: You have a five-second time delay before the system defaults to Yes.

3 Type **N**.

Result: The following menu appears:

```
1. Boot Windows NT (default in 5 seconds)
2. Reboot DOS
3. Menu driven test interface
4. Exit to DOS
```

Note: If the system restarts, repeat steps 1–3 of this procedure.

4 Type **3**.

Result: A full-screen menu appears displaying your system hardware.

5 Press the ESC key to continue.

6 Select SCSI_CD-ROM from the Test menu and press Enter.

7 Enable RESET, VERIFY, and RANDOM_READ using the arrow keys and spacebar.

Result: Enabled subtests are highlighted in light blue. Disabled subtests are highlighted in dark blue.

8 Insert a CD-ROM into the drive.

9 Press Escape to return to the main menu.

10 Press F2.

Result: A dialog box appears.

11 Press the spacebar to change the Loop Count to 1 Pass.

12 Press Enter to run tests.

Result: A message appears indicating that the tests are complete.

To test the SCSI tape drive

Note: Read all instructions thoroughly before proceeding. Several time delays in this procedure give you very little timeto make selections.

1 Start the server.

Note: You have a 10-second time delay before the system defaults to Option 1--Windows NT version.

Result: The following menu appears after start-up:

```
Windows NT version x
MS-DOS
```

2 Move the cursor to MS-DOS and press Enter.

Result: A prompt appears asking you to run diagnostic tools.

Note: You have a five-second time delay before the system defaults to Yes.

3 Type **N**.

Result: The following menu appears:

```
1. Boot Windows NT (default in 5 seconds)
2. Reboot DOS
3. Menu driven test interface
4. Exit to DOS
```

Note: If the system restarts, repeat steps 1–3 of this procedure.

4 Type **3**.

Result: A full-screen menu appears displaying your system hardware.

5 Press the Escape key to continue.

6 Select SCSI_TAPE from the Test menu and press Enter.

7 For extensive testing, enable the WRITE_READ_ALL group.

For a shorter test cycle, enable RESET, VERIFY, and WRITE_READ.

8 Insert a blank tape cartridge into the drive.

Note: Any data on the tape is permanently lost during testing.

9 Select ESC to return to the main menu.

10 Select F2 and set Loop Count to **1 pass**.

11 Select Enter to begin the test.

Performing and interpreting start-up diagnostics

In this section

Overview of performing and interpreting start-up diagnostics

Introduction

This section contains procedures for interpreting the start-up diagnostics on the MAS 702t.

Start-up diagnostics are available automatically when you reboot the server. They are also available when you boot to DOS or when you first install a system.

Start-up diagnostic classes

Three classes of start-up diagnostics are available on the MAS 702t:

- Power-On Self-Test (POST) diagnostics
- SCSI or RAID controller diagnostics
- PCDiags advanced diagnostics

These diagnostics are available at initial system start-up, or after any MAS 702t reset.

Power-On Self-Test (POST) diagnostics

Definition

The Power-On Self-Test (POST) is a system diagnostic program (stored in the BIOS) that runs every time the MAS 702t is rebooted. POST diagnostics test system components, then displays status messages.

POST message formats

POST reports on the system status in three ways:

- POST beep codes
- POST error codes and messages
- countdown codes displayed during normal BIOS POST

Interpreting POST diagnostics

Introduction

This topic explains POST diagnostic codes.

POST beep codes

If an error occurs before video initialization, POST emits beep codes that indicate errors in hardware, software, or firmware.

A beep code is a series of separate tones, each equal in length. Write down the beep codes before calling your Nortel Networks customer support representative.

ATTENTION!

Some POST beep codes are fatal and require that you replace your motherboard. See the following table for more information about beep codes.

Number of beeps	Error message and conditions
1	Refresh failure
2	Parity cannot be reset
3	First 4 kbytes memory failure
4	Timer not operational
5	Processor failure
6	Keyboard controller gate A20 is off (v_mode)
7	Exception interrupt error
8	Display memory read/write error
9	ROM checksum error

Number of beeps	Error message and conditions
10	Shutdown register read/write error

POST error codes and messages

Introduction

The BIOS indicates errors through POST by displaying a POST error code and a message on the screen.

Note: When POST displays an error message, the speaker beeps twice before the message appears.

POST error codes and messages

The following table lists the on-screen POST error codes and messages.

Code	Error message
0002	Primary Boot Device Not Found
0010	Cache Memory Failure, Do Not Enable Cache
0015	Primary Output Device Not Found
0016	Primary Input Device Not Found
0041	EISA ID Mismatch for Slot
0043	EISA Invalid Configuration for Slot
0044	EISA Config NOT ASSURED
0045	EISA Expansion Board Not Ready in Slot
0047	EISA CMOS Configuration Not Set
0048	EISA CMOS Checksum Failure
0049	EISA NVRAM Invalid
0060	Keyboard Is Locked...Please Unlock It
0070	CMOS Time and Date Not Set

Code	Error message (Continued)
0080	Option ROM has bad checksum
0083	Shadow of PCI ROM Failed
0084	Shadow of EISA ROM Failed
0085	Shadow of ISA ROM Failed
0131	Floppy Drive a:\
0132	Floppy Drive b:\
0135	Floppy Disk Controller Failure
0140	Shadow of System BIOS Failed
0170	Disabled CPU slot #________
0171	CPU Failure - Slot 1, CPU # 1
0172	CPU Failure - Slot 1, CPU # 2
0173	CPU Failure - Slot 2, CPU # 1
0174	CPU Failure - Slot 2, CPU # 2
0171	Previous CPU Failure - Slot 1, CPU # 1
0172	Previous CPU Failure - Slot 1, CPU # 2
0173	Previous CPU Failure - Slot 2, CPU # 1
0174	Previous CPU Failure - Slot 2, CPU # 2
0175	CPU modules are incompatible
0180	Attempting to boot with failed CPU
0191	CMOS Battery Failed
0195	CMOS System Options Not Set
0198	CMOS Checksum Invalid

Code	Error message (Continued)
0289	System Memory Size Mismatch
0295	Address Line Short Detected
0297	Memory size decreased
0299	ECC Error Correction Failure
0301	ECC Single bit correction failed, Correction Disabled
0302	ECC Double bit Error
0310	ECC Address failure, Partition #
0370	Keyboard Controller Error
0373	Keyboard Stuck Key Detected
0375	Keyboard and Mouse Swapped
0380	ECC SIMM failure, Board in slot 1 SIMM #
0392	ECC SIMM failure, Board in slot 2 SIMM #
0430	Timer Channel 2 Failure
0440	Gate-A20 Failure
0441	Unexpected Interrupt in Protected Mode
0445	Master Interrupt Controller Error
0446	Slave Interrupt Controller Error
0450	Master DMA Controller Error
0451	Slave DMA Controller Error
0452	DMA Controller Error
0460	Fail-safe Timer NMI Failure
0461	Software Port NMI Failure

Code	Error message (Continued)
0465	Bus Timeout NMI in Slot
0467	Expansion Board NMI in Slot
0501	PCI System Error
0510	PCI Parity Error
0710	System Board Device Resource Conflict
0711	Static Device Resource Conflict
0800	PCI I/O Port Conflict
0801	PCI Memory Conflict
0802	PCI IRQ Conflict
0803	PCI Error Log is Full
0810	Floppy Disk Controller Resource Conflict
0811	Primary IDE Controller Resource Conflict
0812	Secondary IDE Controller Resource Conflict
0815	Parallel Port Resource Conflict
0816	Serial Port 1 Resource Conflict
0817	Serial Port 2 Resource Conflict
0818	USB 1...TBD
0819	USB 2...TBD
0820	Expansion Board Disabled in Slot
0900	NVRAM Checksum Error, NVRAM Cleared
0903	NVRAM Data Invalid, NVRAM Cleared
0905	NVRAM Cleared by Jumper

Code	Error message (Continued)
0982	I/O Expansion Board NMI in Slot
0984	Expansion Board Disabled in Slot
0985	Fail Safe Timer NMI
0986	System Reset Caused by Watchdog Timer
0987	Bus Timeout NMI in Slot

POST codes and countdown codes

Introduction

The BIOS indicates the current stage of POST after the video adapter has been initialized successfully. The following sections outline the recovery and normal Port-80 codes and countdown codes.

Recovery Port-80 codes and countdown codes

This table lists the Port-80 codes and POST countdown codes that are displayed during the recovery boot process.

Port-80 codes	Countdown codes	Description
02h		Disable internal cable
08h		Disable DMA controller #1 and #2, disable interrupt controller #1 and #2, and reset video display
13h		Initialize all chipset registers
15h	900	Initialize system timer
1Bh	800	Real mode base 64 kbyte memory test
20h	700	16 kbyte base RAM test
23h	650	Set up interrupt vectors
40h	600	Test memory in virtual mode
65h	500	Initialize 8237 DMA controller
67h	400	8259 interrupt controller test
80h	300	Unmask disk, keyboard, and timer interrupts
88h	200	Floppy unit initialization
A0h	100	Cache enable
00h	000	Boot OS

Normal Port-80 codes and countdown codes

The following table lists the Port-80 codes and countdown codes displayed during the normal BIOS POST process.

Port-80 codes	Countdown codes	Description
D0h		Early MP initialization, enter real mode
D1h		Power on initialization
D2h		Disable NMI
D3h		Reset video controller
D4h		Enter real mode
D5h		Checksum the 8 kbyte loader BIOS
D6h		Loader BIOS checksum good
D7h	900	Check if keyboard controller (KBC) buffers are free
D8h		Issue BAT (basic assurance test) command to KBC
D9h		Read BAT results
DAh		Check if KBC passed BAT
DBh	820	Keyboard initialization passed
DDh		Disable keyboard and auxiliary devices
DFh		Disable both DMA controllers
E0h	780	Preliminary initialization of PICs
E1h		Enter real big mode and initialize chipset, size memory
E2h		Initialize timer 2 for speaker
E3h	760	Initialize timer channel 0 for system timer

Port-80 codes	**Countdown codes**	**Description**
E4h		Clear any pending parity errors
E6h	740	Test RAM from 0 - 640 kbyte
E7h		Test and initialize 2 Mbytes of memory
E8h		RAM failure, remap memory partitions and test again
E9h		RAM test complete, passed; clear parity errors
EAh	730	Set up stack at 30:100, enable cache, and shadow BIOS
EBh		Initialize code dispatcher
ECh		Make F000h DRAM R/W enabled
EDh		Dispatch POST
23h	700	Initializations before setting up vector table
24h		Setup interrupt vector table
0Dh		Check CMOS clear jumper
0Eh	690	Check validity of CMOS
0Fh		Force CMOS defaults if necessary
10h		CMOS initialization complete
25h		Nothing
28h		Set monochrome mode
29h		Set color display
2Ah		Clear parity status, if any, initialize warm reset flag
2Bh		Video auto-configuration and initialization

Port-80 codes	Countdown codes	Description
F0h		EISA slot initialization
F1h		Enable extended NMI sources
F2h		Test extended NMI sources
2Ch	580	Conventional video option ROM search
2Dh		Scan user binary
2Eh	570	Initialize monochrome display if no other video present
2Fh	560	Test buffer memory for monochrome
30h		Check vertical and horizontal retrace
32h		Check vertical retrace
34h		Sign on message
36h		Initialize messaging services and clear screen
37h	500	Custom sign on display
80h	370	Keyboard/mouse port check
81h		KBC initialization and testing
83h		Check if keyboard is locked
F5h	330	Initialize mouse
39h		Keyboard, mouse, and other sign-ons
3Bh		Prepare for memory test
43h	290	Decide memory size from chipset
4Fh		Disable cache, test memory, and display memory size on screen

Port-80 codes	**Countdown codes**	**Description**
52h		Initialize for the other processors in MP system, reset DMA controller
61h	250	DMA register tests
62h		DMA test OK
65h		Initialize 8237 DMA controller
66h		Clear DMA write request register and mask set/reset register
67h	220	8259 interrupt controller test
F4h		Enable extended NMI sources
8Ch	140	Initialize remaining Plug and Play devices (that is other than video); initialize IPL; initialize IDE controller
8Fh	130	Floppy initialization
92h		Set printer, RS-232 timeout
96h		Option ROM scan and initialization above C800h
97h	080	Scan user binary and conventional option ROM scan
98h		Scan user binary area
9Ah		Clear soft reset flag, complete MP Table
9Dh	070	Timer data area initialization
A0h		Printer setup
A1h		RS-232 setup
A2h		Check for stuck key

Port-80 codes	Countdown codes	Description
ABh		Before NPX (numeric processor instructions) test and initialization
ACh	060	NPX test and initialization
ADh		Update co-processor information in CMOS and recalculate checksum
AEh		Set typematic rate
AFh	050	Keyboard READ ID command
B0h		Wait for READ ID response
A3h		Display POST errors
A6h		Before Setup
A7h	030	Call Setup if required; prompt for password if enabled
B1h		Enable cache for boot
B3h		Setup display mode set
B4H		Jump to pre-OS code
BBh	020	Initialize SMI code, prepare for boot
00h	000	Execute BOOT

Interpreting start-up diagnostics from SCSI BIOS

Introduction

The results from the SCSI controller diagnostics appear after the POST results.

Applicable cards

Results of the start-up diagnostics appear only if you have the following adapter cards installed on your system:

- Symbios Logic SCSI controller

  This controller is integrated into the system and, therefore, is always present.

- Mylex RAID adapter

  The RAID adapter is optional and, therefore, may or may not be present in the system.

Interpreting DOS start-up diagnostics

Introduction

This package runs through a batch file as part of the boot-up sequence, but may be skipped interactively.

Start-up diagnostics files

Diagnostics may be invoked after a reboot by selecting the MS-DOS option. The results of the diagnostics are displayed on-screen, with any errors displayed in red.

Diagnostics results are captured in the following two files:

- c:\testview\test.out

  Do not erase this file.
- c:\testview\test.sum

Note: To run testview, follow the procedure described in “Choosing a boot-up option” on page 277. In Step 3 of the procedure, choose the “Menu driven test interface” option.

Choosing a boot-up option

Introduction

This topic details the point in the reboot process where you can select a boot-up option.

To choose a boot-up option in the reboot process

CAUTION!

Risk of data corruption

Do not type CTRL+C or CTRL+BREAK while booting up the system.

1 Start the server PC.

Note: You have a 10-second time delay before the system defaults to Option 1–Windows NT version.

Result: The following menu appears after start-up:

```
Windows NT version x
MS-DOS
```

2 Move the cursor to MS-DOS and press Enter.

Result: A prompt appears asking you to run diagnostic tools.

Note: You have a five-second time delay before the system defaults to Yes.

3 Type **N**.

Result: The following menu appears:

```
1. Boot Windows NT (default within 10 seconds)
2. Reboot DOS
3. Menu driven test interface
4. Exit to DOS
Choose an option [1,2,3,4]?
Option 1 performs a POST, and boots Windows NT.
Option 2 performs a POST, and reboots DOS.
Option 3 invokes the menu-driven version of the PCDiags
```

```
diagnostics package (testview.exe).
Option 4 starts the DOS command line environment. This
allows you to use the command line version of PCDiags
(t.exe).
```

Note: If the system reboots, repeat steps 1 to 3.

Interpreting event logs generated by start-up diagnostics

Introduction

The following reports are generated by PCDiags:

- Event logs
  These are generated after a successful reboot to Windows NT.
- “test.out” error report file
  The “test.out” file information is formatted and put into the event log on the MAS 702t. The extra detailed error information is put into a “raw string” in the local log and not sent to the client.

To see additional specific events, open the Event Viewer in the Administrative Tools program group in Windows NT.

Performing and interpreting online diagnostics

In this section

Overview

Introduction

This section outlines how to access the run-time online diagnostics provided by the Windows NT server software.

Checking hardware using Windows NT 3.51 diagnostics

Introduction

This topic outlines the diagnostics toolset supplied with Windows NT.

The Windows NT Diagnostics window

The Windows NT 3.51 Diagnostics window allows you to access the following server hardware information areas:

- OS version
- hardware
- memory
- drivers
- services
- devices
- IRQ/Port Status
- DMA/Memory
- environment
- network
- drives

To access Windows NT 3.51 diagnostic tools

1. Log on to the server.

   Note: Access to the diagnostic tools is available to authorized staff who have passwords with the correct access.

2. In the Program Manager in Windows NT, double-click the Administrative Tools icon.
3. Double-click the Windows NT Diagnostics icon.

   Result: The Windows NT Diagnostics window appears.

To check the hardware configuration

1 On the server, in the Windows NT Program Manager, double-click the Administrative Tools icon.

Result: The Administrative Tools window opens.

2 Double-click the Windows NT Diagnostics icon.

Result: The Windows NT Diagnostics window opens.

3 Click the Hardware button.

Result: The Hardware Information window appears.

4 To access CPU information, click the CPU Steppings button.

For more information on the Hardware window, consult your Windows NT documentation.

To check hardware components and drivers

1 On the server, in the Administrative Tools Window, double-click the Windows NT Diagnostics icon.

2 Click the Drivers button.

Result: The Driver List window appears. This windows lists the drivers and their current operational state.

3 Select a driver from the list.

4 Select the Driver Details button for additional information about the selected driver.

To check for hardware conflicts

1 In the Windows NT program manager, double-click the Administrative Tools icon.

2 Double-click the Event Viewer icon in the Administrative Tools window.

Result: The Event Viewer window appears.

3 Select System from the Log menu to view the events.

4 Select Filter Events from the View menu to change the Event Viewer parameters through the Filter dialog box.

Checking hardware using Windows NT 4.0 diagnostics

Introduction

The Windows NT 4.0 system provides tools that can be used to diagnose and debug system problems, including

- Windows NT Diagnostics screen
- Event Viewer

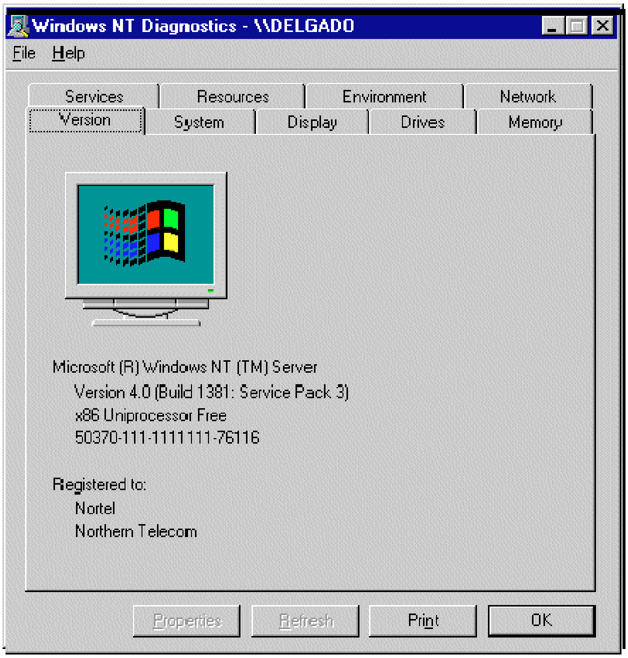
Windows NT Diagnostics window

The Windows NT 4.0 Diagnostics window allows you to view details concerning the system and network components.

The following tabs can be opened on the Diagnostics window to display specific information:

- Version
- System
- Display
- Drives
- Memory
- Services
- Resources
- Environment
- Network

Windows NT Diagnostics main window



To access Windows NT 4.0 diagnostic tools

1. Log on to Windows.
2. Select Start>Programs>Administrative Tools (Common)>Windows NT Diagnostics to access the Windows NT Diagnostics window.
3. Select the appropriate tab on the Diagnostics main window to view information concerning the system and network. Details available on each tab are supplied in the following table

.

Select	To display details about
Version	Version Registration
System	System identifier HAL BIOS information Processors
Display	BIOS information Adapter Driver
Drives	Drives by type or letter To view specific details, select a drive, then press the Properties button to view details for the drive, including size, labels,and so on.
Memory	Memory, including totals, physical and kernel memory, commit charge, kernel
Services	Service and state for both services and devices To view specific details, select a service, then press the Properties button to view details including pathname, dependencies, service flags, and so on.
Resources	Select one of the following buttons to display information about the resources available on the system: - IRQ - I/O Port - DMA - Memory - Devices To view specific details, select a resource, then press the Properties button.
Environment	Variable and value for bothsystem and local user

Select	To display details about
Network	Select one of the following buttons to display information about the network and components: - General - Transports - Settings - Statistics

Event Viewer

Windows NT 4.0 provides an Event Viewer that is used to view event logs to assist in diagnosing and debugging system problems.

Three types of event logs are available from the Event Viewer, as follows:

System	Logs events by Windows NT 4.0 components, including RAS or other WinNT services.
Security	Logs security events, such as logons, log offs, illegal access, and so on. This option is available only to users with Administrative access.
Applications	Logs events by application, such as database file errors, and so on.

To access the Event Viewer

1 Log on to Windows.

2 Select Start>Programs>Administrative Tools (Common)>Event Viewer.

3 Select the appropriate tab to view the associated event logs.

Invoking the chkdsk utility

Introduction

The chkdsk utility checks a specified disk on the server and displays a status report. Use this utility on the C: or D: partition.

Note: A version of this utility, called autocheck, automatically runs at Windows NT boot-time. Output from this utility displays on the start-up blue screen.

Chkdsk utility syntax

The chkdsk utility uses the following syntax:

chkdsk [drive:][path]filename] [/F] [/V] [/R]

Parameters	Description
[drive:]	The drive letter of the drive you want to check.
filename	The names of files to check for fragmentation.
/F	Add this switch to fix errors on the disk.
/V	Add this switch to display the full pathname of every file on the disk.
/R	Add this switch to locate bad sectors and to recover readable information.

To run the chkdsk utility from Windows NT 3.51 Program Manager

1. On the server, double-click the Main icon.

   Result: The Main window appears.

2. Double-click the Command Prompt icon.

   Result: The MS-DOS Command Prompt window appears.

3. At the MS-DOS prompt, type **CHKDSK <drive letter:>**. For example, **chkdsk c:**

4. Press Enter.

   Result: The system runs the chkdsk utility.

5. Type **Exit** to exit MS-DOS and return to Windows NT 3.51.

To run the chkdsk utility from Windows NT 4.0

1. Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

   Result: The MS-DOS Command Prompt window appears.

2. At the MS-DOS prompt, type **CHKDSK <drive letter:>**. For example, **chkdsk c:**

3. Press Enter.

   Result: The system runs the chkdsk utility.

4. Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

Invoking and interpreting TCP/IP diagnostics

Introduction

This topic outlines the following TCP/IP diagnostic tools available for the Ethernet card. The first three tools are the most useful.

- ipconfig
- ping
- tracert
- arp
- nbtstat
- netstat

The ipconfig command

The ipconfig command displays IP configuration information.

Ipconfig default

Running the command without flags displays the IP address, subnet mask, and default gateway for each adapter bound to TCP/IP.

Ipconfig command syntax

ipconfig /[]

The following flags are available for the ipconfig command:.

Flag	Description
/?	Displays Help information.
/all	Displays full configuration information.
/release	Releases the IP address for the specified adapter.
/renew	Renews the IP address for the specified adapter.

To invoke the ipconfig command from Windows NT 3.51 Program Manager

1. On the server, in the Windows NT 3.51 Program Manager, double-click the Main icon.

   Result: The Main window appears.

2. Double-click the Command Prompt icon.

   Result: The MS-DOS Command Prompt window appears.

3. At the MS-DOS prompt, type **ipconfig** <with appropriate parameters>.

   Example: ipconfig /all.

4. Press Enter.

   Result: The ipconfig utility runs.

5. Type **Exit** to exit MS-DOS and return to Windows NT.

To run the ipconfig command from Windows NT 4.0

1. Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

   Result: The MS-DOS Command Prompt window appears.

2. At the MS-DOS prompt, type **ipconfig <with appropriate parameters:>**. For example, **ipconfig /all**

3. Press Enter.

   Result: The system runs the ipconfig utility.

4. Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

The ping command

The ping command sends an echo request to a specified host.

Ping command syntax

The ping command uses the following syntax:

ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]

[-r count] [-s count] [[-j host-list] | [-k host-list]]

[-w timeout] destination-list

Parameters	**Description**
-t	Pings the specified host until interrupted.
-a	Resolves addresses to host names.
-n count	Specifies the number of echo requests to send.
-l size	Sends buffer size.
-f	Set Don’t Fragment flag in packet.
-i TTL	Time To Live.
-v TOS	Type Of Service.
-r count	Record route for count hops.
-s count	Time stamp for count hops.
-j host-list	Loose source route along host list.
-k host-list	Strict source route along host list.
-w timeout	Timeout in milliseconds to wait for each reply.

To invoke the ping command from Windows NT 3.51 Program Manager

1 In the Windows NT 3.51 Program Manager, double-click the Main icon.

Result: The Main window appears.

2 Double-click the Command Prompt icon.

Result: The MS-DOS Command Prompt window appears.

3 At the MS-DOS prompt, type **ping <destination IP address>**.

Example: ping 47.286.32.0

Result: The screen indicates a successful ping.

4 Type **Exit** to return to Windows NT.

To run the ping command from Windows NT 4.0

1 Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

Result: The MS-DOS Command Prompt window appears.

2 At the MS-DOS prompt, type **ping <destination IP address:>**. For example, **ping 47.286.32.0:**

3 Press Enter.

Result: The system indicates a successful ping.

4 Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

The tracert command

This utility determines the route taken to a destination.

How tracert works

The tracert utility follows several steps to complete its task.

- Tracert sends Internet Control Message Protocol (ICMP) echo packets with varying Time-To-Live (TTL) values to the destination.
- Each router along the path must decrement the TTL on a packet by at least 1 before forwarding it, so the TTL is effectively a hop count.
- When the TTL on a packet reaches 0, the router sends back an ICMP Time Exceeded message to the source system.
- Tracert determines the route by sending the first echo packet with a TTL of 1 and incrementing the TTL by 1 on each subsequent transmission until the target responds, or the maximum TTL is reached.
- Tracert then examines the ICMP Time Exceeded messages sent back by intermediate routers.

Tracert syntax

tracert [-d] [-h maximum_hops] [-j host_list] [-w timeout] [target_name]

Tracert parameters

The tracert command uses the following parameters:.

Parameter	Description
-d	Specifies not to resolve addresses to hostnames.
-h maximum_hops	Specifies the maximum number of hops to search for target.
-j host-list	Specifies a loose source route along the host list.
-w timeout	Waits the number of milliseconds specified by the timeout for each reply.
target_name	The name of the target host.

To invoke the tracert command from Windows NT 3.51 Program Manager

1. In the Windows NT 3.51 Program Manager, double-click the Main icon.

   Result: The Main window appears.

2. Double-click the Command Prompt icon.

   Result: The MS-DOS Command Prompt window appears.

3. At the MS-DOS prompt, type **tracert [-d] [-h maximum_hops] [-j host_list] [-w timeout] [target_name]**.

   Example: tracert 47.286.0.32   2 10   47.236.0.64

   Result: The system should respond with a message about tracing a route to the host_list over a maximum number of hops.

4. Type **Exit** to return to Windows NT once the trace is complete.

To run the tracert command from Windows NT 4.0

1. Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

   Result: The MS-DOS Command Prompt window appears.

2. At the MS-DOS prompt, type **tracert [-d] [-h maximum_hops] [j host_list] [-w timeout] [target name]**. For example, **tracert 47.286.0.32 210 47.236.0.04.**

3. Press Enter.

   Result: The system runs the tracert utility.

4. Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

The arp command

The arp command displays and modifies the IP-to-physical address translation tables used by Address Resolution Protocol (arp).

Arp command syntax

The arp command uses the following syntax:

arp -s inet_addr eth_addr [if_addr]

arp -d inet_addr [if_addr]

arp -a [inet_addr] [-N if_addr]

Parameter	Description
-a	Displays current arp entries by interrogating the current protocol data. If inet_addr is specified, the IP and physical addresses for only the specified computer are displayed. If more than one network interface uses arp, entries for each arp table are displayed.
-g	Same as -a.
inet_addr	Specifies an Internet address.
if_addr	Specifies the Internet address of the interface whose address translation table should be modified. If not present, the first applicable interface is used.
eth_addr	Specifies a physical address.
-N if_addr	Displays the arp entries for the network interface specified by if_addr.
-d	Deletes the host specified by inet_addr.

-s	Adds the host and associates the Internet address inet_addr with the Physical address eth_addr. The physical address is given as six hexadecimal bytes separated by hyphens. The entry is permanent.

To invoke the arp command from Windows NT 3.51 Program Manager

1 In the Windows NT 3.51 Program Manager, double-click the Main icon.

Result: The Main window appears.

2 Double-click the Command Prompt icon.

Result: The MS-DOS Command Prompt window appears.

3 At the MS-DOS prompt, type **arp** with the required parameters.

Example: arp -g 47.286.0.32.

Result: The system responds with the message `No ARP entries were found.`

The system responds with the following information about the specified IP address:

```
Interface 47.286.0.32 on Interface 2

Internet AddressPhysical addressType
47.286.0.3208-00-09-15-bd-a6dynamics
```

4 Type **Exit** to return to Windows NT.

To run the arp command from Windows NT 4.0

1 Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

Result: The MS-DOS Command Prompt window appears.

2 At the MS-DOS prompt, type **arp** with the required parameters. For example, **arp -g 47/286.0.32:**

3 Press Enter.

Result: The system runs the arp command.

4 Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

The nbtstat command

The nbtstat command displays protocol statistics and current TCP/IP connections using NBT. This command is available only if the TCP/IP protocol is installed.

Nbtstat command syntax

The nbstat command uses the following syntax:

nbtstat [-a remotename] [-A IP address] [-c] [-n] [-R] [-S] [-s] [interval]

Parameter	**Description**
-a remotename	Lists the remote computer's name table using its name.
-A IP address	Lists the remote computer's name table using its IP address.
-c	Lists the contents of the NetBIOS name cache giving the IP address of each name.
-n	Lists local NetBIOS names. Registered indicates that the name is registered by broadcast (Bnode) or WINS (other node types).
-R	Reloads the LMHOSTS file after purging all names from the NetBIOS name cache.
-r	Lists name resolution statistics for Windows networking name resolution. On a Windows NT computer configured to use WINS, this option returns the number of names resolved and registered through broadcast or through WINS.
-S	Displays both client and server sessions, listing the remote hosts by IP address only.

-s	Displays both client and server sessions, and attempts to convert the remote host IP address to a name using the HOSTS file.
interval	Displays selected statistics, pausing interval seconds between each display. Press CTRL+C to stop displaying statistics. Without this parameter, nbtstat prints the current configuration information once.

To invoke the nbtstat command from Windows NT 3.51 Program Manager

1 In the Windows NT 3.51 Program Manager, double-click the Main icon.

Result: The Main window appears.

2 Double-click the Command Prompt icon.

Result: The MS-DOS Command Prompt window appears.

3 At the MS-DOS prompt, type **nbtstat** with the required parameters.

Result: The system displays protocol statistics and current TCP/IP connections.

4 Type **Exit** to return to Windows NT.

To run the nbstat command from Windows NT 4.0

1 Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

Result: The MS-DOS Command Prompt window appears.

2 At the MS-DOS prompt, type **nbstat** with the required parameters.

3 Press Enter.

Result: The system runs the nbstat utility.

4 Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

The netstat command

The netstat command displays current TCP/IP network connections and protocol statistics.

Netstat command syntax

The netstat command uses the following syntax:

netstat [-a] [-e] [-n] [-s] [-p proto] [-r] [interval]

Parameter	**Description**
-a	Displays all connections and listening ports.
-e	Displays Ethernet statistics. This may be combined with the -s option.
-n	Displays addresses and port numbers in numerical form.
-s	Displays per-protocol statistics.
-p proto	Shows connections for the protocol specified by proto. Proto may be tcp or udp. If used with the -s option, proto may be tcp, udp, or ip.
-r	Displays the contents of the routing table.
interval	Redisplays selected statistics, pausing between each display. Press CTRL+C to stop redisplaying.

To invoke the netstat command from Windows NT 3.51 Program Manager

1 In the Windows NT 3.51 Program Manager, double-click the Main icon.

Result: The Main window appears.

2 Double-click the Command Prompt icon.

Result: The MS-DOS Command Prompt window appears.

3 At the MS-DOS prompt, type **netstat** with the appropriate parameters.

Result: The system displays current TCP/IP network connections and protocol statistics.

4 Type **Exit** to return to Windows NT.

To run the netstat command from Windows NT 4.0

1 Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

Result: The MS-DOS Command Prompt window appears.

2 At the MS-DOS prompt, type **netstat** with the required parameters.

3 Press Enter.

Result: The system runs the netstat utility.

4 Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

Invoking and interpreting Token Ring card diagnostics

Introduction

If TCP/IP protocol is installed, you can diagnose faults on the Token Ring card by using the ping command under Windows NT.

Using the ping command

Instructions for using the ping command are in the procedure "To invoke the ping command from Windows NT 3.51 Program Manager" on page 294.

RAID controller administration

Introduction

RAID controller faults can be detected in three ways:

- DACCF.exe
  This utility includes RAID controller diagnostics.
- DACMON.exe
  This is the Windows NT onlineonline event reporter for RAID faults. The events are stored in the system event log.
- DACADM.exe
  This is the Windows NT online utility that allows you to query and recover from faulty RAID drives.

Invoking and interpreting serial port diagnostics

In this section

Overview of invoking and interpreting run-time diagnostics

Introduction

Run serial port diagnostics on the MAS 702t using the TSTSERIO command. Direct the TSTSERIO command to serial ports on the server after services on these ports have been shut down manually.

Shutting down services

Introduction

This topic details how to shut down a service using a specific serial port. Use the procedures below before invoking the TSTSERIO local loopback tests.

Net Stop command

Use the Net Stop command to stop a specified service on a serial port.

NET STOP command syntax

The Net Stop command uses the following syntax:

net stop “[service-name]”

ATTENTION! You must restart the services that you shut down through the Net Start command after running the diagnostic. For details, see “Restarting services” on page 315.

CAUTION!

Risk of feature loss

By stopping Remote Access, you lose the support access feature.

To invoke the Net Stop command from Windows NT 3.51 Program Manager

1. In the Windows NT Program Manager, double-click the Main icon.

   Result: The Main window appears.

2. Double-click the Command Prompt icon.

   Result: The MS-DOS Command Prompt window appears.

3. At the MS-DOS prompt, type **net stop "[service-name]"**

   Example: Type **net stop "Remote Access Server"**

   Result: The system responds with a message that the specified service is shut down.

4. Type **Exit** to return to Windows NT.

To invoke the Net Stop command from Windows NT 4.0

1. Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

   Result: The MS-DOS Command Prompt window appears.

2. At the MS-DOS prompt, type **net stop** with the required parameters.

3. Press Enter.

   Result: The system runs the **net stop** command utility.

4. Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

Conducting TSTSERIO tests

Introduction

The TSTSERIO command performs local loopback tests of the serial communications ports from the MAS 702t run-time environment.

Note: Before conducting these tests, shut down services using the NET STOP command detailed on page 307.

CAUTION!

Risk of communications loss

By stopping services on COM, you lose the support access feature.

TSTSERIO command syntax

The syntax for the TSTSERIO command is as follows:

TSTSERIO [/?] /P:comport [/S:subtstname [/L:loops]

Flag	**Requirement**	**Description**
[?]	n/a	Displays Help.
/P:comport	Required	Specifies the symbolic port name assigned to the port you want to test.
[/ S:subtstname]	Optional	Specifies a TSTSERIO subtest. See the table on page “TSTSERIO internal loopback diagnostic subtests” on page 310 for a description of the available subtests.

Flag	Requirement	Description
[/L:loops]	Optional	Specifies the number of times (up to a maximum of 65535) to execute the requested test. The default number of tests is 1. A value of 0 infinitely loops until you enter CTRL+C.

TSTSERIO internal loopback diagnostic subtests

The following internal loopback subtests are available for the TSTSERIO command. For each of these tests, the communications resource must be available.

Subtest name	Description
idata	Internal data bus loopback
imsr	Internal modem status register
baud	Internal data bus loopback at various baud rates
word	Test 5-, 6-, 7-, and 8-bit data lengths
stop	Test 1, 1.5, and 2 stop bits
pari	Test odd/even parity
fifo	Test that device can operate in fifo mode

To invoke the TSTSERIO /P command from Windows NT 3.51 Program Manager

1 In the Windows NT Program Manager, double-click the Main icon.

Result: The Main window appears.

2 Double-click the Command Prompt icon.

Result: The MS-DOS Command Prompt window appears.

3 At the MS-DOS prompt, type **tstserio** with appropriate parameters.

Example: TSTSERIO /P com1 or **TSTSERIO /P com2**

4 Type **Exit** to return to Windows NT.

To invoke the TSTSERIO /P command from Windows NT 4.0

1 Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

Result: The MS-DOS Command Prompt window appears.

2 At the MS-DOS prompt, type **tstserio** with the required parameters. For example, type **TSTSERIO /P com1** or **TSTSERIO /P com 2.**

3 Press Enter.

4 Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

TSTSERIO external loopback plug subtests

The following external loopback subtests are available for the TSTSERIO command. For each of these tests, an external loopback connector must be used. For more information, see “Conducting TSTSERIO tests with the loopback plug” on page 314.

Subtest name	Description
edata	External data bus loopback. This test requires an external loopback connector.
emsr	External modem status register. This test requires an external loopback connector.
eint	Test ability of device to generate interrupts. This test requires an external loopback connector.

To invoke the TSTSERIO /S command from Windows NT 3.51 Program Manager

1. In the Windows NT Program Manager, double-click the Main icon.

   Result: The Main window appears.

2. Double-click the Command Prompt icon.

   Result: The MS-DOS Command Prompt window appears.

3. At the MS-DOS prompt, type **tstserio** with appropriate parameters.

   Example: TSTSERIO /P com1 /S extr

4. Type **Exit** to return to Windows NT.

Note: If the port is one of com3–com10 (on the Digiboard), only the edata and emsr tests can be run. The eint and all internal loopback tests cannot run on Digiboard ports.

To invoke the TSTSERIO /S command from Windows NT 4.0

1. Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

   Result: The MS-DOS Command Prompt window appears.

2. At the MS-DOS prompt, type **tstserio** with the required parameters. For example, type **TSTSERIO /P com1 /S extr.**

3. Press Enter.

4. Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

Conducting TSTSERIO tests with the loopback plug

Introduction

The TSTSERIO command requires an external loopback connector plug for its edata, emsr, and eint subtests.

9-pin connector plug

The standard serial loopback connector is a female 9-pin D-sub connector. This connector has the following pins wired together:

- CTS (pin 8) wired to (pin 7) RTS
- SIN (pin 2) wired to (pin 3) SOUT
- DTR (pin 4) wired to (pin 6) DSR

Once the plug is installed on the serial port, TSTSERIO can be invoked according to the procedure outlined in the previous topic.

Restarting services

Introduction

This topic details how to restart a service after invoking the TSTSERIO local loopback tests.

Net Start command

Use the NET START command to restart a specified service on a serial port.

NET START command syntax

The NET START command uses the following syntax:

net start “[service-name]”

To invoke the Net Start command from Windows NT 3.51 Program Manager

1 In the Windows NT Program Manager, double-click the Main icon.

Result: The Main window appears.

2 Double-click the Command Prompt icon.

Result: The MS-DOS Command Prompt window appears.

3 At the MS-DOS prompt, type **net start “[service-name]”**

Example: Type **net start “Remote Access Server”**

Result: The system starts up the specified service.

4 Type **Exit** to return to Windows NT.

To invoke the Net Start command from Windows NT 4.0

1 Select **Start > Programs > MS-DOS Prompt** to display the MS-DOS command prompt window.

Result: The MS-DOS Command Prompt window appears.

2 At the MS-DOS prompt, type **net start "[service name]".** For example, type **net start "Remote Access Server.".**

3 Press Enter.

4 Type **Exit** to exit MS-DOS and return to Windows NT 4.0.

Glossary

A

AC
See alternating current.

ACD call
An automatic call distribution (ACD) call is a call that enters the system through one or more central lines, and then is presented to agents within the call center according to their skillsets and the services required by the caller.

adapter
Hardware required to support a particular device. For example, network adapters provide a port for the network wire. Adapters can be expansion boards or part of the computer's main circuitry.

administrator
A user who is responsible for maintaining the Nortel Networks Symposium Call Center Server.

agent
A user who is responsible for accepting incoming calls.

agent ID
An identification number assigned to a particular agent. The agent uses this number when logging in. The agent ID is not associated with any particular phoneset.

AIP
Advanced I/O Processor

alternating current
AC electrical power, the raw power supplied by all utility companies, must be converted to direct current (DC) for use in computer systems.

American National Standards Institute

A voluntary organization (which includes all the large computer companies) that sets standards for the computer industry.

American Standard Code for Information Interchange

A code for representing English text as numbers, with each character assigned a number from 0 to 127. For example, the ASCII code for uppercase P is 80. ASCII code makes it possible to transfer data from one computer to another.

analog

The type of signal used by most telephone connections. A modem converts a digital (computer) signal to analog (and vice versa) so that the signal can travel through telephone lines.

ANSI

See American National Standards Institute.

API

See application program interface.

APIC

Advanced Peripheral Interrupt Controller

application

When used in reference to the Nortel Networks Symposium Call Center Server, applications are used for the purposes of reporting. Information is collected and reported for applications to give call center managers specific details about call types, callers, or conditions. The master script, and each primary script, has an application with the same name. Applications are created automatically when the master script is activated for the master script and for every primary script that it references.

This term is also used to refer to a program that is run to do various types of work on a computer. Although applications carry out many functions, the user can see (and use) only the graphical user interface (GUI). Common applications include word processors, databases, and multimedia software.

application program interface

A set of routines, protocols, and tools that programmers use to develop software applications. APIs simplify the development process by providing commonly used programming procedures.

Application Specific Integrated Controller

A chip designed for a specific application. ASICs, created by connecting existing circuit building blocks in new ways, cost less, and are much easier to produce than designing a brand new chip.

ASCII

See American Standard Code for Information Interchange.

ASIC

See Application Specific Integrated Controller.

associated supervisor

A supervisor who sees the data related to an agent. *See also* primary supervisor.

Asynchronous Transfer Mode

A network technology that uses start bits and stop bits (which identify a piece of digital code) to facilitate data transfer. ATM equipment can transmit video, audio, and computer data over the same network, ensuring that no single type of data dominates the line.

ATM

See Asynchronous Transfer Mode.

average required bandwidth

The amount of bandwidth that the Capacity Assessment Tool analysis determines is required for the Nortel Networks Symposium Call Center server recommended configuration. *See also* bandwidth.

B

bandwidth

The amount of data that the network can transmit, usually expressed in megabytes (Mbytes) per second. *See also* average required bandwidth.

baseboard

See motherboard.

Basic Input/Output System

Flash ROM based code that runs the Power-On Self Test (POST) and bootstrap loader. BIOS contains low-level access routines for hardware that may be called from DOS.

baud rate

Refers to signaling rate. The baud rate indicates the number of bits per second (bps) that are transmitted. For example, a baud rate of 300 means that 300 bits are transmitted each second (300 bps).

BIOS

See Basic Input/Output System.

bits

Short for binary digit, the smallest unit of information on a machine. A single bit can hold only one of two values: 0 or 1. A byte is composed of eight consecutive bits.

bits per second

The standard measure of data transmission speeds. Assuming asynchronous communication, which requires 10 bits per character, a baud rate of 300 bps translates to 30 characters per second (cps).

bps

See bits per second.

bridge

A protocol-independent device that connects two LANs or two segments of the same LAN. Bridges are faster (and less versatile) than routers because they forward packets without analyzing and rerouting messages.

bus

A collection of wires that connects the microprocessor and main memory to internal computer components. All buses consist of an address bus that transfers data and a data bus that transfers information about where the data should go.

In a network, a bus (also called the backbone) is a main cable that connects all devices on a LAN.

byte

Abbreviation for binary term, a unit of storage capable of holding a single character. On almost all modern computers, a byte is equal to eight bits. Large amounts of memory are indicated in terms of kilobytes (1024 bytes), megabytes (1 048 576 bytes), and gigabytes (1 073 741 824 bytes).

C

cache

A read cache attempts to anticipate and store required data in memory so that it can be retrieved quickly (electronically, rather than mechanically). A write cache electronically holds the data you want to write to disk and slowly writes it to the disk (mechanically).

card

A thin, rectangular plate on which chips and other electronic components are placed. Examples of cards include motherboards, expansion boards, daughterboards, controller boards, Network Interface cards, and video adapters.

cathode-ray tube

The technology used in most televisions and desktop computer display screens. A CRT works by moving a ray of electrons back and forth across the back of the screen, illuminating phosphor dots on the inside of the glass tube.

CDN

See Controlled Directory Number.

CD-ROM

A type of optical disk capable of storing large amounts of data (up to 1 Gbyte), although the most common size is 630 Mbytes. A single CD-ROM has the storage capacity of 700 floppy disks and is particularly well-suited to information that requires large storage capacity.

central processing unit

Sometimes referred to as the microprocessor, the CPU more often describes the system unit, the box that holds a PC's essential components (except keyboard and monitor).

chip

Typically, a chip refers to the small flake of silicon crystal that makes up the microprocessor or some other type of controller.

CLAN

Customer local area network

client

The client part of a client-server architecture. Typically, a client is an application that runs on a personal computer or workstation and relies on a server to perform some operations. For example, an e-mail client is an application that enables you to send and receive e-mail.

CMOS

See Complementary Metal-Oxide Semiconductor.

COM or COMM

Communications port. Usually refers to the Logical Device name of PC serial ports as defined by DOS.

Complementary Metal-Oxide Semiconductor

A commonly used type of semiconductor well-suited for use in battery-powered devices, such as portable computers, because they require less power than NMOS.

Controlled Directory Number

Allow incoming calls to be queued into the switch, and messages regarding these calls to be sent to Nortel Networks Symposium Call Center Server.

controller board

A special type of expansion board that contains a controller for a peripheral device. When you attach new devices, such as a disk drive, to a computer, often a controller board must also be added.

CPU

See central processing unit.

crash

A serious computer failure during which the computer itself stops working or a program closes unexpectedly. A crash indicates a hardware malfunction or a serious software bug.

CRT

See cathode-ray tube.

D

DAT

See digital audio tape.

data types

The types of data that you can use to create variables.

daughterboard

Usually used as a synonym for an expansion board, a daughterboard is any printed circuit board that directly or indirectly to a motherboard.

DBMS

Database Management System

DC

See direct current.

DDS
See digital data storage.

desktop users
Users with the desktop assigned to them can access the system through a computer.

DHCP
See dynamic host configuration protocol.

digital audio tape
A type of magnetic tape that uses a helical scan scheme to record data. DDS (digital data storage) is the most common format for DAT cartridges.

digital data storage
DDS is the industry standard for 4 mm helical scan digital audio tape (DAT) cartridges. *See also* DAT.

digital linear tape
A high-capacity 1/2-inch streaming tape cartridge format.

digital signal processor
A special type of coprocessor that manipulates analog data, such as sound or photographs, that has been converted to digital form.

DIMM
The protective packaging for microprocessor chips that provides a safe and convenient means of installing and removing the chip.

DIP
A type of protective packaging for silicon memory chips that provides a safe and convenient means of installing and removing the chip.

DIP switch
A series of tiny switches built into circuit boards that enables you to configure a circuit board for a particular type of computer or application. DIP switches are always toggle switches, which means they have two possible positions: on or off (or 1 or 0).

direct current

DC, the electrical power used by computers, comes from a single source (such as a battery) which provides a single voltage that stays at a constant level. AC, the power provided by utility companies, must be converted to DC before it can be used in computer systems.

direct memory access

DMA speeds up system performance by moving blocks of memory around inside the computer (typically between I/O devices and memory). This process enables the microprocessor to spend its time performing other functions.

directory number

The number that identifies a phoneset on a PBX or in the public network. The Directory number could be a local PBX extension (local DN), a public network telephone number, or an automatic call distribution directory number (ACD-DN)—the pilot or group number for an ACD queue.

Disk Operating System

Originally developed by Microsoft, DOS is the standard, IBM-compatible, 16-bit operating system. New operating systems (including Windows 95) do not rely on DOS.

display

The device you look at when you work with a computer, for example a CRT monitor (in desktop systems) or a liquid crystal display (in notebooks).

DLL

See dynamic link library.

DLT

See digital linear tape.

DMA

See direct memory access.

DN

See directory number.

DOS
See Disk Operating System.

driver
A program that controls a device. Every device, whether it is a printer, disk drive, or keyboard, must have a driver program. A driver acts like a translator between the device and programs that use the device.

DSP
See digital signal processor.

dual in-line memory module
The protective packaging for microprocessor chips that provides a safe and convenient means of installing and removing the chip.

dual in-line pin
A type of protective packaging for silicon memory chips that provides a safe and convenient means of installing and removing the chip.

dynamic host configuration protocol
A protocol for assigning dynamic IP addresses to devices on a network.

dynamic link library
A library of executable functions or data that can be used by a Windows application. Typically, a DLL provides one or more particular functions and a program accesses the functions by creating either a static or dynamic link to the DLL. A DLL can be used by several applications at the same time.

E

ECC
See error correction code.

ECP
See extended capabilities port.

EEPROM

See electronically erasable programmable read-only media.

EIDE

See enhanced IDE.

EISA

See extended industry standard architecture bus.

ELAN

Embedded local area network

electronically erasable programmable read-only media

A memory chip that needs only a higher than normal voltage and current to erase its contents. EEPROM can be erased and reprogrammed without taking them out of their sockets. EEPROM gives computers and their peripherals a means of storing data without the need for a constant supply of electricity.

EMI

Electromagnetic interference

enhanced IDE

An IDE hard disk interface enhanced with hardware and firmware changes to support disks larger than 540 Mbytes, four disks instead of two, and faster transfer rates. *See also* IDE.

enhanced parallel port

A parallel port standard for PCs that supports bidirectional communication between the PC and attached devices (such as a printer).

EPP

See enhanced parallel port.

error correction code

A scheme that can detect and fix single-bit memory errors without crashing the system. Also known as Error Detection and Correction (EDAC).

Ethernet
A widely used LAN protocol that uses a bus topology and supports data transfer rates of 10 Mbps.

expansion board
Any board that plugs into one of the computers expansion slots. Expansion boards include controller boards, LAN cards, and video adapters.

expansion bus
Enables expansion boards to access the microprocessor and memory. *See also* bus.

extended capabilities port
A parallel-port standard for PCs that supports bidirectional communication between the PC and attached devices (such as a printer).

extended industry standard architecture bus
A 32-bit bus that accommodates ISA PC boards.

F

FAT
See file allocation table.

FIFO
First in, first out

file allocation table
A table that the operating system uses to locate files on a disk.

FITS
Failures in ten to the ninth hours. The number of failures expected in one million hours.

G

gateway
Refers to software or a computer running software that enables two different networks to communicate.

Gbyte
See gigabyte.

general protection fault
A computer condition that causes a Windows application to crash. GPFs are commonly caused when one application attempts to use memory assigned to another application.

gigabyte
Two to the 30th power (1 073 741 824) bytes. One gigabyte is equal to 1024 megabytes.

GPCP
General purpose computing platform

GPF
See general protection fault.

Graphical user interface
What is seen on the monitor when an Windows application (or another non-command-based application) runs. A GUI uses features such as pointers, icons, I-beams and menus to make the program easier to use.

GUI
See Graphical user interface.

H

HAL
See hardware abstraction layer.

handshaking
A process involved in establishing a valid connection or signal between two pieces of hardware or communications software.

hardware abstraction layer
The software layer between the operating system and the hardware.

hub
A common connection point for all 10Base-T cables connected to a small network. A hub enables data to go from one device to another.

I

icon
A small picture that represents an object or program in a GUI.

IDE
Commonly used to describe the AT attachment design, the dominant hard disk interface. IDE is a cost-effective interface technology for mass storage devices in which the controller is integrated into the disk or CD-ROM drive.

IEEE
See Institute of Electrical and Electronics Engineers.

INCA
See Interrupt and Control ASIC.

Industry Standard Architecture
A 16-bit standard interface for add-in cards.

input/output

Refers to any operation, program, or device that enters data into a computer or extracts data from a computer.

Institute of Electrical and Electronics Engineers

An organization of engineers, scientists, and students that develops standards for the computer and electronics industry.

interactive voice response

An application that allows telephone callers to interact with a host computer via prerecorded messages and prompts.

internetwork packet exchange

A networking protocol used by the Novell NetWare operating systems. Like UDP/IP, IPX is a datagram protocol used for connectionless communications. Higher-level protocols, such as SPX and NCP, are used for additional error recovery services.

inter-process communication

IPC enables one process to communicate with another process. It allows one application to control the other and permits several applications to share the same data without interfering with one another.

Also, a generic term for the communication of commands, events, or data between software processes.

Interrupt and Control ASIC

A special Intel chip used on the XXPRESS and AltServer platforms.

interrupt request

Hardware lines used by devices to send interrupt signals to the microprocessor, temporarily shifting program execution to another section of code. When a new device is added to a PC, often the IRQ number must be set to specify which interrupt line the device may use.

I/O

See input/output.

IP address

An identifier for a computer or device on a TCP/IP network. Networks use the TCP/IP protocol to route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255. For example, 1.160.10.240 could be an IP address.

IPC

See inter-process communication.

IPX

See internetwork packet exchange.

IRQ

See interrupt request.

ISA

See Industry Standard Architecture.

ISO

International Standards Organization

IVR

See interactive voice response.

IVR ACD-DN

A directory number that routes a caller to a specific IVR application. An IVR ACD-DN must be acquired for non-integrated IVR systems.

J

jumper

A metal bridge that closes an electrical circuit. Typically, a jumper consists of a plastic plug that fits over a pair of protruding pins. Jumpers are sometimes used to configure expansion boards. By placing a jumper plug over a different set of pins, you can change a board's parameters.

K

Kbyte
See kilobyte.

kilobyte
When used to describe data storage, a kilobyte represent 1024 bytes. When used to describe data transfer rates, a kilobyte represents 1000 bytes.

L

LAN
See local area network.

LCD
Liquid crystal display

LED
Light-emitting diode

local area network
A computer network that spans a relatively small area. Most LANs connect workstations and personal computers and are confined to a single building or group of buildings. LANs can transmit data at very fast rates, but the distances are limited.

M

M1
Meridian 1 switch

MAT
Meridian Administration Tool

Mbyte
See megabyte.

MCS
Multimedia communications systems

megabyte
When used to describe data storage, a megabyte represents 1 048 576 (2 to the 20th power) bytes. When used to describeddata transfer rates, as in Mbps, a megabyte represents one million bytes.

megahertz
One MHz represents one million cycles per second.

Meridian Mail
A Nortel Networks product that provides voice messaging and other voice and fax services.

MHz
See megahertz.

MM
See Meridian Mail

modular test architecture
PCDIAGS is an integrated MTA package of DOS executable files from Intel that tests the base hardware of the MAS machine.

motherboard
The principal board that has connectors for attaching devices to the bus. Typically, the motherboard contains the CPU, memory, and basic controllers for the system. On PCs, the motherboard is often called the system board.

MTA
See modular test architecture.

MTBF
Mean time between failures

N

NetBEUI
See NetBIOS enhanced user interface.

NetBIOS
See Network Basic Input Output System.

NetBIOS enhanced user interface
An enhanced version of the NetBIOS protocol used by network operating systems such as LAN Manager, LAN Server, Windows for Workgroups, Windows 95 and Windows NT.

Network Basic Input Output System
An application programming interface (API) that augments the DOS BIOS by adding special functions for local-area networks (LANs). Almost all LANs for PCs are based on the NetBIOS. Some LAN manufacturers have even extended it, adding additional network capabilities.

network interface card
An expansion board that enables a PC to be connected to a local area network (LAN).

network loop interface
A proprietary digital voice interface into the M1 used by Meridian Mail.

New Technology File System
The file system introduced as part of the Windows NT O/S.

NIC
See network interface card.

NLI
See network loop interface.

ns
nanosecond

NTFS

See New Technology File System.

NTLDR

Windows NT bootstrap loader program

NVRAM

Non-Volatile Random Access Memory

O

OA&M

Operations, administration, and maintenance

object linking and embedding

A compound document standard that enables you to create objects with one application and then link or embed them in a second application.

ODBC

See Open Database Connectivity.

OEM

Original equipment manufacturer

OLE

See object linking and embedding.

Open Database Connectivity

A Microsoft-defined database API standard.

Open System Interconnection

A worldwide communications standard that defines a framework for implementing protocols in seven layers.

OS

Operating Standard

OSA
Operating System Abstraction Layer

OSI
See Open System Interconnection.

P

parallel port
A parallel interface for connecting an external device such as a printer. Most personal computers have both a parallel port and at least one serial port.

parity
The quality of being either odd or even. The fact that all numbers have parity is commonly used in data communications to ensure the validity of data. This is called parity checking.

PBX
See private branch exchange.

PC
See personal computer.

PCEB
PCI to EISA Bus Controller

PCI
See Peripheral Component Interconnect Bus.

PCMCIA
See Personal Computer Memory Card International Association.

PCXB
PCI-to-press-bridge

Peripheral Component Interconnect Bus
A new 32- or 64-bit local bus standard for PCs.

personal computer

A computer having an architecture that is compatible with the IBM PC.

Personal Computer Memory Card International Association

An industry group dedicated to promoting the new PCMCIA/PC Card Standard (credit card–sized peripherals for PCs).

phoneset attribute

An option that allows a user to log in to the system through a phoneset.

PIIX3

PCI-to-ISA/IDE/USB Subsystem

PLM

Product Line Management

PMC

PCI and Memory Controller

POST

See Power-On Self Test.

Power-On Self Test

Initializes and performs rudimentary tests on baseboard hardware, including CPU, floating point unit, interrupts, memory, real -ime clock, video, auto-initializing PC,I and EISA bus.

primary supervisor

The supervisor who is associated directly with the agent. When the agent hits the Emergency key on the phoneset, the call is presented to the agent’s primary supervisor. The data related to the agent is associated with this supervisor.

private branch exchange

A telephone switch, typically used by a business to service its internal telephone needs. A PBX usually offers more advanced features than are generally available on the public network. A PBX interfaces with the public network central office using circuits known as trunks.

protocol
An agreed-upon format for transmitting data between two devices. The protocol determines the type of error checking to be used, the data compression method (if any), how the sending device will indicate that it has finished sending a message, and how the receiving device will indicate that it has received a message.

R

RAID
See Redundant Array of Inexpensive Disks.

RAM
See random access memory.

RAN
Recorded announcement

random access memory
The most common type of memory found in computers and other devices, such as printers. The term RAM is usually synonymous with main memory, the memory available to programs. For example, a computer with 8 Mbytes RAM has approximately 8 million bytes of memory that programs can use.

ranking table
Defines how calls are routed to the sites on the network. A ranking table can be used as the sole mechanism for selecting the best site on the network to take a call.

RAS
See Remote Access Services.

read-only memory
Computer memory on which data has been prerecorded and cannot be removed.

real-time clock

A clock that keeps track of the time even when the computer is turned off. Do not confuse a computer's real-time clock with its CPU clock. The CPU clock regulates the execution of instructions.

Redundant Array of Inexpensive Disks

A category of disk drives that employs two or more drives in combination for fault tolerance and performance. RAID disk drives are used frequently on servers but are not generally necessary for personal computers.

registry

Windows NT central database for storing services, defaults, and so on.

Remote Access Services

A feature built into Windows NT that enables users to log in to an NT-based LAN using a modem, X.25 connections, or WAN link.

RFI

Radio frequency interference

RGB

Red, green, blue: an electrical interface to a video monitor.

ROM

See read-only memory.

route

Defines a group of trunks. Each trunk carries either incoming or outgoing calls to the switch.

router

A device that connects two LANs. Routers are similar to bridges but provide additional functionality, such as the ability to filter messages and forward them to different places based on various criteria.

RPM

Revolutions per minute

RTC

See real-time clock.

Rule file

Stores the formulas and Symposium hardware configurations that the Capacity Assessment Tool uses to make analyses.

S

SCA

See single connector architecture.

SCM

See Service Control Manager.

SCO/Unix

A version of the UNIX operating system that runs on PCs.

SCSI

See Small Computer System Interface.

SCU

See Software Configuration Utility.

secondary supervisor

A supervisor who is available for an agent if the agent's primary supervisor is unavailable. *See also* primary supervisor.

SEER

System Error and Event Report

Sequenced Packet Exchange

A transport layer protocol (layer 4 of the OSI Model) used in Novell Netware networks. The SPX layer sits on top of the IPX layer (layer 3) and provides connection-oriented services between two nodes on the network. SPX is used primarily by client/server applications.

serial port
A general-purpose interface that can be used for almost any type of device, including modems, mice, and printers (although most printers are connected to a parallel port). Most serial ports on personal computers conform to the RS-232C or RS-422 standards.

server
A computer or device on a network that manages network resources. Examples of servers include file servers, print servers, network servers, and database servers.

service
Process that adheres to a Windows NT structure and requirements. It provides system functionality.

Service Control Manager
A Windows NT process that manages the different services on the machine.

SIMM
Single In-line Memory Module

Simple Network Management Protocol
A set of protocols for managing complex networks. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network and then analyzing the responses.

single connector architecture
A method for supplying power and data lines in one connector on hard disks. Provides hot-swap capability.

Small Computer System Interface
A standard for connecting and controlling mass storage devices such as CD-ROMS, tape drives, and hard disks.

Small System Controller
The Small System Controller pack consists of the CPU, memory, network conference, and Ethernet controller.

SMI
System Management Interrupt

SNMP
See Simple Network Management Protocol.

Software Configuration Utility
A utility used to configure PCI and EISA cards. It can also set BIOS parameters.

SPX
See Sequenced Packet Exchange.

SRAM
Static Random Access Memory

stop bit
In asynchronous communications, a bit that indicates that a byte has just been transmitted. Every byte of data is preceded by a start bit and followed by a stop bit.

supervisor
A user who manages a group of agents.

SVGA
Super Video Graphics Adapter

switch
In networks, a device that filters and forwards frames, or packets of information.

switch resource
Devices that are configured on the switch through overlays.

system pack
A logical drive created from two or more physical hard disks using the RAID DAC960 software configuration utility.

T

TCP/IP

See Transport Control Protocol/Internet Protocol.

telephony

The science of translating sound into electrical signals, transmitting them, and then converting them back to sound. The term is used frequently to refer to computer hardware and software that performs functions traditionally performed by telephone equipment.

token ring

A PC network protocol developed by IBM. A token-ring network is a type of computer network in which all the computers are arranged (schematically) in a circle.

Transport Control Protocol/Internet Protocol

The suite of communications protocols used to connect hosts on the Internet. It is the standard for transmitting data over networks.

trunk

A communications link between a PBX and the public central office, or between PBXs. There are various trunk types which provide services such as Direct Inward Dialing (DID trunks), ISDN, and Central Office connectivity.

TTL

Transistor-transistor logic

U

unicode

A worldwide 16-bit character-encoding standard that allows text to be displayed in a wide choice of international languages.

uninterruptible power supply

A power supply that includes a battery to maintain power in the event of a power outage. Typically, a UPS keeps a computer running for several minutes after a power outage, enabling you to save data that is in RAM and shut down the computer safely.

UPS

See uninterruptible power supply.

utility

A program that performs a very specific task, usually related to managing system resources. Operating systems contain a number of utilities for managing disk drives, printers, and other devices.

V

VGA

See video graphics adapter.

video adapter

An expansion board that contains a controller for a graphics monitor.

video graphics adapter

A standard video interface for computers.

voice port

A channel within an IVR system. A voice port is defined as a 2500 phoneset for third-party IVR systems or as an RCS (517 or 2009) phoneset for Meridian Mail.

W

WAN

See wide area network.

wide area network

A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local area networks (LANs). The largest WAN in existence is the Internet.

Win32

A 32-bit API used to access the Windows operating system.

workload scenarios

The workload scenarios define typical patterns of system operations and are not directly related to the various hardware configurations of the system. There are five typical workload scenarios (entry, small, medium, large, and upper end) that are used in performance evaluation for the Symposium Call Center.

X

XBUS

Two parallel bus structures, one for DMA-compatible devices, and one for memory devices that do not support DMA cycles. XBUS connects the real-time clock, flash memory, NVRAM, and keyboard/mouse controller.

Z

zero insertion force

A type of socket.

ZIF

See zero insertion force.

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Meridian Application Server

702t Installation and Maintenance Guide

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How the world shares ideas.