



Nortel Communication Server 1000

Communication Server 1000E Maintenance

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Revision history

May 2007

Standard 01.01. This document is issued to support Communication Server 1000 Release 5.0. This document contains information previously contained in the following legacy documents, now retired: *Communication Server 1000E: Maintenance (553-3041-500)* and *Communication Server 1000S: Maintenance (553-3031-500)*.

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Standard 4.00. This document is up-issued to reflect addition of technical content due to CR Q01542505.

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New in this release

This chapter outlines the new or updated hardware, features and procedures in *Communication Server 1000E Maintenance (NN43041-700)* Release 5.0 relative to Release 4.5..

Features

See the following sections for information about feature changes:

- "System terminal access for Media Gateway Controller" (page 20)
- "Alarm/fan module features" (page 29)
- "Compact flash cards" (page 31)
- "NTDW61 CP PM Call Processor" (page 33)
- "NTDW61 CP PM Signaling Server" (page 36)
- "NTDW60 Media Gateway Controller card" (page 39)
- "NTDW62 and NTDW64 Media Gateway Controller daughterboards" (page 42)
- "NTDW65 Voice Gateway Media Card" (page 42)
- "Media Gateway Controller Local Diagnostic Shells" (page 63)
- "Media Gateway Controller log file" (page 66)
- "Customer Configuration Backup and Restore" (page 103)
- "Replacing the NTDW61 CP PM Call Processor card" (page 112)
- "Replacing NTDW61 CP PM Signaling Server equipment" (page 113)
- Section "Replacing the NTDW60 Media Gateway Controller card" (page 113)
- "Replacing the NTDW62 or NTDW64 DSP daughterboard" (page 114)
- "Replacing the NTDW65 Voice Gateway Media Card" (page 114)

Other changes

- Rebranding of Optivity Telephony Manager to Telephony Manager

10 New in this release

- Element Manager updates

How to get help

Contents

This section contains the following topics:

- "Getting help from the Nortel web site" (page 11)
- "Getting help over the telephone from a Nortel Solutions Center" (page 11)
- "Getting help from a specialist by using an Express Routing Code" (page 12)
- "Getting help through a Nortel distributor or reseller" (page 12)

Getting help from the Nortel web site

The best way to get technical support for Nortel products is from the Nortel Technical Support web site:

www.nortel.com/support

This site provides quick access to software, documentation, bulletins, and tools to address issues with Nortel products. From this site, you can:

- download software, documentation, and product bulletins
- search the Technical Support Web site and the Nortel Knowledge Base for answers to technical issues
- sign up for automatic notification of new software and documentation for Nortel equipment
- open and manage technical support cases

Getting help over the telephone from a Nortel Solutions Center

If you do not find the information you require on the Nortel Technical Support web site, and you have a Nortel support contract, you can also get help over the telephone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7835).

Outside North America, go to the following web site to obtain the telephone number for your region:

www.nortel.com/callus

Getting help from a specialist by using an Express Routing Code

To access some Nortel Technical Solutions Centers, you can use an Express Routing Code (ERC) to quickly route your call to a specialist in your Nortel product or service. To locate the ERC for your product or service, go to:

www.nortel.com/erc

Getting help through a Nortel distributor or reseller

If you purchased a service contract for your Nortel product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller.

Overview

This document is a global document. Contact your system supplier or your Nortel representative to verify that the hardware and software described are supported in your area.

Subject

This document describes system maintenance for the CS 1000E system.

Note on legacy products and releases

This NTP contains information about systems, components, and features that are compatible with Nortel Communication Server 1000 Release 5.0 software. For more information about legacy products and releases, click the **Technical Documentation** link under **Support** on the Nortel home page:

www.nortel.com

Applicable systems

This document applies to the Communication Server 1000E (CS 1000E) system.

Intended audience

This document is intended for individuals who configure, maintain, and troubleshoot CS 1000E systems.

Conventions

In this document, the CS 1000E system is referred to generically as "system."

Related information

This section lists information sources that relate to this document.

NTPs

The following NTPs are referenced in this document:

- *Converging the Data Network with VoIP Fundamentals (NN43001-260)*

- *Circuit Card Reference (NN43001-311)*
- *Signaling Server Installation and Commissioning (NN43001-312)*
- *IP Phones Fundamentals (NN43001-368)*
- *Software Input/Output Administration (NN43001-611)*
- *Element Manager System Reference – Administration (NN43001-632)*
- *Software Input/Output Reference – Maintenance (NN43001-711)*
- *Software Input/Output Reference – System Messages (NN43001-712)*
- *Communication Server 1000 Fault Management – SNMP (NN43001-719)*
- *Traffic Measurement: Formats and Outputs Reference (NN43001-750)*
- *Communication Server 1000E Planning and Engineering (NN43041-220)*
- *Communication Server 1000E Installation and Commissioning (NN43041-310)*
- *Communication Server 1000E Upgrades (NN43041-458)*
- *Telephony Manager 3.1 Telemangement Applications Fundamentals (NN43050-602)*
- *IP Line Fundamentals (NN43100-500)*

Online

To access Nortel documentation online, click the **Technical Documentation** link under **Support** on the Nortel home page:

www.nortel.com

CD-ROM

To obtain Nortel documentation on CD-ROM, contact your Nortel Networks customer representative.

Precautions

Contents

This section contains the following topics:

- "General precautions" (page 15)
- "Circuit cards" (page 15)

General precautions

CS 1000 equipment is based on solid state circuitry that is sensitive to static electricity and environmental conditions. Follow the precautions in this chapter to avoid personal injury and equipment damage.



DANGER

To avoid the danger of electric shock, be careful when working with power equipment and connections. Warning notices are displayed and must be heeded.

Wear an antistatic wrist strap when handling circuit cards to prevent damage caused by static electricity.

Circuit cards

Handle the circuit cards as follows:

- Wear an antistatic wrist strap before handling circuit cards.
- Handle the cards by the card stiffeners and edges only. Do not touch the contacts or components.
- Keep the cards installed in the system as much as possible to avoid dirty contacts and unnecessary wear.
- Set the cards on a protective antistatic bag. If an antistatic bag is not available, hold the card, or set it in a card slot unseated from the connectors.
- Unpack or handle the cards away from electric motors, transformers, or similar machinery.

- Store the cards in protective packing. Do not stack cards on top of each other unless they are packaged.
- Store the cards in a dry dust-free area.

During repair and maintenance procedures:

- Turn off the power switch, if there is one.
- Software-disable the cards, if applicable, before they are removed or inserted.
- Hardware-disable the cards, whenever there is an enable/disable switch, before they are removed or inserted.
- Insert the cards into compatible slots only.
- Return defective or heavily contaminated cards to a repair center; do not try to repair or clean them.

Communicating with the system

Contents

This section contains the following topics:

- "Introduction" (page 17)
- "System terminal access for CP PII and CP PIV Call Servers" (page 18)
- "System terminal access for Media Gateway Controller" (page 20)
- "System terminal access for MG 1000T" (page 20)
- "Telephony Manager" (page 22)
- "Element Manager" (page 24)
- "Accessing the system" (page 24)

Introduction

Send maintenance commands and receive system messages (status and error messages) by communicating with the system through one or more of the following input/output devices or management tools:

- TTY or VDT terminal as an input/output device
- PC running terminal emulation software
- RS-232-C compatible printer as an output-only device
- Telephony Manager (TM)
- Maintenance telephone as an input-only device
- Element Manager

See *Communication Server 1000E Installation and Commissioning (NN43041-310)* for information about how to connect these devices and management tools.

System terminal access for CP PII and CP PIV Call Servers

Terminal Server

Because each CS 1000E Core Call Server provides only two ports for serial devices, the Terminal Server is used to provide the necessary standard serial ports for applications and devices that require them, such as printers and Call Detail Recording (CDR). The Terminal Server is also used to connect maintenance terminals and modems for support staff.

The Terminal Server provides an rlogin service that allows serial devices to establish dedicated connections to pseudo TTY (PTY) ports on the Call Server. (The Terminal Server therefore serves the same purpose as Serial Data Interface [SDI] and Multipurpose Serial Data Link [MSDL] cards in Large Systems.) You can telnet through the Terminal Server to individual components on the ELAN subnet, and therefore obtain maintenance access for each device. You can also access the Terminal Server from a remote PC by dialing the onboard modem.

As the Terminal Server is configured to automatically log in to the active Call Server upon startup, only one Terminal Server is required for each Call Server pair.

While the Terminal Server is needed for serial port access to the Call Server, it can also be optionally configured to provide access to Media Gateway 1000T (MG 1000T) serial ports for maintenance purposes.

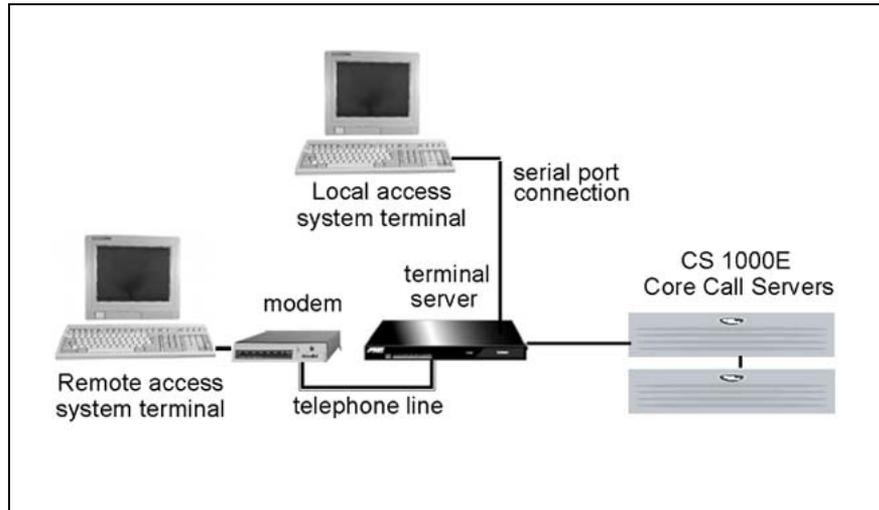
For more details on installing and configuring the Terminal Server, see *Communication Server 1000E Installation and Commissioning (NN43041-310)*.

System terminal

When a system terminal is installed locally, it is typically connected to a serial port on the Terminal Server. This ensures continued access to the active Call Server. When a system terminal is installed at a remote location, a modem and a telephone line are required between the system terminal and the Terminal Server.

Figure 1 "CS 1000E local and remote access system terminals" (page 19) shows a typical system terminal configuration to the Call Servers.

Figure 1
CS 1000E local and remote access system terminals



With the CS 1000E, a system terminal can also connect directly to the Call Server, Signaling Server, Media Cards, and Media Gateway 1000T (MG 1000T).

When a system terminal is installed directly on the CP PII or CP PIV Call Server, it connects to the com 1 port.

When a system terminal connection is made to a CP PM Call Server, the com (SDI) port is routed through the backplane of the shelf to the 50 pin MDF connector. The NTAK19EC cable ships with the CP PM that adapts the 50 pin MDF to a 25 pin DB connector for connectivity. A 25 pin null modem cable is required to adapt the SDI port to a typical PC serial port. Port0 is used for maintenance access. Port1 is for an external modem connection.

When a system terminal is installed on the Signaling Server, the rear serial port is the primary port for maintenance and administration.

When a system terminal connects to an MG 1000E, it connects to the Small System Controller (SSC) through an SDI port on the rear of the MG 1000E.

The Voice Gateway Media Card faceplate provides a female 8-pin mini-DIN serial maintenance port for system terminal connection. The maintenance port on the Shielded 50-pin to Serial/ELAN/TLAN Adapter (L-Adapter) provides an alternative to the faceplate maintenance port. For details, see the Voice Gateway Media Card installation in *Communication Server 1000E Installation and Commissioning (NN43041-310)*.

Remote TTY

If a Media Gateway is using an SSC, the three SDI ports available on the SSC card can be used as additional system TTYs. All applications on SDI ports of the Call Server SSC, with the exception of a Low Speed Link (LSL), are supported on the SDI ports of the MG 1000E SSC.

The purpose of a remote TTY is to access the Call Server from an MG 1000E. However, TTYs configured on the Call Server cannot access the MG 1000E.

If the MG 1000E is configured to be survivable, the SDI ports of the MG 1000E SSC can be used during survival mode, and function as a TTY connected to a standalone CS 1000. However, the TTY has no access to either LD 43 or LD 143. In survival mode, the SDI ports of the MG 1000E cannot be used to access the Call Server. Either port on the Signaling Server can be used for remote access.

System terminal access for Media Gateway Controller

Each Media Gateway Controller (MGC) installed in a CS 1000E has 3 serial ports: SDI0, SDI1, and SDI2. SDI2 is not available during system initialization and therefore cannot be used to access installation menus.

MGC serial ports can be used for local debug purposes or configured as system terminals in LD 17. Unlike the Small System Controller (SSC) SDI ports, all MGC SDI ports are configured through software. The MGC does not have DIP switches. Furthermore, the remote SDI feature of the MGC eliminates the need for a terminal server or TTY on a system with MGC architecture.

See *Communication Server 1000E Installation and Commissioning (NN43041-310)* for more detail about configuring MGC serial ports.

System terminal access for MG 1000T

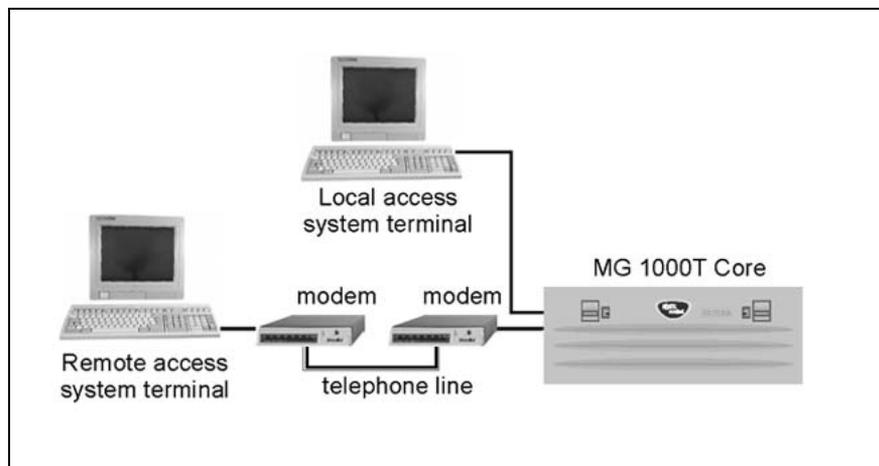
When a system terminal is installed locally with an MG 1000T, it connects to the SSC card on the MG 1000T Core through a rear SDI port. The NTBK48 three-port cable can be connected to the SDI port to provide a total of three serial connections.

When a system terminal is installed at a location that is remote from the MG 1000T, modems and a telephone line are required between the terminal and the SDI port.

System terminals connected to the MG 1000T cannot be used to access the Call Server or MG 1000E.

Figure 2 "MG 1000T local and remote access system terminals" (page 21) shows a typical system terminal configuration to the MG 1000T Core.

Figure 2
MG 1000T local and remote access system terminals



With the MG 1000T platform, a system terminal can also connect to the MG 1000T Expansion, Signaling Server, and Media Cards.

When a system terminal connects to an MG 1000T Expansion, it connects to the SSC through a rear SDI port, in the same manner as the MG 1000T Core.

When a system terminal is installed at a remote location, modems and a telephone line are required between the terminal and the SDI port.

When a system terminal is installed on the Signaling Server, the rear serial port is the primary port for maintenance and administration.

The Voice Gateway Media Card faceplate provides a female 8-pin mini-DIN serial maintenance port for system terminal connection. The maintenance port on the Shielded 50-pin to Serial/ELAN/TLAN Adapter (L-Adapter) provides an alternative to the faceplate maintenance port. For details, see the Voice Gateway Media Card installation in *Communication Server 1000E Installation and Commissioning (NN43041-310)*.

MG 1000E 10BaseT port

The MG 1000E SSC 10BaseT Ethernet port defaults to the disabled state. To use the 10BaseT Ethernet port, assign the port a unique IP address, and enable the port from the Call Server. The MG 1000E 10BaseT Ethernet port can run in Normal or Survival mode. In Normal mode, the MG 1000E does not provide access to maintenance or alarm management.

MG 1000E card slot assignment

The MG 1000E contains physical card slots numbered 1 to 10. When configuring the CS 1000 system, the physical card slot numbers must be transposed to loop, shelf, card.

Connecting to the Media Card RS-232 maintenance port

Connect a serial cable either to the rear P2 connector or to the faceplate connector, but not both. The card's hardware cannot support two devices connected at the same time.

The terminal device should be configured to 9600, 8, N, 1. Configure the flow control to "None" or a similar setting.

If the hardware flow control is enabled, you see information from the card but the card does not respond to any keystrokes. If this happens, ensure the flow control is set to "None", close the session, and reopen it.

Telephony Manager

Telephony Manager (TM) is a management server used to configure and maintain the system. It collects and processes alarms from the system, collects call accounting and traffic data, and acts as a terminal server for multiple devices.

CS 1000 systems can be accessed directly using TM. Each CS 1000 appears as a separate system in the network. The Call Server appears as one of the following:

- Communication Server 1000M Multi Group CP PIV
- Communication Server 1000E Multi Group CP PIV
- Communication Server 1000M Multi Group CP PII
- Communication Server 1000E Multi Group CP PII
- Communication Server 1000E CP PM

TM provides alarm management and maintenance applications.

Alarm management

TM alarm management provides an alarm collection and a processing center for multiple systems and devices. TM receives Simple Network Management Protocol (SNMP) traps from the CS 1000 system, and stores them in a circular log file on the TM Server. The TM Alarm Notification application monitors incoming traps and notifies you of important events and alarms.

TM alarm management has the following components:

- A web-based alarm browser server to view alarms from multiple systems and devices. HTML Help is provided for individual alarms.
- A Microsoft® Windows® alarm browser (Event Monitor) to view CS 1000 system-specific alarms. Windows help is provided for individual alarms.
- An Alarm Notification application to provide a scripting language to generate notifications on selected incoming traps. Notification types include pagers, e-mail, and the forwarding of SNMP traps to an upstream processor (such as Optivity Network Message Services [NMS]). The notification is triggered by trap data such as alarm severity, device type, and time of day. A Script Wizard application simplifies the creation of Alarm Notification scripts.
- A PC Event Log and Viewer to view events and alarms generated on the TM Server and its Windows clients. This Windows application can also generate SNMP traps based on event severity level.

Maintenance applications

With TM Maintenance Windows, maintenance overlays are grouped into hardware-related windows. The TM interface provides a comprehensive view of the CS 1000E system hardware configuration.

TM System Terminal

Perform overlay-based tasks on the System Terminal through the TTY interface. The System Terminal provides online, context-sensitive help for overlays, prompts, and error messages. The System Terminal also provides a terminal emulation capability.

In the web environment, the Terminal Client provides the same functionality as the System Terminal.

There are two versions of System Terminal to support two different connection types — Ethernet or PPP and Serial — as follows:

- The Overlay Passthru is available on TM using Ethernet or PPP. The Overlay Passthru supports access only to the overlays.
- The VT220 provides similar functions using serial connections, as well as terminal emulation for all application modules.

You can access overlays through the System Terminal and application modules through VT220.

See *Telephony Manager 3.1 Telemangement Applications Fundamentals (NN43050-602)* for details on how to use TM.

Element Manager

Element Manager is a web-based interface that supports a broad range of system management tasks, including:

- configuration and maintenance of IP Peer and IP telephony features
- configuration and maintenance of traditional routes and trunks
- configuration and maintenance of numbering plans
- configuration of Call Server data blocks (such as configuration data, customer data, Common Equipment data, D-channels)
- maintenance commands, system status inquiries, backup and restore functions
- software download, patch download, patch activation

The Element Manager web server resides on the Signaling Server and can be accessed directly through a web browser or Telephony Manager (TM). The TM navigator includes integrated links to each network system and their respective instances of Element Manager.

For more information about Element Manager, see *Element Manager System Reference – Administration (NN43001-632)*.

Accessing the system

Use maintenance commands to disable, enable, and test system components. To perform system maintenance on the CS 1000E, use the following:

- TM Server or TM Client PC
- SDI system terminal using command line inputs or TM System Terminal Overlay Passthru/VT220.
- Element Manager. For details on Element Manager, see *Element Manager System Reference – Administration (NN43001-632)* and *Signaling Server Installation and Commissioning (NN43001-312)*.
- Maintenance Telephone.

Access through a TM Server

See *Telephony Manager 3.1 Telemanagement Applications Fundamentals (NN43050-602)* for details on how to access the system with TM.

Access through an SDI system terminal or TM System Terminal Overlay Passthru/VT220

Send maintenance commands and receive system messages by accessing the Call Server, SSC, or MG 1000T Core through an RS-232 device, such as a VDT or TTY.

On the Call Server, the device can be connected through the Terminal Server or through a Com port. If the RS-232 device is connected directly to the Call Server Com port, a separate terminal is required to communicate with each Call Server in the Core.

On the MG 1000T Core, the device is connected directly to the Media Gateway SDI port using the NTBK48 three-port cable. (See *Communication Server 1000E Installation and Commissioning (NN43041-310)* for details.)

When you access the system through a system terminal, a login procedure is required. All system passwords are initially set to "0000". Change passwords in the Configuration Record in LD 17. If a system reload (sysload) occurs before the new password is saved in a data dump, the last active password remains valid.

Accessing the system from an SDI system terminal

To access the system from an SDI system terminal, follow the steps in [Procedure 1 "Accessing the system from an SDI system terminal" \(page 25\)](#).

Procedure 1

Accessing the system from an SDI system terminal

Step	Action
1	Press Return .
	<ul style="list-style-type: none"> a. If the response is OVL111 nn IDLE or OVL111 nn BKGD, you are ready to log into the system. Go to step 2. b. If the response is OVL000 > , you are already logged into the system. Go to step 4. <p>Responses vary with different Background Terminal packages.</p>
2	Enter LOGI ADMIN1 and press Return . The normal response is PASS? . If there is any other response, see <i>Software Input/Output Reference – Maintenance (NN43001-711)</i> .
3	Enter either the level 1 or level 2 password and press Return . If the password is correct, the system responds with the prompt > .
4	Enter LD xx , where xx represents the number of the program.
5	Perform tasks.
6	To end the program, enter four asterisks (****).
7	To end the login session, enter LOGO .

—End—

Access through the maintenance telephone

The Call Server can be accessed using a maintenance telephone. A telephone functions as a maintenance telephone when the class-of-service is defined as Maintenance Telephone Allowed (MTA) in LD 11.

Using a maintenance telephone, you can send a subset of commands. The maintenance telephone takes priority over a system terminal and logs the terminal out.

Specific commands for testing tones and outpulsing through the maintenance telephone are given in the Tone and Digit Switch and Digitone Receiver Diagnostic (LD 34).

Specific commands for testing trunk connections through the maintenance telephone are given in the Trunk Diagnostic (LD 36).

The following Maintenance Overlays are accessible from an IP Phone operating as a maintenance telephone: 30, 32, 33, 34, 36, 37, 38, 41, 42, 43, 45, 46, 60, and 62.

Maintenance Overlay operations are supported on IP Phones except for the Tone and Digit Switch (TDS) commands of LD 34 and TONE commands of LD 46.

To use the maintenance telephone, the Terminal Number (TN) for that telephone must be operating.

To access the system using the maintenance telephone, a Special Service Prefix (SPRE) code, as defined in the Customer Data Block, is entered, followed by "91". See [Procedure 2 "Accessing the maintenance telephone" \(page 27\)](#) for details. To enter commands, press the keys that correspond to the letters and numbers of the command (for example, to enter "LD 42, Return", enter **53#42##**).

[Table 1 "Translation from keyboard to dial pad" \(page 26\)](#) shows the translation from a terminal keyboard to a telephone dial pad.

Table 1
Translation from keyboard to dial pad

Keyboard		Dial Pad
	1	1
A B C	2	2
D E F	3	3

Keyboard		Dial Pad
G H I	4	4
J K L	5	5
M N O	6	6
P Q R S	7	7
T U V	8	8
W X Y Z	9	9
	0	0
Space or # (pound symbol)		#
Return		##

Accessing the maintenance telephone

To access the maintenance telephone, follow the steps in [Procedure 2 "Accessing the maintenance telephone"](#) (page 27).

Procedure 2

Accessing the maintenance telephone

Step	Action
------	--------

- | | |
|---|---|
| 1 | Press the prime DN key. |
| 2 | Place the telephone in maintenance mode by entering xxxx91 , where xxx represents the customer SPRE code as defined in the Customer Data Block in LD 21. The SPRE code is typically "1", which means you enter 191 to place the telephone in maintenance mode. |
| 3 | To check for busy tone, enter Return (##) <ul style="list-style-type: none"> • If there is no busy tone, go to Step 4. • If there is a busy tone, a program is active. To end an active program and access the system, enter four asterisks (****). |
| 4 | Load a program by entering 53#xx## , where xx represents the number of the program. |
| 5 | Perform tasks. |
| 6 | Press the release key to return the telephone to call processing mode. Background routines are then loaded automatically. |

—End—

Hardware maintenance tools

Contents

This section contains the following topics:

- "Introduction" (page 29)
- "Alarm/fan module features" (page 29)
- "Compact flash cards" (page 31)
- "Circuit card features" (page 32)
- "Signaling Server LEDs" (page 54)
- "System alarms" (page 55)
- "Line transfer" (page 56)
- "External power loss" (page 56)

Introduction

Fault indicators and hardware features help perform maintenance tasks (particularly identifying and clearing faults). These maintenance tools include:

- circuit card features that include self-tests and status indicators
- LED indicators that identify Call Server power and temperature faults
- system alarms that categorize the severity of component failure

Alarm/fan module features

The NTDU64 alarm/fan module provides cooling for a CP PII or CP PIV Call Server. It also provides a thermostat to monitor the Call Server temperature.

If the Call Server temperature reaches 42°C (107°F), the fan units switch into high-speed mode. The fans revert to normal speed when the Call Server temperature falls below 37°C (98°F). Also, if one fan fails, the remaining two fans switch into high-speed mode indefinitely.

If the Call Server temperature exceeds 60°C (140°F), it triggers a major alarm. The Call Server continues to operate, provided it does not lose power.

The CP PM Call Server has no alarm/fan module.

Alarm/fan LEDs

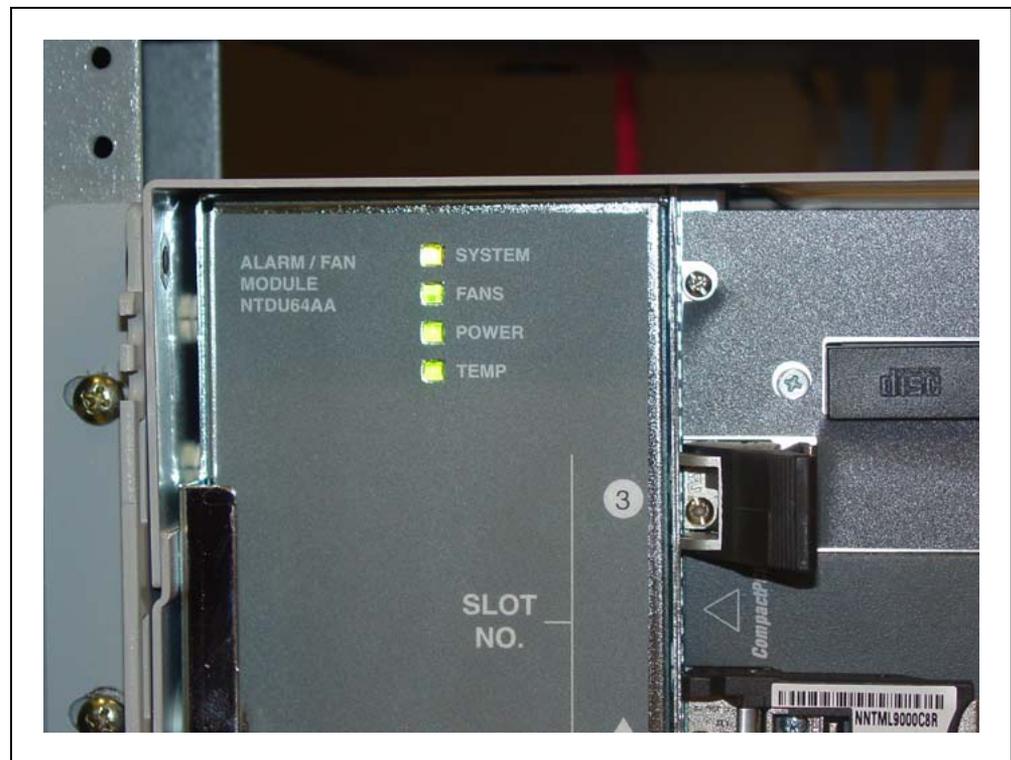
The alarm/fan module also provides status light emitting diode (LED) indicators for the following:

- system
- fans
- power
- temperature

For each LED, green indicates normal operations and red indicates faulty or disabled equipment.

Figure 3 "Alarm/fan module status LEDs" (page 30) shows the alarm/fan module green status LEDs during normal operations.

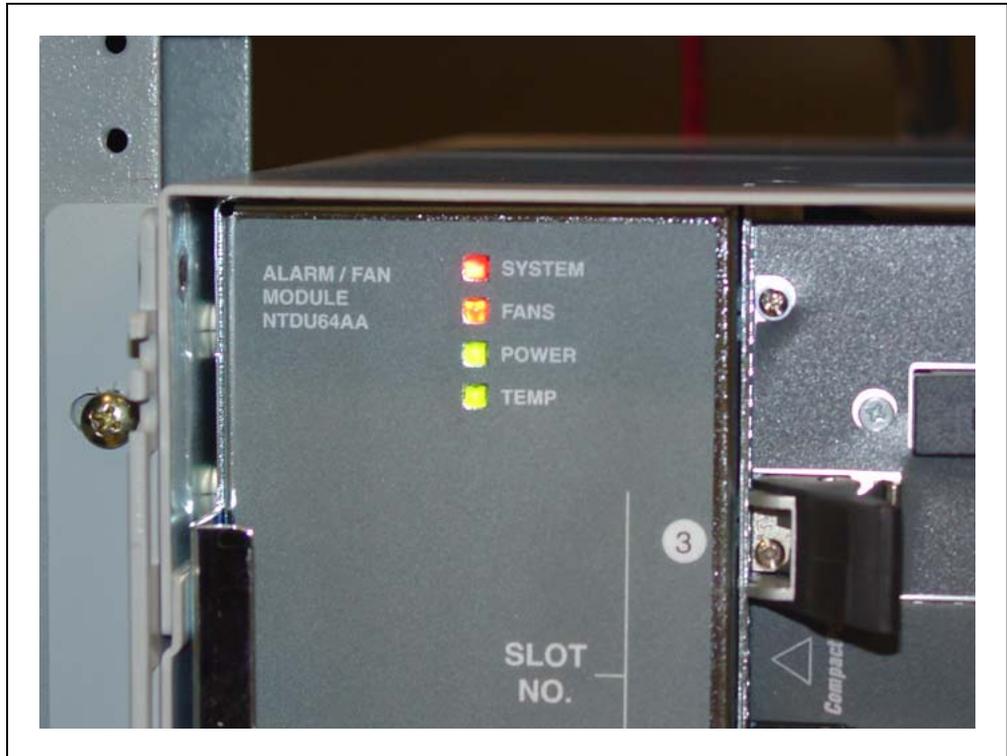
Figure 3
Alarm/fan module status LEDs



The system LED consolidates the status of the other three LEDs. If the fans, power, and temperature are all within normal operating parameters, the system LED is green. If any of the three other LEDs is red, indicating trouble, the system LED also appears red.

Figure 4 "Fan trouble LEDs" (page 31) shows the alarm/fan Module LEDs indicating fan trouble.

Figure 4
Fan trouble LEDs



Because the system LED shows the status of the other three LEDs, it is used to determine the overall status of the Call Server. It is visible through a light pipe in the Call Server front cover.

For information about replacing Call Server components, including the alarm/fan module and power module, see "Replacing equipment" (page 111).

Compact flash cards

The CP PM Call Server has two compact flash (CF) sockets:

- one internal 1 GB Fixed Media Disk (FMD)
- one hot-swappable Removable Media Disk (RMD), accessible on the faceplate. The RMD contains the CP PM Call Server software image.

Compact flash LEDs on the Call Server faceplate indicate the status of the CF devices.

Fixed Media Disk

The Fixed Media Disk (FMD) is internal to the CP PM card, accessible only when the card is removed from the system. This flash card serves as a hard drive. The internal card connects directly to the Advanced Technology Attachment (ATA), also known as the hard drive controller in the chipset.

For CP PM Call Server application, assign switch S5 to position 1. Position 1 indicates that a Compact Flash device is used for the FMD. For CP PM Signaling Server application, assign switch S5 to position 2.

Removable Media Disk

You can load CS 1000 software onto the CP PM Call Server through the RMD.

To support hot insertion and removal, the faceplate card slot is controlled through a PCI-to-CF bridge, but is treated as a standard ATA device.

When you insert or remove the faceplate CF (RMD), SRPTxxxx information messages appear on the TTY and are written to the report log.

When you attempt to backup to the CF and the CF is missing from the faceplate, TEMUxxxx error messages are issued .

For more information about message details, see *Software Input/Output Reference – System Messages (NN43001-712)* .

Formatting a Removable Media Disk Compact Flash card

You can format the Removable Media Disk (RMD) CF card as a bootable or a nonbootable device.

From PDT1 or PDT2, issue the format command as follows: `formatcf2 {0,1}`.

where

0 = a nonbootable device

1 = a bootable device

You can format a compact flash on a PC (Microsoft Windows 98SE, Microsoft Windows 2000, or Microsoft Windows XP) for use as a compact flash in the RMD. You format the disk in FAT16 - DOS format.

Circuit card features

Circuit card features describes various circuit cards and features.

Self-tests

A self-test checks to see that a card is working correctly. Many cards perform a self-test on power-up. The software commands Disable and Enable force a card to self-test. The results of a self-test generally show whether or not there is a problem with the card.

NTDW61 CP PM Call Processor

NTDW61 CP PM Call Processor card features include the following:

- Intel Pentium M 738 1.4 GHz
- two compact flash (CF) sockets
 - one internal 1 GB Fixed Media Disk (FMD)
 - one hot-swappable Removable Media Disk (RMD), accessible on the faceplate.
- 1 GB of DDR RAM, expandable to 2 GB
- two 100BaseT Ethernet ports
 - LAN 0 used for ELAN
 - LAN 1 not used on Call Server
- one 1 Gbps Ethernet port for HSP
- two SDI ports
- one USB port
- a reset (RST) button to cold start the Call Server
- an initialize (INI) button to warm start the Call Server
- an Active CPU or Call Server Redundancy (CS RED) LED

Before CS 1000 Release 5.0, the CS 1000E Core Call Server was a CP PII or CP PIV processor in its own Call Server chassis. For CS 1000 Release 5.0, the CP PM Call Server sits in one of the slots in the MG1000E chassis.

The CP PM Call Server processor connects to the MG 1000E Media Gateway Controllers through Ethernet and therefore does not require backplane connectivity (other than power and a slot ID). The following rules apply to the preferential placement of the CP PM Call Server in the MG 1000E:

- Do not install the CP PM Call Server processor in slot 0 of any MG 1000E. This slot is reserved for the Media Gateway Controller (MGC).
- For ease of cabling, place the CP PM Call Server processor in slot 1, next to the MGC.

- In a system configured for Campus Redundancy, place the two CP PM Call Servers in separate MG 1000E cabinets to increase potential survivability.

The NTDW61 CP PM Call Processor card functions only with the NTDW60 Media Gateway Controller (MGC) card and does not support the Small System Controller (SSC).

The CP PM has no power (PWR) LED.

The CP PM/MGC architecture has no system utility (Sys Util) card, so the display usually associated with the Sys Util card is not present.

Figure 5 "NTDW61 CP PM Call Processor" (page 34) shows the faceplate of the CP PM Call Processor card.

Figure 5
NTDW61 CP PM Call Processor



Initialize button

The manual initialize (Init) button associated with the active Call Server starts the Initialize program. The Initialize program can clear some equipment faults. It then rebuilds call-dependent data and generates system messages indicating the status of the system. This process is called an initialization.



CAUTION SERVICE INTERRUPTION

Call processing is briefly interrupted during an initialization.

Reset button

You can cold restart the processor card with the Reset button. This is equivalent to a full power start up of the processor card. The System Loader initiates call processing and starts memory-checking diagnostics. This process is called a system reload or sysload.

**CAUTION
SERVICE INTERRUPTION**

During a sysload, active calls are disconnected and the system goes into an emergency line transfer state. Use the reset button only when specifically instructed to do so in an NTP.

CP PM Call Processor faceplate LEDs

The status LED indications of the NTDW61 CP PM Call Server are as follows:

- Off: no power
- Red: BIOS self-test running
- Flashing red: bootrom and Operating System (OS) loading
- Yellow: sysload phase 1
- Flashing yellow: sysload phase 2
- Flashing green: SL1 loading on active core
- Green: normal operation

The Active CPU LED indications are as follows:

- Off: no power
- Green: redundant mode, active
- Flashing green: split mode, active
- Yellow: redundant mode, standby
- Flashing yellow: split mode, standby
- Red: single mode

The ELAN LED indications are as follows:

- LED1 Off: 10 Mbps
- LED1 Yellow: 100 Mbps
- LED2 Off: no link, no activity
- LED2 Green: link valid
- LED2 Blink: link valid and activity

The HSP LED indications are as follows:

- LED1 Off: 10 Mbps
- LED1 Yellow: 100 Mbps
- LED1 Green: 1000 Mbps

- LED2 Off: no link, no activity
- LED2 Green: link valid
- LED2 Blink: link valid and activity

NTDW61 CP PM Signaling Server

NTDW61 CP PM Signaling Server card features includes the following:

- Intel Pentium M 738 1.4 GHz processor
- one hard disk drive
- two compact flash (CF) sockets
 - one internal 1 GB Fixed Media Disk (FMD)
 - one hot-swappable Removable Media Disk (RMD), which is accessible on the faceplate.
- 1 GB of DDR RAM, expandable to 2 GB
- two 100BaseT Ethernet ports
 - LAN 0 used for ELAN
 - LAN 1 used for TLAN
- one 1 Gbps Ethernet port (not used on Signaling Server)
- two serial ports
- one USB port (not used on Signaling Server)
- a reset (RST) button to cold start the Signaling Server
- an initialize (INI) button to warm start the Signaling Server

CP PM Signaling Server LEDs

The status LED indications of the NTDW61 CP PM Signaling Server are as follows:

- Off: no power
- Red: BIOS self-test running
- Flashing red: bootrom and operating system (OS) loading
- Yellow: applications loading
- Flashing yellow: applications loaded successfully
- Green: pbxLink up
- Flashing green: pbxLink down

For more detailed information about the CP PM Signaling Server, see *Signaling Server Installation and Commissioning (NN43001-312)*.

NT4N64 PII and NT4N39 PIV Call Processor features

Buttons on the NT4N64 PII and NT4N39 PIV Call processor cards allow the administrator to initialize and reset the system.

Initialize button

The manual initialize (Init) button associated with the active Call Server starts the Initialize program. The Initialize program can clear some equipment faults. It then rebuilds call-dependent data and generates system messages indicating the status of the system. This process is called an initialization.



CAUTION SERVICE INTERRUPTION

Call processing is briefly interrupted during an initialization.

Reset button

You can cold restart the processor card with the Reset button. This is equivalent to a full power start up of the processor card. The System Loader initiates call processing and starts memory-checking diagnostics. This process is called a system reload or sysload.



CAUTION SERVICE INTERRUPTION

During a sysload, active calls are disconnected and the system goes into an emergency line transfer state. Use the reset button only when specifically instructed to do so in an NTP.

CP PIV faceplate LEDs

The CP PIV faceplate features the following 5 LEDs:

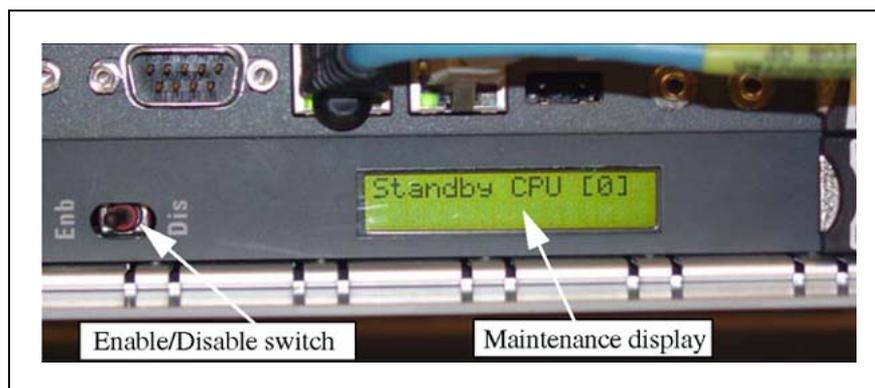
- PWR – Solid Green – Power Good
- CF – Flashing Green shows activity on compact flash cards CF1 or CF2.
- HDD – Flashing Green shows activity on secondary IDE bus (not used)
- LAN1 – ELAN Activity
- LAN2 – HSP Activity
 - Flashing Yellow – 10 MB
 - Flashing Green – 100 MB
 - Flashing Amber – 1000 MB (1 GB)

CP PII and CP PIV System Utility card features

The System Utility card maintenance display indicates the status of the CP PII or CP PIV Call Server, either active or standby. The display also provides an indication of normal and fault conditions as well as the progress of software upgrades and backups.

Figure 6 "System Utility card display for standby Call Server" (page 38) shows the System Utility card display for a standby Call Server.

Figure 6
System Utility card display for standby Call Server



Interpretations of the maintenance display codes are listed in the *Software Input/Output Reference – System Messages (NN43001-712)*. Examine previous codes, system messages, and visual indicators with any current maintenance display codes to properly analyze faults.

Each new code shown on a maintenance display overwrites the one before it. However, all codes displayed are recorded. You can review them by printing the History File (in LD 22).

Figure 6 "System Utility card display for standby Call Server" (page 38) also shows the location of the Enable/Disable (Enb/Dis) switch on the card. This switch enables and disables the hardware for that card.

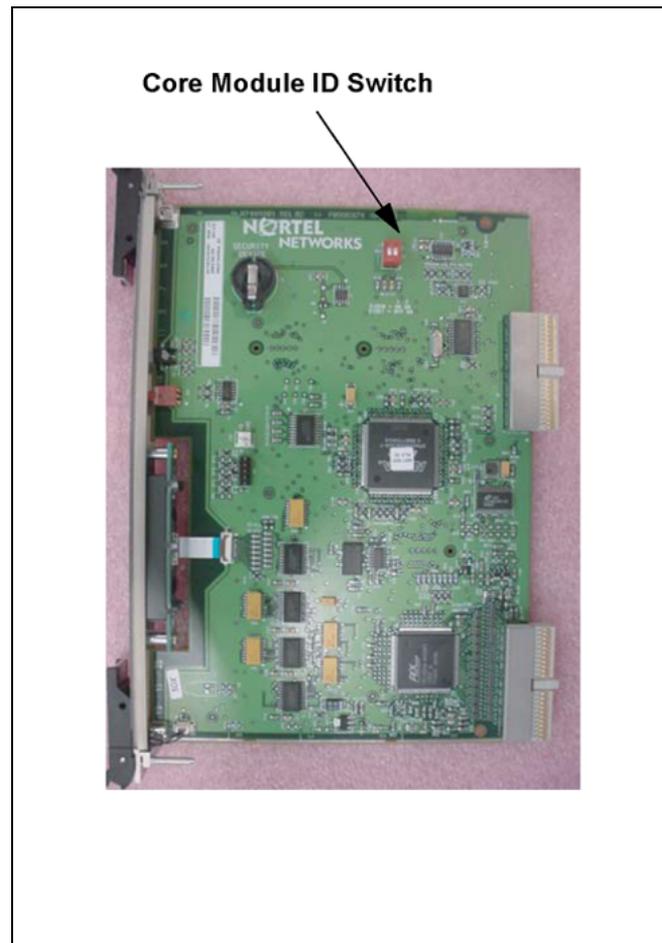
Table 2
Core module ID switch settings (System Utility card)

	Position 1	Position 2
Core 0	On	On
Core 1	Off	On

The System Utility card also contains DIP switches that specify the address of the card for Call Server 0 or Call Server 1. The Core ID switches are set in the factory.

Confirm that these settings match the identification labels for the module into which they will be installed. See Table 2 "Core module ID switch settings (System Utility card)" (page 38) and Figure 7 "Core Module ID switch" (page 39).

Figure 7
Core Module ID switch



NTDW60 Media Gateway Controller card

The NTDW60 Media Gateway Controller (MGC) card provides a gateway controller for MG 1000E IP media gateways in a CS 1000E system. The MGC card functions as a gateway controller for CP PII, CP PIV and CP PM Call Servers.

The MGC card has two expansion sites to accommodate Digital Signal Processor (DSP) daughterboards. The card occupies slot 0 in the media gateway chassis.

Excluding DSP daughterboards, MGC card features include:

- internal compact flash, which appears to the software as a standard hard disk drive
- six 100BaseT Ethernet ports
- three SDI ports
- four-character LED display

NTDW60 Media Gateway Controller LEDs

The Media Gateway Controller faceplate provides a 4-character LED display that indicates normal or abnormal situations during system initialization and regular operation of the MGC.

Media Gateway Controller LED display during system initialization

During system initialization, diagnostic information from the associated sanity tests appears on the MGC faceplate. The following table summarizes this information.

Table 3
MGC LED messages during system initialization

Message	Description
BOOT	The first message displayed when the system becomes active.
POST	Power-on self-test, displayed while the MGC carries out system hardware tests.
PASS	Power-on self-test pass.
Exxx	Error code, where xxx is a numeric value. The system has detected a serious error. See Table 5 "MGC LED error codes" (page 41) for error code details.
LOAD	Application software is loading.

In a successful initialization, the diagnostic messages appear in the following order: BOOT, POST, PASS, LOAD.

If a fatal error occurs during the self-test, an error code appears. The PASS and LOAD messages do not appear.

Media Gateway Controller LED display during normal operation

During normal operations, the MGC LED displays the IP Media Gateway (IPMG) superloop and MGC shelf number. If an error occurs, the display cycles between the shelf number and the error code. Each item appears for 20 seconds. The following table summarizes the information that appears on the LED display.

Table 4
MGC LED messages during normal operation

Message	Description
Exxx	Error code, where xxx is a numeric value. The system has detected a serious error. See Table 5 "MGC LED error codes" (page 41) for error code details.
LLL ^S	IPMG super loop and MGC shelf number, where LLL is the superloop number and S is the shelf number (032 ⁰ , 120 ¹).

Media Gateway Controller LED error codes

The following table summarizes the error codes possible on the MGC LED display.

When the fault has been cleared, the error code is also cleared from the LED display and a corresponding MGCxxxx message is issued to the TTY, the LOG, and the SNMP.

Table 5
MGC LED error codes

LED code	Message	Severity	Description	Corrective action	Output
E001	MGC0001	Major	MGC <supl shelf> A DSP DB-96 is detected in DB position #2.	Remove the Media Gateway Controller from the chassis/ cabinet and move the DSP DB-96 from DB position #2 to DB position #1.	TTY LOG SNMP LED
E002	MGC0002	Critical	Unable to send MGC <supl shelf> registration request to Call Server	Check IP configuration and network connections.	TTY LOG SNMP LED
E003	MGC0011	Critical	MGC <supl shelf> link to Call Server is down	Check IP configuration and network connections.	TTY LOG SNMP LED

NTDW62 and NTDW64 Media Gateway Controller daughterboards

The NTDW60 Media Gateway Controller provides Digital Signal Processor (DSP) resources with the NTDW62 32-port DSP daughterboard and the NTDW64 96-port DSP daughterboard. These daughterboards transcode between IP and TDM devices in a CS 1000E. The daughterboards eliminate the need for Voice Gateway Media Cards in an MG 1000E, although the system can contain both DSP daughterboards and Voice Gateway Media Cards, if desired.

Two positions are available on the MGC card for DSP daughterboards. The following configurations of daughterboard placement on a Media Gateway Controller are possible:

- an NTDW62 32-port in position 1
- an NTDW62 32-port in position 2
- an NTDW62 32-port in position 1 and an NTDW62 32-port in position 2
- an NTDW64 96-port in position 1
- an NTDW64 96-port in position 1 and an NTDW62 32-port in position 2

The following table summarizes where you can place the daughterboards and the card slots assigned to each card when it is in that position.

Table 6
DSP daughterboard placement and card slot assignment

Daughterboard	Position 1	Card slot	Position 2	Card slot
NTDW62 32-port	yes	11	yes	0
NTDW64 96-port	yes	11, 12, 13	no	-

The NTDW62 and NTDW64 DSP daughterboards have no LEDs.

NTDW65 Voice Gateway Media Card

The NTDW65 MC32S Media Card provides 32 IP-TDM gateway ports. The MC32S replaces the previous media card or ITG card and runs on CS 1000 Release 5.0 software. Secure Real Time Protocol (SRTP) secures the IP media path to and from the DSP channels on the card.

The NTDW65 Voice Gateway Media Card includes the following components and features:

- 32 DSP channels
- six-port Layer 2 switch
- 10BaseT ELAN for management and signaling messages
- two TTY ports on the processor for debugging
- 100 BaseT faceplate port for debugging

- four-character LED display

NTDW65 Voice Gateway Media Card LEDs

The Voice Gateway Media Card faceplate provides a four character LED display that indicates normal or abnormal situations during system initialization and regular operation of the media card.

Voice Gateway Media Card LED display during system initialization

During system initialization, diagnostic information from sanity tests appears on the MC32S media card faceplate. The following table summarizes this information.

Table 7
Media card LED messages during system initialization

Message	Description
BOOT	The first message displayed when the MC32S media card becomes active
POST	Power-on self-test, displayed while the MC32S carries out system hardware tests
PASS	Power-on self-test pass
FAIL	The system detected a serious error during self-test
LOAD	Application software is loading

In a successful initialization, the preceding diagnostic messages appear in the following order: BOOT, POST, PASS, LOAD.

If a fatal error occurs during the self-test, FAIL appears on the LED display. PASS and LOAD messages do not appear.

Voice Gateway Media Card LED display during normal operation

During normal operation the faceplate displays the following informational and diagnostic messages:

Table 8
Media card LED messages during normal operation

Message	Description
Lxxx	L = a leader card and xxx = the number of registered sets
Fxxx	F = a follower card and xxx = the number of registered sets
Wxxx	Error code, where xxx is a numeric value
Sxxx	System link error code, where xxx is a numeric value

Circuit card LEDs

Many circuit cards have one or more LEDs on the faceplate. The LED gives a visual indication of the status of the card or of a unit on a card.

When a green LED is steadily lit, the card is operating normally. When a green LED is off, the card is disabled or faulty.

When a red LED is steadily lit, the card, or a unit on it, is disabled, faulty or unequipped.

When a red LED is off and power is available to the card, the card is operating normally.

Media Card LEDs

The Media Card faceplate provides the following LEDs.

Status LED

The Media Card faceplate red LED indicates the following:

- the enabled/disabled status of the card
- the self-testing result during power up or card insertion into an operational system

Ethernet activity LEDs

The Media Card faceplate contains Ethernet activity LEDs for each subnet. The faceplate contains six Ethernet activity LEDs, three for the ELAN subnet and three for the TLAN subnet. The LEDs indicate the following links on the ELAN and TLAN subnets (in order from the top):

- 100 (100BaseT)
- 10 (10BaseT)
- A (Activity)

Maintenance hex display

The four-digit LED-based hexadecimal display provides the status of the Media Card at all times. The hex display provides an indication of fault conditions and the progress of PC Card-based software upgrades or backups. See [Table 36 "Media Card faceplate maintenance display codes" \(page 154\)](#) for a description of the hex display codes.

The Maintenance display also indicates the progress of the internal self-test in the form of T:xx.

ITG-P LED (Card Status)

The red status faceplate LED indicates the enabled or disabled status of the 24 card ports. The LED is on (red) during the power-up or reset sequence. The LED remains lit until the system enables the card. If the LED remains on, the self-test failed, the card is disabled, or the card rebooted.

NTAK10 faceplate LEDs

The NTAK10 2 Mb DTI circuit card has a total of six faceplate LEDs. Five of the LEDs are directly associated with the operation of the NTAK10 circuit card. The remaining LED is associated with the onboard clock controller.

The following table describes the NTAK10 LEDs.

Table 9
NTAK10 LEDs

LED	State	Definition
DIS	On (Red)	The NTAK10 2 Mb DTI circuit card is disabled.
	Off	The NTAK10 2 Mb DTI is not in disabled state.
OOS	On (Yellow)	The NTAK10 2 Mb DTI circuit card is in out-of-service state. No alarm states exist, the card is not disabled, nor is it in a loopback state.
	Off	The NTAK10 is not in an out-of-service state.
NEA	On (Yellow)	A near-end alarm state has been detected.
	Off	No near-end alarm.
FEA	On (Yellow)	A far-end alarm state has been detected.
	Off	No far-end alarm
LBK	On (Yellow)	The NTAK10 2 Mb DTI is in loopback mode.
	Off	The NTAK10 2 Mb DTI is not in loopback mode.
CC	On (Red)	The clock controller is switched on and disabled.
	On (Green)	The clock controller is switched on and is either locked to a reference or is in free-run mode.
	Flashing (Green)	The clock controller is switched on and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD 60. If the CC is tracking, this can be an acceptable state. Check for slips and related clock controller error conditions. If none exist, this state is acceptable, and the flashing identifies jitter on the reference.
	Off	The clock controller is switched off.

NTAK79 faceplate LEDs

The NTA79 2 Mb PRI circuit card has a total of seven faceplate LEDs. Five of the LEDs are directly associated with the operation of the Primary Rate interface (PRI). The remaining two LEDs are associated with the onboard Clock Controller and the onboard D-channel interface (DCHI).

The NTA79 faceplate LEDs are described in [Table 10 "NTAK79 LEDs" \(page 46\)](#).

Table 10
NTAK79 LEDs

LED	State	Definition
OOS	On (Red)	The NTA79 2 Mb PRI circuit card is either disabled or out-of-service state.
	Off	The NTA79 2 Mb PRI is not in disabled state.
ACT	On (Green)	The NTA79 2 Mb PRI circuit card is in active state.
	Off	NTA79 2 Mb PRI is not in disabled state. The OOS LED is red.
RED	On (Red)	A red alarm state has been detected. This represents a local alarm state of: Loss of Carrier (LOS) Loss of Frame (LFAS), or Loss of CRC Multi-frame (LMAS).
	Off	No red (local) alarm.
YEL	On (Yellow)	A yellow-alarm state has been detected. This represents a remote alarm indication from the far end. The alarm can be either Alarm Indication (AIS) or Remote Alarm (RAI).
	Off	No yellow (remote) alarm.
LBK	On (Green)	The NTA79 2 Mb PRI is in loopback mode.
	Off	The NTA79 2 Mb PRI is not in loopback mode.
CC	On (Red)	The clock controller is switched on and disabled.
	On (Green)	The clock controller is switched on and is either locked to a reference or is in free run mode.
	Flashing (Green)	The clock controller is switched on and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD 60. If the CC is tracking, this can be an acceptable state. Check for slips and related clock controller error conditions. If none exist, this state is acceptable, and the flashing identifies jitter on the reference.
	Off	The clock controller is switched off.

LED	State	Definition
DCH	On (Red)	The DCHI is equipped and disabled.
	On (Green)	The DCHI is equipped and enabled, but not necessarily established.
	Off	The DCHI is switched off.

NTBK50 faceplate LEDs

The NTBK50 circuit card has a total of seven faceplate LEDs. Five of the LEDs are directly associated with the operation of the PRI. The remaining two LEDs are associated with the Clock Controller and DCHI/DDCH daughterboard.

The NTBK50 2 Mb PRI circuit card LEDs are described in [Table 11 "NTBK50 faceplate LEDs" \(page 47\)](#).

Table 11
NTBK50 faceplate LEDs

LED	State	Definition
OOS	On (Red)	The NTBK50 2 Mb PRI circuit card is either disabled or out-of-service. Also, the state of the card after power-up, completion of self-test, and exiting remote loopback.
	Off	The NTBK50 2 Mb PRI is not in disabled state.
ACT	On (Green)	The NTBK50 2 Mb PRI circuit card is in active state.
	Off	The NTBK50 2 Mb PRI is in disabled state. The OOS LED is red.
RED	On (Red)	A red-alarm state has been detected. This represents a local alarm state of Loss of Carrier (LOS), Loss of Frame (LFAS) or Loss of CRC Multi-frame (LMAS).
	Off	No red (local) alarm.
YEL	On (Yellow)	A yellow-alarm state has been detected. This represents a remote alarm indication from the far end. The alarm can be either Alarm Indication (AIS) or Remote Alarm (RAI).
	Off	No yellow (remote) alarm.
LBK	On (Green)	The NTBK50 2 Mb PRI is in loopback mode.
	Off	The NTBK50 2 Mb PRI is not in loopback mode.
CC	On (Red)	The clock controller is software-disabled.
	On (Green)	The clock controller is enabled and is either locked to a reference or is in free-run mode.

LED	State	Definition
CC	Flashing (Green)	The NTAK20 is equipped and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD 60. If the CC is tracking, this can be an acceptable state. Check for slips and related clock controller error conditions. If none exist, this state is acceptable, and the flashing identifies jitter on the reference.
	Off	The clock controller is not equipped.
DCH	On (Red)	The DCH is disabled.
	On (Green)	The DCH is enabled, but not necessarily established.
	Off	The DCH is not equipped.

NTAK09 and NTRB21 faceplate LEDs

The NTAK09/NTRB21 1.5 Mb DTI/PRI/DCH circuit cards have seven faceplate LEDs. Five LEDs are directly associated with the operation of the NTAK09/NTRB21 circuit cards. The remaining two LEDs are associated with the optional daughterboards. The first of these LEDs indicates the status of the NTAK20 Clock Controller daughterboard. The second LED indicates the status of the D-channel interface.

[Table 12 "NTAK09/NTRB21 LEDs" \(page 48\)](#) describes the LEDs found on the NTAK09/NTRB21 DTI/PRI/DCH circuit cards. Only one of the five LEDs is on at one time.

Table 12
NTAK09/NTRB21 LEDs

Affected circuit card	LED	State	Definition
NTAK09 or NTRB21	DIS	On (Red)	The circuit card is disabled.
		Off	The circuit card is not in disabled state.
	ACT	On (Green)	The circuit card is in active state. No alarm states exist, the card is not disabled, nor is it in a loopback state.
		Off	An alarm state or loopback state exists, or the card is disabled. See other faceplate LEDs for additional information.
	RED	On (Red)	A red-alarm state is detected.
		Off	No red alarm.
	YEL	On (Yellow)	A yellow-alarm state is detected.
		Off	No yellow alarm.

LBK

Affected circuit card	LED	State	Definition
		On (Green)	The card is in loopback mode.
		Off	The card is not in loopback mode.
	DCH	On (Red)	The D-channel is equipped and disabled.
		On (Green)	The D-channel is equipped and enabled.
		Off	The D-channel is not equipped.
NTAK20	CC	On (Red)	The NTAK20 is equipped and disabled.
		On (Green)	The NTAK20 is equipped and is either locked to a reference or is in free-run mode.
		Flashing (Green)	The NTAK20 is equipped and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD 60. If the CC is tracking, this can be an acceptable state. Check for slips and related clock controller error conditions. If none exist, this state is acceptable, and the flashing is identifies jitter on the reference.
		Off	The NTAK20 is not equipped.
NTAK93 or NTBK51	DCH	On (Red)	The D-channel daughterboard is equipped and disabled.
		On (Green)	The D-channel daughterboard is equipped and enabled.
		Off	The D-channel daughterboard is not equipped.

Monitor jacks

The NTAK09, NTAK10, NTAK79, NTBK50, and NTRB21 have two bantam jacks (RCV and XMT) on the faceplate. They are used to monitor the performance of the carrier in the receive and transmit direction. The jacks allow the convenient connection of external T1/E1 test equipment and ISDN protocol analyzers.

NTDK20 SSC card faceplate LEDs

The NTDK20 SSC card has either three or five faceplate LEDs, depending on the version of the card.

The SSC/PC Card LED indicates the following, if the LED is:

- Off, the SSC is in normal operation
- Yellow, the SSC is disabled
- Red, the SSC is running self-test

- Red and flashes three times, the self-test passed
- Green steady or flashing, the PC Card is accessed

The Layer 7 Port LEDs indicate the following, if the Port LEDs are:

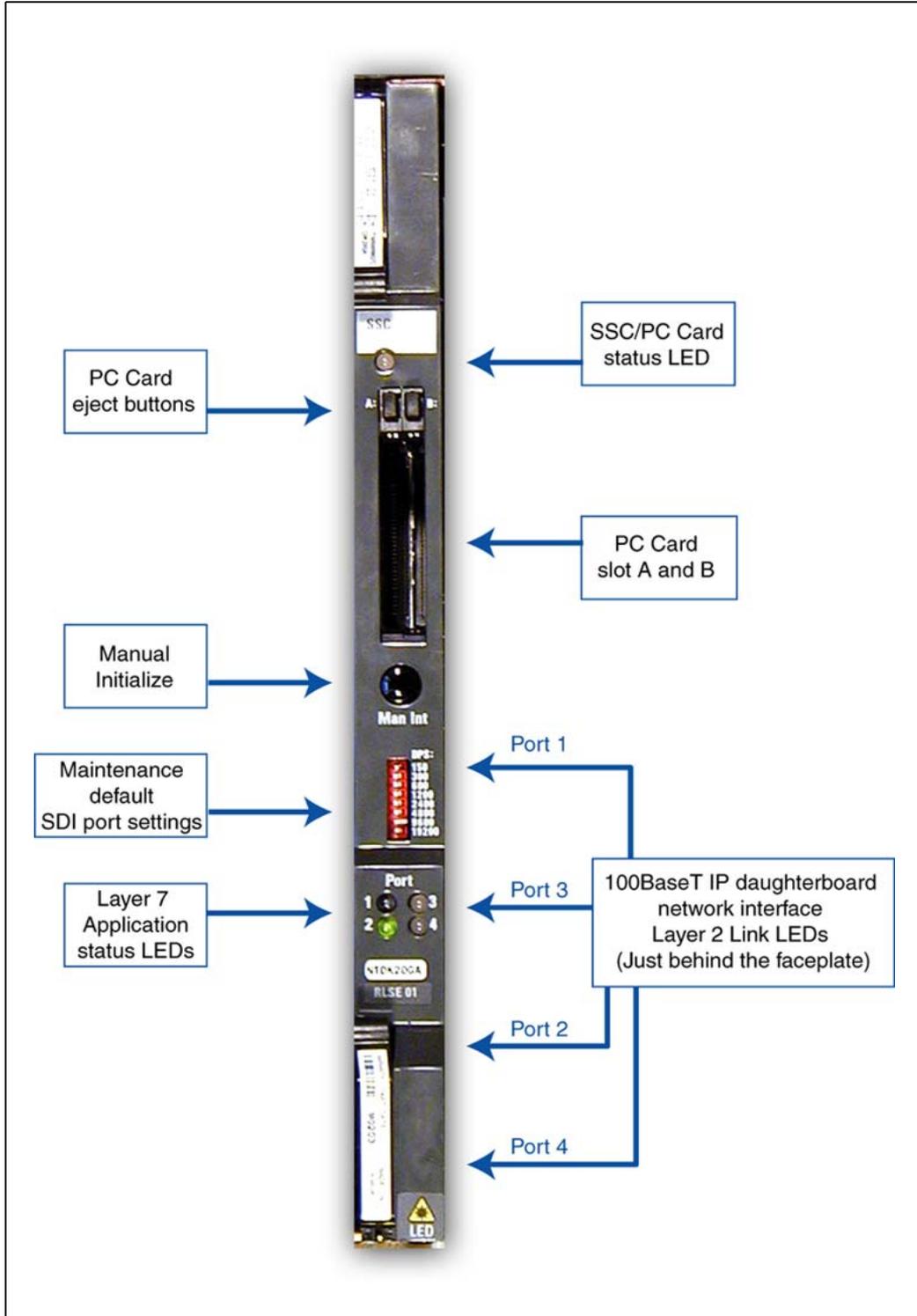
- Red, the link is disabled and voice is disabled
- Amber, the link is established and voice is disabled
- Green, the link and voice are established

The IP daughterboard network interface port Layer 2 Link LEDs indicate the following, if the Link LEDs are:

- green, the link is established
- red (receive) and yellow (transmit) flashing, show network activity

Figure 8 "SSC card faceplate" (page 51) shows the SSC card faceplate features.

Figure 8
SSC card faceplate



Initialize button

Similar to the Init button on the CS 1000E Core Call Server, the manual initialize (Man Int) button on the SSC card starts the Initialize program. The Initialize program can clear some equipment faults. It then rebuilds call-dependent data, and generates system messages indicating the status of the system. This process is called an initialization.



CAUTION SERVICE INTERRUPTION

Call processing is briefly interrupted during an initialization.

NTDK83 and NTDK99 IP daughterboard LEDs

The NTDK83 and NTDK99 IP daughterboard network interfaces each have three LEDs for each IP network interface they contain. The LEDs provide the status of the Layer2 network link to the IP daughterboards. [Figure 9 "NTDK83 and NTDK99 card circuit board LEDs" \(page 52\)](#) and [Table 13 "NTDK83 and NTDK99 daughterboards LEDs" \(page 52\)](#) provide further descriptions of these LEDs.

Figure 9
NTDK83 and NTDK99 card circuit board LEDs

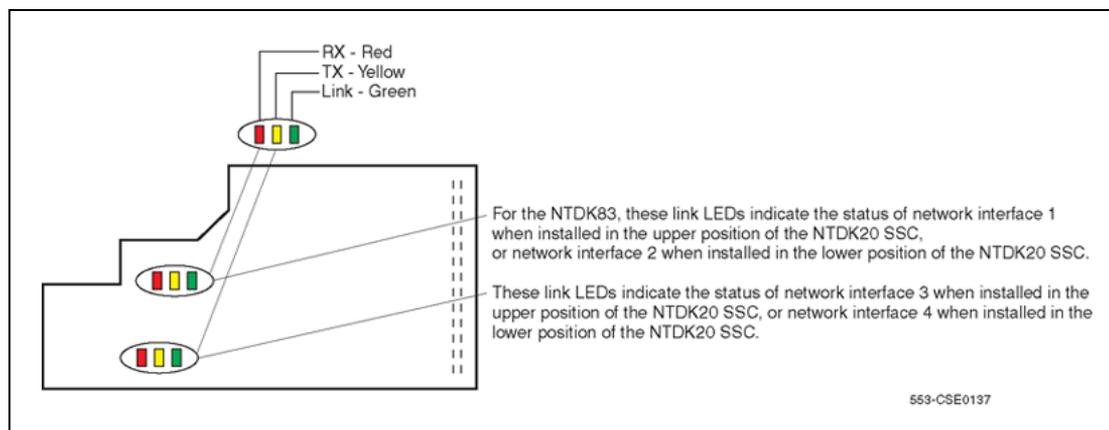


Table 13
NTDK83 and NTDK99 daughterboards LEDs

LED	State	Definition
Receive	Red	The information/data is being received.
	Off	No information/data is being received.
Transmit	Yellow	Information/data is being transmitted.
	Off	No information/data is being transmitted.

LED	State	Definition
Link	Green	A physical connection with link pulses exists between the card and the customer's data equipment.
	Off	No connection exists.

Figure 10 "MG 1000T Core SSC IP daughterboard LEDs" (page 53) shows the IP daughterboard LED locations for the SSC card in the MG 1000T Core, and Figure 11 "Media Gateway SSC IP daughterboard link LED" (page 53) shows the IP daughterboard LED locations for MG 1000Es and MG 1000T Expansions.

Figure 10
MG 1000T Core SSC IP daughterboard LEDs

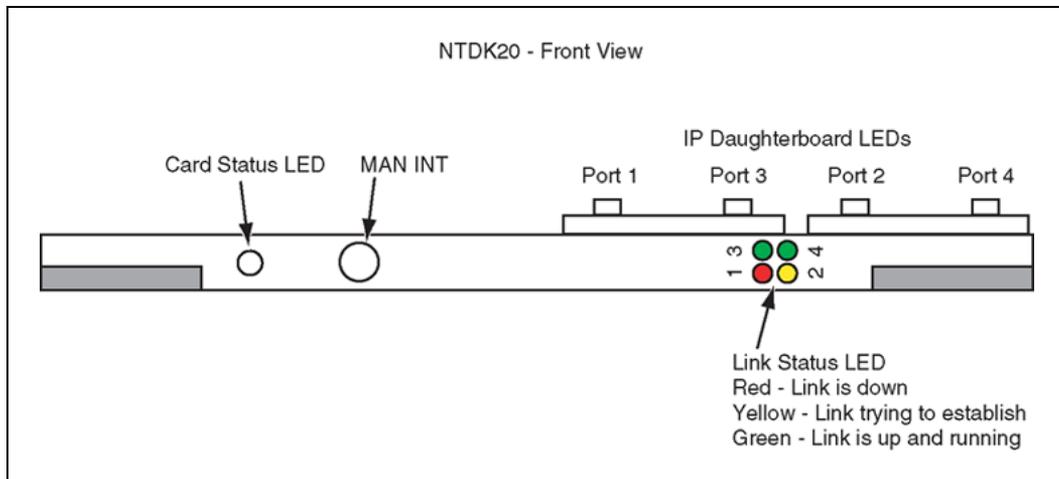


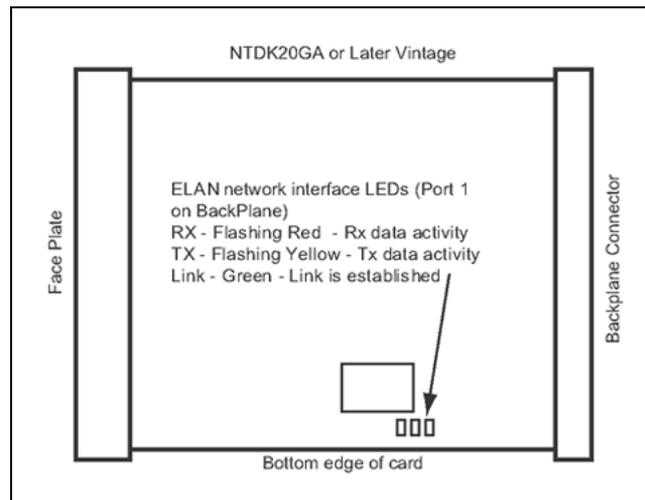
Figure 11
Media Gateway SSC IP daughterboard link LED



ELAN network interface LEDs

The NTDK20 SSC card also has three LEDs to indicate the status of the ELAN network interface. See [Figure 12 "ELAN network interface LEDs on SSC" \(page 54\)](#) for the location and a description of the LEDs.

Figure 12
ELAN network interface LEDs on SSC

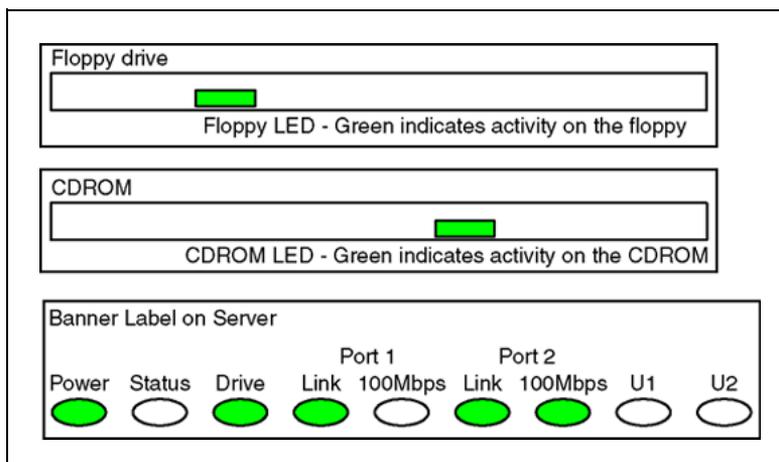


Signaling Server LEDs

See [Figure 13 "Signaling Server LEDs" \(page 55\)](#) and the following for the status of the Signaling Server LEDs:

- Power – LED Green power is on, LED OFF power is off.
Note: When the power is turned off on a Signaling Server that is operational, the two Link LEDs for Port 0 and Port 1 continue to flash.
- Status – LED off indicates CPU is running. Red LED indicates CPU has halted.
- Drive – Flashing Green means hard drive or CD-ROM is active.
- Link – Green LED indicates an active link for either network interface Port 1 or Port 2.
- 100 Mbps – Green LED indicates the network interface Port 0 or Port 1 is running at 100Mbps. Off indicates 10Mbps.
- U1 and U2 are not used.

Figure 13
Signaling Server LEDs



System alarms

Major and minor alarms can be displayed on the attendant console when connected to the system. However, attendant consoles cannot be connected to an MG 1000T and therefore cannot display MG 1000T alarms.

Major alarms

A major alarm indicates a fault that seriously interferes with call processing. The causes of major alarms are listed in [Table 14 "Causes of major and minor alarms"](#) (page 55).

When an MG 1000E is equipped with a power fail transfer unit (PFTU), a major alarm causes designated analog (500/2500-type) telephones to connect directly to Central Office trunks. This is called a line transfer.

Minor alarms

A minor alarm indicates that the system hardware or software has detected a fault requiring attention. The causes of minor alarms are listed in [Table 14 "Causes of major and minor alarms"](#) (page 55).

A minor alarm is indicated on attendant consoles in customer groups affected by the fault. A minor alarm indication on the console is an optional feature, enabled and disabled on a customer basis through data administration procedures.

Table 14
Causes of major and minor alarms

Alarm	Cause
Major	CPU or control bus failure Program failure when attempting to load the system

Alarm	Cause
	System power faults Temperature fault (excessive heat)
Minor	Conference failure Digitone receiver failure More than one fault on different cards in one MG 1000E (indicated on affected customer console only) Serial Data Interface failure Memory failure Network failure (indicated on affected console only) Peripheral signaling failure Tone and digit switch failure

External alarms

A remote alarm, in the context of general maintenance, is the extension of a major alarm to another location or to an audible or visual indicator. The system generates a signal that indicates a major alarm condition and sends the alarm signal to a remote location, such as a monitoring center or test center, or to an indicator, such as a light or bell.

Line transfer

As an option, connect one or more PFTUs to the MG 1000Es. Each PFTU connects designated analog (500/2500-type) telephones to Central Office trunks. If call processing stops, those analog (500-2500-type) telephones are transferred through the PFTU to the Central Office so the outside connections are still available. A line transfer occurs:

- during a sysload (system reload)
- if there is a major power failure
- if call processing stops due to a Call Server failure
- if there is a loss of power to the MG 1000E
- if there is a loss of power to the PFTU
- if a line transfer switch on the attendant console is turned on

External power loss

You can connect reserve (backup) power supplies to the system, that is, uninterruptible power supplies (UPS) for AC-powered systems. If the main source of external power is lost, power to the system is maintained by the UPS.

Software maintenance tools

Contents

This section contains the following topics:

- "Introduction" (page 57)
- "Maintenance applications" (page 58)
- "Diagnostic programs" (page 59)
- "Media Gateway Controller Local Diagnostic Shells" (page 63)
- "TM alarm management" (page 66)
- "Interactive diagnostics" (page 67)

Introduction

Software maintenance tools help to identify and clear faults, and provide self-checking capabilities. Various software maintenance tools are available for the CS 1000:

- "Diagnostic programs" (page 59) monitor a variety of operations, detect faults, and initiate a corrective action during normal call processing.
- "Interactive diagnostics" (page 67) test hardware, isolate faults, and verify fault clearing.
- "Element Manager" (page 143) provides the means to check status and issue a variety of commands.
- Telephony Manager (TM) alarm management, includes the following components:
 - a web-based alarm browser
 - a Microsoft® Windows® alarm browser (Event Monitor)
 - an Alarm Notification
 - a PC Event Log and Viewer
- TM maintenance applications

Maintenance applications

CS 1000 systems have over 600 overlay-based maintenance commands. To maintain a CS 1000 system using system terminals, you must remember, or look up, which overlay has the appropriate commands and the syntax of each command.

TM eliminates the need to remember many of these commands by providing a subset of overlay functions for maintenance of the Call Server, MG 1000Es, MG 1000T Core and Expansions, Signaling Servers, and Voice Gateway Media Cards.

TM Maintenance applications are available through Maintenance Windows (windows-based) and Maintenance Pages (web-based). Both provide the same functionality.

TM Maintenance Windows groups maintenance overlays into hardware-related windows. The TM interface provides a comprehensive view of the system hardware configuration:

- The hardware list works like a spreadsheet data view. You can scroll through the list, sort the list, and select items for changing.
- Right-click an item from the list and apply a Maintenance command from the pop-up menu.
- Print the list or copy it to a spreadsheet.
- Select a TN or DN and print the TN/DN block.
- See enabled/disabled status in real time.

Maintenance Windows applications

TM Maintenance Windows include the following:

SSC

The Small System Controller (SSC) window displays the status of the Media Gateway SSC cards. Perform actions and tasks on the SSC cards in the SSC window.

I/O Ports

The I/O (Input/Output) Ports window displays the status of I/O ports on the system. Execute actions and tasks on a selected port.

Network Loops

The Network Loops window lists the network loops on the system. Execute actions and tasks on a selected loop by choosing commands from the Maintenance menu.

PE Cards

The PE Cards window displays the status of all Intelligent Peripheral Equipment (IPE)-type cards associated with each Media Gateway on the system. Execute actions and tasks on a selected card.

PE Units

The PE Units window displays information for PE units and Directory Numbers (DN) on the system. Perform actions and tasks on a selected unit.

B- and D-channels

On the MG 1000T, the PRI/PRI2 B- and D-channels window displays the B- and D-channels on the selected digital trunk (for example, PRI loop). Perform actions and tasks on a selected channel.

For detailed information about each Maintenance Windows function, see the Maintenance Applications chapter in *Telephony Manager 3.1 Telemanagement Applications Fundamentals (NN43050-602)*.

Diagnostic programs

Diagnostic software programs monitor system operations, detect faults, and clear faults. Some programs run continuously, while some are scheduled.

Diagnostic programs are resident or nonresident software programs. Resident programs, such as the Error Monitor and Resident Trunk Diagnostic, are always present in system memory. Nonresident programs, such as the Input/Output Diagnostic and Core Equipment Diagnostic, are used as Midnight and Background Routines or for interactive diagnostics. Nonresident programs are loaded from the system disk and are run as scheduled or upon request.

See *Software Input/Output Reference – Maintenance (NN43001-711)* and *Software Input/Output Reference – System Messages (NN43001-712)* for detailed information about all diagnostic programs.

Overlays

Nonresident programs are also called overlays or loads. They are identified by a title and a number preceded by the mnemonic for load (for example, Trunk Diagnostic — LD 36).

MG 1000T

The MG 1000T platform supports the same overlay commands and associated TN format (c u) as the CS 1000 system.

CS 1000E

The CS 1000E Core Call Server and MG 1000Es support the overlay commands and TN format (l s c u) associated with Large Systems.

However, a number of maintenance commands are either not supported or not applicable to the MG 1000E. [Table 15 "Unsupported overlay commands for MG 1000E" \(page 60\)](#) lists the commands that are not supported in the MG 1000Es.

Table 15
Unsupported overlay commands for MG 1000E

LD	Unsupported commands
30	CPED, DISL, ENLL, LDIS, LENL, LOOP, RPED, SLFT, STEI, TIET, TTSM, and TTWI
32	DISL, DISN, DLIF, DSCT, DSNW, DSPS, DSRB, DSTS, DSXP, ENLG, ENLL, ENLN, ENNW, ENPS, ENRB, ENTS, ESTU, FDIS, PCON, PERR, PLOG, PMES, PTAB, PTRF, RLBT, RLSU, SDLC, STAT NCAL, STAT loop, STAT NWK, STAT PER, IDC loop, IDCS, SUPL, XNTT, XPCT and XPEC
34	DTR and TDS Also, the following Maintenance Telephone commands are not supported: CDT, CMP, CUST, CWG, DRNG, DTD, ITN, JDRG, JIDT, ORD, PCRT and TST
38	DISX and ENLX
45	TEST
46	DISL, DISX, ENLL, ENLX and MFS
92	No supported commands (the Automatic Trunk Maintenance feature is not supported in CS 1000E)

Error Monitor

The Error Monitor is a resident program that continuously tracks call processing. The Error Monitor generates system messages if it detects invalid or incorrectly formatted call processing information.

System messages generated by the Error Monitor are preceded by the mnemonic ERR, which usually indicates hardware faults, or the mnemonic BUG, which usually indicates software problems.

With prompt ERRM in the Configuration Record (LD 17), instruct the system to print or not print ERR or BUG messages. If many similar BUG messages occur, consult the Technical Assistance Center.

Initialize Program

The Initialize Program momentarily interrupts call processing when it clears Core Equipment faults. It then rebuilds call-dependent data and generates system messages with the mnemonic INI, which indicate the status of the system.

**CAUTION
SERVICE INTERRUPTION**

Call processing is briefly interrupted during an initialization.

To activate an initialization (warm start) on the Call Server, press the initialize button on the CP card.

An initialization occurs automatically after the System Loader program runs, when a software or firmware fault is detected, and when a Core Equipment hardware fault is detected.

Midnight and Background Routines

In the Configuration Record (LD 17), select the nonresident software programs that run in the Midnight Routine and Background Routine. These routines automatically perform maintenance checks. Programs included in the Midnight Routine are defined with the prompt DROL (derived from "daily routine overlay"). Programs included in the Background Routine are defined with the prompt BKGD.

The Midnight Routine runs once every 24 hours. This routine is preset to run at midnight when a system is shipped. Assign a different time in the Configuration Record. When the Midnight Routine starts, the system cancels any other program.

A memory test runs once a day. The Core Equipment Diagnostic (LD 35) runs as part of the Midnight Routine, even if it is not programmed.

The Background Routine runs when no other program is loaded in the overlay area. The programs included in the Background Routine run in sequence repeatedly until there is another request to use the overlay area (for example, if you log on to check the status of a circuit card) or the Midnight Routine runs.

For the CS 1000E system, include the programs listed in [Table 16 "Programs used in Midnight and Background Routines" \(page 62\)](#) in Midnight and Background Routines. Software Audit (LD 44), and Network and Signaling Diagnostic (LD 30) should always be used in the Background Routine.

The maintenance requirements and the configuration of the system determine the other programs included in Midnight and Background Routines.

Table 16
Programs used in Midnight and Background Routines

LD	Program function
30	Network and Signaling Diagnostic
33	1.5 Mb/s Remote Peripheral Equipment Diagnostic
34	Tone and Digit Switch and Digitone Receiver
35	Core Equipment Diagnostic
36	Trunk Diagnostic 1
37	Input/Output Diagnostic
38	Conference Circuit Diagnostic
40	Call Detail Recording Diagnostic
41	Trunk Diagnostic 2
43 (Midnight only)	Data Dump
44	Software Audit
46	Multifrequency Sender Diagnostic
60 (Midnight only)	Digital Trunk Interface Diagnostic
61 (Midnight only)	Message Waiting Lamp
135	Core Equipment Diagnostic
137	Input/Output Diagnostic

Overlay Loader

This resident program locates, loads, and checks all nonresident software programs. It automatically activates the Midnight and Background Routines. Load the Overlay programs manually by entering the commands through the system terminal or maintenance telephone. When the program is loaded, the program mnemonic (such as, TRK for Trunk Diagnostic) appears on the system terminal.

Overload Monitor

The volume of system messages is continuously monitored by the system. If too many error messages are detected from a line or trunk card, the system activates the Overload Monitor program. The Overload Monitor disables the faulty card and generates system messages with the mnemonic OVD.

Resident Trunk Diagnostic

This program automatically monitors all trunk calls and records apparent faults on each trunk. If the number of faults on a trunk exceeds the threshold for that trunk, the program generates a system message identifying the trunk and the type of fault.

A failure on a trunk can keep the trunk from detecting incoming calls. The threshold mechanism cannot detect such a failure, so this program also records the number of days since each trunk received an incoming call. If some incoming calls are not being processed, use the command LMAX in Trunk Diagnostic 1 (LD 36) to identify the trunk with the maximum idle days.

System Loader

The System Loader program loads all call processing programs and data and starts memory-checking diagnostics. After all required programs and data are loaded and all checks performed, the System Loader is erased from system memory, the Initialize Program runs, and normal call processing begins. This process is called a sysload (or system reload). The System Loader operates automatically on system power-up or if a core equipment or power fault destroys information in the system memory.

Media Gateway Controller Local Diagnostic Shells

You can perform maintenance functions specific to the Media Gateway Controller (MGC) through Local Diagnostic Shell 1 (LDB1) and Local Diagnostic Shell 2 (LDB2). LDB1 provides MGC-specific functions similar to the PDT1 shell functions on the Call Server. LDB2 provides advanced functions similar to the PDT2 shell functions on the Call Server.

Access the LDB shells locally on an MGC serial port or remotely through rlogin, telnet, secure shell, or PPP. Passwords for the MGC platform are synchronized with passwords on the Call Server. Therefore, when logging on to LDB on the MGC, enter the Call Server PDT1 user name and password to access LDB1 and the Call Server PDT2 user name and password to access LDB2. To access the VxWorks shell, enter `su` from the LDB2 Command Line Interface (CLI).

When you log on to the MGC, the following login banner appears:

```
Welcome to the Media Gateway Controller command line.
Firmware Version:<APPS FW version>
Management IP:<ELAN IP>
IPMG:<supl shelf>
Call Server IP Address:<CS IP address>
Installed daughterboards:<x> where x = 1 or 2
OS Time: mm/dd/yyyy (hh:mm:ss)
Use "exit" to logout.
```

```
Idle session timeout = 20 minutes
mm/dd/yyyy hh:mm:ss MGCnnnn (None) (Info): MGC <supl
shelf> - User <LDB1/LDB2> has logged into the card.
```

The following table summarizes the Local Diagnostic Shell CLI commands:

Table 17
Local Diagnostic Shell CLI commands

Command	Shell	Description
diskformat	LDB2	Format the internal compact flash card on the MGC.
diskshow	LDB1	Display the total used and available disk space on the internal compact flash card.
displayshow	LDB1	Display messages that currently appear on the LED of the MGC, except the superloop and shelf.
ethportdisable <port>	LDB2	Disables a port so that it can be used for mirroring.
ethportmirror <port1> <port2>	LDB2	Mirror an embedded Ethernet switch port. To disable mirroring of a port, use none for port2.
ethportreset	LDB2	Clears all port mirroring and reenables standard embedded Ethernet switch functionality.
ethportshow	LDB1	Displays Ethernet port settings for external and internal interfaces. The output includes autonegotiation settings, duplex, port speed, and port-mirroring status.
ethspeedshow	LDB1	Prints the current speed and duplex settings of the ports on the embedded Ethernet switch.
macshow	LDB1	Displays all MAC addresses associated with internal and external Ethernet ports on the embedded Ethernet switch.
memshow	LDB1	Displays the total used and available RAM memory on the MGC.
mgcinfo	LDB1	Displays MGC information such as IP addresses, uptime, registration status, and superloop information.
mgcsetup	LDB1	Starts the setup menu. Change the local MGC configuration information, including local IP addresses, host name, and Call Server IP address.
rmonstatreset <port>	LDB1	Resets all RMON statistics counters for a port on the embedded Ethernet switch.
rmonstatresetall	LDB1	Resets all RMON statistics counters for all ports on the embedded Ethernet switch.
rmonstatshow <port>	LDB1	Displays RMON statistics collected by the embedded Ethernet switch for the port.

Command	Shell	Description
rmonstatshowall	LDB1	Displays RMON statistics collected by the embedded Ethernet switch for all ports.
swversionshow	LDB1	Displays the versions of all software and loadware currently in service on the MGC.

Local access to the MGC debug shell

For more detail about configuring MGC serial ports, see *Communication Server 1000E Installation and Commissioning (NN43041-310)*

When you connect to an MGC TTY that is not configured as a system terminal, you receive no system prompt.

When you connect to an MGC TTY that is configured as a system terminal, you automatically connect to the Call Server SL1 shell.

In either situation, the commands in the following table provide access to the LDB and OAM shells.

Table 18
Accessing MGC debug shells

Command	Description
Ctrl+l, Ctrl+d, Ctrl+b	Obtain an LDB prompt.
Ctrl+o, Ctrl+a, Ctrl+m	Obtain an OAM prompt.
Ctrl+o, Ctrl+a, Ctrl+m	Obtain an OAM prompt from the LDS command line. The LDS session terminates after a successful logon to OAM.
Ctrl+l, Ctrl+d, Ctrl+b	Obtain an LDS prompt from the OAM command line. The OAM session terminates after a successful logon to LDB.
exit	Exit LDB or OAM.

To access the Call Server Problem Determination Tool (PDT), enter **Ctrl+p, Ctrl+d, Ctrl+t** on an MGC TTY configured as a system terminal.

Remote access to the MGC debug shell

Release 5.0 of CS 1000 supports rlogin, telnet, FTP, and secure shell (ssh) for remote access to the Media Gateway Controller.

For remote access to the MGC, initiate an rlogin or telnet session from the remote host to the ELAN address of the MGC.

The commands in [Table 18 "Accessing MGC debug shells" \(page 65\)](#) function remotely and locally.

Media Gateway Controller log file

A 1 MB circular log file accumulates system messages. The file, called Log0001.rpt, is stored in the MGC directory /u/rpt. Each record contains:

- timestamp
- message mnemonic
- message description
- severity
- if applicable, the four character LED message

Log0001.rpt is a report log file, similar to the log files on the Call Server and Signaling Server. The CLI commands to view and manage this file are identical to the commands on the Signaling Server platform.

Table 19
OAM DLOG commands

Command	Description
<code>activeDlogShow</code>	Display the current used firmware download file. See <i>IP Line Fundamentals (NN43100-500)</i> .
<code>inactiveDlogShow</code>	Display the inactive firmware download log file. See <i>IP Line Fundamentals (NN43100-500)</i> .
<code>dnldFailShow</code>	Display failed results in the active firmware download log file. See <i>IP Line Fundamentals (NN43100-500)</i> .

TM alarm management

Web-based alarm browser

TM alarm management provides a list of alarms and events from multiple systems and devices. The Alarm Browser page is used to retrieve, view, sort, and view help on alarms received by the TM server.

Microsoft® Windows® alarm browser (Event Monitor)

Alarm management consists of a number of components that improve handling of system-generated alarms and events. It is available only for systems configured with the alarm management package (296).

Alarm management components are:

- Text Handler
- Alarm Banner dialog box

PC Event Log and viewer

The Events Monitor window displays the system Event Log, which shows all recent system alarms and events previously stored in the system history file.

The Events Monitor window displays active events in a way that you can quickly view the most important events. System events with a severity of critical, major, or minor are considered alarms. These alarms are events that can require corrective action. System events with a severity of Info are for informational purposes only and are not considered alarms.

Alarm Notification

The Alarm Notification application receives SNMP events from designated network equipment over an Ethernet network and sends out alarm notifications when specified event conditions are detected. Received events are compared to a set of rules that can activate notifications of different types. These notifications include:

- SNMP traps or events transmitted to predefined destinations
- text notification over a modem
- pager notification to alpha or numeric pagers
- e-mail using Simple Mail Transfer Protocol (SMTP)
- log

For detailed information about Alarm Management, see *Telephony Manager 3.1 Telemanagement Applications Fundamentals (NN43050-602)* and *Communication Server 1000 Fault Management – SNMP (NN43001-719)*.

Interactive diagnostics

Load nonresident software programs into the memory through the TM System Terminal or an SDI terminal. These programs, also called overlays or loads, are identified by a title and a number that is preceded by the mnemonic for load (for example, Trunk Diagnostic — LD 36).

The programs used in Midnight and Background Routines are also used manually as interactive diagnostic programs. See [Table 16 "Programs used in Midnight and Background Routines" \(page 62\)](#).

Nonresident programs are used interactively with a command and response format. In this format, enter a command that tells the system to perform a specific task. The system performs the task and sends system messages indicating status or errors back to you.

With interactive diagnostics you can:

- Disable, test, and enable specific equipment.
- Verify that a reported fault still needs to be cleared.
- Verify that a repair procedure has cleared a fault.

All maintenance programs, commands, and system messages are described in detail in *Software Input/Output Reference – Maintenance (NN43001-711)* and in *Software Input/Output Reference – System Messages (NN43001-712)*.

Enhanced Maintenance feature

The system software sometimes requires modifications, called patches, which are provided by Nortel Technical Assistance Centers. The command ISS in Print Routine 3 (LD 22) prints the software generic and issue. A plus symbol (+) by the issue number means a patch is in service.

The Enhanced Maintenance feature provides the following:

- Enable patches to automatically survive a sysload.
- Enable patches on nonresident programs.
- Records all patches in the system.
- Enable data cartridges to be shipped with preloaded patches.

If a problem occurs with a patch, the CPU sends system messages, with the mnemonic EHM, to the system terminal or the history file.

Maintenance enhancement allows a technician to upgrade a site using the same software generic with new or replacement patches that are preloaded on the disk. Also, you can selectively dump specified patches from core memory to disk. You can use the dump patch facility for this purpose.

A maximum of 50 dummy globals are allowed for patches, instead of the normal five. Use of these globals are tracked, and you are given warning messages if attempting to use them for another patch.

Clearing faults

Contents

This section contains the following topics:

- "Fault clearing process" (page 69)
- "Fault indicators" (page 72)
- "Clearing Core Call Server faults" (page 73)
- "Clearing Signaling Server faults" (page 79)
- "Clearing MG 1000E faults" (page 80)
- "Clearing MG 1000T faults" (page 87)
- "Monitoring 100BaseT link voice Quality of Service" (page 95)
- "Clearing trunk faults" (page 97)
- "Clearing Terminal Server faults" (page 100)
- "Clearing IP Phone faults" (page 100)

Fault clearing process

To clear a fault in the CS 1000, follow the steps in Procedure 3 "Clearing a fault in the CS 1000" (page 69).

Procedure 3

Clearing a fault in the CS 1000

Step	Action
1	Observe and record all fault indicators, system messages, and user reports.
2	Look up all system messages in <i>Software Input/Output Reference – System Messages (NN43001-712)</i> .

The interpretation of the message can identify faulty equipment and tell you what action to take to clear the problem. If you cannot clear the fault using a Maintenance Application or through information in *Software Input/Output Reference – Maintenance (NN43001-711)*, follow the process in this chapter to isolate and clear the fault.

- 3 If the system messages are not current or seem incomplete, review previous messages or initialize the system for information about the current status, as required.
- 4 Try to enable or test disabled equipment.
- 5 Software reenables cards by disabling and reenabling them. When the cause of a fault is not clearly evident, perform a software test to help identify the problem.



CAUTION

Working with ESDS devices

Wear an antistatic wrist strap when handling circuit cards to prevent damage caused by static discharge.

- 6 Software disables the circuit cards and hardware reenables them by unseating and reinstalling the cards. To unseat a circuit card, unscrew all faceplate screws holding the card in place. (Each circuit card has two screws except for the Drive Carrier card, which has four). Use the faceplate latches to eject the card. When reseating a circuit card, ensure to latch it and retighten all screws.
- 7 Replace equipment as necessary.

—End—

Verification

To verify that the system is operating properly and there are no remaining faults, follow the steps in [Procedure 4 "Verifying operation" \(page 70\)](#).

Procedure 4

Verifying operation

Step	Action
------	--------

- | | |
|---|---|
| 1 | Ensure all LEDs on the alarm/fan module are green. |
| 2 | Make sure all circuit cards that could have been removed are reinserted in their assigned location and enabled. |

- 3 Ensure the system utility card has the correct DIP switch settings for CPU 0 or CPU 1 as required. Also ensure that the enable/disable switch is configured to enable.
- 4 Make sure all wiring and connectors that could have been disconnected are reconnected.
- 5 Configure the midnight routine to run after logging out of the system by entering:


```
LD 135
MIDN
```

 End the session in LD 135 and log out of the system by entering:


```
**** (four asterisks)
LOGO
```

 The midnight routine runs now.
- 6 Check system messages produced when the midnight routine runs. Clear any faults indicated.

ATTENTION

Using the STAD command

Effective in CS 1000, Release 5.0, only users that have SEC_ADMIN privileges can change the system time and date. For more information about Release 5.0 security enhancements, see *Security Management Fundamentals (NN43001-604)*.

- 7 If a sysload occurred while clearing a fault, reset the correct time and date by entering:


```
LD 2
STAD (day) (month) (year) (hour) (minute) (second)
```

 Check the time and date entered:


```
TTAD
```

 End the session in LD 2 and log out of the system:


```
**** (four asterisks)
LOGO
```
- 8 Replace any covers that were removed.
- 9 Tag defective equipment with a description of the fault and return it to a repair center.

—End—

Fault indicators

When there is a fault in the system, you can receive notification by any combination of the following indicators:

- system messages
- visual fault indicators
- user reports

System messages

System messages are codes with a mnemonic and number, such as OVD0021. The mnemonic identifies a software program or a type of message. In this example, OVD indicates a message related to the Overload Monitor program. The number identifies the specific message.

Use system messages with other indicators, such as visual indicators, to identify and clear faults.

Table 20 "System message fault indicators and related fault types" (page 72) lists the most common fault-indicating messages and the type of fault they indicate. For a complete list and interpretation of system messages, see *Software Input/Output Reference – System Messages (NN43001-712)*.

You can view system messages in the TM PC Event Log. Right-click on the system message in the Event Log to show a description and a maintenance action for system messages.

Each type of fault indicator is described in Table 20 "System message fault indicators and related fault types" (page 72).

Table 20
System message fault indicators and related fault types

System messages	Type of fault
CCED messages CED messages CIOD messages HWR messages INI001, 002, 004, 005, 007 IOD006, 007, 060, 061, 291—297 NWS030, 102, 103, 142 SYS messages SRPT 181, Major failure	Call Server

System messages	Type of fault
CNF messages DTA, DTC, DTI messages ERR020, 120, 4060 INI003, 008—012 NWS101, 141, 201—204, 301, 401 OVD021, 022, 023, 031 SYS4696 TDS messages XMI messages	System resources
ERR4062 NWS301, 401, 501 OVD001—010, 024 XMI messages	Peripheral Equipment
ERR090, 220, 270 OVD001—010 TRK messages	Trunk
ERR500 MWL500 NWS501 OVD001—010	Telephone

Visual fault indicators

To identify faults, use the following visual indicators:

- A major alarm display indicates a possible power, Call Server, or Small System Controller (SSC) card fault.
- Circuit card Light Emitting Diodes (LEDs) indicate a circuit card or a unit on a circuit card is disabled. For details on specific LEDs, see the following sections.
 - ["Circuit card features" \(page 32\)](#)
 - ["NTDW60 Media Gateway Controller LEDs" \(page 40\)](#)
 - ["Media Card LEDs" \(page 44\)](#)
 - ["Signaling Server LEDs" \(page 54\)](#)

Clearing Core Call Server faults

CS 1000 Core Call Server faults can disable the CP card and stop call processing. In addition, other equipment may not operate properly while a Call Server fault is in the system.

When call processing stops on the Call Server, you may need to replace the following equipment:

- CP PM Call Processor card (NTDW61)

- CP PM Signaling Server card (NTDW61)
- Media Gateway Controller card (NTDW60)
- Media Gateway Controller daughterboards (NTDW62 and NTDW64)
- CP PII Call Processor card (NT4N46)
- CP PIV Call Processor card (NT4N39)
- System Utility card (NT4N48)
- Drive Carrier card (NTDU67)
- CS 1000E Core Call Server (NTDU63)
- SSC card (NTDK20)
- SSC Daughterboard Flash memory (NTTK25)
- SSC 100BaseT IP Daughterboard (NTDK83 or NTDK99)
- Call Server chassis (NTDU30)
- Alarm/Fan module (NTDU64)
- Power Supply module (NTDU65) or air filter
- Main power cord
- Uninterruptible power supply (UPS)

Table 21 "Call Server fault indications" (page 74) shows common Call Server fault indicators.

Table 21
Call Server fault indications

Indicator	Possible indications
System messages	BSD080, 085, 086, 103 CCED messages CED messages CIOD messages HWR messages INI001, 002, 004, 005, 007 IOD006, 007, 060, 061, 291—297 NWS030, 102, 103, 142 SYS messages SRPT 181, Major failure
Visual indicators	Major alarm on attendant console Red LED lit on NTDK 20 SSC card Red LED lit on Call Server alarm/fan module. See " Alarm/fan module features " (page 29) for details.

Indicator	Possible indications
Maintenance displays	The System Utility card liquid crystal display (LCD) provides system messages that indicate normal and fault conditions. Interpretations of the maintenance display codes are in the <i>Software Input/Output Reference – System Messages (NN43001-712)</i> .
User reports	Major alarm reported by attendant

Call Server fault indications and actions

Table 22 "Call Server faults" (page 75) lists Call Server fault indications and associated actions. See "Fault clearing process" (page 69) for a complete fault-clearing process. If you must replace equipment to clear a fault, see "Replacing equipment" (page 111) for instructions.

Table 22
Call Server faults

Condition	Possible cause	Action
Software Installation Tool does not load	Mismatch between the Security Device and keycode	Positively identify the eight digits engraved on the face of the Security Device beneath the Nortel logo (NT SDID) with the NT SDID on the keycode floppy disk label, and verify the NT SDIDs match.
	Incorrect Install Program disk	Verify that you are using the correct Install Program disk for your system.
Data dump error, or no access to overlays and OVL005 message is displayed	Manual initialize button pressed during a backup that uses the Customer Configuration Backup and Restore feature	Issue the ENLT command at the TTY.
System Utility card LED is red and no TTY output on Com 1 System constantly rebooting	Defective CP card	Unseat the CP card and reinstall it. Make sure all cables are securely connected. If the fault remains, continue with this procedure. Replace the cable to the Com 1 port. If the fault remains, replace the CP PII card. If the CP card is replaced and the symptoms persist, replace the Call Server.

Condition	Possible cause	Action
System Utility card LED is red and TTY output on Com 1	Defective System Utility card	Ensure the Enable/Disable switch is in the enabled position. If the LED remains red, test the card by entering LD 135 TEST SUTL C 15 C represents the affected Call Server, either 0 or 1. If the fault remains, replace the System Utility card.
Defective RMD	Defective CF card	Stat RMD in LD 135 to obtain partition status. Repartition if partition is corrupt or unreadable, or replace the CF card.
FMD not responding	Defective or unprogrammed CF card	Reinstall software or replace FMD.
Ethernet port LEDs are off	Bad cable or cable not connected	Test cable, replace cable if necessary, and make sure all equipment power is on.
Ethernet ports unable to communicate	Autonegotiation failed	Check configuration of LAN equipment (must be set to autonegotiate).
Drive Carrier card not operating (CP PII only)	Defective Drive Carrier card	Unseat the Drive Carrier card and reinstall it. If the Drive Carrier card does not recover, continue with this procedure. Test the card by entering LD 137 STAT CMDU TEST CMDU If the problem continues, a CIOD system message appears. If the fault remains, replace the Drive Carrier card.
Floppy drive not operating (CP PII only)	Defective floppy drive	Remove the floppy disk from the floppy drive, place it in the floppy drive of the other Call Server, and test operation. If the floppy disk is operational, replace the Drive Carrier card that contains the faulty floppy drive.

Condition	Possible cause	Action
CD-ROM drive not reading disk (CP PII only)	CD-ROM is damaged	<p>If you have another CD, insert it into a known operational Drive Carrier card, and load the Software Installation Tool from the correct Install Program diskette.</p> <p>In the Software Installation Tool, go to the Tools Menu and select <j> -To check the customer-specific part of the CD-ROM</p> <p>If the test succeeds, it is unlikely the CD is damaged. However, if the test indicates a failure to read all files on the CD, the CD is damaged and must be replaced.</p>
CD-ROM drive not operating (CP PII only)	Defective CD-ROM drive	<p>Remove the CD from the CD-ROM drive, place it in the CD-ROM drive of the other Call Server, and test operation.</p> <p>If the CD is operational, replace the Drive Carrier card that contains the faulty CD-ROM drive.</p>
Fan LED or temperature LED is red	High room temperature	Adjust room temperature as necessary. Allow the system to cool for a few minutes and then reset the system.
	Defective alarm/fan module	Verify that the fans in the alarm fan/module are operational. Unseat and reinstall alarm/fan module. If the fault continues, replace the alarm/fan module.
	Power supply air filter is obstructed	Check filter to ensure it is clean. If the filter is dirty or damaged, clean or replace the filter as described in Procedure 22 "Cleaning and replacing the power supply air filter" (page 124) .
The power LED is red	Power fault or defective power supply module	<p>Turn off the power switch at the rear of the Call Server and remove the power cord. Loosen the locking screw at the front of the module. Unseat and reseat the module firmly. Tighten the locking screw and replace the power cord. Turn on the power switch and observe if failure has cleared.</p> <p>If the fault continues, replace the power supply module.</p>
<p>Note: When in shutdown mode, the power supply continues to power the LEDs on the alarm/fan module that indicate a power supply failure.</p>		

Condition	Possible cause	Action
All LEDs in the Call Server are off	Power switch is off	Turn the power switch on.
	Disconnected power cable	Check the power cable connection to the power supply module. Ensure that it is firmly connected. If the cable is connected, check the power cable connection to the other Call Server. If all power cables are firmly connected, go to the next possible cause.
	Defective power cable	Replace power cable.

**WARNING**

The following tests are performed on a live power connection.

All LEDs in the Call Server are off	No power at outlet	With a meter or test lamp, test for AC power at the outlet. If no power is available at the outlet when AC power is supplied through a UPS unit, repair or replace the UPS following the manufacturer's instructions. If no power is available at the outlet when AC power is supplied through commercial service (not through a UPS), take the necessary steps to have the commercial power restored. If power is available at the outlet, go to the next possible cause.
	Defective power supply	Turn the power switch on the back of the power supply to OFF (down). Wait at least 60 seconds, and then turn the switch back to ON (up). Ensure power supply is well seated and the locking screw is tightened. If all LEDs remain off, or the power LED on the alarm/fan module is red, replace the power supply.
	Defective alarm/fan module	If the Nortel display remains lit and the alarm/fan LEDs are all off, ensure that the alarm/fan module is well seated and the locking screw is tightened.

Condition	Possible cause	Action
		If it is still not operating properly, replace the alarm/fan module.
	Defective Call Server	If the power supply and alarm/fan module are replaced and the symptoms persist, replace the Call Server.

Clearing Signaling Server faults

The Signaling Server is an OEM or commercial-off-the-shelf (COTS) 1U server that provides signaling for the system. Signaling Servers have ELAN and TLAN network interfaces that are connected to an Ethernet switch through CAT5 cables. Signaling Servers have two serial ports and visual indicators for maintenance. Signaling Servers have three push buttons, one each for power, reset, and INI (initialization). No support is available for the INI button, USB ports, keyboard port, and mouse port.

Table 23
Signaling Server Diagnosis

Condition	Possible Cause	Action
Signaling Server not running. All LEDs off.	No power to system	Check power cable.
	Power supply failed	Replace Signaling Server.
Signaling Server running with no fan noise	Fan failed	Replace Signaling Server.
Floppy drive tries accessing floppy but fails (CP PII only)	Floppy media is corrupted	Replace floppy.
	Floppy not formatted	Format floppy.
Floppy drive not accessing floppy & green light not illuminating. (CP PII only)	Floppy drive failed	Replace Signaling Server.
CD-ROM drive tries to access CD-ROM but stops (CP PII only)	CD-ROM media is corrupted	Replace CD-ROM disk.
CD-ROM drive not accessing CD-ROM. No green light. (CP PII only)	CD-ROM Drive failed	Replace Signaling Server.
100BT light not on	Auto Negotiate Failed	Provision Ethernet Switch to 100MB. Switch Auto Negotiate off.

Condition	Possible Cause	Action
ELAN or TLAN network interface Link light not active	Bad connection to Ethernet switch	Check power on Ethernet switch. Check CAT5 Ethernet cable. Check Ethernet switch port.
	Failed network interface	Replace Signaling Server.
Signaling Server unable to boot from hard drive	Hard drive not formatted	Install software. See <i>Communication Server 1000E Installation and Commissioning (NN43041-310)</i> .
	Hard drive with bad sectors	Install software and use disk check option. Replace Server if disk check fails.
	Hard drive failed	Replace Signaling Server
Signaling Server not responding through serial port.	Software failed	Reset Signaling Server
Signaling Server boots and then stops.	No software loaded	Load software. See <i>Communication Server 1000E Installation and Commissioning (NN43041-310)</i> .

Clearing MG 1000E faults

Clearing ELAN network interface faults

On each MG 1000E, the MGC card connects to the ELAN subnet through the ELAN network interface. A CAT5 or 100BaseT Ethernet cable connects the ELAN network interface to a Layer 2 switch on the ELAN subnet. This provides speech path switching and transmit and receive signaling messages.

Faults related to the ELAN network interface can cause system initializations, disable conference capability, or disable all terminal connections (such as trunks and telephones) on a card. ELAN network interface faults can also make functional equipment appear faulty.

[Table 24 "ELAN network interface fault indicators" \(page 80\)](#) provides fault indicators for MG 1000E ELAN network interface faults.

Table 24
ELAN network interface fault indicators

Indicator	Possible indications
System messages	CNF messages ERR020, 120, 4060

Indicator	Possible indications
	INI003, 008—012
	NWS101, 141, 201—204, 301, 401
	OVD021, 022, 023, 031
	SYS messages
	TDS messages
	XCT messages
	XMI messages
Visual indicators	Red LEDs lit or flashing on circuit cards

Isolating MG 1000E ELAN network interface faults

Troubleshooting MG 1000E ELAN network interface faults is required when there is no connection or the connection is dropped between the ELAN network interface and the IP network.

Use a Serial Data Interface (SDI) terminal to troubleshoot faults with the MG 1000E ELAN network interface. Follow the steps in [Procedure 5 "Troubleshooting for MG 1000E ELAN network interface"](#) (page 81).

Procedure 5

Troubleshooting for MG 1000E ELAN network interface

Step	Action
1	Verify that the green Link LED on the daughterboard in the MG 1000E SSC is on (indicating that the physical connection is operational). If the Link LED is off, check the physical connection by verifying that the daughterboard and cables are properly installed.
2	Use the LD 32 command <code>DISS 1 s</code> (where <code>l s</code> are the loop and shelf numbers of the MG 1000E) to disable the link for testing.
3	Test the IP connectivity between the CS 1000E Core Call Server and the Layer 2 switch by pinging the IP address of the Layer 2 switch. Perform the same test between the MG 1000E and the Layer 2 switch. Consult the local IS department for the appropriate IP address.

- 4 Use the `PING <ip address of the MG 1000E>` command in LD 117 to verify network connection.
- 5 Reenable any disabled components. Verify the 100BaseT connection between the Call Server and the MG 1000E is operating by pinging the IP address of the MG 1000E(s) configured.

ATTENTION

The MG 1000E supports only Layer 2 and Layer 3 switches. Software-based routers are not recommended.

—End—

MG 1000E faults

The MG 1000E provides the interface between network switching and terminal equipment (such as trunks and telephones). MG 1000E faults can disable network and terminal equipment. See [Table 25 "MG 1000E fault indicators" \(page 83\)](#) for MG 1000E fault indicators.

An overload (OVD) message on an MG 1000E indicates a network loop is disabled and that all connections on the loop are disabled. The network loop number corresponds to a specific card number in the MG 1000E. System messages can also indicate that one or more cards is defective or disabled without producing an OVD message. In either case, look up all system messages in *Software Input/Output Reference – System Messages (NN43001-712)* and follow the instructions given.

Manual continuity tests can also be used to isolate Network and Intelligent Peripheral Equipment (IPE) faults. See *Software Input/Output Reference – Maintenance (NN43001-711)* for details on performing the tests.

If the fault does not clear, or when call processing has stopped on the MG 1000E, you may need to replace the following equipment:

- Media Gateway Controller card (NTDW60)
- Media Gateway Controller daughterboards (NTDW62 and NTDW64)
- NTDK20 SSC card
 - NTTK25 software daughterboard
 - NTDK83 100BaseT dual-port IP daughterboard
 - NTDK99 100BaseT single-port IP daughterboard
- NTDU0606 CAT5 Ethernet cable used to connect the NTDK99 IP daughterboard to the bulkhead connectors
- CAT 5 IP cables

- NTDU14 Media Gateway
- NTDU15 Media Gateway Expander
- NTDK95 Expander cables
- NTDU30 Call Server
- NTDU27 Signaling Server
- NTDU40 Media card

Table 25
MG 1000E fault indicators

Indicator	Possible indications
Sample system messages	ERR4062 NWS301, 401, 501 OVD001—010, 024 XMI messages
Visual indicators	Red LEDs lit on circuit cards

Table 26 "MG 1000E fault causes and actions" (page 83) provides additional instructions for isolating faults in an MG 1000E. See "Fault clearing process" (page 69) for complete fault clearing process.

ATTENTION

Call processing on the Media Gateway is interrupted when the NTDK20 SSC circuit card is unseated.

Table 26
MG 1000E fault causes and actions

Condition	Possible cause	Action
Software does not load	Improper Security Device	Ensure that a generic MG 1000E Security Device is installed.
Layer 7 LED is Red	Defective NTDU0606 cable or CAT5 IP cable to switch.	Inspect the cable connections visually and check them physically. Replace defective cables as required.
Link LED is off or flickering		

Condition	Possible cause	Action
Red LED on SSC card	Defective NTDK20 SSC card in MG 1000E	<p>Disable the MG 1000E by entering: LD 32 DISS 1 s (where l s are the MG 1000E loop and shelf numbers)</p> <p>Replace the SSC card.</p> <p>Enable the MG 1000E by entering: LD 32 ENLS 1 s (where l s are the MG 1000E loop and shelf numbers).</p>
	Improperly installed NTKK25 software daughterboard	<p>Power down the system, remove the NTDK20 SSC card. Unseat the software daughterboard and reseal it. Reinsert the NTDK20 SSC circuit card. Power up the system.</p>
	Improperly installed NTDK83 IP daughterboard	<p>Power down the system, remove the NTDK20 SSC card. Unseat the daughterboard and reseal it. Reinsert the NTDK20 SSC circuit card. Power up the system.</p>
	Defective NTDK83, NTDK99 daughterboard	<p>Unseat the NTDK20 SSC circuit card and replace the daughterboard. Reinsert the NTDK20 SSC circuit card.</p>
	Defective Media Gateway or Expander	<p>Replace the defective Media Gateway or Expander.</p>
Red LED on circuit card and system message	Card circuitry latched	<p>Disable the card. Unseat and reseal it and then reenale the card. If the fault persists, go to the next possible cause.</p>
LED is red on circuit card	Defective circuit card	<p>Enable the circuit card by entering: LD 32 ENLC 1 s c u (where l s c u represents the card number)</p>
Two or more units on a circuit card are disabled		
System message indicating the circuit card or units on it are disabled		<p>If the fault persists, replace the affected circuit card.</p>

Condition	Possible cause	Action
Common visual indication and system messages on MG 1000E Expander	Defective NTDK95 Expander cable	Replace the NTDK95 cable connecting the MG 1000E to the MG 1000E Expander.
Multiple cards exhibit problems	Defective Media Gateway	Replace the Media Gateway.
Nortel logo is not lit or fan is not running	Loss of AC power Defective Media Gateway	Restore AC power. Replace the Media Gateway.
MG 1000E constantly rebooting	Defective SSC card or Media Gateway or Expander	Replace the SSC card, Media Gateway, or Expander.
Red LED on SSC card and system messages	Defective IP Links	View the status of the IP links by entering: LD 135 STAT IPL x (x is the number for the MG 1000E, 1 through 128)
Media quality has deteriorated		Enable the MG 1000E by entering: LD 32 ENLS 1 s (where l s are the MG 1000E loop and shelf numbers)
Intermittent trunk or line problems		Enable the MG 1000E by entering: LD 32 ENLS 1 s (where l s are the MG 1000E loop and shelf numbers)
Multiple system messages about this MG 1000E		If the fault remains, go to the next possible cause.
	Defective NTDK83 IP daughterboard in MG 1000E	Disable the MG 1000E by entering: LD 32 DISS 1 s (where l s are the MG 1000E loop and shelf number)
		Replace the IP daughterboard on the NTDK20 SSC circuit card.
		If the fault remains, replace the SSC card.

MG 1000E Problems with transferring, placing conference calls, or Music-on-Hold

If several users cannot transfer or place conference calls, or calls do not receive Music-on-Hold (MOH), a circuit card that provides conference capability may be disabled. Look up all system messages in the *Software Input/Output Reference – System Messages (NN43001-712)* and follow the instructions.

Also, ensure that sufficient DSP resources are provisioned for Music, conference, and RAN (see *Communication Server 1000E Planning and Engineering (NN43041-220)* for details).

ATTENTION

Currently, the CS 1000E supports only Recorded Announcement Broadcast and Music Broadcast.

If the fault does not clear, you may need to replace some of the following equipment:

- NTDK20 SSC card
- NTDK99 IP daughterboard
- NTDK83 IP daughterboard

In addition to the conference channels on the SSC, the NTDK83 and the NTDK99 IP daughterboards each provide an additional 16 conference channels per port when installed on the MG 1000E SSC.

[Table 27 "Conference channels causes and actions" \(page 86\)](#) provides additional instructions for isolating conference channel faults in an MG 1000E.

ATTENTION

Call processing on the affected Media Gateway is interrupted when the NTDK20 SSC circuit card is unseated.

Table 27
Conference channels causes and actions

Condition	Possible cause	Action
Several users cannot place conference calls when links and phones are operational.	Defective IP links	View the status of the IP Links by entering: LD 135 STAT IPL x (where x is the number for the MG 1000E 1 through 128) If the fault remains, check the IP daughterboard conference loops. If the fault remains, check the NTDK20 SSC conference loops.
System message indicates conference loop is defective.	Defective IP daughterboard on SSC card	If a fault is indicated on a conference loop, replace the daughterboard on the Media Gateway.

Condition	Possible cause	Action
System message indicates conference loop is defective.	Defective SSC circuit card	<p>If a fault is indicated on conference loop, replace the NTDK20 SSC circuit card.</p> <p>Reuse the daughterboards and security device installed on the original NTDK20 SSC circuit card.</p>
Defective conference loop with no system message	Defective IP daughterboard or SSC circuit card Defective NTDK20 SSC card	<p>If there are no messages indicating a fault on any conference loop, test each conference loop in the system by entering: LD 38 CNFC loop ("loop" represents the conference loop number)</p> <p>If the conference loop is disabled, try to enable it by entering: LD 38 ENLL loop ("loop" represents the conference loop number)</p> <p>Install a new NTDK20 SSC circuit card.</p> <p>Reuse the daughterboards and security device attached to the original NTDK20 SSC circuit card.</p> <p>If the card tests "OK", the NTDK20 SSC circuit card was defective.</p> <p>If after a few minutes the problem reoccurs, replace the Media Gateway.</p>

Clearing MG 1000T faults

The MG 1000T platform provides the interface between network switching and digital trunks. MG 1000T faults can disable network equipment.

An OVD message indicates a network loop is disabled and all connections on the loop are disabled. The network loop number corresponds to a specific card number in the MG 1000T. System messages can also indicate that one or more cards are defective or disabled without producing an OVD message. In either case, look up all system messages in *Software Input/Output Reference – System Messages (NN43001-712)* and follow the instructions given.

Manual continuity tests can be used to isolate faults. See LD 30 in *Software Input/Output Reference – Maintenance (NN43001-711)* for details on performing the tests.

If the fault does not clear, or if call processing has stopped on the MG 1000T, you may need to replace the following equipment:

- NTDK20 SSC card
 - NTKK25 software daughterboard
 - NTDK99 single-port 100BaseT IP daughterboard
 - NTDK83 dual-port 100BaseT IP daughterboard
- NTDU0606 CAT5 Ethernet cable used to connect the NTDK99 IP daughterboard to the bulkhead connectors
- NTKK34 UTP 100BaseT CAT5 Cross-over cables
- NTDU14 Media Gateway
- NTDU15 Expander
- NTDK95 Expander cables
- NTVQ01 Media Card

See [Table 28 "MG 1000T fault indicators" \(page 88\)](#) for MG 1000T fault indicators.

Table 28
MG 1000T fault indicators

Indicator	Possible indications
Sample system messages	ERR4062 NWS301, 401, 501 OVD001—010, 024 XMI messages
Visual indicators	Red LEDs lit on circuit cards

Clearing MG 1000T Core faults

The SSC card in the MG 1000T Core is the primary processor for the MG 1000T platform. It performs system control and switching for the MG 1000T Core and Expansions.

Faults on the MG 1000T Core can stop call processing on the MG 1000T. In addition, other equipment may not operate properly while there is an MG 1000T Core fault in the system.

Table 29 "MG 1000T Core fault indications" (page 89) lists common fault indications for the MG 1000T Core.

Table 29
MG 1000T Core fault indications

Indicator	Possible indications
System messages	CCED messages CED messages CIOD messages HWR messages INI001, 002, 004, 005, 007 IOD006, 007, 060, 061, 291—297 NWS030, 102, 103, 142 SYS messages
Visual indicators	Red LED lit on NTDK20 SSC circuit card

Fault indicated on the MG 1000T Core

Table 30 "MG 1000T Core fault causes and actions" (page 89) lists fault indications and associated actions for the MG 1000T Core. See "Fault clearing process" (page 69) for complete fault clearing process.

ATTENTION

Call processing on the Media Gateway is interrupted when the MG 1000T Core SSC card is unseated.

Table 30
MG 1000T Core fault causes and actions

Condition	Possible cause	Action
Software Installation Tool does not load	Mismatch between the Security Device and keycode	Positively identify the NT SDID on the MG 1000T Core (eight digits engraved on the face of the Security Device beneath the Nortel logo) with the NT SDID on the keycode floppy disk label. Verify the NT SDIDs match.
Data dump error	Corrupt data on software daughterboard Security failure during an upgrade	Perform an EDD NBK command in LD 43 to restore the data. Reenter the keycodes. Up to three invalid keycodes can be entered. After the third invalid keycode is entered, all current changes are lost and the Setup Program returns to the main menu.

Condition	Possible cause	Action
Data dump error, or no access to overlays while OVL005 message is displayed	Manual initialize button pressed when performing a backup using the Customer Configuration Backup and Restore feature	Issue the ENLT command at the TTY.
Red LED is lit on SSC card	Card circuitry latched	Disable the SSC card. Unseat and reseal the card and then reenale it. If the fault persists, go to the next possible cause.
	Improperly installed NTKK25 software daughterboard	Power down the system and remove the NTKK20 SSC card. Unseat and reseal the software daughterboard. Reinsert the NTKK20 SSC circuit card. Power up the system.
Red LED is lit on SSC card	Defective NTKK25 software daughterboard	Unseat the NTKK20 SSC circuit card and replace the software daughterboard. Reinsert the NTKK20 SSC circuit card.
	Improperly installed NTKK83 IP daughterboard	Power down the system and remove the NTKK20 SSC card. Unseat and reseal the IP daughterboard. Reinsert the NTKK20 SSC circuit card. Power up the system.
	Defective NTKK83 IP daughterboard	Unseat the NTKK20 SSC circuit card and replace the IP daughterboard. Reinsert the NTKK20 SSC circuit card.
	Defective NTKK20 SSC card	If the fault persists, replace the NTKK20 SSC card. Reuse all daughterboards and the security device installed on the original NTKK20 SSC circuit card. Enable and test the card by entering: LD 30 TEST If the new card passes the test, the original NTKK20 SSC circuit card was defective. If after a few minutes the problem reoccurs, replace the Media Gateway.

Condition	Possible cause	Action
System constantly rebooting	Defective SSC card or Media Gateway	Replace the SSC card or Media Gateway.
Nortel logo is not lit or fan is not running	Loss of AC power Defective Media Gateway	Restore AC power. Replace the Media Gateway. Enable and test the cards by entering: LD 30 TEST

Clearing MG 1000T Expansion faults

Table 31 "MG 1000T Expansion fault causes and actions" (page 91) provides additional instructions for isolating faults in an MG 1000T Expansion. Initial indicators can be red LEDs on the circuit cards or a system message indicating a circuit card or units on it are disabled. Look up all system messages in the *Software Input/Output Reference – System Messages (NN43001-712)* and follow the instructions given.

Table 31
MG 1000T Expansion fault causes and actions

Condition	Possible cause	Action
Software does not load	Improper Security Device	Positively identify the NT SDID on the MG 1000T Expansion (eight digits engraved on the face of the Security Device beneath the Nortel logo). Verify that it matches the NT SDID on the MG 1000T Core Security Device.
Layer 7 LED is Red	Defective NTDU0606, NTTK34, or CAT5 IP cable	Inspect the cable connections visually and check them physically. Replace defective cables as required.
Link LED is off or flickering		
Red LED on SSC	Defective NTDK20 SSC card in MG 1000T	Disable the MG 1000T Expansion by entering: LD 32 DISS x (where x is the number for the MG 1000T Expansion, 1 through 4)
Intermittent trunk problems		
Multiple system messages about an MG 1000T Expansion		Replace the SSC card.
		Enable the MG 1000T Expansion by entering: LD 32 ENLS x (where x is the number for the MG 1000T Expansion, 1 through 4)
		Perform a circuit card test by entering:

Condition	Possible cause	Action
		LD 30 TEST (this command ensures that all circuit cards are reenabled in the MG 1000T).
Red LED on SSC card	Improperly installed NTKK25 software daughterboard	Power down the MG 1000T and remove the NTKK20 SSC card. Unseat and reseat the software daughterboard. Reinsert the NTKK20 SSC circuit card. Power up the MG 1000T.
	Improperly installed NTKK99 IP daughterboard	Power down the MG 1000T and remove the NTKK20 SSC card. Unseat and reseat the daughterboard. Reinsert the NTKK20 SSC circuit card. Power up the MG 1000T.
	Defective NTKK99 IP daughterboard	Unseat the NTKK20 SSC circuit card and replace the daughterboard. Reinsert the NTKK20 SSC circuit card.
	Defective Media Gateway or Expander	Replace the defective Media Gateway or Expander.
Red LED on circuit card	Defective circuit card	Enable the circuit card by entering: LD 32 ENLC c (where c represents the card number)
Two or more units on a circuit card are disabled		
System message indicating the circuit card or units on it are disabled		Test the card by entering: LD 30 UNTT c (where c represents the card number).
		If the fault persists, replace the affected circuit card.
Common visual indication and system messages on MG 1000T Expander	Defective NTKK95 Expander cable	Replace the NTKK95 cable connecting the MG 1000T Expansion to the MG 1000T Expander.
Multiple cards exhibit problems	Defective Media Gateway	Replace the Media Gateway. Enable and test the cards by entering: LD 30 TEST
Nortel logo is not lit or fan is not running	Defective Media Gateway	Replace the Media Gateway

Condition	Possible cause	Action
Media quality has deteriorated	Defective IP links	<p>To view the status of the IP links, enter: LD 135 STAT IPL x (where x is the number for the MG 1000T Expansion, 1 through 4)</p> <p>Perform Local and Remote Loopback tests on the IP links by entering: LD 135 LLBK IPL x (where x is the number for the MG 1000T Expansion, 1 through 4)</p> <p>Enable the MG 1000T by entering: LD 32 ENLS x (where x is the number for the MG 1000T Expansion, 1 through 4)</p> <p>If the fault remains, go to the next possible cause.</p>
	Defective NTDK99 IP daughterboard in MG 1000T	<p>Disable the MG 1000T Expansion by entering: LD 32 DISS x (where x is the number for the MG 1000T Expansion, 1 through 4)</p> <p>Replace the IP daughterboard on the NTDK20 SSC circuit card.</p> <p>If the fault remains, replace the SSC card.</p>

Clearing MG 1000T Core-to-Expansion link faults

The Core-to-Expansion links in the MG 1000T are an integral part of the MG 1000T functionality. A Core-to-Expansion link refers to the 100BaseT connection between the SSC card in the MG 1000T Core and the SSC card in an MG 1000T Expansion. The link provides speech path switching and transmit and receive signaling messages between the SSC cards.

Core-to-Expansion link faults can cause system initializations, disable conference capability, or disable all trunk connections on a card. The Core-to-Expansion link faults can also make functional equipment appear faulty.

Table 32 "IP Network fault indicators" (page 94) provides fault indicators for MG 1000T Core-to-Expansion link faults.

Table 32
IP Network fault indicators

Indicator	Possible indications
System messages	CNF messages
	DTA, DTC, DTI messages
	ERR020, 120, 4060
	INI003, 008—012
	NWS101, 141, 201—204, 301, 401
	OVD021, 022, 023, 031
	SYS messages
	TDS messages
	XCT messages
Visual indicators	XMI messages
	Red LEDs lit or flashing on circuit cards

Troubleshooting Core-to-Expansion link connectivity faults

Troubleshooting the Core-to-Expansion 100BaseT link is required when there is no connection or the connection is dropped between the MG 1000T Core and an MG 1000T Expansion. [Procedure 6 "Troubleshooting Layer 2 and Layer 3 LAN connections for MG 1000T" \(page 95\)](#) provides troubleshooting procedures for Layer 2 and Layer 3 connections.

Use an SDI terminal to perform the following procedures using overlay commands.

Layer 2 and Layer 3 LAN connections

The MG 1000T platform supports only Layer 2 and Layer 3 switches. Software routers are not recommended. To troubleshoot for Layer 2 and Layer 3 LAN connection, follow the steps in [Procedure 6 "Troubleshooting Layer 2 and Layer 3 LAN connections for MG 1000T" \(page 95\)](#).

Procedure 6**Troubleshooting Layer 2 and Layer 3 LAN connections for MG 1000T**

Step	Action
1	Verify that the green Link LED on the daughterboard in the MG 1000T Core SSC is on (this indicates that the physical connection is functioning). If the Link LED is off, check the physical connection by verifying that the daughterboard and cables are properly installed.
2	Test the LAN connectivity between the MG 1000T Core and the Layer 2/3 switch by pinging the IP address of the Layer 2/3 switch. Perform the same test between the MG 1000T Expansion and the Layer 2/3 switch. Consult the local IS department for the appropriate IP address.
3	To disable the link for testing, in LD 32, enter <code>DISS <n></code> (where n = IP daughterboard port#).
4	To test the signaling and voice path of the daughterboard, in LD 135, enter <code>LLBK <link #></code> . If the card fails the LLBK test, replace the IP daughterboard.
5	Verify that the MAC address of the MG 1000T Expansion is correctly configured on the MG 1000T Core. In LD 117, enter <code>PRT IPR</code> to access the MAC data.
6	In LD 117, enter <code>PING <ip address of the MG 1000T Expansion></code> to verify the network connection.
7	Reenable any disabled components. Verify that the 100BaseT connection between the MG 1000T Core and the MG 1000T Expansion is operating by pinging the IP address of the MG 1000T Expansion(s) configured.

—End—

Monitoring 100BaseT link voice Quality of Service

Behavioral characteristics of the network are dependent on factors like Round Trip Delay (RTD), queueing delay in the intermediate nodes, packet loss, and available bandwidth.

The service level of each IP link is measured and maintained on the Call Server for the operation of the MG 1000Es, and on the MG 1000T Core for the operation of the MG 1000T Expansions. Information for latency and packet loss is collected from the hardware and processed. Based on system-configured thresholds, the level of service is derived and reported

automatically or when the technician requests a report with the `PRT QOS <cab#>` command in LD 117. See *Software Input/Output Administration (NN43001-611)* and *Software Input/Output Reference – Maintenance (NN43001-711)*.

Data Network Ratings (Excellent, Good, Fair, and Poor) are calculated along with the actual parameter values for the network delay. See [Table 33 "Campus data network voice quality measurements" \(page 96\)](#) for the Data Network Ratings parameters for specific values of Packet Delay Variation (PDV) and packet loss.

Table 33
Campus data network voice quality measurements

	PDV Max 7.8 ms	PDV Min 0.5 ms	Packet loss
Excellent	<5 ms	<12 ms	< 0.5%
Good	5 - 25 ms	12 - 32 ms	0.5 - 1%
Fair	25 - 45 ms	32 - 52 ms	1 - 1.5%
Poor	>45 ms	>52 ms	> 1.5%

The values presented in [Table 33 "Campus data network voice quality measurements" \(page 96\)](#) assume that there is no echo cancellation mechanism and no particular mechanism for recovering lost packets.

The command `PRT PDV <cab#>` in LD 117 displays both the current size of the PDV buffer and the number of PDV underflows.

In addition, a warning message is printed when a parameter threshold or a combination of thresholds is reached. You cannot configure the thresholds.

In LD 117, the command `CHG PDV <port#> <delay>` is used to configure a PDV buffer size for each link basis. The `<delay>` parameter can take values from 0.5 ms to 8 ms. This value should be initially tested at default settings. Increase the `<delay>` parameter value by 0.5 ms increments if an unacceptable level of voice quality is experienced ("pops and clicks"). Decrease this value if an echo is experienced. The goal is to operate with the smallest buffer possible.

The PDV buffer size for each IP connection is configured at the Call Server for the MG 1000Es and at the MG 1000T Core for the MG 1000T Expansions.

ATTENTION

Systems must meet the minimum data networking requirements from *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Clearing trunk faults

This section deals with trunk faults on either the MG 1000E or MG 1000T. Trunk circuit cards provide the interface between the system and Central Office (CO) trunks, or between PBXs. The maintenance telephone can be used to test trunks. Two types of trunk cards are considered:

- E&M Trunk: provides four trunk units, each of which can be connected to a trunk configured to operate as one of the following:
 - E&M signaling trunk
 - Two-wire Tie trunk
 - Four-wire Tie trunk
 - Paging trunk
- Universal Trunk: provides eight trunk units, each of which can be connected to a trunk configured to operate as one of the following:
 - CO trunk
 - Direct Inward Dialing (DID) trunk
 - Two-way Tie, Dial Repeating (2DR)
 - Two-way Tie, Outgoing Automatic Incoming Dial (OAID) trunk
 - Recorded Announcement (RAN) trunk
 - Music trunk
 - Paging trunk

Trunk faults can cause problems (such as noise) on outside calls and can keep calls from entering or leaving the system.

Fault clearing procedures using an SDI terminal

See [Table 34 "Trunk fault indicators" \(page 97\)](#) for trunk fault indicators.

Table 34
Trunk fault indicators

Indicator	Possible indications
System messages	ERR090, 220, 270 OVD001—010 TRK messages
Visual indicators	Red LED lit on trunk circuit card

Trunk cannot make or receive calls

A user cannot make or receive calls over a trunk. An OVD system message may be received, indicating that this trunk has been disabled. Look up all system messages in the *Software Input/Output Reference – System Messages (NN43001-712)* and follow the instructions.

If the fault does not clear, manual continuity tests can be used to isolate faults to peripheral equipment, such as E&M or Universal Trunk circuit cards. See *Software Input/Output Reference – Maintenance (NN43001-711)* for details on performing the tests in LD 30.

Trunk connections from the main frame to the trunk cards can be checked with a butt telephone or test telephone. Check the trunk wiring at the entry point for dial tone and progress toward the Media Gateway.

Constantly observe and look up system messages as you replace equipment.

You may need to replace:

- E&M Trunk circuit card: NT8D15
- Universal Trunk circuit card: NT8D14
- any other trunk circuit card
- NTDK20 SSC card
- NTAK03 TDS/DTR circuit card
- trunk equipment (such as music source or paging equipment)

Table 35 "Trunk cannot make or receive calls(OVD message may be received)" (page 98) provides additional instructions for isolating trunk faults in an MG 1000E or MG 1000T

Table 35
Trunk cannot make or receive calls
(OVD message may be received)

Possible cause	Action
Excessive traffic in the system	Additional trunk circuit cards may be required to handle the traffic in the system.
Defective trunk circuit card	If the indicated circuit card is an E&M or Universal Trunk circuit card, hardware-disable it and then reenable to initiate a self-test. If the test fails, replace the circuit card. If the test passes, disconnect the wiring between the circuit card and the cross-connect terminal.

Possible cause	Action
	<p>Enable the TN by entering the following:</p> <p>For MG 1000T: LD 32 ENLU c u (where c u represent card and unit numbers)</p> <p>For MG 1000E: LD 32 ENLU l s c u (where l s c u represent loop, shelf, card and unit numbers)</p> <p>Wait for an OVD message.</p> <p>If an OVD message appears, replace the circuit card.</p> <p>If there is no OVD message, reconnect the wiring and go to the next possible cause.</p>
Disabled or defective TN	<p>Test the TN by entering: LD 30 UNTT c u ("c u" represents card and unit numbers)</p> <p>Test other TNs by entering: TEST</p> <p>If the test fails, replace the indicated item and test again. Otherwise, go to the next possible cause.</p>
Defective wiring	<p>At the main cross-connect terminal, disconnect the wiring to the CO or other trunk equipment (such as a music source or paging equipment).</p> <p>Enable the TN and wait for an OVD message. If an OVD message appears, repair or replace the wiring to the Media Gateway.</p> <p>If there is no OVD message, repair or replace the wiring from the cross-connect terminal to the telephone.</p> <p>If the trunk circuit card still does not enable or there is still a trunk problem, reconnect the wiring and go to the next possible cause.</p>
Defective trunk equipment	<p>Make sure the CO equipment or other trunk equipment is not defective.</p> <p>If there is no problem with this equipment, go to the next possible cause.</p>

Clearing Terminal Server faults

One potential fault that can occur with the MRV Terminal Server is database corruption. When there is a database fault, all Terminal Server LEDs flash and the console port does not respond.

To correct this fault, configure all parameters to factory default as described in MRV procedures.

ATTENTION

To prevent database corruption in the MRV Terminal Server, never remove the Flash card or power down the Terminal Server while the Flash card LED is illuminated.

Clearing IP Phone faults

For IP Phone fault clearing procedures, see *IP Phones Fundamentals (NN43001-368)* and *IP Line Fundamentals (NN43100-500)*.

Database management

Contents

This section contains the following topics:

- "Tools to backup and restore customer databases" (page 101)
- "Equipment Data Dump" (page 102)
- "Customer Configuration Backup and Restore" (page 103)

Tools to backup and restore customer databases

Element Manager provides access to Call Server backup and restore functions. See "Call Server backup, data dump, and restore" (page 145).

LD 43 and LD 143 provide different methods to backup and restore customer data:

- LD 43: Equipment Data Dump (EDD)
 - CP PII: backs up the customer database from internal memory to the internal drive on the SSC and to floppy disk
 - CP PIV: backs up the customer database from internal memory to the internal drive on the SSC and to RMD (compact flash)
 - CP PM: backs up the customer database from internal memory to file (/u/ccbr/ccbr.gz) and to RMD (compact flash)
- LD 43: The BKO command copies EDD output to removable media.
- LD 143: The Archive Database Utilities program provides a way to copy EDD output to removable media in a format organized by the user.
- LD 143: Customer Configuration Backup and Restore (CCBR) backs up customer data to an external device over a direct serial connection.

3 Load the Equipment Data Dump Program (LD 43).

```
LD 43          Load program
.              EDD
```

4 When "EDD000" appears on the terminal, enter:

```
EDD           Begin the data dump
```

**CAUTION****Loss of Data**

If the data dump is not successful, do not continue. Contact your technical support organization. You must correct a data dump problem before replacing circuit cards or upgrading the system.

5 When the data dump is successful, the following messages appear:

```
Internal backup complete
All files backed up!
DATADUMP COMPLETE
```

6 **** Exit program

—End—

Customer Configuration Backup and Restore

Communication Server 1000, Release 5.0 introduces the Customer Configuration Backup and Restore (CCBR) feature to the large system. With this feature you can perform the following tasks:

- Locally or remotely access the system.
- Backup the customer configuration database to a remote PC or external storage.
- Restore or update the customer configuration database when the system is operating.
- Restore or update the customer configuration database when the system is not operating.

Equipment requirements

CCBR requires the following equipment:

- a computer that supports Xmodem communications protocol

Ensure that your communications package complies with the protocol specifications described in *Communication Server 1000E Installation and Commissioning (NN43041-310)*. Not all Xmodem protocols are identical. Some may not operate properly with the CCBR feature.

- modems for remote access

To remotely access the system, connect a modem to an SDI port on the SSC card or on the CP PM card.

To locally access the system, connect a computer directly to an SDI port on the SSC card or on the CP PM card.

Feature operations

Procedure 9

Backing up the customer configuration database

Step	Action
1	Log on to the system.
2	Perform a data dump using LD 43, as shown in " Equipment Data Dump " (page 102).
3	Type **** to exit LD 43.
4	Type LD 143. The system responds with the following: CCBR000 .
<div style="border: 1px solid black; padding: 5px;"> <p>ATTENTION</p> <p>Review Steps 5 through 7 before you proceed. If you do not perform these steps within approximately 5 minutes after you issue the XBK command, the system times out.</p> </div>	
5	Type XBK . The system responds with the following: INFO :

- 6** Enter a header name for the configuration data backup file and press **Enter**. Enter up to 128 characters of text, including spaces, carriage returns, and line feeds.

If you enter more than 128 characters, the system exits text entry mode and responds with `R>`. If you do not want to enter text, press **Enter**.

The system responds with `R>` , to indicate that it is ready to continue.

ATTENTION

You must complete the next step within 2 minutes or the system times out. If a timeout occurs, return to Step 5 and retype the **XBK** command.

- 7** To receive the configuration database file, use the Xmodem protocol. The file arrives in binary format.

For information about receiving files, see the manual supplied with your communications software package.

- 8** Wait for the file transfer operation to end. File transfer time depends on database size and baud rate. When the file transfer completes successfully, the system responds `OK`.

If the file transfer fails, the system responds with one of the following:

BKP0003	Some transferring data is invalid. Data transfer is not attempted. Corrective action: Repeat the backup procedure from the beginning (EDD).
BKP0008	The data transfer was interrupted by a system timeout or by a line problem, such as excessive noise. Corrective action: Repeat the procedure from Step 5 (XBK).

- 9** To verify the CCBK backup, type **XVR**. Wait for the system to respond with the `R>` prompt.

The **XVR** command sends the backed-up file to the system and compares it with the original configuration data. This ensures the integrity of the backed-up file.

- 10** With the communications software on the computer, use Xmodem to send the backed-up file to the system for a comparison.

The system displays the character `C` every 3 seconds until the file is sent. The file transfer must finish before the character `C` appears 20 times (approximately 1 minute) to avoid a system timeout.

Following is an example of what can appear on the screen:

```
.XVR
```

```
R>
CCCCCCCCC
```

When the file verification succeeds, the system responds OK.

If the file verification fails, the system responds with one of the following:

- | | |
|---------|---|
| BKP0002 | <p>Mismatch in the data file.
Corrective action:</p> <ul style="list-style-type: none"> • Compare the file again with the xvr command.
If the verification fails again, repeat the backup and reverify with the xvr command. • Check your communications package parameters. Ensure that the parameter settings are correct: Mode = binary; Protocol = Xmodem. Another possible cause is that the communications package is stripping characters. |
| BKP0003 | <p>Some transferring data is invalid. Data transfer is not attempted.
Corrective action: Repeat the backup procedure from the beginning (EDD).</p> |
| BKP0003 | <p>Some transferring data is invalid. Data transfer is not attempted.
Corrective action: Repeat the backup procedure from the beginning (EDD) and then repeat the verification procedure.</p> |
| BKP0008 | <p>The data transfer was interrupted by a system timeout or by a line problem, such as excessive noise.
Corrective action: Repeat the verification procedure.</p> |

The configuration database backup procedure is complete. Type ******** to exit the program.

—End—

Procedure 10
Restoring or updating the configuration database (system operating)

Step Action

- | | |
|---|--|
| 1 | Type LD 143 . |
| 2 | The system responds with the following:

CCBR

. |

- 3 Type **XRT** to begin the configuration database restore.
The system prepares to receive the database file from the computer and restore it to the SSC (CP PII and CP PIV) or to the Call Server (CP PM).

- 4 The system responds with the following:

```
WAIT - - 2 MINUTES
R>
```



WARNING

The receiving file is erased at the start of this step. If a problem occurs during the restore procedure, do not leave the system in this state. Repeat the restore procedure. If you encounter further problems, perform an EDD to dump the current data to the SSC (CP PII and CP PIV) or to the Call Server file (CP PM).

- 5 Send the backed up database file to the system using the communications software and the XModem protocol on the computer.

The system displays the character C every 3 seconds until the file transfer is complete. The file transfer must finish before the character C appears 20 times (approximately 1 minute) to avoid a system timeout.

The system site ID, in the configuration database records being sent, is compared to the ID on the system. If the IDs do not match, the data is restored, but the following warning message appears:

```
BKP0011
```

The site ID in the restored data does not match that of the system. This response is normal when you use this procedure as part of an installation process.

Corrective action:

Ensure that the customer data file is correct and that you are not restoring the wrong file to the system. If the file is correct, contact Nortel technical support.

When the database restore succeeds, the system responds: OK.

6 If the database restore fails, the system sends one of the following messages:

- | | |
|---------|---|
| BKP0004 | Failure to erase the SSC file or Call Server file.
Corrective action:
Repeat the restore procedure. If the procedure fails again:
For CP PII and CP PIV Call Servers, the probable cause is a faulty flash ROM. Replace the SSC card.
For CP PM Call Servers, contact Nortel technical support. |
| BKP0003 | The received file contains invalid data.
Corrective action:
Check the transmitted data file to ensure that it is the correct one.

Repeat the restore procedure using the XRT command. If the procedure fails again, a corrupt data file is a probability. |
| BKP0008 | Transmission error occurred due to a timeout or excessive line noise.
Corrective action:
Repeat the procedure. |

7 To verify the CCBR restore, type **XVR**. Wait for the system to respond with the **R>** prompt.

The **XVR** command verifies the sent file by comparing it with the system file.

8 Use the communications software and the XModem protocol to send the backed-up database file to the system for comparison.

The system displays the character **C** every 3 seconds until the file transfer is complete. To avoid a system timeout, the file transfer must finish before the character **C** appears 20 times (approximately 1 minute).

When verification succeeds, the system responds **OK**.

If file verification fails, the system sends one of the following messages:

BKP0002	Indicates a mismatch. Corrective action: Repeat the xvr command. If verification fails again, repeat the restore and reverify. Check your communications package parameters. Ensure that Mode = binary and Protocol = Xmodem. Another possible cause is that the communications package is stripping characters.
BKP0003	Received file contains invalid data. Corrective action: Perform an EDD to update the system file. Repeat the verification using the xvr command.
BKP0008	Transmission error occurred due to a timeout or excessive line noise. Corrective action: Repeat the procedure.

- 9 Type **xsl** to perform a sysload. The system responds with the following:
CONFIRM? (Y/N).
- 10 Type **y** to continue or **n** to cancel.

If you type **y**, the system responds with the following:
PSWD?
- 11 Enter the password. The system responds with various sysload-related messages and **DONE** when the sysload is complete.

ATTENTION

Effective in CS 1000, Release 5.0, only users that have SEC_ADMIN privileges can change the system time and date. For more information about Release 5.0 security enhancements, see *Security Management Fundamentals (NN43001-604)*.

- 12 Reset the correct time and date:
LD 2
STAD (day) (month) (year) (hour) (minute) (second)
- 13 Check the time and date entered:
TTAD

Customer configuration database restore is complete.

To exit LD 43, type ****.

—End—

Replacing equipment

Contents

This section contains the following topics:

- "Removing CS 1000E Core Call Server cover" (page 112)
- "Replacing the NTDW61 CP PM Call Processor card" (page 112)
- "Replacing NTDW61 CP PM Signaling Server equipment" (page 113)
- Section "Replacing the NTDW60 Media Gateway Controller card" (page 113)
- "Replacing the NTDW62 or NTDW64 DSP daughterboard" (page 114)
- "Replacing the NTDW65 Voice Gateway Media Card" (page 114)
- "Replacing the NT4N64 CP PII Call Processor card" (page 116)
- "Replacing the NT4N39AA CP PIV Call Processor card" (page 117)
- Section "Replacing the NT4N48 System Utility card" (page 119)
- "Replacing the NTDU67 Drive Carrier card (CP PII only)" (page 120)
- "Replacing the NTDU64 alarm/fan module" (page 122)
- "Replacing the NTDU65 power supply module" (page 123)
- "Accessing Media Gateway internal components" (page 125)
- "Replacing the NTAK02 SDI/DCH circuit card" (page 126)
- "Replacing the NTAK03 TDS/DTR circuit card" (page 127)
- "Replacing the NTAK79 or NTBK50 2.0 Mbit PRI card" (page 128)
- "Replacing the NTAK09 1.5 Mbit DTI/PRI card (PRI applications)" (page 131)
- "Replacing the NTAK09, NTAK10, or NTRB21 circuit cards (DTI applications)" (page 132)
- "Replacing equipment cards" (page 133)
- "Replacing the NTDK20 SSC card" (page 137)

- "Replacing the NTKK25 software daughterboards" (page 138)
- "Replacing IP daughterboards" (page 141)

ATTENTION

Before you replace circuit cards, back up the customer database. See "Equipment Data Dump" (page 102).

Removing CS 1000E Core Call Server cover



WARNING

The Call Server cover contains fragile light pipes. Be sure to remove with care and place face down to protect the light pipes.

Procedure 11

Removing Call Server cover

Step	Action
1	Simultaneously push in the spring-loaded latches at either side of the cover and pull forward.
2	Be cautious of the cover's light pipes; they are fragile. Set the cover down face first to avoid damage to the light pipes.

—End—

Replacing the NTDW61 CP PM Call Processor card

Procedure 12

Replacing the NTDW61 CP PM Call Processor card

Step	Action
1	Perform an EDD to back up the customer configuration database.
2	Label and remove all cables.
3	Unlock faceplate latches and remove card.
4	Remove the security dongle and insert it on the replacement card.

- 5 Slide the CP PM Call processor into Slot 1 (or higher) of the chassis. Slot 1 provides for easiest cabling.
- 6 Lock the card into the faceplate latches.
- 7 Reconnect all cables.
- 8 To install Call Server software, see *Communication Server 1000E Installation and Commissioning (NN43041-310)*.

—End—

Replacing NTDW61 CP PM Signaling Server equipment

Replacing a defective Signaling Server

Replacing a defective CS 1000 Release 5.0 Signaling Server requires that you perform a migration of the Signaling Server from one hardware platform to another.

For detailed instructions about how to replace a defective Signaling Server, see *Signaling Server Installation and Commissioning (NN43001-312)*.

Replacing the hard drive on a CP PM Signaling Server

For detailed instructions about how to replace the hard drive on a CP PM Signaling Server, see *Signaling Server Installation and Commissioning (NN43001-312)*.

Replacing the NTDW60 Media Gateway Controller card

Procedure 13

Replacing the NTDW60 Media Gateway Controller card

Step	Action
1	Power down the main chassis.
2	Label and remove all cables.
3	Unlock the faceplate latches and remove the card.
4	Remove the security dongle and insert it on the replacement card.
5	Remove the daughterboards from the defective MGC card and install them on the replacement card. See " Replacing the NTDW62 or NTDW64 DSP daughterboard " (page 114).
6	Insert the MGC into Slot 0 of the chassis.

- 7 Reconnect all cables.
- 8 To install MGC software, see *Communication Server 1000E Installation and Commissioning (NN43041-310)*.

—End—

Replacing the NTDW62 or NTDW64 DSP daughterboard

To access the DSP daughterboards on the Media Gateway Controller, see [Section "Replacing the NTDW60 Media Gateway Controller card" \(page 113\)](#).

Procedure 14

Replacing the NTDW62 or NTDW64 daughterboard

Step	Action
1	Remove the NTDW60 Media Gateway Controller card from the Media Gateway and place the card on a clean, electrostatic discharge (ESD) surface.
2	Remove the defective DSP daughterboard.
3	Place the new DSP daughterboard in the position from which you removed the defective daughterboard: position 1 or position 2.
4	Using the supplied screws, securely attach the daughterboard to the MGC.
5	Reinsert the NTDW60 MGC card in slot 0 of the Media Gateway.
6	Use LD 14 on the Call Server to check card configuration.

—End—

Replacing the NTDW65 Voice Gateway Media Card

Procedure 15

Replacing the NTDW65 Voice Gateway Media Card

Step	Action
1	In Element Manager, select System > Maintenance from the navigator. The Maintenance Web page appears. You can select an overlay or a function to perform maintenance. The default is overlay.

- 2 Select **Select by Functionality**.
A list of available diagnostics appears.
- 3 Select **Network & Peripheral Equipment**.
The **Network & Peripheral Diagnostics** page appears.
- 4 Select **DISC – Disable card** from the **Card Commands** list.
- 5 Enter the card number in the corresponding **Command Parameter** text box.
- 6 Click **Submit** to the right of the text box.
The output from this command is shown in the text box in the lower half of the web page.
- 7 Remove the card:
 - a. Label and remove all cables.
 - b. Unhook the locking devices.
- 8 Install the replacement card:
 - a. Pull the top and bottom locking devices away from the card faceplate.
 - b. Insert the Voice Gateway Media Card into the card guides and gently push it until it makes contact with the backplane connector.
 - c. Hook the locking devices.

The Voice Gateway Media Card boots automatically. If the card is a Follower, it retrieves the node configuration files from the IP telephony node Leader. If the card is a Leader, you must configure it. See *IP Line Fundamentals (NN43100-500)* for the configuration procedure.
- 9 Observe the Voice Gateway Media Card faceplate display.
The red LED remains lit until the card is configured and enabled. When the card has finished booting, the faceplate display shows **Fxxx** or **Lxxx** (where xxx is the number of telephones registered to the card), indicating that the card is a Follower or Leader.

—End—

Replacing the NT4N64 CP PII Call Processor card

Procedure 16

Replacing the NT4N64 CP PII Call Processor card

Step	Action				
1	<p>Check the System Utility card maintenance display to verify that the Call Server containing the CP PII card to be replaced is inactive.</p> <p>a. If the Call Server containing the CP PII card is active, switch Call Servers in LD 135:</p> <table border="0"> <tr> <td style="padding-right: 20px;">LD 135</td> <td>To load the program.</td> </tr> <tr> <td>SCPU</td> <td>Switch Call Servers (if necessary).</td> </tr> </table>	LD 135	To load the program.	SCPU	Switch Call Servers (if necessary).
LD 135	To load the program.				
SCPU	Switch Call Servers (if necessary).				
2	<p>In LD 135, split the CPU cores:</p> <p style="padding-left: 40px;">SPLIT</p>				
3	Remove all cables connected to the CPU being replaced.				
4	Use a small-bladed screwdriver to remove the screws from the CP PII card.				
5	To remove the card, hold the card by the faceplate latches and gently pull it out of the slot.				
6	To install the replacement card, hold the card by the faceplate latches and gently push it into the slot until the connectors make contact with the backplane.				
7	Gently push the latches forward to set the card and lock it in place.				
<div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <div style="display: flex; align-items: center;">  <div> <p>CAUTION</p> <p>Damage to Equipment</p> <p>Never force the card into the slot. If the card gets stuck, remove it and try again.</p> </div> </div> </div>					
8	Use a small-bladed screwdriver to replace the screws on the card.				
9	Replace all cables on the replaced CP PII card.				
<div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">ATTENTION</p> <p>Before continuing with this procedure, you must reinstall the software from CD-ROM. See "Installing software" procedures in <i>Communication Server 1000M and Meridian 1: Large System Installation and Configuration</i> (553-3021-210), Release 4.0.</p> </div>					



- 10** After the inactive Call Server reloads, check status in LD 135:
`STAT CPU`
- 11** In LD 135, on the active Call Server, rejoin the two CP PII cards:
`JOIN`
- 12** After the disk sync and memory sync complete, enter the following in LD 135:
`STAT CPU` To check for normal system operation.
- 13** In LD 135, verify that the replaced CP PII card can control call processing:
`SCPU` To check replaced CP PII.
- Note:** Switch Call Server back, if necessary.

—End—

Replacing the NT4N39AA CP PIV Call Processor card

Procedure 17

Replacing the NT4N39AA CP PIV Call Processor card

Step	Action
1	<p>Check the System Utility card maintenance display to verify that the Call Server containing the CP PIV card to be replaced is inactive.</p> <p>If the Call Server containing the CP PIV card is active, switch Call Servers in LD 135:</p> <p><code>LD 135</code> Load the program.</p> <p><code>SCPU</code> Switch Call Servers (if necessary).</p>
2	<p>In LD 135, split the CPU cores:</p> <p><code>SPLIT</code></p>
3	Remove all cables connected to the CPU being replaced.
4	Use a small-bladed screwdriver to remove the screws from the CP PIV card.

Replacing the NT4N48 System Utility card

ATTENTION

On a CS 1000E, the System Utility card minimum vintage is NT4N48BA.

Procedure 18

Replacing the NT4N48 System Utility card

Step	Action				
1	<p>Check the System Utility card maintenance display to verify that the Call Server containing the CP PII card to be replaced is inactive.</p> <p>a. If the Call Server containing the System Utility card is active, switch Call Servers in LD 135:</p> <table border="0"> <tr> <td style="padding-left: 40px;">LD 135</td> <td>To load the program.</td> </tr> <tr> <td style="padding-left: 40px;">SCPU</td> <td>Switch Core (if necessary).</td> </tr> </table>	LD 135	To load the program.	SCPU	Switch Core (if necessary).
LD 135	To load the program.				
SCPU	Switch Core (if necessary).				
2	<p>In LD 135, split the Call Servers:</p> <p style="padding-left: 40px;">SPLIT</p>				
3	<p>In LD 135, on the inactive Call Server, software-disable the System Utility card:</p> <table border="0"> <tr> <td style="padding-left: 40px;">DIS SUTL c 15</td> <td>Disable the System Utility card, where: c = Call Server number (0 or 1)</td> </tr> </table>	DIS SUTL c 15	Disable the System Utility card, where: c = Call Server number (0 or 1)		
DIS SUTL c 15	Disable the System Utility card, where: c = Call Server number (0 or 1)				
4	Hardware-disable the System Utility card: configure the faceplate switch to DIS.				
5	Use a small-bladed screwdriver to remove the screws from the System Utility card.				
6	To remove the card, hold the card by the faceplate latches and gently pull it out of the slot.				
7	Before you install the new System Utility card, hardware-disable it: configure the faceplate switch to Dis.				
8	Ensure the security device is installed on the card.				
9	Ensure the switch setting for core side is configured appropriately (for Call Server 0 or Call Server 1).				
10	To install the replacement card, hold the card by the faceplate latches and gently push it into the slot until the connectors make contact with the backplane.				

- 11 Gently push the latches forward to set the card and lock it in place.



CAUTION

Damage to Equipment

Never force the card into the slot. If the card gets stuck, remove it and try again.

- 12 Use a small-bladed screwdriver to tighten the screws on the card.
- 13 Hardware-enable the System Utility card: configure the faceplate switch to ENB.
- 14 In LD 135, software-enable the System Utility card:

`ENL SUTL c 15` Enable the System Utility card, where:
c = Call Server number (0 or 1)

- 15 In LD 135, check status:

`STAT SUTL c 15` Check the System Utility card status,
where:
c = Call Server number (0 or 1)

- 16 In LD 135, on the active Call Server, rejoin the two Call Servers:

`JOIN`

—End—

Replacing the NTDU67 Drive Carrier card (CP PII only)

See *Software Input/Output Administration (NN43001-611)* for a description of all maintenance commands, and *Software Input/Output Reference – System Messages (NN43001-712)* for interpreting system messages.



CAUTION

Service Interruption

At some point in this procedure, the system warm starts, causing a momentary interruption in call processing.

Procedure 19
Replacing the NTDU67 Drive Carrier card

Step	Action				
1	<p>Check the Drive Carrier card maintenance display to verify that the Call Server containing the Drive Carrier card to be replaced is inactive.</p> <p>a. If the Call Server containing the Drive Carrier card is active, switch cores in LD 135:</p> <table style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">LD 135</td> <td>To load the program.</td> </tr> <tr> <td>SCPU</td> <td>Switch Core (if necessary).</td> </tr> </table>	LD 135	To load the program.	SCPU	Switch Core (if necessary).
LD 135	To load the program.				
SCPU	Switch Core (if necessary).				
2	<p>In LD 135, split the CPU Cores:</p> <p style="margin-left: 40px;">SPLIT</p>				
3	<p>Power down the Call Server using the power switch at the right rear of the Call Server.</p>				
4	<p>Use a small-bladed screwdriver to remove the four screws from the Drive Carrier card.</p>				
5	<p>Unhook the locking devices and remove the Drive Carrier card.</p>				
6	<p>Put the Drive Carrier card being replaced into a static bag and box.</p>				
7	<p>Insert the new Drive Carrier card into the Call Server slot.</p>				
8	<p>Lock the locking devices by pushing them gently towards the faceplate.</p>				
9	<p>Use a small-bladed screwdriver to tighten the screws on the Drive Carrier card.</p>				
10	<p>Press the Reset button on the CP PII Call Processor card.</p> <p>When the keycode is validated against the Security Device, the Install menu is displayed.</p>				
11	<p>Choose - To Install Software, Database, CP-BOOTROM from the Install Menu.</p>				
12	<p>Install the Operating Software from the Install Disk. See <i>Communication Server 1000E Upgrades (NN43041-458)</i>.</p>				
13	<p>Install the Customer Database.</p>				

- 14 In LD 135, check status:

STAT CMDU This checks the Drive Carrier card status

- 15 In LD 135, on the active Call Server, rejoin the two Call Servers:

JOIN

—End—

Replacing the NTDU64 alarm/fan module

Procedure 20

Replacing the NTDU64 alarm/fan module

Step	Action
------	--------

Note: The alarm/fan module can be replaced without powering down the Call Server.

- 1 Unhook the locking devices on the alarm/fan module.
- 2 Pull the alarm/fan module out of the Call Server. (See [Figure 14 "Alarm/fan module"](#) (page 122)).

Figure 14
Alarm/fan module



- 3 Insert the replacement alarm/fan module into the vacated slot and hook the locking devices.
- 4 Use a Phillips screwdriver to tighten the screws on the alarm/fan module.

—End—

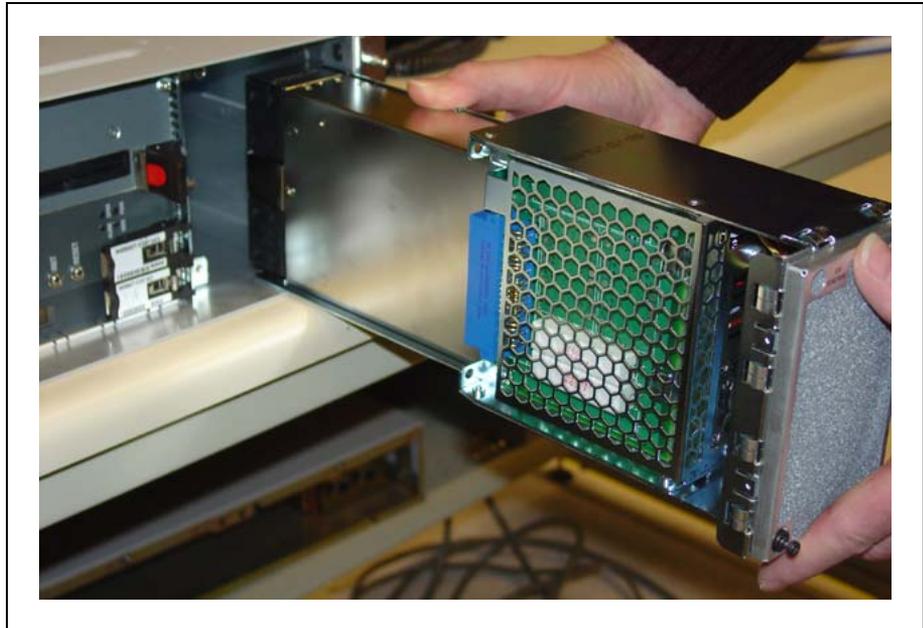
Replacing the NTDU65 power supply module

Procedure 21

Replacing the NTDU65 power supply module

Step	Action
1	Turn off power to the Call Server using the switch at the rear right of the Call Server.
2	Also at the rear of the Call Server, unplug the power cord.
3	Loosen the locking screw on the front of power supply.
4	Unseat the power supply module by pulling on the module handle.
5	Pull the power supply out of the Call Server. (See Figure 15 "Power supply module" (page 123))

Figure 15
Power supply module



- 6 Before you insert the power module into the Call Server, configure the power supply switch on the rear of the module to OFF (down).
- 7 Insert the replacement power supply into the vacated slot and ensure it is well-seated.
- 8 Use a Phillips screwdriver to tighten the locking screw on the power supply.

- 9 Reattach the power cord at the rear of Call Server and reconnect to the power source. Turn on power to the power supply module.
- 10 Tag defective equipment with a description of the problem, and package it for return to a repair center.

—End—

Figure 16 "CS 1000E power supply air filter" (page 124) shows the Call Server power module air filter (P06094950). It consists of one aluminium frame and foam insert. The air filter foam kit (N0003712) contains ten replacement foam inserts.

Figure 16
CS 1000E power supply air filter



Procedure 27 "Removing the NTAK20 and NTAK93/NTBK51 from the NTBK50 card" (page 129) describes how to clean and replace the air filter.

Procedure 22
Cleaning and replacing the power supply air filter

Step Action

Note: *The power supply can remain powered on during this procedure.*

- 1 To remove the power supply air filter, gently unsnap the filter from the front of the power supply module. If the aluminium frame is damaged, replace the filter.
- 2 To remove the air filter foam, unsnap the frame that contains the filter foam insert and gently pull the foam insert loose from the frame. If the foam is damaged, replace the foam insert.
- 3 To clean the foam insert, rinse it with clean water under a tap or carefully vacuum it. After rinsing, allow the foam to dry thoroughly before reinstalling in the frame.
- 4 To reinstall the air filter, replace the foam insert into the aluminium frame and gently snap the aluminium frame back into the small slots on the front of the power supply module.

—End—

Accessing Media Gateway internal components

This procedure describes how to access components in the Media Gateway and Expander. To remove the front cover for access to terminal components, follow the steps in [Procedure 23 "Removing the front cover for access to internal components"](#) (page 125).



CAUTION

CAUTION WITH ESDS DEVICES

To avoid card damage from static discharge, wear a properly connected antistatic wrist strap.

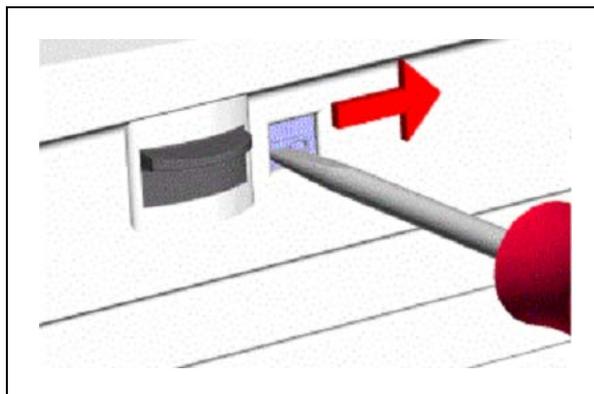
Procedure 23

Removing the front cover for access to internal components

Step	Action
------	--------

- | | |
|---|---|
| 1 | If the front cover lock latches are in their locked position, use a flat screwdriver to slide the icon away from the latch. See Figure 17 "Inserting screwdriver in slot" (page 126). |
|---|---|

Figure 17
Inserting screwdriver in slot



- 2 Simultaneously slide both spring-loaded latches toward the bottom of the cabinet and pull forward. Lift the cover upward to remove it from the cabinet. See [Figure 18 "Depressing latches and pulling back on front cover"](#) (page 126).

ATTENTION

The bottom of the front cover is supported by but is not secured to the cabinet. Be careful not to drop the cover.

Figure 18
Depressing latches and pulling back on front cover



—End—

Replacing the NTAK02 SDI/DCH circuit card

The NTAK02 SDI/DCH circuit card can be installed only on the MG 1000T platform.

Procedure 24**Replacing the NTAk02 SDI/DCH circuit card****Step Action**

- 1 If the following circuit cards are configured, disable them in the following overlays:

SDI	LD 48
-----	-------

DCHI	LD 96
------	-------

The system may initialize if you do not perform this step.

- 2 Hold the SDI/DCH circuit card by the lock latches, unlock the latches, and slide the circuit card out of the Media Gateway.
- 3 Verify the settings of the switches and jumper plugs on the replacement circuit card and correct any settings that need to be changed.

Ensure the settings are the same as the existing circuit card. For information about settings see the *Communication Server 1000E Installation and Commissioning (NN43041-310)*.

- 4 Hold the SDI/DCH circuit card by the lock latches and slide it into its assigned slot until it connects with the backplane.
- 5 Secure the lock latches on the circuit card.
- 6 If the following circuit cards were previously disabled, enable them in the following overlays:

SDI	LD 48
-----	-------

DCHI	LD 96
------	-------

—End—

Replacing the NTAk03 TDS/DTR circuit card**Procedure 25****Replacing the NTAk03 TDS/DTR circuit card****Step Action**

- 1 Disable the SDI ports in LD 48.
- 2 Disable the TDS channels and Digitone Receivers in LD 34.

- 3 Hold the TDS/DTR circuit card by the lock latches, unlock the latches, and slide the circuit card out of the Media Gateway.
- 4 Hold the replacement TDS/DTR circuit card by the lock latches and slide it into its assigned slot until it connects with the backplane.
- 5 Secure the lock latches on the circuit card.
- 6 Enable the SDI ports, TDS channels, and Digitone Receivers in their respective overlays.

—End—

Replacing the NTA79 or NTB50 2.0 Mb PRI card

NTA79 and NTB50 2.0 Mb PRI cards can be installed only on the MG 1000T platform.

Procedure 26

Replacing the NTA79 or NTB50 2.0 Mb PRI card

Step	Action
------	--------

- | | |
|---|--|
| 1 | If the card is an NTA79, or is an NTB50 with the NTA93 DCHI daughterboard attached, disable the associated D-channel using the following overlay and commands: |
|---|--|

```
LD 96          DIS DCH X
```

If the card is an NTB50 with the NTB51 DDCH daughterboard attached, disable the associated downloadable D-channel using the following overlay and commands:

```
LD 96          DIS DCH X
LD 96          DIS MSDL X
```

- | | |
|---|--|
| 2 | Disable the Clock Controller using these commands: |
|---|--|

```
LD 60          DIS CC 0
```

- | | |
|---|--|
| 3 | Disable the PRI pack using these commands: |
|---|--|

```
LD 60          DIS L X
```

The LEDs on the front of the card change from green (enabled) to red (disabled.) For this to happen, the `DIS MSDL` command must be used, as in Step 1.

- 4 Hold the circuit card by the lock latches, unlock the latches, and slide the circuit card out of the Media Gateway. If required, remove any daughterboards that may be attached. See [Procedure 27 "Removing the NTAK20 and NTAK93/NTBK51 from the NTBK50 card"](#) (page 129).
- 5 On the replacement PRI circuit card, configure any switches and install any daughterboards as required. Hold the card by the lock latches and slide it into its assigned slot until it connects with the backplane.
- 6 Enable the Clock Controller and the PRI in their corresponding overlays:

```
LD 60          ENL CC 0
LD 60          ENLL X
```

The associated DCHI/DDCH is automatically enabled.

- 7 Check the tracking of the Clock Controller with the following overlay:

```
LD 60          SCK 0
```

If it is not tracking or is not locked, use the following commands to track:

```
LD 60          TRCK PCK/SCLK
```

—End—

Removing daughterboards from the NTBK50 card

Because of the physical layout of the motherboards and daughterboards, remove the NTAK20 before the NTAK93/NTBK51.

Procedure 27

Removing the NTAK20 and NTAK93/NTBK51 from the NTBK50 card

Step	Action
------	--------

- | | |
|---|--|
| 1 | Starting at the two corners opposite the connector, gently lift each corner out of the locking groove of the standoff. |
|---|--|

- 2 At the two corners adjacent to the connector, gently lift the entire side until the mounting holes are clear of the locking groove of the standoff.
- 3 To remove the connector pins, grasp the edge of the board adjacent to the connector and lift gently.

—End—

If more than one NTB50 card is installed, the additional cards may not carry daughterboards, depending on the system configuration. At least one NTA20 for each system is required.

Mounting the daughterboards

Work on a flat, static-free surface when mounting or removing daughterboards. To install the NTA93 and NTB51 daughterboard before the NTA20 daughterboard, follow the steps in [Procedure 28 "Installing the NTA93/NTB51 daughterboard before the NTA20 daughterboard"](#) (page 130).

Procedure 28

Installing the NTA93/NTB51 daughterboard before the NTA20 daughterboard

Step	Action
1	Visually inspect the connector pins on the underside of the daughterboard. Realign bent pins prior to mounting.
2	Place the NTB50 flat on an antistatic pad.
3	From an overhead view, with the daughterboard parallel above the NTB50 and the connector pins aligned over the connector sockets, line up the mounting holes on the daughterboard with the tops of the standoffs on the NTB50.
4	Lower the daughterboard onto the NTB50, keeping the standoffs in line with all four holes, until the holes rest on the tops of the four standoffs.
5	If more than a very slight amount of pressure is required at this point, the connector pins may not be aligned with the connector socket. If so, lift the daughterboard off the NTB50 and return to Step 2.
6	Apply pressure along the edge of the board where the connector is located until the standoffs at the two corners adjacent to the connector snap into a locked position.

- 7 Press down on the two corners opposite until they lock into place.

—End—

Replacing the NTAK09 1.5 Mb DTI/PRI card (PRI applications)

Procedure 29

Replacing the NTAK09 1.5 Mb DTI/PRI card when it is configured as PRI

Step	Action
------	--------

- | | |
|---|--|
| 1 | If the NTAK93 DCHI daughterboard is attached to the card, disable the associated D-channel using the following overlay commands: |
|---|--|

```
LD 96          DIS DCH X
```

If the NTBK51 DDCH daughterboard is attached to the card, disable the associated downloadable D-channel using the following overlay commands:

```
LD 96          DIS DCH X
LD 96          DIS MSDL X
```

- | | |
|---|---|
| 2 | To disable the Clock Controller (if on PRI), use the following command: |
|---|---|

```
LD 60          DIS CC 0
```

- | | |
|---|---|
| 3 | To disable the PRI pack, use the following command: |
|---|---|

```
LD 60          DIS L X
```

The LEDs on the front of the card change from green (enabled) to red (disabled.) For this to happen, the `DIS MSDL` command must be used, as in Step 1.

- | | |
|---|---|
| 4 | Hold the circuit card by the lock latches, unlock the latches, and slide the circuit card out of the Media Gateway. If required, remove any attached daughterboards. Because of the physical layout of the motherboards and daughterboards, remove the NTAK20 before the NTAK93. To remove the NTAK20 and NTAK93 from the NTAK09 card, follow the steps in Procedure 27 "Removing the NTAK20 and NTAK93/NTBK51 from the NTBK50 card" (page 129). To reinstall the |
|---|---|

daughterboards, see [Procedure 28 "Installing the NTAK93/NTBK51 daughterboard before the NTAK20 daughterboard"](#) (page 130).

- 5 On the replacement PRI circuit card, configure switches and install daughterboards as required. Hold the card by the lock latches and slide it into the assigned slot until it connects with the backplane.
- 6 Enable the Clock Controller and the PRI in their corresponding overlays:

```
LD 60          ENL CC 0
LD 60          ENLL X
```

The associated DCHI is automatically enabled.

- 7 Check the tracking of the Clock Controller with the following command:

```
LD 60          SCK 0
```

If the clock is not tracking or is not locked, use the following command to track:

```
LD 60          TRCK PCK/SCLK
```

—End—

Replacing the NTAK09, NTAK10, or NTRB21 circuit cards (DTI applications)

To replace any card that is configured as a Digital Trunk Interface (DTI), use the following procedure.

Procedure 30

Replacing the NTAK09, NTAK10, or NTRB21 when configured as a DTI

Step	Action
------	--------

- 1 Disable the Clock Controller by using the command:

```
LD 60          DIS CC 0
```

- 2 Disable the DTI pack by using the command:

```
LD 60          DISL X
```

- 3 Hold the circuit card by the lock latches, unlock the latches, and slide the circuit card out of the Media Gateway. If required, remove any daughterboards attached to the card.
- 4 On the replacement DTI circuit card, configure any switches and install any daughterboards as required. Hold the replacement DTI circuit card by the lock latches and slide it into the assigned slot until it connects with the backplane.
- 5 Enable the Clock Controller (if on the DTI) and the DTI in their corresponding overlays:

```
LD 60          ENL CC 0
LD 60          ENLL X
```

- 6 Check the tracking of the Clock Controller with the following overlay:

```
LD 60          SSCK 0
```

If the clock is not tracking or is not locked, use the following commands to start tracking.

```
LD 60          TRCK PCK/SCLK
```

—End—

Replacing equipment cards

Follow the steps in [Procedure 31 "Replacing equipment cards" \(page 134\)](#) to replace Intelligent Peripheral Equipment (IPE) cards, including the following:

- NT8D02 Digital Line Card
- NT8D03 Analog Line Card
- NT8D09 Analog Message Waiting Line Card
- NT8D14 Universal Trunk Card
- NT8D15 E&M Trunk Card

See *Software Input/Output Reference – Maintenance (NN43001-711)* and *Software Input/Output Reference – System Messages (NN43001-712)* for a description of all maintenance commands and system messages.

Procedure 31
Replacing equipment cards

Step Action

- 1 Software-disable the card with the following command:

```
LD 32          DISC 1 s c
```
- 2 Unhook the locking devices on the card. Pull it out of the card cage.
- 3 On the replacement card, configure option switches or jumper plugs to the same settings as those on the card you removed.
- 4 Insert the replacement card into the vacated slot and hook the locking devices.

When cards are installed, the red LED on the faceplate flashes as a self-test runs. If the self-test is completed successfully, the card is automatically enabled (if it is configured in software) and the LED goes out. If the self-test fails, the LED lights steadily and remains lit.
- 5 Software-enable the card by entering: **ENLC 1 s c**

When the process is complete, a system response appears.
- 6 To end the program, enter four asterisks (****).

—End—

Replacing the NT5K21 equipment card

Procedure 32
Replacing the NT5K21 XMFC/MFE equipment card

Step Action

- 1 Software-disable the card with the following command:

```
LD 54          DISC 1 s c
```
- 2 Unhook the locking devices on the card. Pull it out of the card cage.
- 3 Insert the replacement card into the vacant slot and hook the locking devices.

After you install cards, the red LED on the faceplate flashes as a self-test runs. If the self-test succeeds, the card is automatically enabled (if it is configured in software) and the LED turns off. If the self-test fails, the LED lights steadily and remains lit.

- 4 Software-enable the card by entering: `ENLC 1 s c`
When the process is complete, a system response appears.
- 5 To end the program, enter four asterisks (****).

—End—

Replacing the NTAG26 equipment card

Procedure 33

Replacing the NTAG26 equipment card

Step	Action
------	--------

- | | |
|---|---|
| 1 | Software-disable the card with the following command:

<code>LD 34 DISC 1 s c</code> |
| 2 | Unhook the locking devices on the card. Pull it out of the card cage. |
| 3 | Insert the replacement card into the vacant slot and hook the locking devices.

After you install cards, the red LED on the faceplate flashes as a self-test runs. If the self-test succeeds, the card is automatically enabled (if it is configured in software) and the LED turns off. If the self-test fails, the LED lights steadily and remains lit. |
| 4 | Software-enable the card by entering: <code>ENLC 1 s c</code>
When the process is complete, a system response appears. |
| 5 | To end the program, enter four asterisks (****). |

—End—

Replacing the NTA92 off-premises protection module

A lightning strike can cause failure of the NTA92 protection assembly. The first indication of such a failure is an out-of-service telephone. To check for and replace failed protectors, follow the steps in [Procedure 34 "Testing for loop closure"](#) (page 136) or [Procedure 35 "Testing continuity"](#) (page 136).

Procedure 34

Testing for loop closure

Step	Action
1	To test for a dial tone across cable pairs on J1 and J2, use standard loop closure test equipment (for example, butt-in). If a protector failed, go to Step 2. If not, go to the appropriate chapter in this guide.
2	Remove the protection module cover plate.
3	Remove the faulty protector.
4	Install a new protector in the same position as the faulty protector.
5	Replace the cover plate.
6	Test the set for proper operation.

—End—

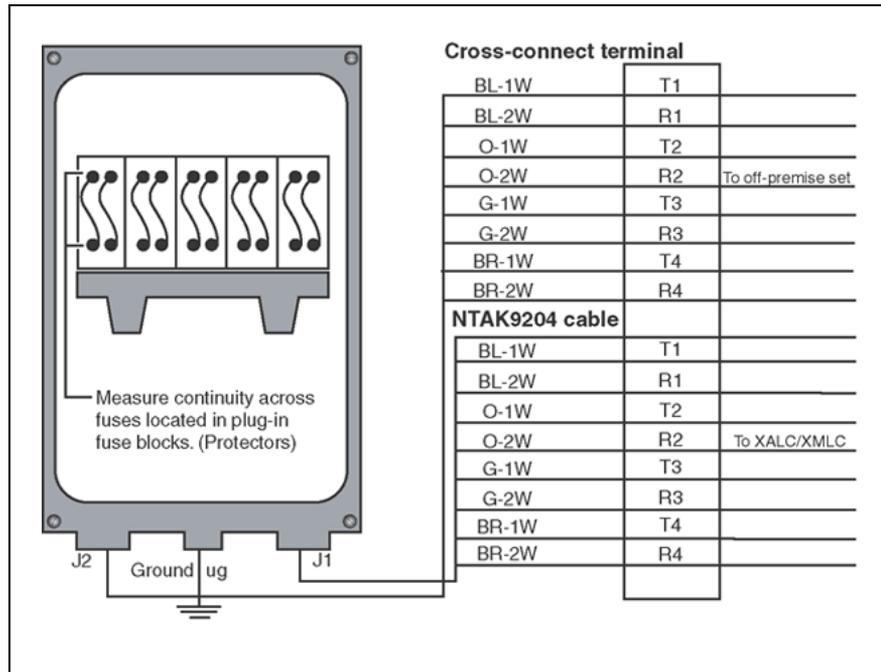
Procedure 35

Testing continuity

Step	Action
1	Remove the cover plate from the protection module.
2	Use an ohmmeter to measure continuity across the protectors. See Figure 19 "Wiring diagram for NTA92 off-premises protection module" (page 137). If a protector failed, go to Step 3. If not, go to the appropriate chapter in this guide.
3	Remove the faulty protector.
4	Install a new protector in the same position as the faulty protector.
5	Replace the cover plate.
6	Test the set for proper operation.

—End—

Figure 19
Wiring diagram for NTAK92 off-premises protection module



Replacing the NTDK20 SSC card

To replace the NTDK20 SSC card, minimum vintage HA, follow the steps in [Procedure 36 "Replacing the NTDK20 SSC card" \(page 137\)](#).

Procedure 36

Replacing the NTDK20 SSC card

Step	Action
------	--------

- | | |
|---|--|
| 1 | Perform an EDD backup in LD 43 . |
| 2 | Turn the Media Gateway power supply off. |
| 3 | Hold the NTDK20 SSC circuit card by the lock latches, unlock the latches, and slide the circuit card out of the Media Gateway. |
| 4 | Remove the software daughterboard. Install the software daughterboard and the security device on the replacement NTDK20 SSC card.

See "Replacing the NTKK25 software daughterboards" (page 138) . |
| 5 | Transfer any IP daughterboards to the replacement NTDK20 SSC: <ul style="list-style-type: none"> • NTDK83 |

- NTDK99

See ["Replacing IP daughterboards"](#) (page 141).

- 6 Hold the NTDK20 SSC circuit card by the lock latches and slide it into slot 0 of the Media Gateway until it connects with the backplane.
- 7 Secure the lock latches on the circuit card.
- 8 Set the breaker on the Media Gateway power supply to the "on" position.

—End—

Replacing the NTKK25 software daughterboards

This procedure is equivalent to a new system installation. It requires a PC Card or an external PC Card drive to back up the configuration files, the current keycodes, feature set, License parameters, and a Software Delivery Card with the current version of software.



WARNING

Do not format the PC Card using a Windows application. Format the PC Card using the type of card on which it will be running. For example, a PC Card formatted using an SSC card is readable only by the SSC card. It is not readable by a Media Card.

Software daughterboard compatibility

There are two types of software daughterboards:

- NTKK25 - provided with the system
- NTKK13 - still supported

Replacement of a software daughterboard

To replace the software daughterboard, follow the steps in [Procedure 37 "Replacing the software daughterboard"](#) (page 138).

Procedure 37

Replacing the software daughterboard

Step	Action
1	Log in and back up the configuration files.
2	If required, update the Boot Code on the SSC card.
3	Power down the system.

- 4 Remove the NTKK20 SSC card from the Media Gateway.
- 5 Lift the daughterboard up, and away from the NTKK20 SSC card until it is clear of the connector assembly.
- 6 Position the replacement software daughterboard.
- 7 Seat the software daughterboard on the NTKK20 SSC card.
- 8 Reinstall the NTKK20 SSC card into slot 0 of the Media Gateway.
- 9 Power up the system.
- 10 Complete the steps required to perform a "New System Installation".
- 11 Restore the backup configuration files.

—End—

Unscheduled replacement of a software daughterboard

To replace a failed software daughterboard, follow the steps in [Procedure 38 "Replacing a failed software daughterboard" \(page 139\)](#).

Configuration files are only as current as the last Data Dump (EDD).

Procedure 38

Replacing a failed software daughterboard

Step	Action
1	Decision Point. If the system is down, go to step 6 . If the system is operating, go to step 2 .
2	If you back up to a PC, use Customer Configuration Backup and Restore (CCBR) or the XBK command, both in LD 143.
3	Perform a Data dump. <ul style="list-style-type: none"> • Use LD 43. • Enter command EDD.
4	Disable all DCH using LD 60.
5	Disable all AML links using LD 48.
6	To change the software daughterboard: <ol style="list-style-type: none"> a. Power down the system. b. Remove the SSC from the Media Gateway.

- c. Remove the software daughterboard from the SSC card and replace with a replacement software daughterboard of the same family. Example: The NTSK11AF, providing the vintage is the same.

OR

If the new card is not the same vintage but the same base board, use a Software Delivery Card to install the software daughterboard. Proceed to [step 7](#) after system power up.

- 7 If the new software daughterboard is the same vintage as the old one, you do not need a Software Delivery Card for the install. After power up, the card appears in the main menu. From the Install menu, select item 1 "New System Installation - From software daughterboard". Proceed to [step 10](#).
- 8 If an NTKK25 or a programmed daughterboard of a different vintage is being used, insert a Software Delivery card with the same release and issue of software as the one being replaced into slot A of the SSC card. You can then log into the system.
- 9 From the main menu, select item 4 "New System Installation - From Software Delivery Card".
- 10 Proceed with the Installation Menu choices as described in *Communication Server 1000E Installation and Commissioning (NN43041-310)*. When prompted for the choice of database, select item 2 "Basic Configuration".

ATTENTION

It is important to choose "Basic Configuration". Otherwise, the system can invoke an EDD after loading the new software, which can overwrite the customer data stored on the CPU.

- 11 After installing the software and rebooting the system, restore customer backup configuration files:
 - If you used CCBR to back up to a PC, then use CCBR to restore. If you used the XBK command to back up to a PC, then use the RBK command in LD 143 to restore.
 - Login and load LD 143.
 - Need to perform an upgrade.
 - From the Main Menu, select item 3 "Utilities".
 - Select item 1 "Restore".
 - Select item 1 "Backup Flash Drive".
 - Confirm Restore database from the Backup Flash drive.

- Reboot system by setting the power supply off, and then on.

—End—

Replacing IP daughterboards

Procedure 39

Replacing the NTDK83 or NTDK99 IP daughterboard

Step	Action
1	Turn the power supply and reserve power off.
2	Unplug the IP cable from the Media Gateway bulkhead.
3	Unplug and remove the NTDK20 SSC from the Media Gateway and place on a clean flat surface.
4	Disconnect the cable from the IP daughterboard and the LED connector if used.
5	Detach the IP daughterboard.
6	Position the replacement IP daughterboard.
7	Seat the replacement IP daughterboard into the same slot you removed the defective IP daughterboard from on the NTDK20 SSC card.
8	Reconnect the IP cable. Ensure that the cable is fully inserted into the connector. A click should be heard when the cable is fully engaged.
9	Reconnect the LED connector that was disconnected in step 4 if necessary.
10	Record the MAC address of the new IP daughterboard installed on the SSC in the Media Gateway. When necessary use LD 117 to configure the new MAC address for the Media Gateway. See <i>Communication Server 1000E Installation and Commissioning (NN43041-310)</i> .
11	Reinstall the NTDK20 SSC circuit card in slot 0 of the Media Gateway.
12	Reconnect the IP cable to the Media Gateway bulkhead.
13	Power up the system.

—End—

Element Manager

Contents

This section contains the following topics:

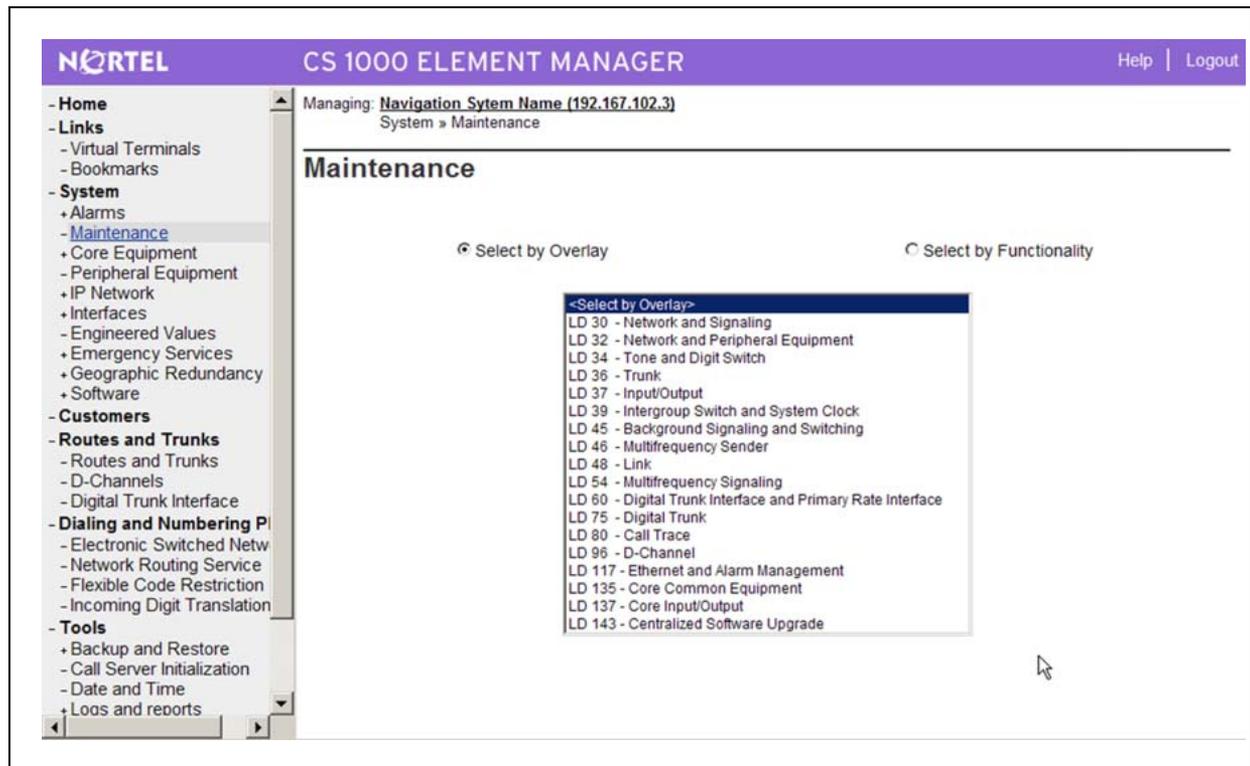
- "Call Server maintenance" (page 143)
- "Call Server backup, data dump, and restore" (page 145)
- "Signaling Server maintenance" (page 147)
- "Media Card maintenance" (page 148)
- "Gatekeeper backup and restore" (page 148)
- "Remote upgrade" (page 150)
- "LD 36 analog trunk card status" (page 152)

Call Server maintenance

To perform maintenance on the Call Server, you can access a subset of overlay functions in Element Manager.

Search for maintenance functions by LD number or by functionality on the system maintenance page, as shown in [Figure 20 "Element Manager Call Server maintenance"](#) (page 144).

Figure 20
Element Manager Call Server maintenance



You can perform some of the following maintenance functions using Element Manager.

- LD 36 – Trunk Diagnostics
 - card commands
 - unit commands
 - customer route commands
 - miscellaneous commands, such as CMIN, CMIN ALL, and CDSP
- LD 60 – Digital Trunk Interface (DTI) and Primary Rate Interface (PRI) Diagnostics
 - digital trunk diagnostic commands
 - clock controller commands
- LD 96 – D-channel Diagnostics
 - D-channel commands
 - MSDL commands
 - TMDI commands

- LD 32 – Network and Peripheral Equipment Diagnostics
 - loop, shelf, card, and unit commands
 - M39xx unit commands
 - DSL commands
 - BRIL, BRIE, and BRIT applications commands

You can use the rlogin command to the Call Server/H.323 gateway if you have a configured Pseudo TTY (PTY) and if an rlogin client is available on the administrative PC or workstation.

Use three asterisks (***) to rlogin directly to any SSC. The administrative workstation must be on the ELAN network and must have an rlogin client application. Otherwise, if administration is on the TLAN network or customer LAN, you must use a telnet client to connect to a primary SSC, and you must then rlogin to the Call Server.

- LD 117 – Ethernet and Alarm Management
 - Zone diagnostic commands
 - Ethernet diagnostic commands
 - Ethernet Quality of Service diagnostic commands
 - Emergency Services diagnostics, such as ERL, ELIN, and subnet commands
- Equipment Data Dump (EDD)

In Release 5.0, support no longer exists for LD 43 on Element Manager. EDD is now part of the Call Server backup procedure. See "[Call Server data dump \(EDD\)](#)" (page 146).
- installation, activation, and deactivation of patches

For a complete list and explanation of LD commands, see *Element Manager System Reference – Administration (NN43001-632)*.

Call Server backup, data dump, and restore

The Backup and Restore link of the Tools branch of the Element Manager navigator provides access to Call Server Backup and Restore functions.

Call Server backup

Procedure 40

Backing up the Call Server in Element Manager

Step	Action
1	Click Tools > Backup and Restore > Call Server . The Call Server Backup and Restore page appears.
2	Click Backup . The Call Server Backup Web page appears.
3	Select Backup from the Action list, and click Submit . The Call Server Backup Waiting page opens to indicate that the backup is in progress. An Equipment Data Dump (EDD) is also in progress. See " Call Server data dump (EDD) " (page 146).

—End—

Call Server data dump (EDD)

The Backup function invokes a data dump and writes the Call Server data to the primary and internal backup drives.

The Backup function performs the same task as the `EDD` CLI command traditionally configured in LD 43.

When the backup finishes, a dialog box appears to indicate that the Equipment Data Dump (EDD) is complete.
Click **OK**.

A summary of the results of the EDD appears at the bottom of the Call Server Backup web page.

Call Server restore

The Call Server Restore function restores the backed-up files from the internal backup device to the primary device. The Restore function performs the same task as the CLI `RIB` command traditionally configured in LD 43.



WARNING

The process to restore data using the Element Manager interface is immediate. No warning or detailed information is provided on the specifics of the data to be restored. You must cold start the system before the restored data is in effect.

Procedure 41
Restoring Call Server data in Element Manager

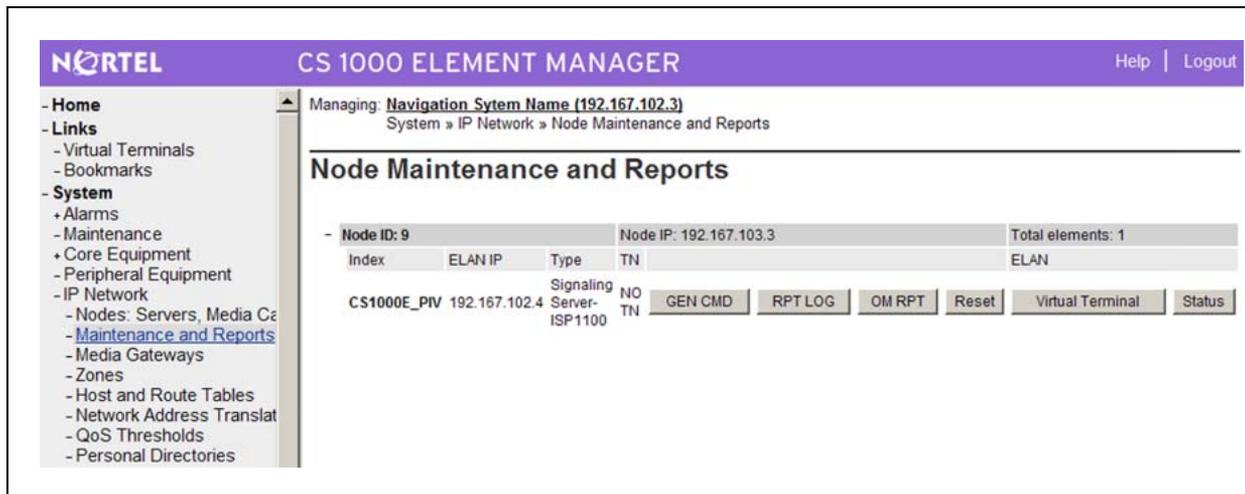
Step	Action
1	Click Tools > Backup and Restore > Call Server . The Call Server Backup and Restore page appears.
2	On the Call Server Backup and Restore page, click Restore . The Call Server Restore page appears.
3	Select Restore from Backup Data (RES) in the Action list, and click Submit .

—End—

Signaling Server maintenance

To access Signaling Server maintenance functions in Element Manager, as shown in [Figure 21 "Element Manager Signaling Server maintenance"](#) (page 147), select **IP Network > Maintenance and Reports**.

Figure 21
Element Manager Signaling Server maintenance



You can perform the following Signaling Server maintenance functions using Element Manager:

- reset
- access the maintenance window
- download new firmware
- upload new firmware
- telnet

- increase virtual trunk capacity and perform configuration tasks on virtual trunks
- turn the gatekeeper on or off
- view report log and trace files
- view Operational Measurement (OM) files
- upload log, trace, or OM files
- perform CLI commands
- access Help
- configure and manage the Web-based services for Personal Directory, Redial List, and Callers List

Media Card maintenance

To access Media Card maintenance functions in Element Manager, select **IP Network > Maintenance and Reports** .

You can perform the following Media Card maintenance functions using Element Manager:

- reset Voice Gateway Media Card
- enable or disable Voice Gateway Media Card
- telnet to the Media Card maintenance window
- download loadware and firmware for upgrades
- view individual DSPs
- view or upload Operational Measurement (OM) data
- access Help
- install and uninstall patches

The maintenance of Media Cards that run IP Line software is similar to the maintenance of other Media Cards or Signaling Servers.

You can reinstall Media Card software following a procedure similar to a new installation. You must manually upgrade each Media Card. Remote software upgrade procedures for IP Line are similar for SSC, Media Card, and ITGL.

Gatekeeper backup and restore

To back up the Gatekeeper to a floppy disk from Element Manager, follow the steps in [Procedure 42 "Backing up Gatekeeper from the NRSM Web interface"](#) (page 149).

Procedure 42**Backing up Gatekeeper from the NRSM Web interface**

Step	Action
1	Get a 1.44 Mb floppy disk and label it with the following information: GATEKEEPER BACKUP IP ADDRESS: 47.11.249.86 DATE: June 1, 2002 TIME: 10:15 AM
2	Make sure the disk is not write-protected.
3	Insert the labeled floppy disk into the floppy disk drive of the Gatekeeper.
4	Log on to the NRSM Web interface as Administrator.
5	From the navigation tree, select Database Backup/Restore, click Database Backup, and then click Backup.
6	Wait to receive confirmation message.
7	Remove the floppy disk from the drive.

—End—

To restore the Gatekeeper from a floppy disk, follow the steps in [Procedure 43 "Restoring the Gatekeeper from a floppy disk" \(page 149\)](#).

Procedure 43**Restoring the Gatekeeper from a floppy disk**

Step	Action
1	Get the correct floppy disk according to the label.
2	Insert the floppy disk in the floppy disk drive of the Gatekeeper.
3	Log into the NRSM Web interface as Administrator.
4	From the navigation tree, select Database Backup/Restore, click Database Restore, and then click Restore.
5	Click one of these three options: <ul style="list-style-type: none"> a. Restore both the database and configuration parameters b. Restore only the database c. Restore only the configuration parameters

- 6 Wait to receive a confirmation message.
- 7 Remove the floppy disk from the drive.

—End—

To automatically backup the Gatekeeper to a floppy disk, follow the steps in [Procedure 44 "Backing up the Gatekeeper to a floppy disk" \(page 150\)](#).

Procedure 44

Backing up the Gatekeeper to a floppy disk

Step	Action
------	--------

- 1 Get a 1.44 Mb floppy disk and label it with the following information:
GATEKEEPER
AUTOMATIC BACKUP
IP ADDRESS: 47.11.249.86
- 2 Make sure the floppy disk is not write-protected.
- 3 Insert and leave the labeled floppy disk into the floppy disk drive of the Gatekeeper.
- 4 The Gatekeeper automatically backs up the database and configuration files to the floppy disk on a daily basis at a certain hour at night.

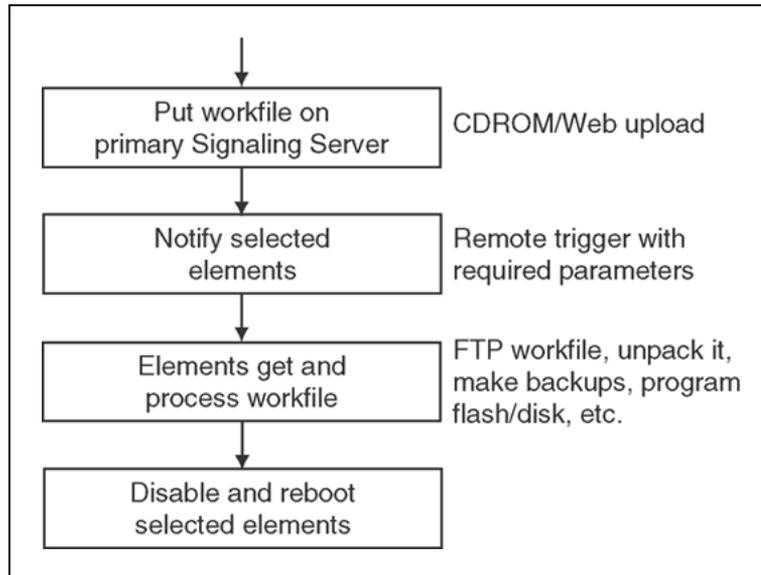
—End—

Remote upgrade

The usual way to upgrade Signaling Servers/Media Cards and Voice Gateway Media Cards is to remotely deliver new software and have the elements upgrade themselves.

[Figure 22 "Element remote upgrade flow" \(page 151\)](#) shows the element remote upgrade flow.

Figure 22
Element remote upgrade flow



New software is distributed as single, packed and compressed workfiles that are named to uniquely identify their type (SSC or Media Card) and version.

Workfiles are placed in a directory on a node primary SSC. Workfiles can be delivered directly on a CD-ROM drive on the Signaling Server using CLI or Web maintenance menus. Workfiles can also be delivered through the network on a Web interface (for example, workfiles come from the Web browser workstation).

Workfiles for SSCs and Media Cards can be on the primary SSC, but each node is managed separately. If the primary SSC on which the workfiles were originally placed becomes unavailable, then the workfiles must now be placed on the new primary SSC. The technician validates the version of a workfile before initiating a remote upgrade.

The elements are notified individually to download and process a new workfile. To limit service interruption, an element must be disabled before it is upgraded. Software upgrades are typically timed to minimize the impact.

With the Web interface, you can select multiple elements to disable and upgrade. However, with the CLI you can only select one element at a time. The primary SSC is upgraded separately from the other elements because the upgrade procedure includes a disable and a reboot. A reboot interrupts Web service and can interrupt other element upgrades.

The element upgrade trigger mechanism delivers appropriate parameters to the elements to perform the upgrade, including the following:

- software server address
- logon and password

- workfile path and file name

With this generic approach, you can access the software server (primary SSC) through its ELAN or TLAN interface, depending on the IP address specified. The path to a workfile is not fixed.

The trigger function returns as soon as an element is notified. Pacing of the downloads (to minimize network and server resource impact) is accomplished by notifying the elements serially: the next element is not notified until the current element has completed its workfile download.

The element retrieves and processes the workfile when triggered. Processing can include the following:

- unpacking the workfile
- making a backup copy of the original software
- programming flash memory
- copying disk files

The technician must refresh the software management web pages to view the element status, including the software version. You must reboot selected elements to use the new software when the upgrade process is complete.

LD 36 analog trunk card status

The STAT command in LD 36 provides status for all analog trunk cards within the system. The card number prints before the list of units.

Sample output of LD 36 with the STAT command:

```
CARD 1
UNIT 00 = DSBL (TRK)(TIE LDR IMM/IMM)
UNIT 01 = UNEQ
UNIT 02 = DSBL (TRK)(TIE LDR IMM/IMM)
UNIT 03 = UNEQ
UNIT 04 = UNEQ
UNIT 05 = DSBL (TRK)(DID LDR IMM/IMM)
UNIT 06 = UNEQ
UNIT 07 = DSBL (TRK)(TIE LDR IMM/IMM)
```

Media Card maintenance

Contents

This section contains the following topics:

- "Introduction" (page 153)
- "Faceplate maintenance display codes" (page 153)
- "Replacing a Media Card" (page 158)
- "Verify Media Card software and firmware" (page 158)
- "IP Line and IP Phone maintenance and diagnostics" (page 159)
- "IP line shell commands" (page 160)
- "Invoking alarm and log files" (page 161)
- "Media Card 32S and DSP daughterboard DSP tests" (page 161)

Introduction

This chapter provides information about the maintenance functions of the Media Card.

Check the Nortel web site for information about the latest software, firmware and application releases. See *IP Line Fundamentals (NN43100-500)* for verification steps.

Faceplate maintenance display codes

The Media Card maintenance display provides the diagnostic status of the card during power-up, its operational state when in service, and error information on the functional state of the card.

During power-up, the card performs multiple self-tests, including:

- internal RAM test
- ALU test
- address mode test
- Boot ROM test, timer test

- external RAM test

If any of these tests fail, the card enters a maintenance loop, and no further processing is possible. A failure message is printed on the display to indicate which test failed. For more information and a list of the maintenance display codes, see *IP Line Fundamentals (NN43100-500)*.

If the maintenance display shows a persistent T:20, indicating a software failure, and this occurs after the card is reset during a software download procedure, call the Nortel technical support for assistance in downloading new software onto the card.

If a test fails on the Media Card, F:XX appears on the Hex display for three seconds after the T:13 (Testing SEEPROM) message. For example, if the 8051 coprocessor test failed, F:05 is displayed on the Media Card faceplate. If more than one test fails, the message indicates the first failure.

[Table 36 "Media Card faceplate maintenance display codes" \(page 154\)](#) provides a list of related normal and fault display codes for the Media Card.

Table 36
Media Card faceplate maintenance display codes

Normal code	Corresponding Fault code	Message
T:00	F:00	Initialization
T:01	F:01	Testing Internal RAM
T:02	F:02	Testing ALU
T:03	F:03	Testing address modes
T:04	F:04	Testing watchdog
T:05	F:05	Testing 8051 coprocessor
T:06	F:06	Testing timers
T:07	F:07	Testing external RAM
T:08	F:08	Testing security device
T:09	F:09	Programming timeswitch FPGA
T:10	F:10	Programming ISPDI FPGA
T:11	F:11	Testing host dual port RAM
T:12	F:12	Testing DS-30 dual port RAM
T:13	F:13	Testing SEEPROM
T:14	F:14	Booting Host processor, waiting for response with self-test information
T:15	F:15	Not used at present

Normal code	Corresponding Fault code	Message
T:16	F:16	Not used at present
T:17	F:17	Not used at present
T:18	F:18	Not used at present
T:19	F:19	Not used at present
T:20	F:20	Waiting for application startup message from Host processor
T:21	F:21	CardLAN enabled, waiting for request configuration message
T:22	F:22	CardLAN operational, A07 enabled, display now under host control

If the IXP encounters any failures during its initialization, an H:XX error code is displayed. [Table 37 "List of error codes for the Media Card" \(page 155\)](#) shows the list of error codes:

Table 37
List of error codes for the Media Card

Code	Description
H:00	Host Processor not booting
H:01	SDRAM test failure
H:02	SRAM test failure
H:04	PC Card device failure
H:08	Network interface failure
H:10	CS 1000E interface failure
H:20	DSP interface failure
H:40	NVRAM/EEPROM interface failure
H:80	PCM connector failure

Media Card error messages

When an error or specific event occurs, SNMP sends an alarm trap to TM or any SNMP manager that is configured in the SNMP Manager's list in the ITG Card properties. It also puts the system error message into the error log file containing error messages.

View the error log in TM IP Line 3.0 application by clicking **Open Log File** on the **Maintenance** tab of **ITG Card Properties**. You can also view the log file in any text browser after uploading it to an FTP host using the LogFilePut command.

Error messages with a severity category of "Critical" are displayed on the maintenance faceplate in the form: "Gxxx" or "Sxxx", where xxx is the last three digits of the ITG or ITS message. [Table 38 "Critical ITG Error messages" \(page 156\)](#) lists the critical ITG messages and [Table 39 "Critical ITS Error messages" \(page 157\)](#) lists the critical ITS messages.

For a complete listing of other error messages, see *Software Input/Output Reference – System Messages (NN43001-712)*.

Table 38
Critical ITG Error messages

Maintenance Display	Corresponding Critical Error Message	Description
G000	ITG1000	Card (re)booted.
G001	ITG1001	Task spawn failure <name>.
G002	ITG1002	Memory allocation failure.
G003	ITG1003	File IO error <operation> <object> <errno> <errtext>.
G004	ITG1004	Network IO error <operation> <object> <errno> <errtext>.
G005	ITG1005	Message queue error <operation> <object> <errno> <errtext>.
G006	ITG1006	Unexpected state encountered <file> <line> <state>.
G007	ITG1007	Unexpected message type <file> <line> <msg>.
G008	ITG1008	Null pointer encountered <file> <line> Name of pointer.
G009	ITG1009	Invalid block <file> <line> Type of block.
G010	ITG1010	Unable to locate data block <file> <line> Type of block.
G011	ITG1011	File transfer error: <operation> <file> <host>.
G012	ITG1012	Module initialization failure: <moduleName>.
G013	ITG1013	Ethernet receiver buffer unavailable, packet(s) discarded.
G014	ITG1014	Ethernet carrier: <ifName> <state>.
G015	ITG1015	Ethernet device failure: <ifName>.
G016	ITG1016	Unused alarm value: 16.
G017	ITG1017	Invalid or unknown SSD message: <ssdType> <TN> <msg>.
G018	ITG1018	Unused alarm value: 18.
G019	ITG1019	DSP channel open failure <channel>.

Maintenance Display	Corresponding Critical Error Message	Description
G020	ITG1020	Configuration error <param> <value> <reason>.
G021	ITG1021	DSP successfully reset <dsp>.
G022	ITG1022	DSP channel not responding, channel disabled <channel>.
G023	ITG1023	DSP device failure: <dsp> <errnum> <errtext>.
G024	ITG1024	Unused alarm value: 24.
G025	ITG1025	DSP download: <dsp> <reason>.
G026	ITG1026	Unused alarm value: 26.
G027	ITG1027	DSP memory test: <dsp> <reason>.
G028	ITG1028	Voice packet loss: <channel> <%packetLoss> <direction> <dstAddr>.
G029	ITG1029	Error in DSP task <file> <line> <errno> <errtext>.
G030	ITG1030	Allocation failure in DSP memory pool.
G031	ITG1031	Invalid codec number: <codec>.
G032	ITG1032	Attempt to open a DSP that is already open: <channel>.
G033	ITG1033	Failed to send data to DSP channel: <channel>.
G034	ITG1034	DSP channel unexpectedly closed: <channel>.
G035	ITG1035	Encountered and unexpected open DSP channel, closed it: <channel>.
G036	ITG1036	Call Server communication link.
G037	ITG1037	Wrong image downloaded. Binary was created for <cardType> card.
G038	ITG1038	IPLlogin protection (login available/locked).
G039	ITG1038	Bad DSP channel <channel id>.
G040	ITG1040	Last reset reason for card: <reasonString> where the reason String can be: Reboot command issued; Watchdog Timer Expired; Manual reset; Internal XA problem; or Unknown.

Table 39
Critical ITS Error messages

Maintenance Display	Corresponding Critical Error Message	Description
S000	ITS1000	VTI function call timeout.
S001	ITS1001	User terminal registration failed. <ip> <hwid> <errno> <errtext>.

Maintenance Display	Corresponding Critical Error Message	Description
S002	ITS1002	Connect service activation error <reason>.
S003	ITS1003	Duplicate master <node> <ip1> <ip2>.
S004	ITS1004	Invalid node ID <ip> <hwid>.
S005	ITS1005	Corrupted node ID/TN field <ip> <hwid>.
S006	ITS1006	Received corrupted UNISlim message <message dump>.
S007	ITS1007	Received unknown UNISlim message <message dump>.
S008	ITS1008	Terminal connection status: <ip> <status>.
S009	ITS1009	Call Server communication link:<state>.
S010	ITS1010	Terminal doesn't support Codec:<ip><codec>.
S011	ITS1011	<IP Address>: Last reset reason for phone: <reasonID> (<reasonString>).

Replacing a Media Card

Replace the Media Card when the following conditions occur:

- After a reboot, the Media Card displays a fault code of the form F:xx on the faceplate LED display and the card cannot register with the CS 1000E. This indicates an unrecoverable hardware failure. If the Media Card displays the F:08 code, this can merely indicate that the Security Device is missing from the card.
- The management Ethernet interface or the voice Ethernet interface on the Media Card fails. The failure is originating in the Media Card if its associated hub port and TLAN network interface cable are operational. The failure can be indicated as follows:
 - No link pulse on the Media Card voice IP interface status LED and on the associated hub.
 - The maintenance terminal continuously prints **InIsa0 Carrier Failure** messages.
- A voice channel on the Media Card has a consistent voice quality fault, such as persistent noise or lack of voice path, even after resetting the card and retransmitting the card properties.

To replace a Media Card, see *IP Line Fundamentals (NN43100-500)*.

Verify Media Card software and firmware

To verify the Media Card software and firmware, see *IP Line Fundamentals (NN43100-500)*.

IP Line and IP Phone maintenance and diagnostics

For Nortel IP Phones, there are two kinds of Terminal Numbers (TNs) to consider:

- A physical TN, which represents a physical unit of the Media Card.
- A virtual TN, which is configured on a virtual superloop and represents an IP Phone.

The physical TNs are seen as trunk units and are managed using existing LD 32 commands. These commands do not apply to virtual TNs. Use Element Manager for virtual TN maintenance. See *Element Manager System Reference – Administration (NN43001-632)* for details.

LD 32 supports STAT, DISU, ENLU, and IDU commands on an IP Phone virtual TN. All other commands generate an NPR047 message.

The IDU command provides the usual information, such as:

- TN
- TNID
- NT code
- color code
- release code
- serial number
- IP address of the IP Phone
- IP address of the Media Card that acts as the terminal proxy

The serial number is the last three bytes of the IP Phone's MAC address, printed in ASCII hex format.

Because the system must obtain the requested information from the IP Phone, IDU is effectively a "ping" command. Consequently, it can be used to test the end-to-end IP connectivity of the IP Phone.

If the IP Phone is not registered with the CS 1000E, an NPR0048 message is generated. If the IP Phone is registered but idle, the system prints the IP Phone IP address and Media Card IP address and generates an NPR0053 message.

For additional information on the output format of the IDU command in LD 32 and the maintenance commands in LD 32 for the IP Phone, see *IP Line Fundamentals (NN43100-500)*.

Lamp Audit

The Lamp Audit function provides a continuous source of heartbeat messages to ensure the IP Phone is powered and the IP connection is active. Because there is a reliable UDP connection from the Call Server to the IP Phones, any failure in the IP Phones, the Voice Gateway Media Card, or the IP connections is detected. In addition to Lamp Audit, Network Signaling Diagnostics can be run as part of the midnight routines:

- When the Voice Gateway Media Card detects the IP Phone is disconnected, the card logs the event and sends an unregistered message to the Call Server for that telephone.
- When the Call Server detects a loss of connection with the Voice Gateway Media Card, it logs a message and unregisters all of the telephones and gateway channels associated with that card.

IP line shell commands

The IP Line shell commands are designed to supplement overlay commands and to manage features specific to the IP Line platform.

The IP Line shell commands are accessed by connecting a TTY to the MAINT port on the Media Card faceplate. Alternatively, the TM ITG "Telnet" command can be used to access the IP Line shell.

Commands are grouped into six categories:

- General purpose commands
- File transfer commands
- IP configuration commands
- Reset commands
- DSP commands

To view a list of the ITG shell commands applicable to the Media Card see *IP Line Fundamentals (NN43100-500)*.

Warm rebooting the Media Card

To warm reboot an out-of-service Media Card, use the following IP Line shell command:

```
cardReset
```

Media Card DSP tests

At the IP Line shell, you can perform the following DSP tests:

- To run a self-test on the DSP daughterboard, type `DSPselfTest`
If the self-test fails, replace the Media Card.
- To run or stop a PCM loopback test, type

`DSPPcmLpbkTestOn` or `DSPPcmLpbkTestOff`

- To run or stop a Send loopback test, type:
`DSPSndLpbkTestOn` or `DSPSndLpbkTestOff`
- To run or stop a Receive loopback test, type
`DSPRcvLpbkTestOn` or `DSPRcvLpbkTestOff`

Invoking alarm and log files

Alarm and log file output is turned on using the IP Line shell. The following commands are entered at the IP Line shell prompt:

- To turn on/off the error log file, type: `logFileOn` or `logFileOff`.
- To display the modes of all log files/alarms, type: `logFileShow`.

Media Card 32S and DSP daughterboard DSP tests

Media Card 32S and DSP daughterboards have new commands that can be accessed with the OAM and PDT2 shells.

At the OAM shell, you can perform the following DSP tests:

- To run a basic hardware DSP self-test, type
`dsphwcheck`
If the self-test fails, reseal or replace the Media Card or DSP daughterboard.
- To run a DSP loopback test, type
`dsplooptest [channel1 channel2]`
- To list the state of each channel on the DSP, type
`dspchanstateshow`
- To display the number of channels for each DSP, type
`dspnumshow`

At the PDT2 shell, you can perform the following PCM tests

- To start a PCM capture for a specific channel, streaming the output to the supplied destination IP address, type
`pcmcapturestart [channel IP address]`
- To stop a PCM capture, type
`pcmcapturestop`

Proactive Voice Quality Management

Contents

This section contains the following topics:

- "Introduction" (page 163)
- "How voice quality monitoring works" (page 164)
- "Feature packaging" (page 167)
- "Supported system types" (page 167)
- "Feature implementation" (page 167)
- "LD 117 Print zone QoS IP statistics" (page 167)
- "LD 117 Configure voice-quality metric thresholds" (page 168)
- "LD 117 Print voice-quality metric thresholds" (page 169)
- "LD 117 Configure voice-quality sampling (polling)" (page 169)
- "LD 117 Configure zone alarm-notification levels" (page 169)
- "LD 117 Print zone alarm-notification levels" (page 171)
- "Diagnosing and isolating voice-quality problems" (page 171)
- "SNMP interface" (page 172)
- "Heterogeneous environments" (page 172)

Introduction

CS 1000 and Meridian 1 systems, that are equipped with Voice Gateway Media Cards running IP Line 4.0 or later, support Proactive Voice Quality Management (PVQM). PVQM includes the following capabilities:

- Monitoring of voice quality metrics (latency, jitter, packet loss, and R-Value) for IP Phones and gateway endpoints.
R-Value monitoring is available on Phase 2 IP Phones only.
- Two levels of voice quality alarms (Warning and Unacceptable).
Alarm thresholds, configured in LD 117, are used to classify system performance as good, poor, and unacceptable.

This is available on Phase 2 IP Phones only.

- SNMP alarm generation when voice quality metric thresholds are violated based on a call or bandwidth zone.
- Controlling the number of voice-quality-related SNMP alarms. This is performed zone-by-zone by configuring zone alarm notification in LD 117. Alarm control assists in isolating voice quality problems and reducing network traffic.
- Recording of voice quality metric threshold violations, accessible in IP Phone Zone Traffic Report 16 (LD 2) and SNMP MIB. IP Phone Zone Traffic Report 16 (TFS016) includes peg counts for both alarm levels (Warning and Unacceptable) when recording threshold violations for latency, jitter, and packet loss. R-Value is limited to one peg count: Unacceptable.
- R-Value information, available in Operational Measurement (OM) reports. OM reports contain hourly summary of voice quality metrics and endpoint registration activity.
- Network diagnostic utilities to identify, isolate, and report network problems affecting voice quality. The diagnostic utilities are available by using the Command Line Interface (CLI) or IP Phones with Phase 2 software.

Network diagnostic utilities includes the following:

- Ping
- Traceroute
- Ethernet statistics
- IP Network statistics
- UNISlim/Reliable User Data Protocol (RUDP) statistics
- Real-Time Control Protocol (RTCP) statistics
- Dynamic Host Control Protocol (DHCP) data

How voice quality monitoring works

PVQM monitors voice quality by polling IP endpoints during and at the end of a call to sample the following voice-quality metrics:

- **Latency** - length of time, in seconds, for information to travel through the network
- **Jitter** - the variability in latency, in seconds
- **Packet Loss** - number of packets lost during transmission, in percentage
- **R-Value** - measurement of listening R-Value using ITU E-Model. R-Value maps to Mean Opinion Score (MOS).

The sampled metrics are compared to user-configured thresholds to determine system performance. When sampled metrics exceed configured thresholds, the system generates statistics.

For details about configuring metric thresholds, see "[LD 117 Configure voice-quality metric thresholds](#)" (page 168).

The Signaling Server or Voice Gateway Media Card collect statistics for each metric to create a Quality Detail Report (QDR). The QDR summarizes metric threshold violations into one of the following categories:

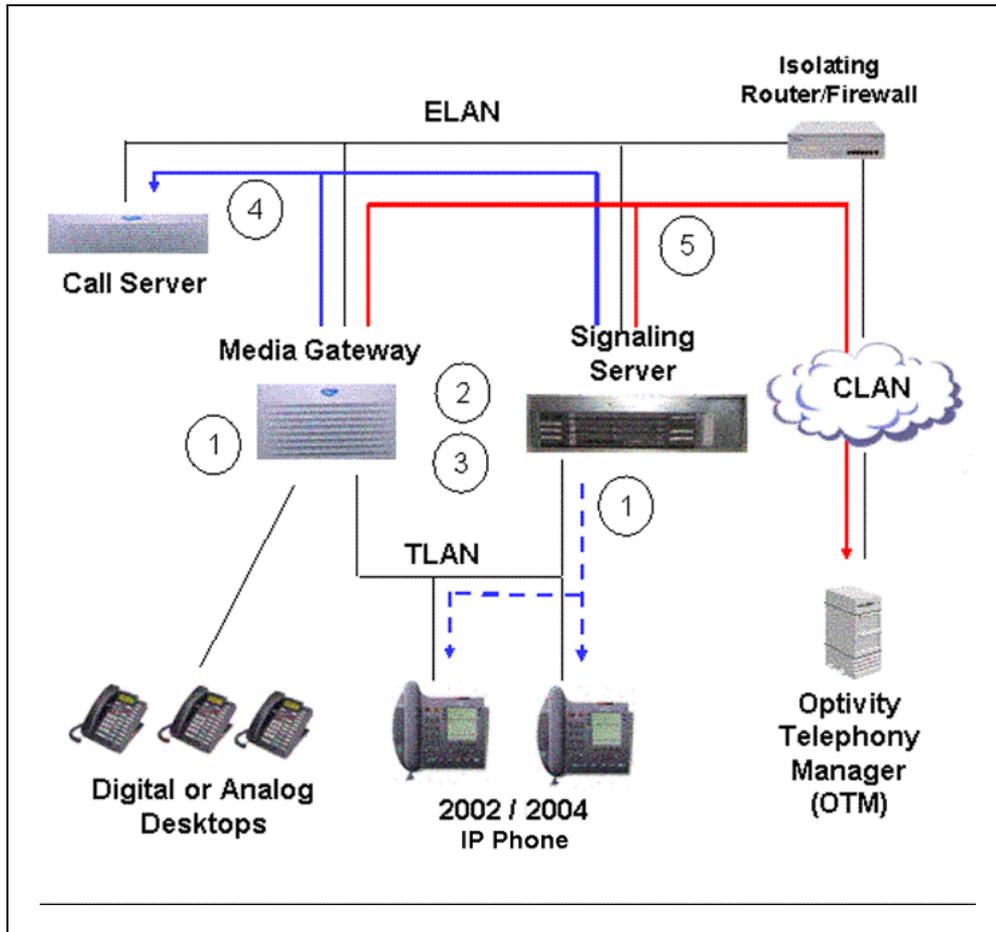
- Warning
- Unacceptable

Each summarized QDR record is added to the IP Phone Zone Traffic Report 16 (TFS016). The TFS016 report summarizes by zone the voice quality over the reporting period to allow the administrator to view the overall voice quality. For more information about TFS016, see *Traffic Measurement: Formats and Outputs Reference (NN43001-750)*.

An SNMP alarm is generated when a voice quality metric threshold exceeds Warning or Unacceptable status. For details about controlling the number of SNMP alarms generated, see "[LD 117 Configure zone alarm-notification levels](#)" (page 169).

[Figure 23 "Voice quality monitoring flow diagram"](#) (page 166) illustrates PVQM within the Voice over IP (VoIP) system.

Figure 23
Voice quality monitoring flow diagram



Legend

1. IP Phones and endpoints are polled during a call and at the end of a call to extract voice-quality statistics.
2. Statistics for each metric are collected on the Signaling Server or Voice Gateway Media Card.
3. Voice-quality statistics are compared to threshold settings and a QDR is created.
4. The QDR is forwarded to the Call Server for reporting purposes.
5. An SNMP alarm is generated when a voice-quality metric exceeds the Warning or Unacceptable threshold.

Feature packaging

To monitor the R-Value audio-quality metric, the Proactive Voice Quality Management (PVQM) package 401 is required. Monitoring of all other voice-quality metrics is available with base CS 1000 Release 5.0 software.

Supported system types

CS 1000 and Meridian 1 systems, that are equipped with Voice Gateway Media Cards running IP Line 4.0, support PVQM.

Feature implementation

To implement this feature, you must install the PVQM_401 software package.

Task summary list

Following is a summary of tasks in this section:

- "LD 117 Print zone QoS IP statistics" (page 167)
- "LD 117 Configure voice-quality metric thresholds" (page 168)
- "LD 117 Print voice-quality metric thresholds" (page 169)
- "LD 117 Configure voice-quality sampling (polling)" (page 169)
- "LD 117 Configure zone alarm-notification levels" (page 169)
- "LD 117 Print zone alarm-notification levels" (page 171)

LD 117 Print zone QoS IP statistics

Display QoS IP statistics for zones, ordered by attribute or by zone, in LD 117. Traffic Report 16 contains similar information and a list of attributes. For more details about traffic reports, see *Traffic Measurement: Formats and Outputs Reference (NN43001-750)*.

Table 40
LD 117 Print zone QoS IP statistics

Command	Description
AQOS <attribute> <zone>	Print QoS IP statistics by attribute for a specific zone.
AQOS <attribute> ALL	Print QoS IP statistics by attribute for all zones.
ZQOS <zone> <attribute>	Print QoS IP statistics by zone for a specific attribute.
ZQOS <zone> ALL	Print QoS IP statistics by zone for all attributes.

LD 117 Configure voice-quality metric thresholds

To configure voice-quality metric thresholds based on a call or zone in LD 117, see [Table 41 "LD 117 Configure voice-quality metric thresholds" \(page 168\)](#).

Table 41
LD 117 Configure voice-quality metric thresholds

Command	Description
CHG CQWTH <WarnJitter><WarnLatency><WarnPacketLoss><WarnRFactor>	<p>Change voice-quality Warning thresholds on a per-call basis</p> <p>Where:</p> <p><WarnJitter> = 5-(20)-200 msec</p> <p><WarnLatency> = 5-(40)-100 msec</p> <p><WarnPacketLoss> = 5-(20)-100 in units [1/10 of a percent]</p> <p>For example, 10 means 1%</p> <p><WarnRFactor> = 20-(65)-94</p>
CHG CQUTH <UnacpJitter><UnacpLatency><UnacpPacketLoss><UnacpRFactor>	<p>Change voice-quality Unacceptable thresholds on a per-call basis</p> <p>Where:</p> <p><UnacpJitter> = 5-(40)-500 msec</p> <p><UnacpLatency> = 5-(100)-500 msec</p> <p><UnacpPacketLoss> = 5-(70)-250 in units [1/10 of a percent]</p> <p>For example, 10 means 1%</p> <p><UnacpRFactor> = 20-(60)-94</p>
CHG ZQWTH <WarnJitter><WarnLatency><WarnPacketLoss><WarnRFactor>	<p>Change voice-quality Warning thresholds on a zone basis</p> <p>Where:</p> <p><WarnJitter> = 0-(20)-100%</p> <p><WarnLatency> = 0-(20)-100%</p> <p><WarnPacketLoss> = 0-(20)-100%</p> <p><WarnRFactor> = 0-(20)-100%</p>
CHG ZQUTH <UnacpJitter><UnacpLatency><UnacpPacketLoss><UnacpRFactor>	<p>Change voice-quality Unacceptable thresholds on a zone basis</p> <p>Where:</p> <p><UnacpJitter> = 0-(2)-100%</p> <p><UnacpLatency> = 0-(2)-100%</p> <p><UnacpPacketLoss> = 0-(2)-100%</p> <p><UnacpRFactor> = 0-(2)-100%</p>

To configure voice-quality metric thresholds using Element Manager, select **IP Network > QoS Thresholds** from the System menu of the Element Manager navigator bar.

ATTENTION

Changes to threshold values do not propagate to the Signaling Server or the Voice Gateway Media Card until you perform a datadump.

LD 117 Print voice-quality metric thresholds

Table 42

LD 117 Print voice-quality metric thresholds

Command	Description
PRT QSTHS	Print all voice-quality thresholds

LD 117 Configure voice-quality sampling (polling)

To configure the sampling (polling) period, zone alarm-rate collection window, and the minimum number of samples to collect during the window, see [Table 43 "LD 117 Configure voice-quality sampling \(polling\)" \(page 169\)](#).

To configure voice-quality sampling using Element Manager, select **IP Network > QoS Thresholds** from the System menu of the Element Manager navigator bar.

Table 43

LD 117 Configure voice-quality sampling (polling)

Command	Description
CHG SQOS <SamplePeriod><SampleRateWindow><MinSampleCnt>	Change voice-quality sampling parameters Where: <SamplePeriod> = 5-(30)-60 <SampleRateWindow> = 60-(300)-3600 seconds <MinSampleCnt> = 50-(100)-1000

LD 117 Configure zone alarm-notification levels

Systems that process a large number of calls potentially generate a significant number of SNMP alarms. Controlling the number of alarms by configuring zone alarm-notification levels helps isolate voice-quality problems and reduce network traffic.

Voice-quality threshold alarms are examined for their severity relative to the alarm-notification level settings. If the voice-quality threshold alarm severity exceeds the configured notification level, it generates an SNMP alarm. Otherwise it is suppressed.

You can configure Voice-quality threshold alarm-notification levels by zone so that some bandwidth zones can be monitored for all alarms and other zones report only serious voice-quality problems. Alarm-notification levels are defined in [Table 44 "Voice-quality threshold alarm-notification levels" \(page 170\)](#).

Table 44
Voice-quality threshold alarm-notification levels

Level	Description	Alarms
0	All voice-quality alarms are suppressed	None
1	Allow zone-based Unacceptable alarms	QOS0017 QOS0018 QOS0019 QOS0020 QOS0021
2	Allow all of the preceding plus zone-based Warning alarms	All preceding plus QOS0012 QOS0013 QOS0014 QOS0015 QOS0016
3	Allow all preceding plus per-call Unacceptable alarms	All preceding plus QOS0007 QOS0008 QOS0009 QOS0010 QOS0011 QOS0021 QOS0032 QOS0033 QOS0036 QOS0037
4	Allow all preceding plus per-call Warning alarms	All preceding plus QOS0001 QOS0002 QOS0003 QOS0005 QOS0006 QOS0018 QOS0019 QOS0022 QOS0023 QOS0024 QOS0025 QOS0026 QOS0027

To control the number of alarms generated by the system, see [Table 45 "LD 117 Configure zone alarm-notification levels"](#) (page 171).

To configure zone alarm-notification levels using Element Manager, select **IP Network > QoS Thresholds** from the System menu of the Element Manager navigator bar.

Table 45
LD 117 Configure zone alarm-notification levels

Command	Description
CHG ZQNL <ZoneNumber> <level>	Change the notification level for the specified zone Where: <ZoneNumber> = 0-255 <level> = 0-(2)-4

LD 117 Print zone alarm-notification levels

Table 46
LD 117 Print zone alarm-notification levels

Command	Description
PRT ZQNL <ZoneNumber>	Print the notification level for the specified zone Where: <ZoneNumber> = 0-255

Diagnosing and isolating voice-quality problems

To isolate voice-quality problems, access network diagnostic utilities on an IP Phone. You can run directly the utilities from the IP Phone itself or remotely through a CLI. Diagnostic utilities include the following:

- **Ping and Traceroute**
Run the Ping or Traceroute command from a specific endpoint with any destination, typically another endpoint or Signaling Server.
- **IP Networking statistics**
View information on the packets sent, packets received, broadcast packets received, multicast packets received, incoming packets discarded, and outgoing packets discarded.
- **Ethernet statistics**
For an IP Phone on a particular endpoint, view Ethernet statistics, such as number of collisions, VLAN ID, speed, and duplex. The exact statistics depend on what is available from the IP Phone for the specific endpoint.

- **UNISTIM/RUDP statistics**
View RUDP statistics for IP Phones, such as number of messages sent or received, retries, resets, and uptime.
- **Real time Transport Protocol statistics**
While a call is in progress, view RTP/RTCP QoS metrics, such as packet loss and jitter.
- **DHCP**
View DHCP settings, such as IP address; and S1, S2, and S4 addresses for each IP Phone.

For detailed information about network diagnostic utilities, see *IP Phones Fundamentals (NN43001-368)*.

SNMP interface

Simple Network Management Protocol (SNMP) interfaces with the traffic-reporting system so that Telephony Manager (TM), or any third-party system, can have a simple, standards-based interface into the system traffic reports.

For details about the SNMP interface, see *Communication Server 1000 Fault Management – SNMP (NN43001-719)*.

Heterogeneous environments

In a heterogeneous environment, with a mixture of Nortel equipment and third-party equipment, voice-quality monitoring, detection, and alarming are performed only on IP endpoints that have voice-quality monitoring capabilities.

For information about IP endpoints and their voice-quality capabilities in the system, see [Table 47 "IP endpoint and voice-quality capabilities" \(page 172\)](#).

Table 47
IP endpoint and voice-quality capabilities

Endpoint type	Voice-quality monitoring operation
Phase 0 and Phase I IP Phones	Detect jitter, packet loss, and latency (when the far end is RTCP-compliant) threshold violations. Polling detects threshold violations. .
Phase 2 IP Phones without PVQM package	Detect jitter, packet loss, and latency (when the far end is RTCP-compliant) threshold violations. The IP Phone asynchronously detects threshold violations.

Endpoint type	Voice-quality monitoring operation
Phase 2 IP Phones with PVQM package	Detect jitter, packet loss, and latency (when the far end is RTCP-compliant) and R-Value threshold violations. Threshold violations are detected asynchronously by the IP Phone.
IP Softphone 2050	Detect jitter, packet loss, and latency (when the far end is RTCP-compliant) threshold violations. Polling detects threshold violations.
CS 1000 and Meridian 1 systems with Voice Gateway Media Cards running IP Line 4.0	Detect jitter and packet loss threshold violations. Polling detects threshold violations.
Third-party Media Gateway	Not supported.

pbxLink connection

Contents

This section contains the following topics:

- "Introduction" (page 175)
- "pbxLink connection failure detection" (page 175)
- "LD 117 STAT SERV enhancement" (page 177)

Introduction

pbxLink Connection Failure Detection and status reporting provide the following functionality:

- The pbxLink Connection Failure Detection feature provides a way to detect the link status of Signaling Servers and Voice Gateway Media Cards. An alarm is generated if the pbxLink is not detected after a warm or cold start of the Call Server.
- The STAT SERV command in LD 117 displays the link status of the Signaling Server and Voice Gateway Media Cards that are configured to connect to the system. The display also provides information about the applications that run on the Signaling Server and Voice Gateway Media Cards.

pbxLink connection failure detection

The Call Server, which maintains a list of all known registered elements (Signaling Servers and Voice Gateway Media Cards), monitors the pbxLink. When booted, a Call Server has a 5-minute delay to enable these known elements to reestablish contact with the Call Server.

If a known element fails to register with the Call Server, an ELAN0028 alarm is generated.

If an unknown Signaling Server or Voice Gateway Media Card registers with the Call Server, an ELAN0029 alarm is generated.

Displaying pbxLink information Element Manager (EM)

To display pbxLink information in Element Manager, use the `pbxLinkShow` command, as shown in Figure 24 "Displaying pbxLink information in Element Manager" (page 176).

To access the `pbxLinkShow` command in EM, follow the steps in Procedure 45 "Displaying pbxLink information in Element Manager" (page 176).

Figure 24
Displaying pbxLink information in Element Manager

Managing: 192.167.104.53
System » IP Network » Node Maintenance and Reports » General Commands

General Commands

Element IP : 192.167.104.54 Element Type : Signaling Server-CPPM

Group: pbxLink Command: pbxLinkShow RUN

IP address: 192.167.104.53 Number of Pings: 3 PING

Click a button to invoke a command.

Procedure 45 Displaying pbxLink information in Element Manager

Step	Action
------	--------

- 1 In the EM navigator System menu, select **IP Network > Node Maintenance and Reports** .
The **Node Maintenance and Reports** page appears.
- 2 Click **GEN CMD** to the right of the Call Server information line.
- 3 Select **pbxLink** from the **Group** list.
- 4 Select **pbxLinkShow** from the **Command** list.
- 5 Click **Run**.

—End—

CLI

To display the pbxLink information for a Meridian 1 or CS 1000 system, use the LD 117 STAT SERV command at the Command Line Interface (CLI) of the Call Server.

LD 117 STAT SERV enhancement

To display link-status information for Voice Gateway Media Cards that are registered to a Call Server you can use the suite of Statistic Services (STAT SERV) commands.

STAT SERV provides consolidated link-status information by application type, IP address, host name, and IP Telephony Node ID.

STAT SERV status information includes the following:

- node ID
- host name
- ELAN IP address
- element role
- platform type
- connection ID
- enabled applications
- registered and unregistered endpoints, such as IP Phones and Voice Gateway Media Cards
- information about the pbxLink and enabled applications
- the Signaling Server resource count

pbxLink information

The STAT SERV command provides the following pbxLink information:

- the time the pbxLink was last established
- the time the pbxLink was lost, if previously established
- the time the pbxLink last attempted to establish a connection, if the pbxLink failed to establish
- the Signaling Server resource count, which helps to determine the number of virtual trunks that you can configure.

Application information

If an active link to an element is established, the Call Server obtains information about the applications that run on the element.

Table 48 "Queried information in STAT SERV" (page 178) lists the applications and describes the information provided by those applications.

Table 48
Queried information in STAT SERV

Application/element	Information provided
LTPS application	number of registered IP Phones number of busy IP Phones
VTRK application	number of registered VTRKs number of busy VTRKs
Voice Gateway Media Cards	number of registered Voice Gateway Media Cards number of busy Voice Gateway Media Cards
Signaling Servers and Voice Gateway Media Cards	time that the element established a link with the Call Server elements that failed to register or lost a link

Figure 25 "Sample LD 117 STAT SERV output" (page 179) shows an example of LD 117 STAT SERV output.

Figure 25
Sample LD 117 STAT SERV output

Commands										
STAT SERV	IP	xx.xx.xx.xx								
		xx.xx.xx								
		xx.xx								
		xx								
	TYPE	SRV								
	APP	APPS								
	NAME	HOSTNAME								
	NODE	NODE_ID								
Response										
NODE ID	HOSTNAME	ELANIP	LDR	SRV	APPS	PBXLINK STATE	PBXLINK DATE	PBXLINK TIME	CONNECTID	
909	vxTarget	47.11.216.126	YES	SMC	LTPS	LINK UP	5/06/2003	22:51:06	0x200a2128	
999	IPService	47.11.216.141	N/A	SS	LTPS VTRK	LINK UP	5/06/2003	22:51:06	0x200a2128	
999	IPService	47.11.216.141	YES	SS	LTPS VTRK	LINK UP	5/06/2003	22:51:06	0x200a2128	
999	vxTarget	47.11.216.143	NO	ITGP	LTPS	INV CONN	5/06/2003	23:18:08	0x0	
999	vxTarget	47.11.216.144	NO	ITGP	LTPS	FAILED	5/06/2003	22:51:06	0x0	

Table 49 "STAT SERV response fields and description" (page 179) lists field descriptions in the STAT SERV response.

Table 49
STAT SERV response fields and description

STAT SERV response field	Description
NODE ID	The related node. Value is a number from 0 – 9999.
HOSTNAME	The alias that the system assigned to the host. Value is a string.
ELANIP	The element IP connection to the Call Server. Value is an IP address.

STAT SERV response field	Description
LDR	Specifies if the element is the Leader for the related node. Value is YES or NO.
SRV	The element type. Values are <ul style="list-style-type: none"> • SMC – Media Card 32-port card • ITGP – ITG-P 24-port card • SS – Signaling Server
APPS	The application running on the element. Values are <ul style="list-style-type: none"> • LTPS • VTRK
PBXLINK STATE	The element current pbxLink state. Values are <ul style="list-style-type: none"> • LINK UP • LOST • FAILED • INV CONN (element is connected, but its configuration was not found on the Call Server, which indicates that this element might be connected to the wrong Call Server)
PBXLINK DATE/TIME	When the element pbxLink state last changed.
CONNECTED	The element connection ID.
Sets	Values are <ul style="list-style-type: none"> • reg – the number of IP Phones registered to the element • busy – the number of IP Phones that are currently busy
VGWs	Values are <ul style="list-style-type: none"> • reg – the number of voice gateways (DSP resources) are configured on the element • busy – the number of voice gateways (DSP resources) are active/busy on the element
VTRK	Values are <ul style="list-style-type: none"> • reg – the number of VTRK channels are configured on the element • busy – the number of VTRK channels are active/busy on the element
SSRC	Signaling Server capacity

Technical Assistance service

Contents

This section contains information on the following topics:

- "Nortel Technical Assistance Centers" (page 181)
- "Services available" (page 183)
- "Requesting assistance" (page 185)

Nortel Technical Assistance Centers

To help customers obtain maximum benefit, reliability, and satisfaction from their CS 1000E systems, Nortel provides technical assistance in resolving system problems. [Table 50 "Customer Technical Services \(CTS\)" \(page 181\)](#) lists the centers that provide this service.

Table 50
Customer Technical Services (CTS)

Location	Contact
Nortel Global Enterprise Technical Support (GETS) PO Box 833858 2370 Performance Drive Richardson, TX 75083 USA	North America Telephone: 1 800 4NORTEL
Nortel Corp. P.O. Box 4000 250 Sydney Street Belleville, Ontario K8N 5B7 Canada	North America Telephone: 1 800 4NORTEL
Nortel Service Center - EMEA	EMEA Telephone: 00 800 8008 9009 or +44 (0)870 907 9009 E-mail: emeahelp@nortel.com

Location	Contact
Nortel 1500 Concord Terrace Sunrise, Florida 33323 USA	Brazil Telephone: 5519 3705 7600 E-mail: entcts@nortel.com English Caribbean Telephone: 1 800 4NORTEL Spanish Caribbean Telephone: 1 954 858 7777 Latin America Telephone: 5255 5480 2170
Network Technical Support (NTS)	Asia Pacific Telephone: +61 28 870 8800 Australia Telephone: 1800NORTEL (1800 667835) or +61 2 8870 8800 E-mail: asia_support@nortel.com People's Republic of China Telephone: 800 810 5000 E-mail: chinatsc@nortel.com Japan Telephone: 010 6510 7770 E-mail: supportj@nortel.com Hong Kong Telephone: 800 96 4199 E-mail: chinatsc@nortel.com Taiwan Telephone: 0800 810 500 E-mail: chinatsc@nortel.com Indonesia Telephone: 0018 036 1004 Malaysia Telephone: 1 800 805 380 New Zealand Telephone: 0 800 449 716 Philippines Telephone: 1 800 1611 0063 or 632 917 4420 Singapore Telephone: 800 616 2004 South Korea Telephone: 0079 8611 2001

Location	Contact
	Thailand: Telephone: 001 800 611 3007

Services available

Services available through the Technical Assistance Centers include:

- diagnosing and resolving software problems not covered by support documentation
- diagnosing and resolving hardware problems not covered by support documentation
- assisting in diagnosing and resolving problems caused by local conditions

There are several classes of service available. Emergency requests (Class E1 and E2) receive an immediate response. Service for emergency requests is continuous until normal system operation is restored. Non-emergency requests (Class S1, S2, and NS) are serviced during normal working hours. [Table 51 "Technical service emergency classifications" \(page 183\)](#) and [Table 52 "Technical services non-emergency classifications" \(page 184\)](#) describe the service classifications.

Table 51
Technical service emergency classifications

Class	Degree of failure	Symptoms
E1	Major failure causing system degradation or outage	System out-of-service with complete loss of call-processing capability. Loss of total attendant console capability. Loss of incoming or outgoing call capability. Loss of auxiliary Call Detail Reporting (CDR) in resale application. Call processing degraded for reasons such as trunk group out-of-service: <ul style="list-style-type: none"> • 10% or more lines out-of-service • frequent initializations (seven per day or more) • inability to recover from initialization or SYSLOAD

Class	Degree of failure	Symptoms
		<ul style="list-style-type: none"> consistently slow dial tone (eight seconds or more delay)
E2	Major failure causing potential system degradation or outage	Standby CPU out-of-service. Frequent initializations (one per day or more). Disk drive failure. Two sets of disks inoperative.

Table 52
Technical services non-emergency classifications

Class	Degree of failure	Symptoms
S1	Failure that affects service	Software or hardware trouble directly and continuously affecting user's service or customer's ability to collect revenue. Problem that seriously affects service at in-service or cut-over date.
S2	Intermittent failure that affects service	Software or hardware faults that intermittently affect service. System-related documentation errors that directly result in or lead to impaired service.
NS	Failure that does not affect service	Documentation errors. Software inconsistencies that do not affect service. Hardware diagnostic failures (not previously defined) that cannot be corrected by resident skills. Test equipment failures for which a backup or manual alternative can be used. Any questions concerning products.

Except as excluded by the provisions of warranty or other agreements with Nortel, a fee for technical assistance may be charged, at rates established by Nortel. Information on rates and conditions for services are available through Nortel sales representatives.

Requesting assistance

Collect the information listed in [Table 53 "Checklist for service requests"](#) (page 185) before you call for service.

Table 53
Checklist for service requests

Name of person requesting service	_____
Company represented	_____
Telephone number	_____
System number/identification	_____
Installed software generic and issue (located on data disk)	_____
Modem telephone number and password (if applicable)	_____
Seriousness of request (see Table 51 "Technical service emergency classifications" (page 183) and Table 52 "Technical services non-emergency classifications" (page 184))	_____
Description of assistance required	_____

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Nortel Communication Server 1000

Communication Server 1000E Maintenance

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