297-5231-032

DMS-100 Family

Centrex IP

i2004 Operations and Maintenance Manual

CIPL0001   Standard   01.01   July 2000

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DMS-100 Family

Centrex IP

i2004 Operations and Maintenance Manual

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Use only with Nortel Networks recommended, approved Limited Power Source; output rated; 16 VAC,500 mA, 50/60 Hz.

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Publication history

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Standard 01.01. CIPL0001. Initial release of document.

Contents

About this document

When to use this document

This document provides basic operations, maintenance, installation, and configuration information on the i2004 Internet Telephone in a Centrex IP network. This document supports NA100 and Meridian SL-100 offices that use Centrex IP Release 2.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the next software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the same software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

References

The following documents provide additional information on the i2004 Internet Telephone:

- *Centrex IP Service Implementation Guide*, 297-5231-021

- *The i2004 Internet Telephone - Getting Started*, P0906640

- *The i2004 Internet Telephone - Quick Reference Configuration Guide*, P0906641

- *The i2004 Internet Telephone User Guide*, NTC51.00.04.10

What precautionary messages mean

Nortel Networks documents use the following types of precautionary messages:

- attention
- danger
- warning
- caution

Attention

An attention message identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. An example of an attention message follows.

> **ATTENTION**
> The i2004 Internet Telephone performs best on a switched Ethernet network. If you install the telephone on a shared Ethernet network, the telephone may not perform at optimal levels.

Danger

A danger message identifies a possible risk of personal injury. An example of a danger message follows:

> **DANGER**
> **Risk of electrocution**
> Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

Warning

A warning message identifies a possible risk of equipment damage. An example of a warning message follows:

> **WARNING**
> **Possible damage to telephone**
> Do not plug the i2004 Internet Telephone into an ISDN connection. The IDSN connection can damage the telephone.

Caution

A caution message identifies a possible risk of service interruption or degradation. An example of a caution message follows:

> **CAUTION**
> **Loss of service**
> When you restart the TPS, all i2004 Internet Telephones that use the TPS will loose service.
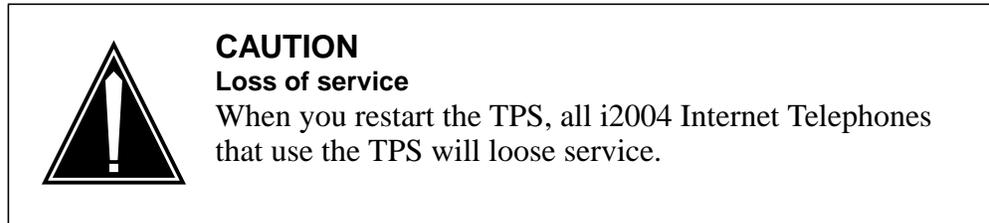
How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Commands

Commands are shown with symbols and **bold** type. An input prompt (>) identifies a command that you enter at a prompt. Bold type identifies an action button, a field name, or a specific value. An arrow (->) identifies a menu command.

>quit

At the **SET IP** prompt, enter the IP address.

Enter **Y** in each field and press the **OK** softkey.

From the Taskbar, select **Start->Settings->Control Panel**.

Parameters

Fixed parameters are shown without brackets. Variables are shown with brackets.

>ping <tps_ip>

Responses

Responses are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.

Logon complete

Server Unreachable
```

How measurements are described

The following table lists measurement abbreviations used in this document.

Table 1

Abbreviation	Description
o	degree
%	percent
C	centigrade
cm	centimeter
g	gram
g/m^3	gram per cubic metre
Hz	hertz
in	inch
kg	kilogram
kHz	kilohertz
lb.	pound
m	metre
m^2/s^3	square meter per second cubed
mA	milliampere
mg	milligram
mg/m^2	milligram per square metre
mg/m^3	milligram per cubic metre
mm	milimetre
ms	millisecond
m/s^2	metre per second squared
V	volt

1 Introduction

This chapter describes the i2004 Internet Telephone and how the telephone operates as a client in the Centrex IP network.

Description

The i2004 Internet Telephone works as a client in existing Centrex and private branch exchange (PBX) systems to provide voice-over-IP (VoIP) services over a central office and corporate local area networks (LAN). The i2004 Internet Telephone provides one-button access to voice features, a display screen, line and line appearance keys, and softkeys.

Figure 1-1 shows the i2004 Internet Telephone.

Figure 1-1 i2004 Internet Telephone

The i2004 Internet Telephone provides the following features and functions:

- large multi-field liquid crystal display (LCD), including six user-programmable, self-labeling keys for direct access to lines or voice features

- wideband-compatible speakerphone (150 Hz to 7 kHz) with acoustic echo cancellation

- integrated headset jack with convenient on button

- user-selectable ringer, speaker, handset, and headset volume

- five services keys to access to commonly-used applications and services

- integrated accessory and expansion bay connectors to support future service enhancements

- dedicated hold, release, handsfree, headset, and mute keys

- support for G 711, G.723.1, G.729A-Annex B

- integrated 10/100 BaseT auto-sensing Ethernet network interface (RJ-45)

- automatic Internet Protocol (IP) address assignment via Dynamic Host Configuration Protocol (DHCP)

- upgradable through network-based download of additional functionality or codecs

- hearing-aid compatible

Centrex IP network

The i2004 Internet Telephone is an IP terminal in the Centrex IP network. Figure 1-2 shows the Centrex IP network.

Figure 1-2 Centrex IP network
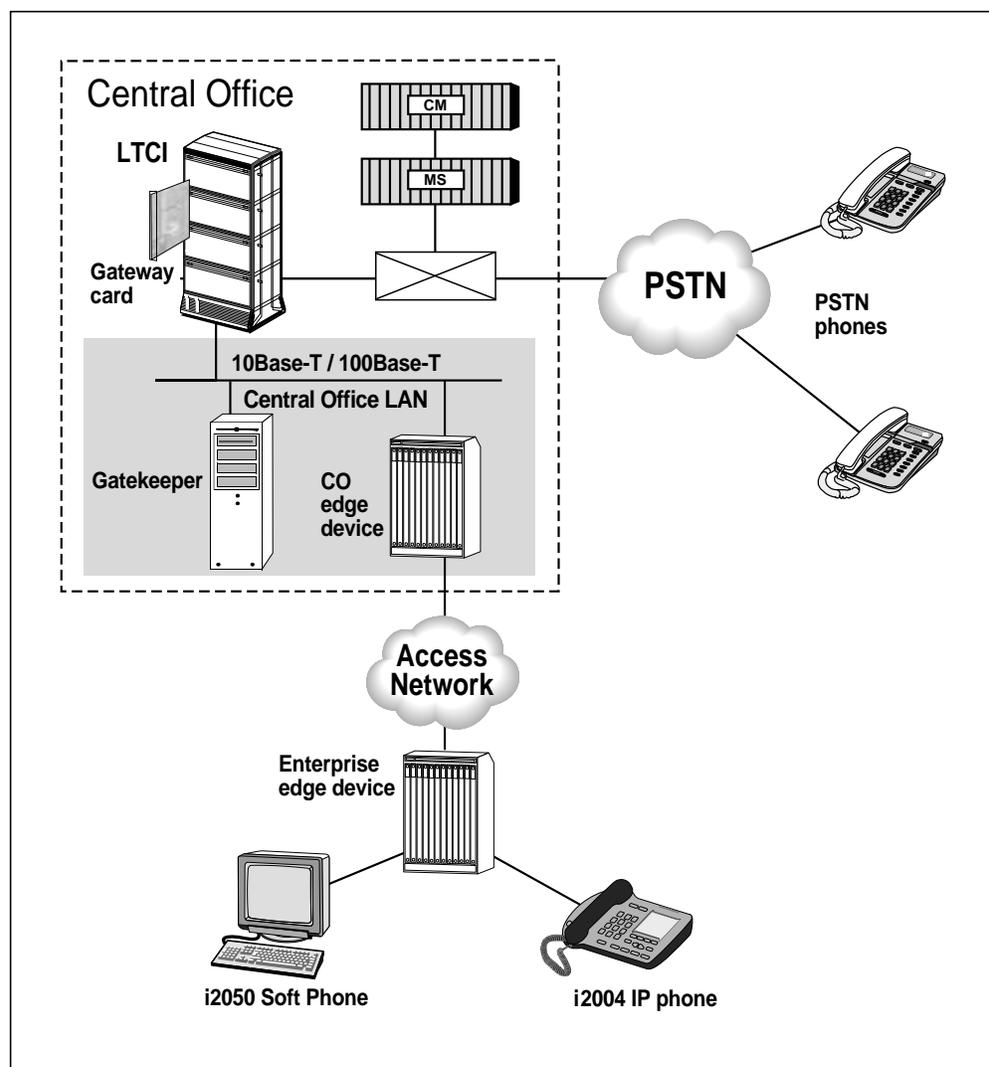
The IP Gateway card (NT7X07AA) is an XMS-based peripheral module (XPM) circuit pack that resides in the P-side interface slots of an ISDN line trunk controller (LTCI). The Gateway provides the primary interface between the public switched telephone network (PSTN) and the i2004 Internet Telephones on the enterprise LAN.

The Gatekeeper is the central call processing server of the Centrex IP network. The Gatekeeper is a dual configuration personal computer (PC) and application that runs on a Windows NT platform. The Gatekeeper provides registration and admission control to the H.323-based terminals.

Terminal proxy server

The i2004 Internet Telephone communicates with the Gateway and Gatekeeper through the Terminal Proxy Server (TPS) software that can reside on the same platform as the Gatekeeper. The TPS provides call control services for the i2004 Internet Telephone and other terminals.

The TPS database stores the configuration data of the i2004 Internet Telephone. This data includes the directory numbers (DN) assigned to the telephones, the key assignments for voice features, and the IP address of the Gatekeeper.

The TPS performs the following functions for the i2004 Internet Telephone:

- makes call setup requests to the Gatekeeper
- processes and transmits Gatekeeper messages to the i2004 Internet Telephone
- performs admission signaling for the i2004 Internet Telephone
- performs call control signaling for the i2004 Internet Telephone
- maintains the call state and the user interface

Call flow

The i2004 Internet Telephone supports the following types of calls:

- IP terminal to PSTN terminal
- IP terminal to IP terminal

When an IP terminal originates a call in the Centrex IP network, the following events occur:

1. The end user dials the destination number.
2. The Gatekeeper receives an H.323 call request.
3. The Gatekeeper sends a call setup message to determine if the user is registered.

4. The Gatekeeper looks up the home gateway address.

5. The Gateway uses H.225 to route the call request to the Gateway.

6. The Gateway converts the H.225 IP signal to a Q.931 circuit switched signal and sends the call request to the DMS switch.

7. The DMS routes the call to the PSTN terminal or IP terminal.

The call signaling path for both types of calls goes through the Gatekeeper to the Gateway on the DMS. On an IP terminal to PSTN terminal call, Centrex IP establishes the voice path between the IP terminal and the Gateway. On an IP terminal to IP terminal call, Centrex IP establishes a voice path between the two terminals

Protocols

This section describes the protocols used by the i2004 Internet Telephone.

Ethernet

The i2004 Internet Telephone supports 10BaseT and 100BaseT on a single loop. Nortel Networks programs a single media access control (MAC) address into the telephone for identification.

IP stack

The i2004 Internet Telephone supports the following protocols as part of the IP stack of the telephone:

- IP

- Internet Control Message Protocol (ICMP)

- Address Resolution Protocol (ARP)

- User Datagram Protocol (UDP)

- Trivial File Transfer Protocol (TFTP) or UNIStim File Transfer Protocol (UFTP)

Media

The i2004 Internet Telephone uses Real-Time Protocol (RTP) headers on UDP to transport media streams. The format of the media depends on the media application.

Control

The i2004 Internet Telephone is controlled by Unified Networks IP Stimulus (UNIStim) Protocol packetized on UDP.

To maintain functionality during server failures and firmware upgrades, the i2004 Internet Telephone supports the specification of multiple TPSs during the bootstrap process. The i2004 Internet Telephone communicates with the

primary TPS until the primary TPS informs the telephone to switch to the backup TPS. The i2004 Internet Telephone cannot independently switch servers.

Download

The i2004 Internet Telephone uses TFTP or UFTP protocol to download software as part of the bootstrap process.

Bootstrap

The i2004 Internet Telephone uses a three-phase bootstrap process.

1. Phase 1 is a primary DHCP session to acquire the following information:
   - an IP address for the i2004 Internet Telephone
   - a router IP address
   - the subnet mask
   - the IP address of the TPS

2. Phase 2 is a secondary DHCP session with the TPS. The TPS checks the version of firmware on the i2004 Internet Telephone. If the i2004 Internet Telephone needs a new version of firmware, the TPS instructs the telephone to download the latest version through TFTP or UFTP.

3. Phase 3 is a UNIStim initialization handshake with the TPS.

DHCP implementation

The i2004 Internet Telephone supports DHCP to automatically configure the parameters necessary to bring an i2004 Internet Telephone in service on the network. DHCP allows an i2004 Internet Telephone to boot without manual configuration by the end user.

The i2004 Internet Telephone supports operations behind network address translation (NAT) boxes and firewalls.

Types of DHCP implementations

The i2004 Internet Telephone supports three types of DHCP implementations:
- full DHCP
- partial DHCP
- no DHCP

Full DHCP

If the i2004 Internet Telephone uses full DHCP, the telephone automatically performs a DHCP session at powerup. The telephone obtains all parameters necessary to contact the TPS and begin operations.

Nortel Networks recommends full DHCP for all i2004 Internet Telephones. Full DHCP supports complete plug and play installation of the i2004 Internet Telephone.

Partial DHCP

If the i2004 Internet Telephone uses partial DHCP, the i2004 automatically performs a DHCP session at powerup. However, the telephone only obtains the standard IP stack parameters required to send IP packets over the network. The telephone must be manually configured with TPS information before the telephone can begin full operations.

In a partial DHCP session, the i2004 Internet Telephone obtains the following parameters:

- the IP address of the telephone

- the netmask of the telephone

- the default gateway

In a partial DHCP session, the i2004 Internet Telephone must be manually configured with the following parameters:

- the IP addresses of the primary and secondary TPS

- the retry counts for the primary and secondary TPS

- the action code for the primary and secondary TPS

Partial DHCP is useful in configurations that use dynamic IP addresses but do not use a DHCP server with TPS-specific information.

No DHCP

The i2004 Internet Telephone can operate without using DHCP. An end user or installer must manually configure the i2004 Internet Telephone with all telephone, network, and TPS information.

Messaging

If the i2004 Internet Telephone uses full DHCP or partial DHCP, the telephone exchanges a sequence of messages with the DHCP server in the Centrex IP network. A summary of the power-up message sequence follows:

1. The i2004 Internet Telephone broadcasts a DHCP Discover (DHCPDISCOVER) message to the limited broadcast address 255.255.255.255 on port 67.

2. The DHCP server responds with a DHCP Offer (DHCPOFFER) message to the limited broadcast address. However, the DHCP server responds to port 68.

3. The i2004 Internet Telephone acknowledges the DHCPOFFER with a DHCP Request (DHCPREQUEST) broadcast message. The DHCPREQUEST message includes the server identifier.

   Note 1: If the i2004 Internet Telephone receives DHCPOFFER messages from more than one DHCP server, the telephone acknowledges the first valid response.

   Note 2: If the i2004 Internet Telephone does not receive a DHCPOFFER before a timeout expires, the telephone broadcasts a new DHCPDISCOVER message.

4. The DHCP server responds with a DHCP Acknowledgement (DHCPACK) message that contains the configuration parameters. The IP address is a non-permanent IP address with a specific lease duration.

5. The i2004 Internet Telephone comes into service. The i2004 Internet Telephone manages the lease and renews the IP address as required.

Class Identifier option

If the i2004 Internet Telephone uses full DHCP, the telephone includes a **Class Identifier** option with each DHCPDISCOVER and DHCPREQUEST message. The value of the option is **Nortel-i2004-A**. The value is ASCII encoded and NULL (0x00) terminated. **Nortel-i2004** identifies the terminal and **-A** identifies the version of the terminal.

Other options

If the i2004 Internet Telephone uses full DHCP, the telephone requires one of the following options in each DHCPOFFER and DHCPACK message:

- a Vendor Specific option with a specific encapsulated subtype that is unique to the i2004 Internet Telephone

- a Site Specific option with a specific DHCP option that is unique to the i2004 Internet Telephone

The format for each option follows:

- Type
- Length
- Data

Type allows the i2004 Internet Telephone to work in environments where another vendor uses the initial choice. Type is 1 octet. The option can include only one type. Valid types follow:

0x80	128
0x90	144
0x9d	157
0xbf	191
0xfb	251

Length is a variable that depends on message content. Length is 1 octet.

Data consists of length octets and uses the following ASCII-based format.

Nortel-i2004-A,<iii.jjj.kkk.lll>:<ppppp>,<aaa>,<rrr>;<iii.jjj.kkk.lll>:<pppp>,<aaa>,<rrr>.

Table 1-1 describes each field.

Table 1-1 Fields in Data

Field	Description	Value
Nortel-2004-A	Identifies option as Nortel-specific option. The **-A** identifies the version.	ASCII characters
,	Separates fields	ASCII character
;	Separates information on primary and secondary TPS	ASCII character
.	End of structure	ASCII character
iii.jjj.kkk.lll	IP address TPS	ASCII encoded decimal. A field in the IP address can be less than 3 digits but no more than 3 digits.
ppppp	Port of TPS	ASCII encoded decimal. The field can be less than 5 digits but no more than 5 digits.
aaa	Action code for TPS. Stored as one octet (0x00 to 0xFF) in the i2004 Internet Telephone.	ASCII encoded decimal number from 0 to 255. 1 is the only choice with Centrex IP Release 2.
rrr	Retry count for the TPS. Stored as one octet (0x00 to 0xFF) in the i2004 Internet Telephone.	ASCII encoded decimal number from 0 to 255

Configuration

Refer to the *Centrex IP Service Implementation Guide*, 297-5231-021 for procedures to configure the DHCP server and add the site-specific options.

2 Components and features

This chapter describes the components and features of the i2004 Internet Telephone.

Standard equipment

The following equipment is standard on the i2004 Internet Telephone.

- telephone
- handset
- handset cord
- footstand
- wall plug power supply

    Note: In North America, the power supply is packaged with the telephone. Outside of North America, the power supply is packaged separately from the telephone.

- Category 5 Ethernet cable
- *The i2004 Internet Telephone Getting Started Guide*
- *The i2004 Internet Telephone Quick Reference Configuration Guide*

Optional equipment

The following equipment is optional on the i2004 Internet Telephone.

- headset
- wall mount kit
- shoulder rest

Physical characteristics

Table 2-1 lists the physical characteristics of the i2004 Internet Telephone. Except where noted, all dimensions do not include the handset.

Table 2-1 Physical characteristics

Characteristic	Dimension
Width (left to right)	286 mm / 11.25 in.
Length (front to rear)	187 mm / 7.35 in.
Height (top to bottom)	40 mm / 1.6 in. front 100 mm / 3.9 in. to 131 mm / 5.2 in rear ***Note:*** The tilt of the footstand causes the range in the height of the rear of the telephone.
Weight	1185 g / 2lb ***Note:*** Includes handset.
Color	Ether Grey

Components

Use the i2004 Internet Telephone to make voice calls and use calling features over a corporate local area network (LAN). Components on the telephone support quick one-button access to most features and operations. Figure 2-1 illustrates the components of the i2004 Internet Telephone.

Figure 2-1 Telephone components
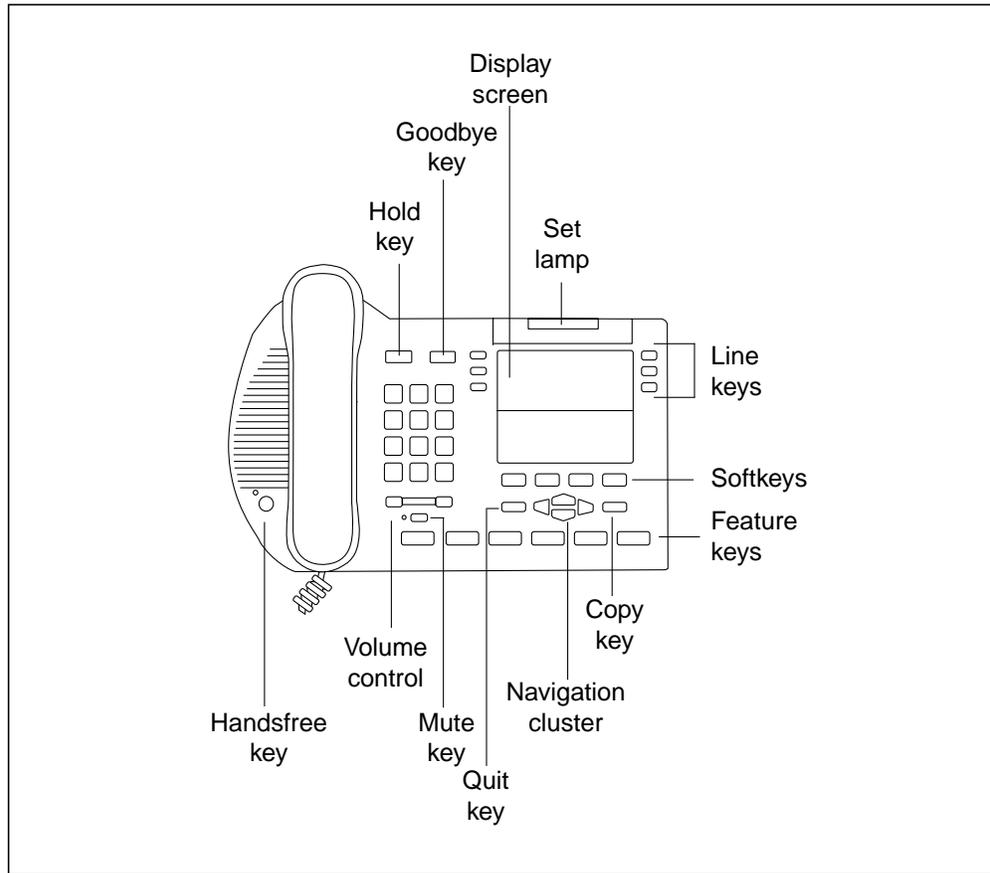
Display screen

The display screen on the i2004 Internet Telephone consists of three sections. Figure 2-2 shows the display screen.

Figure 2-2 Display screen
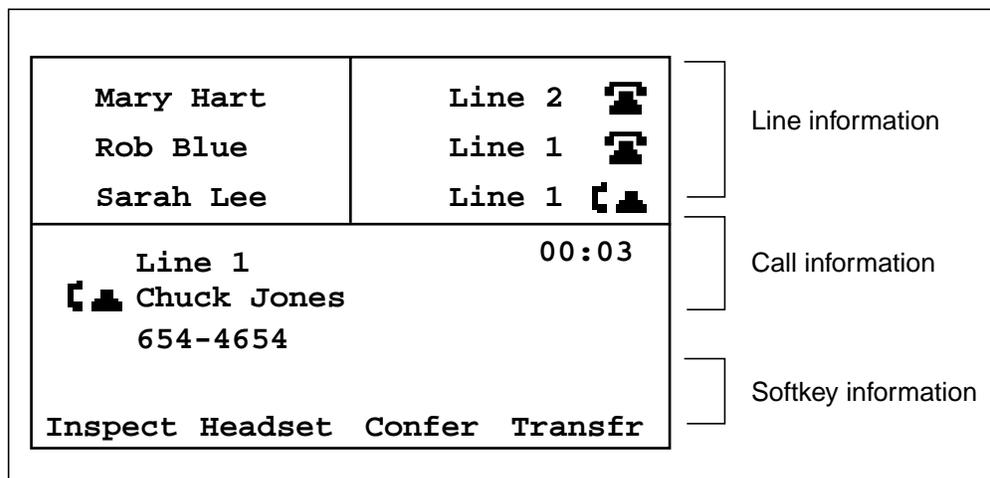
The top section of the display screen shows the available lines for the i2004 Internet Telephone. The telephone symbol in the lower right side is the primary telephone line.

The middle section of the display screen shows call information. If Caller ID is available, the screen shows the name and number of the incoming caller. When the telephone is idle, the display shows the current date and time. The display also shows reminders if the telephone is forwarded or blocked from receiving incoming calls.

The lower section of the display screen shows information on the features programmed for each softkey.

Line keys

The i2004 Internet Telephone includes six programmable line keys. Each unique line and line appearance has a dedicated line key. Line key labels display **Line X**, with the primary line labeled **Line 1**.

The i2004 Internet Telephone supports multiple appearances of the same line. For example, two line appearances of the primary line can support call handling and function similar to Call Waiting.

A single telephone line that serves as the Multiple Appearance Directory Number (MADN) can appear on multiple telephones. This function makes call sharing easier to manage. MADN labels display the same label across all terminals that share the line.

Softkeys

The softkeys on the i2004 Internet Telephone provide quick and customized access to telephone's features. The softkeys can change with call context. For example, when the telephone is on a call the softkeys can offer one-button access to Call Transfer and Inspect. When the telephone is idle, the softkeys can include Forward and Do Not Disturb.

The lower section of the display screen provides the label for each softkey. If the i2004 Internet Telephone supports more than four features, the **more** selection on the display screen accesses the additional features.

Service keys

The service keys on the i2004 Internet Telephone provide one-button access to voice mail and other services. Table 2-2 describes each service key.

Table 2-2 Service keys

Key	Icon	Description
Headset		Routes audio to the optional headset. This key is active when the headset is installed.
Directory		Enters network-based voice dialing services.
Inbox		Enters network-based messaging services.
Outbox		Displays a list of the last 10 numbers dialed.
Services		Allows a user to configure the i2004 Internet Telephone.
Expand		Not available for this Centrex IP release.

Function keys

The function keys on the i2004 Internet Telephone provide one-button access to telephone functions. Table 2-3 describes each function key.

Table 2-3 Function keys

Key	Description
Hold	Holds and retrieves calls.
Goodbye	Terminates the call and returns dial-tone when the telephone is off-hook.
Copy	Not available for this Centrex IP release.
Quit	Quits the submenu and returns the telephone to an idle state.
Handsfree	Turns hands-free on.

Navigation cluster

The keys in the navigation cluster allow the user to scroll through a list of information.

Set lamp

The set lamp wraps to the back of the telephone. The set lamp is the ringing and message indicator.

Volume control

The volume control is a toggle lever located below the keypad.

Power supply

A 16V @ 500 mA AC wall transformer provides power to the i2004 Internet Telephone. The transformer uses a barrel connector to plug into the i2004 Internet Telephone.

The i2004 Internet Telephone does not support closet powering through the telephone's RJ-45 Ethernet connector.

Footstand

The footstand allows you to adjust the tilt angle of the telephone.

Physical connections

The back of the i2004 Internet Telephone provides the following physical connections:

- power supply
- RJ-45 jack for Ethernet connection to network
- handset jack
- headset jack

Parameters

Parameters coded into the i2004 Internet Telephone allow the telephone to connect to the Centrex IP network. Parameters include the Internet Protocol (IP) address and port number of the primary and secondary Terminal Proxy Servers (TPS). The parameters can be automatically configured through Dynamic Host Configuration Protocol (DHCP) or manually entered.

Table 2-4 lists the basic parameters for the i2004 Internet Telephone. The procedures in this document describe how to enter, view, and change these parameters.

Table 2-4   Parameters

Parameter	Definition	Possible values
DHCP?	Use of DHCP	**0** if the i2004 Internet Telephone uses DHCP **1** if the i2004 Internet Telephone does not use DHCP
DHCP	Level of DHCP use	**0** if the i2004 Internet Telephone uses full DHCP **1** if the i2004 Internet Telephone uses partial DHCP
SET IP	The IP address for the i2004 Internet Telephone	IP address
NETMASK	Net submask	IP address
DEF GW	The IP address of the subnet router	IP address
S1 IP	The IP address of the primary TPS	IP address
S1 PORT	The port number of the primary TPS	Port number
S1 ACTION	The action code for the primary TPS	0 to 255. **1** for UNIStim is the only valid value for Centrex IP Release 2.
S1 RETRY COUNT	The number of times the i2004 Internet Telephone attempts to contact the primary TPS	0 to 255. Nortel Networks recommends a retry count of **1**.
S2 IP	The IP address of the secondary TPS	IP address
S2 PORT	The port number of the secondary TPS	Port number
S2 ACTION	The action code for the secondary TPS	0 to 255. **1** for UNIStim is the only valid value for Centrex IP Release 2.
S2 RETRY COUNT	The number of times the i2004 Internet Telelphone attempts to contact the secondary TPS	0 to 255. Nortel Networks recomends a retry count of **1**.

3 Installation procedures

This chapter provides the procedures to install an i2004 Internet Telephone. Table 3-1 lists the procedures.

Table 3-1 Installation task and procedures

Number	Procedure	Page
1	"Create a terminal profile"	Page 3-2
2	"Install the i2004 Internet Telephone"	Page 3-4
3	"Initialize the i2004 Internet Telephone"	Page 3-9

Create a terminal profile

Application

Use this procedure to create a terminal profile for an i2004 Internet Telephone.

Prerequisites

This procedure has the following prerequisites:

- Make sure you establish the line and create the user profile at the DMS switch for this terminal. Refer to the *SERVORD Reference Manual* for information.

- Make sure you have the directory assistance number for the i2004 Internet Telephone.

Action

Perform the following steps to complete this procedure.

From the MAP terminal

1   Determine the DN key for the telephone.

    a   From the CI command line, open the QPIN tool. Type

        >qpin

        and press the **Enter** key.

        The MAP terminal shows the following message:

        `QPIN - Query PIN/DNKEY for IP-Pphone/IPLL`

        `QPIN:`

    b   At the **QPIN** prompt, enter the DN of the telephone. Type

        >dn <dn>

        and press the **Enter** key.

        where

        dn is the DN of the telephone

        Example

        `>dn 6137234732`

        The MAP terminal shows the DN key of the DN.

        `DNKEY : 00613723473200950097`

    c   Record the DN key.

From the TPS terminal

2   Start the TPS Config Tool. From the Taskbar, select **Start->Programs->Nortel Networks->Terminal Proxy Server->Configuration Tool**.

    The TPS Config Tool opens.

Create a terminal profile (end)

    3   Enter the DN key for the telephone.

        a   Click the **DN Key Settings** tab.

            *The DN Key Settings window opens. The lower left corner of the window has an empty field. The instructions **Enter DN Key digits to search and press Add button to add** appear over the empty field.*

        b   In the empty field, enter the DN key you recorded in step 1c and click the **Add** button.

            The DN Key Profiles table shows the new DN key.

    4   Update the **Directory Number** for the new DN key.

        a   Make sure the row with the new DN key is selected.

        b   In the **DN Key Profiles** table, double-click the value in the **Directory Number** column.

            The field changes color to white and shows a flashing cursor.

        c   In the field, enter the directory assistance number for the user and press the **Enter** key.

            *An asterisk (*) appears next to the DN key value. The message ***denotes unsaved changes** appears above the table.*

    5   Update the **Language** for the new DN key.

        a   Right-click the value under **Language**.

            The field changes color to grey and a icon for a pull-down menu appears.

        b   From the pull-down menu, select the language.

    6   Save the new terminal profile. Click the **Apply** button.

        *The TPS Config Tool creates a .obj file for the DN key in the **c:\Program Files\Nortel Networks\Terminal Proxy Server\dnkeydb** directory. The name of the file is <dnkey>.obj, where <dnkey> is the DN key.*

    7   Quit the TPS Config Tool. Click the **OK** button.

    8   You have completed this procedure. Go to the procedure "Install the i2004 Internet Telephone" in this document.

Install the i2004 Internet Telephone

WARNING
Possible damage to telephone
Do not plug the i2004 Internet Telephone into an ISDN connection. The ISDN connection can damage the telephone.

ATTENTION
The i2004 Internet Telephone performs best on a switched Ethernet network. If you install the i2004 Internet Telephone on a shared Ethernet network, the telephone may not perform at optimal levels.

Application

Use this procedure to install an i2004 Internet Telephone.

Prerequisites

This procedure has the following prerequisites:

- Perform the procedure "Create a terminal profile" in this document before you perform this procedure.
- Make sure the user's location has a 10/100 BaseT Ethernet connection.

Action

Perform the following steps to complete this procedure.

At the user's location

1   Connect the handset.

    a   Connect one end of the handset cord to the handset jack on the bottom of the telephone base.

    b   Connect the other end of the handset cord to the handset.

If the i2004 Internet Telephone	Do
has an optional headset	Go to step 2.
does not have an optional headset	Go to step 3.

2   Connect the headset. Plug the headset cord into the headset jack on the base of the i2004 Internet Telephone.

3   Connect one end of Category 5 Ethernet cable into the line cord jack on the bottom of the telephone.

Install the i2004 Internet Telephone (continued)

4   Connect the power adapter to the i2004 Internet Telephone.

   a   Connect the barrel jack of the AC Power Adapter to the AC Power Adapter plug on the bottom of the telephone base.

   b   Dress the cord around the semi-circular rib and hook the cord under the tab.

   Note: This step prevents the power supply cord from interfering with the telephone's tilt mechanism.

5   Install the footstand.

   a   Place the i2004 Internet Telephone and the footstand face-down and bottom-to-bottom on a clean non-abrasive surface. The following figure shows how to place the telephone and footstand.
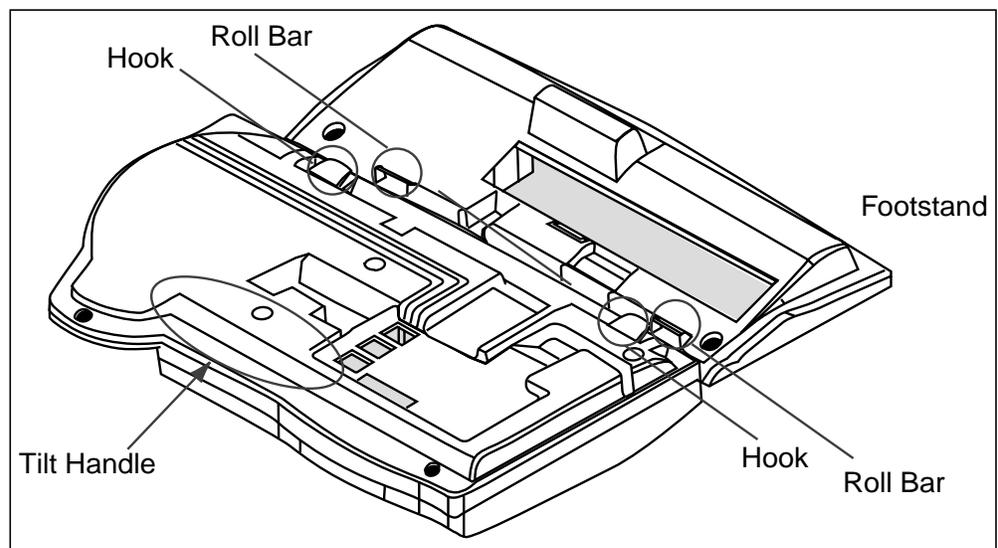
Install the i2004 Internet Telephone (continued)

    b   Insert the hooks on the bottom of the i2004 Internet Telephone into the roll bars in the footstand. The following figures show the hooks and roll bars.

Install the i2004 Internet Telephone (continued)

    c Snap the plastic hooks at the top of the footstand into the i2004 Internet Telephone. You will hear the hooks click into place.

    d Press the tilt handle and force the footstand tilt stops past the handle.

        Note: The footstand may need a sharp blow or hard push.

6   Adjust the tilt of the telephone.

    a Press the tilt handle located at the top of the telephone on the back.

    b Raise or lower the telephone to the desired angle and height.

    c Release the tilt handle to lock the telephone in the desired position.

7   Connect the i2004 Internet Telephone to the network.

    a Connect one end of the line cord to the line cord jack on bottom of the telephone base.

    b Connect the Ethernet Category 5 cable to the wall jack for the IP voice network.

Install the i2004 Internet Telephone (end)

8

> **ATTENTION**
>
> If this installation is a new installation, go to the "Initialize the i2004 Internet Telephone" procedure in this document immediately after you plug in the power supply.

Plug the AC Power Adapter in the nearest outlet.

If the icons	Do
flash	The telephone has not initialized. You have completed this procedure. Go to the procedure "Initialize the i2004 Internet Telephone" in this document to complete the installation.
do not flash	The telephone has been initialized. Go to step 9.

9 You have completed this procedure and installed the telephone.

Initialize the i2004 Internet Telephone

Application

Use this procedure to initialize the i2004 Internet Telephone.

Prerequisites

This procedure has the following prerequisites:

- Perform the procedure "Install the i2004 Internet Telephone" before you begin this procedure.

- Make sure you have the directory number (DN) key for the i2004 Internet Telephone from the system administrator.

- Make sure you know how the i2004 Internet Telephone will use Dynamic Host Configuration Protocol (DHCP). The i2004 Internet Telephone can use full DHCP, partial DHCP, or no DHCP.

  If the telephone uses partial DHCP or no DHCP, you will manually configure the parameters in the telephone during this procedure. Refer to the "Parameters" section in the "Components and features" chapter in this document.

Use the following keys when you initialize the i2004 Internet Telephone:

- Use the asterisk (*****) key to enter a period (.) when you enter an IP address.

- Softkey 1 is the **OK** key. The **OK** key accepts the information and continues to the next parameter.

- Softkey 2 is the **Bkspace** key. **The Bkspace** deletes each character.

- Softkey 3 is the **Clear** key. The **Clear** key deletes the entry.

- Softkey 4 is the **Cancel** key. The **Cancel** key aborts the session and forces the i2004 Internet Telephone to perform a hard reset.

Initialize the i2004 Internet Telephone (continued)

Action

Perform the following steps to complete this procedure.

From the i2004 Internet Telephone

1   Look at the display screen on the i2004 Internet Telephone.

If the display screen shows	Do
Nortel Networks	Go to step 2.
Locating Server ...	The telephone has begun to initialize automatically. Wait for the process to finish.
Server unreachable	The telephone has failed to initialize. Cycle power to the telephone and go to step 2.
line information	The telephone has successfully initialized. To re-initialize the telephone, go to step 3.

2

ATTENTION

After the display screen shows **Nortel Networks**, you have about two seconds to enter the default key sequence. After two seconds, the message **Locating Server ...** appears.

Begin the manual configuration.

a   Enter the default key sequence. Starting from the left, press each softkey once.

*The display screen shows **Manual Cfg** and the entry for the **DHCP?** parameter.*

b   Go to step 4.

3   Enter the default key sequence. Press the following keys in sequence.

- **Mute**
- **Right** navigation key
- **Up** navigation key
- **Left** navigation key
- **Down** navigation key
- **Up** navigation key
- **Mute**
- **Mute**

*The display screen shows **Manual Cfg** and the entry for **DHCP?** parameter.*

Initialize the i2004 Internet Telephone (continued)

4   The **DHCP?** parameter identifies the use of DHCP. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

If you enter	Do
0 (the i2004 uses DHCP)	*The display screen shows the entry for the **DHCP** parameter.* Go to step 5.
1 (the i2004 does not use DHCP)	*The display screen shows the entry for the **SET IP** parameter.* Go to step 6.

5   The **DHCP** parameter is the level of DHCP use. If necessary, edit the entry. When you finish, click the OK button to save the entry and advance to the next parameter.

If you enter	Do
0 (the i2004 uses full DHCP)	*The display screen shows the message **Locating server....*** Go to step 17.
1 (the i2004 uses partial DHCP)	*The display screen shows the entry for the **S1** parameter.* Go to step 9.

6   The **SET IP** parameter is the IP address of the i2004 Internet Telephone. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **NETMSK** parameter.*

7   The **NETMSK** parameter is the network submask. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **DEF GW** parameter.*

8   The **DEF GW** parameter is the IP address of the subnet router. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S1 IP** parameter.*

9   The **S1 IP** parameter is the IP address of the primary Terminal Proxy Server (TPS). If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S1 PORT** parameter.*

10   The **S1 PORT** parameter is the port number of the primary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S1 ACTION** parameter.*

Initialize the i2004 Internet Telephone (end)

11	The **S1 ACTION** parameter is the action code for the primary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.
	The display screen shows the entry for the S1 RETRY COUNT parameter.
12	The **S1 RETRY COUNT** parameter is the retry count for the primary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.
	The display screen shows the entry for the S2 IP parameter.
13	The **S2 IP** parameter is the IP address of the secondary TPS.If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.
	The display screen shows the entry for the S2 PORT parameter.
14	The **S2 PORT** parameter is the port number of the secondary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.
	The display screen shows the entry for the S2 ACTION parameter.
15	The **S2 ACTION** parameter is the action code for the secondary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.
	The display screen shows the entry for the S2 RETRY COUNT parameter.
16	The **S2 RETRY COUNT** parameter is the retry count for the secondary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.
	The telephone attempts to connect to the server.

If the display shows	Do
Locating server...	Go to step 17.
a blank screen	Press the **Goodbye** key and go to step 19.

17	Wait for the display to show one of the following messages.

If the display shows	Do
Enter the DNkey...	The telephone successfully connected to the server. Go to step 18.
Server unreachable	The telephone did not connect to the server. Go to the troubleshooting chapter in this document.

18	Enter the DN Key and press the **OK** button.
	Note: If the display screen remains blank, take the telephone offhook.
19	You have completed this procedure and installed an i2004 Internet Telephone.

4 Troubleshooting

> **ATTENTION**
>
> The information in this chapter describes a range of activities. Contact the appropriate level of support if you do not have the responsibility or expertise to use this information to troubleshoot a problem.
>
> For additional help, contact Nortel Networks technical assistance service (TAS) at 1-800-825-TECH or 1-800-825-8234.

This chapter provides information to troubleshoot problems with the i2004 Internet Telephone.

Overview

The i2004 Internet Telephone is an end-user device in the Centrex IP network. Problems with the i2004 Internet Telephone can occur due to any of the following conditions:

- incorrect parameters in the i2004 Internet Telephone
- incorrect parameters in the TPS for the i2004 Internet Telephone
- communications problems between the i2004 Internet Telephone and the Centrex IP network
- problems with the TPS or another Centrex IP network component

If a specific problem exists on a single i2004 Internet Telephone, the problem could be specific to the telephone or the parameters for the telephone in the Terminal Proxy Server (TPS). If the same problem exists on multiple i2004 Internet Telephones, the problem could be related to the Centrex IP network or a Centrex IP network component such as the TPS.

Troubleshooting tools

A variety of tools are available to help troubleshoot problems with the i2004 Internet Telephone.

Reason codes

The i2004 Internet Telephone shows reason codes that identify a problem with the telephone or a Centrex IP network operation. Most reason codes appear when the i2004 Internet Telephone initializes. An example of a reason code follows:

```
1006
```

Reason codes range from 1000 to 2999.

- A value from 1000 to 1999 refers to login problems that the i2004 Internet Telephone encountered with the TPS.

- A value from 2000 to 2999 refers to registration problems that the i2004 Internet Telephone encountered with the Gatekeeper.

- A value from 2400 to 2499 refers to parameter download failures.

i2004 messages

The i2004 Internet Telephone shows messages on the display screen that identify the following:

- normal operations, such as the message `Downloading Firmware...`

- faults, such as the message `Server Unreachable`

TPS Config tool

The TPS Config tool allows you to configure the TPS and i2004 Internet Telephone. With the TPS Config tool you can perform the following activities:

- Define directory number (DN) keys.

- Define the following i2004 firmware information:

  — the IP address of the load server

  — the name of the firmware load

  — the version of the firmware load

  — the type of firmware download

- Define the coding/decoding (CODEC) equipment for the TPS.

The *Centrex IP Service Implementation Guide*, 297-5231-021, provides additional information on the TPS Config tool.

TPS Debug tool

The TPS Debug tool allows you to debug problems with the TPS and the i2004 Internet Telephone. With the TPS Debug tool you can perform the following activities:

- Trace the calls on a specific terminal. For example, you can trace the Q931 messages sent and received by the TPS for a given i2004 Internet Telephone.

- View the datafill on a specific terminal. For example, you can see the services datafilled for a specific i2004 Internet Telephone.

- View the data for the TPS. For example, you can view a table of all DN keys and the terminals that use each DN key.

TPS logs

In a typical software installation, TPS log files are stored on the TPS in the folder. **C:\Program Files\Nortel Networks\Terminal Proxy Server\TPS_logs**.

> *Note:* The software upgrade program allows you to store the logs in the default folder previously listed or a different folder.

The TPS provides two types of logs:

- system logs
- call processing (callp) message logs

System logs

System logs describe events that affect a single terminal or all terminals the TPS supports. System logs use the following format:

```
Sev: <number> <date><log_title>
<event_information>
```

Sample logs follow:

```
Sev 4 Mar 26 21:49:11 E2 Controller
00638760203
Proper DnKey Received 00930001

Sev 4 Mar 26 21:49:12 Call Processing
Login request for new terminal 006038760203/6137234560/93/1
```

The name of a system log file begins with **tpslog**.

Callp message logs

Callp logs provide coded information on messaging between the terminal, TPS, and Gatekeeper. Each line provides the i2004 identifier, call identifier, and message type.

The name of callp message log begins with **tpsmsglog**.

Ping

Ping is a utility that tests network connections. The ping utility sends packets to a specified IP address. Use ping to find out if a device is connected to the network and the time to contact the device.

Tracert

Tracert is a utility that identifies the route packets take to a destination. The tracert utility sends packets to a specified Internet Protocol (IP) address. Use tracert to identify where a packet stops in the network.

Portable PC

Use a portable PC to troubleshoot communication problems at the i2004 Internet Telephone.

Support from Nortel Networks

For additional help troubleshooting problems with the i2004 Internet Telephone, contact Nortel Networks TAS at 1-800-825-TECH or 1-800-825-8234.

Reason code problems

This section describes how to troubleshoot some reason codes that appear on the i2004 Internet Telephone.

Reason code 1006

Reason code 1006 indicates that the i2004 Internet Telephone is using an invalid DN key. Perform the following steps to solve this problem.

1. Re-enter the DN key in the i2004 Internet Telephone.

2. If the problem continues, open the TPS Config tool and make sure the TPS has the correct information for the DN key.

Reason code 1008

Reason code 1008 indicates that the i2004 Internet Telephone is using a DN key that another i2004 Internet Telephone is using. The TPS log file includes a log with the message dn key <dn_key> is currently being used by terminal <mac_address>. The user could be moving to a

new i2004 Internet Telephone and using the DN key from the existing terminal. Perform the following steps to solve this problem.

1. Logout of the existing i2004 Internet Telephone.

2. Use the **Relogin** softkey to login to the new i2004 Internet Telephone.

3. Re-enter the DN key in the new i2004 Internet Telephone.

If the problem continues, open the TPS Config tool and re-enter the DN key in the TPS. After you re-enter the DN key, use the **Relogin** softkey to login to the i2004 Internet Telephone.

Reason code 2000

Reason code 2000 indicates the Gatekeeper does not have all the datafill for the i2004 Internet Telephone that is trying to register. One of the following situations could cause this problem:

- The database of static data download information does not include the telephone.

- The Gatekeeper reaches a threshold of available memory and automatic failover fails.

- The database of static data download information is locked.

Perform the following steps to solve this problem.

1. Re-enter the DN key in the i2004 Internet Telephone.

2. If the problem continues, check the Gatekeeper log file to determine why the Gatekeeper rejected the registration request. Troubleshoot the Gatekeeper or contact the Gatekeeper support group.

3. If the problem continues, make sure the Gatekeeper receives static data from the Gateway.

Reason code 2019

Reason code 2019 indicates that the i2004 Internet Telephone failed to authenticate. The telephone may have the wrong DN or incorrect authentication information. Perform the following steps to troubleshoot this problem.

1. Re-enter the DN key in the i2004 Internet Telephone.

2. If the problem continues, check the Gatekeeper log file to determine why the Gatekeeper rejected the registration request. Troubleshoot the Gatekeeper or contact the Gatekeeper support group.

3. If the problem continues, make sure the Gatekeeper has received static data from the Gateway.

Reason code 2024

Reason code 2024 indicates the Gatekeeper rejected the registration request and authentication failed. Troubleshoot the Gatekeeper or contact the Gatekeeper support group.

Reason code 2031

Reason code 2031 indicates the TPS sent an initial registration message to the Gatekeeper but did not receive a response. Perform the following steps to troubleshoot this problem.

1. Open the TPS Config tool and make sure the TPS has the correct IP address for the Gatekeeper.

2. If the IP address is correct, make sure the Gatekeeper is on.

Reason code 2410

Reason code 2410 indicates that the TPS sent a Q931 register message to the Gatekeeper during parameter downloading but did not receive a response. The Gatekeeper or Gateway could have a trouble condition. Troubleshoot the Gatekeeper or Gateway, or contact the appropriate support group.

Reason code 2414

Reason code 2414 indicates one of the following problems:

*   The TPS sent a Q931 register message to the Gatekeeper and received a Q931 release complete message.

*   An i2004 Internet Telephone connected to a 911 agent during a TPS restart and the 911 agent recalled the telephone.

An out-of-service Gateway can cause these problems. Troubleshoot the problem or contact the Gateway support group.

Reason code 2423

Reason code 2423 indicates the requests for parameter downloading from an i2004 Internet Telephone exceeded the number allowed within a 15 minute time limit. Perform the following steps to solve this problem:

1. Detach and re-attach the logical terminal identifier (LTID) to the GWIP on the DMS. See the "DMS maintenance" chapter in the *Centrex IP Service Implementation Guide*, 297-5231-021, for more information.

2. Cycle power to the i2004 Internet Telephone.

Reason code 2428

Reason code 2428 indicates the switch rejected the parameter downloading attempt because the following conditions exist:

- The i2004 Internet Telephone belongs to a multiple-appearance directory number (MADN) group

- Another member of the MADN group is active on a call with the MADN DN.

To solve this problem, use the **Relogin** softkey to relogin to the i2004 Internet Telephone when the other members of the MADN group are not using the MADN DN.

User-level problems

This section describes possible problems with the i2004 Internet Telephone that a user could report.

Authentication failed or authorization failed messages

If the i2004 Internet Telephone displays the message `Authentication Failed` or `Authorization Failed`, the TPS could not authenticate the telephone. Troubleshoot the TPS or contact the TPS support group.

Call drops

During an active call, the call can unexpectedly drop without either party releasing the call. If this problem occurs, the Gateway or Gatekeeper dropped the call. Use the following steps to troubleshoot the problem, or contact the appropriate support group.

1. Check the TPS message log determine if the TPS received one of the following messages:

    - an incoming Q931 Release Complete message

    - a RAS DRQ message for the i2004 Internet Telephone at the time the call was dropped

    The messages indicate that the Gatekeeper or Gateway requested that the call be dropped. Check the Gatekeeper logs for more information.

2. Check the TPS system log file for a message with the text `DRQ received from gatekeeper for terminal <terminal_id>`. This log indicates that the Gatekeeper or Gateway requested that the call be dropped.

    The log is generated during abnormal and normal operations. For example, the log is generated when the remote party releases the call.

    When a remote party releases a call, the TPS can receive an incoming RAS DRQ message and an incoming Q931 Release Complete message. If

the TPS receives the RAS DRQ message before the Q931 Release Complete message, the log is generated.

Call drops when user presses key

The i2004 Internet Telephone may drop a call when the user presses a key, such a feature softkey or another DN key. To troubleshoot the problem, check the TPS logs file. The following table lists the logs that can identify the cause of this problem.

TPS log	Cause of problem	Solution
`Q931 Connection lost on <terminal_id>`	The Gatekeeper dropped the Q931 connection to the TPS.	Use the Gatekeeper logs file to troubleshoot the Gatekeeper, or contact the Gatekeeper support group.
`DRQ received from gatekeeper for terminal <terminal_id>`	The Gateway or Gatekeeper dropped the call.	Use the Gatekeeper logs file to troubleshoot the Gatekeeper, or contact the Gatekeeper support group.

DN key icon flashes offhook and onhook

When the user presses a DN key, the DN key icon flashes offhook and onhook. The flash can occur immediately or up to 10 seconds after the user presses the DN key.

To troubleshoot the problem, check the TPS logs file. The following table lists the logs that can identify the cause of this problem.

TPS log	Cause of problem	Solution
`ARJ for terminal<terminal_id>`	If Reject Reason is **Timeout**, the TPS sent an admissions request to the Gatekeeper but did not receive a response.	Troubleshoot the Gatekeeper, or contact the Gatekeeper support group.
	If Reject Reason is not **Timeout**, the Gatekeeper rejected the admissions request.	The TPS log identifies the reason for the rejection. Use the log to troubleshoot the problem, or contact the appropriate support group.
`Q931 timeout occurred on terminal <terminal_id> on call <call_id>`	The TPS sent a Q931SETUP message to the Gatekeeper but did not receive a response within six seconds.	Troubleshoot the Gatekeeper or contact the Gatekeeper support group.
`Release complete was received in response to an outgoing call setup message for terminal <terminal_id> on call <call_id>`	The TPS sent a Q931 SETUP message to the Gatekeeper. The Gatekeeper sends a "release complete" message instead of a setup ack or call proceeding message.	The Gateway may be down. Troubleshoot the Gateway, or contact the Gateway support group.
`Q931 Status received on terminal <terminal_id>`	Centrex IP encountered a call signaling protocol error.	Contact the next level of support.
`Origination attempt on terminal <terminal_id> was rejected`	The TPS is processing an origination request for this telephone. The TPS allows the user to have only one outstanding origination request. The TPS typically generates this log when the user presses the DN keys too quickly.	Tell the user to press the DN keys slower. If the problem persists, the Gatekeeper or Gateway cannot process messages in an acceptable period of time. Contact the Gatekeeper support group.

Headset message

If the i2004 Internet Telephone displays the message `Headset not plugged in`, the telephone does not detect the optional headset. Have the user check the headset connection to the telephone.

Initialization failed and service denied message

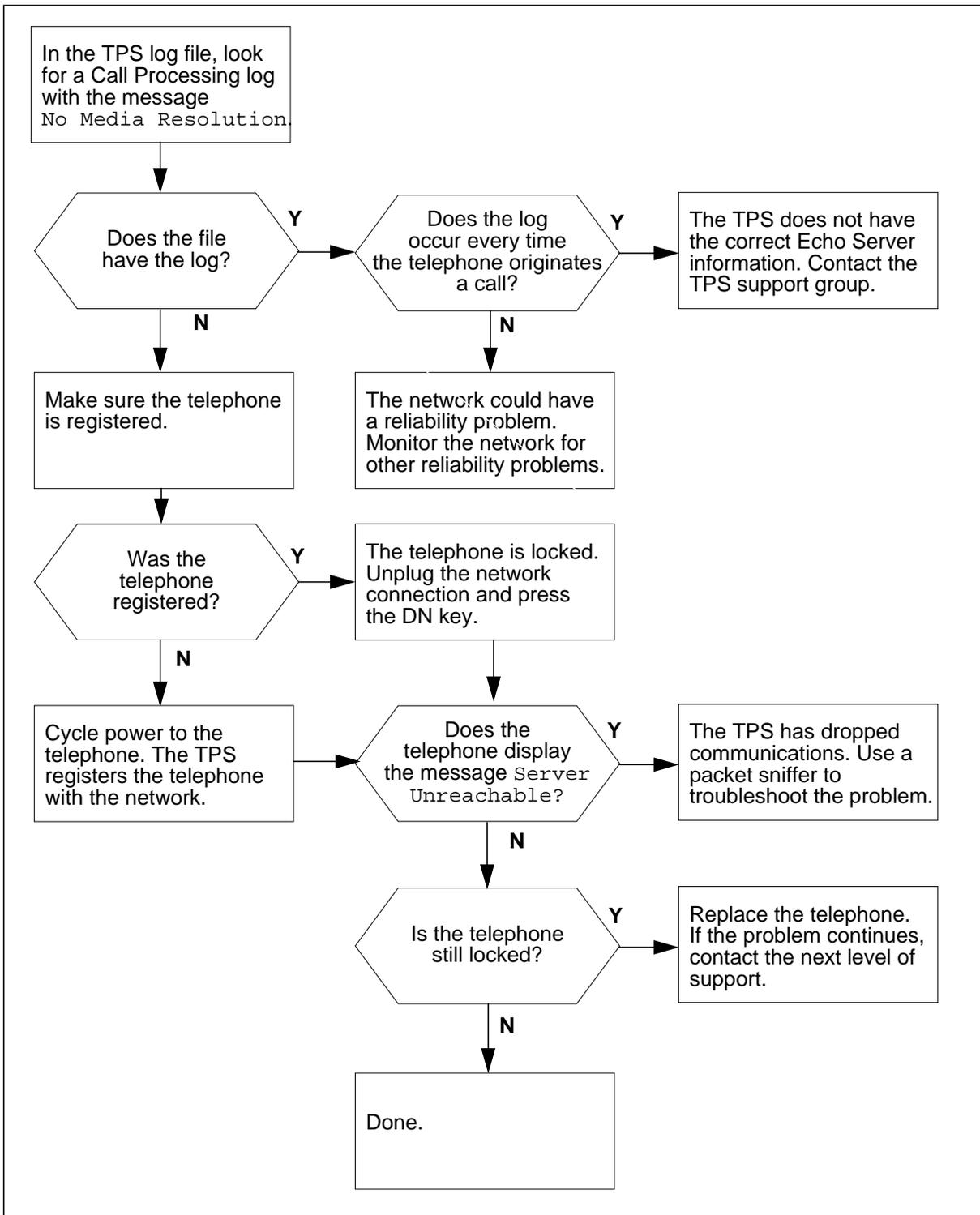The i2004 Internet Telephone may show the following messages in order:

- `Initializing`
- `Initialization Failed`
- `Service Denied`
- a reason code

See the section "Reason codes" in this chapter for information on troubleshooting this problem.

No response when DN key pressed

When a user presses a DN key, the i2004 Internet Telephone may not respond. Figure 4-1 shows the steps to troubleshoot this problem.

Figure 4-1 Troubleshooting no response when DN key pressed

```
In the TPS log file, look
for a Call Processing log
with the message
No Media Resolution.
```

Does the file have the log? — **Y** → Does the log occur every time the telephone originates a call? — **Y** → The TPS does not have the correct Echo Server information. Contact the TPS support group.

N ↓

Make sure the telephone is registered.

Does the log occur every time the telephone originates a call? — **N** ↓ The network could have a reliability problem. Monitor the network for other reliability problems.

Was the telephone registered? — **Y** → The telephone is locked. Unplug the network connection and press the DN key.

N ↓

Cycle power to the telephone. The TPS registers the telephone with the network.

Does the telephone display the message `Server Unreachable?` — **Y** → The TPS has dropped communications. Use a packet sniffer to troubleshoot the problem.

N ↓

Is the telephone still locked? — **Y** → Replace the telephone. If the problem continues, contact the next level of support.

N ↓

Done.

Server unreachable message on a single telephone

If a single i2004 Internet Telephone displays the message `Server Unreachable`, the i2004 cannot communicate with the TPS. The problem can exist in the i2004 Internet Telephone, the TPS, or the communications link between the telephone and the TPS. Perform the following steps to troubleshoot this problem.

1. Make sure the i2004 Internet Telephone is physically connected to the network.

2. If the problem continues, make sure the i2004 Internet Telephone has the correct parameters for the TPS IP address and net submask.

3. If the problem continues, cycle power to the i2004 Internet Telephone.

4. If the problem continues, perform a ping test from the i2004 Internet Telephone to the TPS. If the ping test fails, troubleshoot the TPS or the link to the TPS.

5. If the ping test succeeds, perform a ping test to the i2004 Internet Telephone.

6. If the ping test succeeds, replace the telephone with another i2004 Internet Telephone. If the problem continues with the new i2004 Internet Telephone, contact the next level of support.

Telephone cannot receive incoming call from PSTN telephone

An i2004 Internet Telephone may not receive an incoming call from a PSTN telephone. Perform the following steps to troubleshoot the problem:

1. Make sure the i2004 Internet Telephone is registered. Perform the "Check the terminal registration" procedure in this document. If the i2004 Internet Telephone is not registered, tell the user to cycle power to the telephone.

2. If the telephone was registered, make sure the TPS receives an incoming Q931 SETUP message from the telephone.

   a. Use the TPS Debug tool to trace Q931 messages to the i2004 Internet Telephone. The "Trace messages for an i2004 Internet Telephone" procedure in this document describes how to use the TPS Debug tool to trace messages.

   b. Telnet to the TPS logs file.

   c. Make a call to the i2004 Internet Telephone. If the telephone does not show an incoming call and the telnet window does not show an incoming Q931 message for the telephone, the Gatekeeper has a

problem condition. Troubleshoot the Gatekeeper or contact the Gatekeeper support group.

3. If the TPS receives an incoming Q931 message, check the TPS log file. The following table lists the logs that can help identify the cause of the problem.

TPS log	Cause of problem	Solution
`Terminal <terminal> was presented a call to DN <dn>. However, this terminal does not have an appearance for that DN.`	The Gatekeeper routed the call to the wrong terminal	Troubleshoot the Gatekeeper or contact the Gatekeeper support group.
`Terminal does not have an available appearance for incoming call.`	The DMS released a call that was associated with the telephone, but the TPS was not informed that the call was released.	If the log occurs every time a call is made to the telephone, tell the user to cycle power to the telephone. Contact Nortel Networks TAS to determine why the call was not properly released.
`Q931 Message with eid <id> could not be mapped to a terminal.`	The log occurs if the i2004 Internet Telephone has an active call when the TPS restarts. The telephone cannot receive an incoming call.	Have the user release the call. The TPS re-initializes the telephone.

Telephone drops call when user answers call

When the user answers an incoming call, the telephone drops the call. Check the TPS log file for a log with the following message:

`Retrieve request without RTP info on call <call_id>`

The user retrieved the call before the i2004 Internet Telephone provided the TPS with the IP address and port information needed for the incoming call.

Check the TPS log file for a log with the following message:

`<terminal_info> - sent NewCAllReject! DN:DNAppearance :<dn_no>`

If you see a single log, the network could have a reliability problem. Monitor the network for similar errors or contact the appropriate support group.

If you see the log every time the user answers a call, the TPS does not have the correct Echo Server information. Contact the TPS support group.

Telephone fails to process a request

The i2004 Internet Telephone may fail to process a request in the following circumstance:

1. An i2004 user is on a call to another i2004 user.

2. The caller attempts to perform one of the following actions:

    - hold a call

    - select a softkey

    - select another DN key

3. The i2004 Internet Telephone beeps and fails to process the user's request.

Check the TPS log file for a log with the following message:

```
Received Invalid Key Event during TPS Media Recovery:
```

The TPS restarted during the call. The TPS preserves calls during a restart. However, the TPS will reject all key presses by the user after a restart.

Have the user hang up. The TPS will reset the i2004 Internet Telephone.

Upgrading firmware message

If a single i2004 Internet Telephone displays the message `Upgrading Firmware`, wait a few minute. The process to upgrade firmware takes several minutes.

If the i2004 Internet Telephone continues to display the message, the telephone cannot communicate with the Trivial File Transfer Protocol (TFTP) or UNIStim File Transfer Protocol (UFTP) server. Perform the following steps:

1. Make sure the TFTP or UFTP load server is running.

2. If the server is running, make sure the DHCP options for the i2004 Internet Telephone are correct.

3. If the DHCP options are correct, make sure the TPS Config tool has the correct i2004 settings.

4. If the i2004 settings are correct, restart the TFTP or UFTP application.

5. If the problem continues, restart the TFTP or UFTP load server.

6. If the problem continues, use the **Relogin** softkey to relogin to the i2004 Internet Telephone.

User cannot activate or deactivate Call Forwarding

If the user cannot activate or deactivate Call Forwarding, perform the following steps:

1. Have the user repeat the key sequence. The user must complete the key sequence in 10 seconds. The key sequence begins when the user presses the **Forward** softkey and ends when the user presses the **OK** softkey.

2. If the problem continues, check the TPS log file for a log with the following message:

   ```
   Q931 timeout occurred on terminal <terminal_id> on call
   <call_id> in call state Defunct with service 18.
   ```

   The TPS sent a Q931 FA message on the null call reference to the Gatekeeper, but the TPS did not receive a response in six seconds.

3. If the problem continues, use the Gatekeeper logs file to troubleshoot the Gatekeeper or contact the Gatekeeper support group.

User cannot activate or deactivate Do Not Disturb

If the user cannot activate or deactivate Do Not Disturb, check the TPS log file for a log with the following message:

```
Q931 timeout occurred on terminal <terminal_id> on call
<call_id> in call state Defunct with service 18.
```

The TPS sent a Q931 FA message on the null call reference to the Gatekeeper, but the TPS did not receive a response in six seconds.

Use the Gatekeeper logs file to troubleshoot the Gatekeeper or contact the Gatekeeper support group.

User cannot retrieve a call

Check the TPS log file for a log with the following message:

```
Select attempt on terminal <terminal_id> was rejected.
```

The TPS is processing an origination request. The TPS allows the user to have only one outstanding origination request. The TPS typically generates this log when the user presses the DN keys too quickly.

Tell the user to press the DN keys slower. If the problem continues, the Gatekeeper or Gateway cannot process messages in an acceptable period of time. Troubleshoot the Gatekeeper or Gateway, or contact the appropriate support group.

Waiting for connection message

If a single i2004 Internet Telephone displays the message `Waiting for Connection`, the TPS has restarted and the i2004 is attempting to connect.

Wait a few minutes for the telephone to connect. If the telephone fails to connect, troubleshoot the TPS or contact the TPS support group.

Network-level problems

This section describes possible network-level problems with the i2004 Internet Telephone.

Batch installations

You can encounter unique problems when you install a large group of i2004 Internet Telephones. One telephone may successfully register, but remaining telephones fail to register. Possible causes to this problem follow:

- The telephone has an incorrect MAC address.

- The telephone has the same IP address as another telephone.

Perform the following steps to troubleshoot problems with an incorrect MAC address.

1. Get the DN keys for the last i2004 Internet Telephone that successfully registered and the first i2004 Internet Telephone that failed to register.

2. Use the TPS Debug tool to find the MAC address for each DN key.

If the MAC addresses match, the i2004 Internet Telephone that failed to register is defective. Return the telephone to Nortel Networks. If the MAC addresses do not match, the i2004 Internet Telephone that failed to register may have an incorrect IP address.

Perform the following steps to troubleshoot problems with an incorrect IP address:

1. Re-initialize the last i2004 Internet Telephone that successfully registered. Make sure DHCP is set to **Off**.

2. Re-initialize the first i2004 Internet Telephone that failed to register, Make sure DHCP is set to **Off**. Use the IP address of the last telephone that successfully registered.

If the first telephone goes out of service, the two telephones have the same IP address. Get a a new IP address for the i2004 Internet Telephone that failed to register.

If the first telephone stays in service, the telephones have different IP addresses. Re-initialize both telephones with the original parameters.
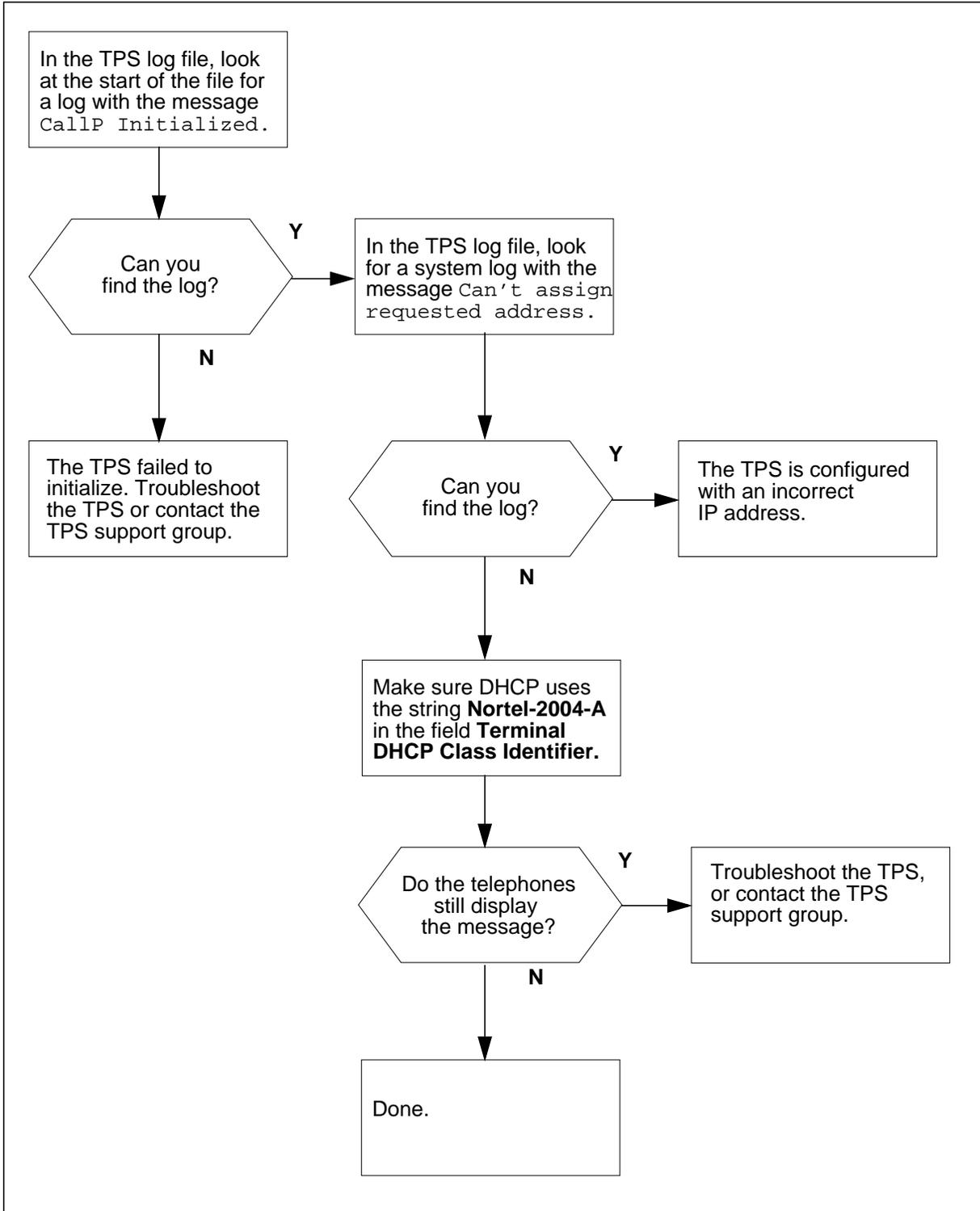
Outbound caller list is empty on multiple telephones

If the outbound caller list is empty on multiple telephones, the TPS for the telephones restarted. The TPS does not preserve the outbound caller list during a restart.

Server unreachable message on multiple telephones

If multiple i2004 Internet Telephones display the message Server Unreachable, the TPS that supports the telephones has a fault. Figure 4-2 shows the steps to troubleshoot this problem.

Figure 4-2 Troubleshooting Server Unreachable message on multiple telephone

```
┌─────────────────────────┐
│ In the TPS log file, look│
│ at the start of the file │
│ for a log with the       │
│ message                  │
│ CallP Initialized.       │
└─────────────────────────┘
            │
            ▼
       Can you                    Y    ┌─────────────────────────┐
       find the log? ──────────────────▶│ In the TPS log file, look│
                                        │ for a system log with the│
            │ N                         │ message Can't assign     │
            ▼                           │ requested address.       │
┌─────────────────────────┐            └─────────────────────────┘
│ The TPS failed to       │                        │
│ initialize. Troubleshoot│                        ▼
│ the TPS or contact the  │              Can you              Y   ┌─────────────────────┐
│ TPS support group.      │              find the log? ──────────▶│ The TPS is configured│
└─────────────────────────┘                                       │ with an incorrect    │
                                            │ N                    │ IP address.          │
                                            ▼                      └─────────────────────┘
                                ┌─────────────────────────┐
                                │ Make sure DHCP uses the │
                                │ string Nortel-2004-A in │
                                │ the field Terminal DHCP │
                                │ Class Identifier.       │
                                └─────────────────────────┘
                                            │
                                            ▼
                                  Do the telephones     Y   ┌─────────────────────┐
                                  still display ───────────▶│ Troubleshoot the TPS,│
                                  the message?              │ or contact the TPS   │
                                            │ N             │ support group.       │
                                            ▼               └─────────────────────┘
                                ┌─────────────────────────┐
                                │ Done.                   │
                                └─────────────────────────┘
```

TPS restarts

If the TPS restarts, the i2004 Internet Telephones on the TPS can experience operational and connection problems. The problems can affect a single telephone, multiple telephones, or all telephones on the TPS.

The TPS release notes on the Centrex IP software CD provide information on TPS restarts and possible trouble conditions for the i2004 Internet Telephone.

Waiting for connection message on multiple telephone

If multiple i2004 Internet Telephones show the message `Waiting for Connection`, the TPS for the i2004 Internet Telephones has not established a connection to the Gatekeeper.

Check the TPS log file for the following log:

```
Failed to establish outgoing Q931 connection to <ip_address>
```

The log indicates that the TPS failed to establish a connection to the Gatekeeper. Perform the following steps:

1. Make sure the Gatekeeper is running.
2. In the TPS Config tool, make sure the value in the **GK IP Address** field is set to the virtual IP address of the Gatekeeper.

Waiting to register message on multiple telephones

If multiple i2004 Internet Telephones display the message `Waiting to Register`, the TPS has restarted and the terminals are in the queue to be re-initialized. The TPS re-initializes a set number of i2004 Internet Telephones at the same time.

Wait a few minutes for the telephone to re-initialize. Each telephone takes a few seconds to re-initialize. In a large network, the TPS can take several minutes to re-initialize all the telephones.

5 Operations and maintenance procedures

ATTENTION

The procedures in this chapter describe a range of activities. Contact the appropriate level of support if you do not have the responsibility or expertise to perform a procedure.

This chapter provides procedures to operate and maintain the i2004 Internet Telephone in a Centrex IP network.

Change a terminal profile

Application

Use this procedure to change a terminal profile for an i2004 Internet Telephone. This procedure provides steps to change the following information:

• the directory assistance number of the terminal

• the language of the terminal

Prerequisites

Make sure you have the directory assistance number for the i2004 Internet Telephone.

Action

Perform the following steps to complete this procedure.

From the MAP terminal

1 Determine the DN key for the telephone.

    a From the CI command line, open the QPIN tool. type

       >qpin

       and press the **Enter** key.

       The MAP terminal shows the following message:

       QPIN - Query PIN/DNKEY for IP-Pphone/IPLL

       QPIN:

    b At the **QPIN** prompt, enter the DN of the telephone. Type

       >dn <dn>

       and press the **Enter** key.

       where

       dn is the DN of the telephone.

       Example

       >dn 6137234732

       The MAP terminal shows the DN key of the DN.

       DNKEY : 00613723473200950097

    c Record the DN key.

Change a terminal profile (end)

From the TPS terminal

2   Start the TPS Config Tool. From the Taskbar, select **Start->Program Files->Nortel Networks->Terminal Proxy Server->Configuration Tool**.

The TPS Config Tool opens.

3   Click the **DN Key Settings** tab.

The DN Key Settings window opens.

4   Select the DN key that you recorded in step 1c.

If you need to change the	Do
directory assistance number for the terminal	Go to step 5.
language for the terminal	Go to step 6.

5   Update the **Directory Number** for the new DN key.

   a   Make sure the row with the new DN key is selected.

   b   In the **DN Key Profiles** table, double-click the value in the **Directory Number** column.

   The field changes color to white and shows a flashing cursor.

   c   In the field, enter the user's directory assistance number and press the **Enter** key.

   *An asterisk (*) appears next to the DN key value. The message ***denotes unsaved changes** appears above the table.*

If you	Do
need to change language for the terminal	Go to step 6.
do not need to change the language of the terminal	Go to step 7.

6   Update the **Language** for the new DN key.

   a   Right-click the value under **Language**.

   The field changes color to grey and a icon for a pull-down menu appears.

   b   From the pull-down menu, select the language.

7   Save the new terminal profile. Click the **Apply** button.

8   Quit the TPS Config Tool. Click the **OK** button.

9   You have completed this procedure.

Check the terminal registration

Application

Use this procedure to make sure a terminal is registered with the Gatekeeper.

Prerequisites

Make sure you have the directory number (DN) key of the terminal.

Action

Perform the following steps to complete this procedure.

From the TPS terminal

1   Start the TPS Debug tool. From the Taskbar, select
    Start->Programs->Nortel Networks->Terminal Proxy Server ->Debug Tool.
    The TPS Debug Tool window opens.

2   Enter the following information:
    - User Name
    - Password
    - Internet Protocol (IP) address of the Terminal Proxy Server (TPS)

    When you finish, click the **OK** button.

3   Click the **TPS Table Details** tab.

4   Use the pull-down menu to select the **DnKeyToHwid** table and click the **Dump** button.

5   Find the DN key for the terminal. Record the MAC address for the DN key.

If If you	Do
find the DN key	Go to step 6
do not find the DN key	The terminal is not registered with the Gatekeeper. Go to step 8.

6   Use the pull-down menu to select the **HwidToRasEid** table and click the **Dump** button.

7   Find the MAC address you recorded in step 5.

If If you	Do
find the MAC address	The terminal is registered with the Gatekeeper. Go to step 8.
do not find the MAC address	The terminal is not registered with the Gatekeeper. Go to step 8.

8   You have completed this procedure.

Logout of an i2004 Internet Telephone

Application

Use this procedure to log out of an i2004 Internet Telephone. You may need to logout of an i2004 Internet Telephone before you login to the telephone to troubleshoot a problem.

Prerequisites

This procedure has no prerequisites.

Action

Perform the following steps to complete this procedure.

From the i2004 Internet Telephone

1   Press the **Services** key. The Services key is the key with the globe icon in the in the lower right corner of the i2004 Internet Telephone.

*The i2004 Internet Telephone displays the service **Phone Options**.*

2   Press the **Select** softkey.

*The i2004 Internet Telephone displays the following options: **Display Contrast**, **Firmware Version**, and **Log Out**.*

3   Use the up and down keys in the navigation cluster to select **Log Out**.

4   Press the **Select** softkey.

The i2004 Internet Telephone displays the following message:

```
Press OK to end the session or press Cancel to resume.
```

5   Press the **OK** soft key.

The i2004 Internet Telephone logs out of the TPS. The i2004 Internet Telephone displays the following message:

```
Enter the DN Key.
```

   Note: At this prompt, you can use a new DN key login to the telephone.

6   You have completed this procedure.

Perform a ping test from the i2004 Internet Telephone

Application

Use this procedure to perform a ping test for an i2004 Internet Telephone in a Centrex IP network. This procedure performs the following activities:

- Perform a ping test to the Terminal Proxy Server (TPS).
- Perform a ping test to the i2004 Internet Telephone.

Prerequisites

This procedure has the following prerequisites:

- Have a portable personal computer (PC).
- Make sure you have the Internet Protocol (IP) address of the TPS.

Action

Perform the following steps to complete this procedure.

From the i2004 Internet Telephone

1   Record the IP address of the i2004 Internet Telephone. The IP address is the **SET IP** parameter in the i2004 Internet Telephone.

2   Disconnect the Category 5 line cord from the base of the i2004 Internet Telephone.

3   Plug the Category 5 line cord into the portable PC.

4   Turn the PC on.

5   Open an MS-DOS window.

6   Perform a ping test to the TPS. At the MS-DOS prompt, type

     >ping <tps_ip>

     and press the **Enter** key.

     where

     <tps_ip> is the IP address of the TPS

If the ping test	Do
successfully connects to the TPS	The TPS and the communications link are in service. Go to step 7.
displays a `Request Timed Out` message	The TPS or the communications link is not in service. Troubleshoot the problem or contact the TPS support group.

     Note: Possible troubleshooting steps include replacing the Category 5 line cord or running the tracert tool to trace the route to the TPS.

7   Disconnect the Category 5 line cord from the portable PC.

8   Connect the Category 5 line cord to the base of the i2004 Internet Telephone.

Perform a ping test from the i2004 Internet Telephone (end)

9   Disconnect the Category 5 line cord from the IP voice network.

10   Plug the Category 5 line cord into the portable PC.

11   Perform a ping test to the i2004 Internet Telephone. At the MS-DOS prompt, type

>ping <i2004_ip>

and press the **Enter** key.

where

<i2004_ip> is the IP address of the i2004 Internet Telephone

If the test is	Do
successful	The i2004 Internet Telephone and the communications link are in service. Go to step 12.
not successful	The i2004 Internet Telephone or the communications link is not in service. Troubleshoot the problem or contact the appropriate support group.

12   You have completed this procedure.

Run tracert from the i2004 Internet Telephone

Application

Use this procedure to run the tracert utility from an i2004 Internet Telephone.

Prerequisites

This procedure has the following prerequisites:

- Have a portable personal computer (PC).

- Make sure you have the Internet Protocol (IP) address of the Terminal Proxy Server (TPS).

Action

Perform the following steps to complete this procedure:

From the i2004 Internet Telephone

1   Disconnect the Category 5 line cord from the base of the i2004 Internet Telephone.

2   Plug the Category 5 line cord into the portable PC.

3   Turn the PC on.

4   Open an MS-DOS window.

5   Trace the route to the TPS. At the MS-DOS prompt, type

   `>tracert <tps_ip>`

   and press the **Enter** key.

   where

   <tps_ip> is the IP address of the TPS

   The tracert utility displays the IP address of each device in the route of the packet.

If the trace	Do
is successful	The TPS and the communications link are in service. Go to step 6.
displays the message `Destination net unreachable` for any IP address.	A problem exists at that IP address. Troubleshoot the problem or contact the appropriate support group.

   Note: If necessary, repeat this step to troubleshoot communications problems from the i2004 Internet Telephone. You may need to trace the route to other components in the Centrex IP network.

6   You have completed this procedure.

Trace messages for an i2004 Internet Telephone

Application

Use this procedure to view messages between an i2004 Internet Telephone and the telephone's Terminal Proxy Server (TPS).

Prerequisites

This procedure has the following prerequisites:

- Make sure you have the MAC address of the telephone. If necessary, perform the "View the MAC address of a DN key" procedure or the "View the MAC address of an i2004 Internet Telephone" procedure in this document.

- Make sure the telephone is registered. If necessary, perform the "Check the terminal registration" procedure in this document.

Action

Perform the following steps to complete this procedure.

From the TPS terminal

1   Start the TPS Debug tool. From the Taskbar, select
Start->Programs->Nortel Networks->Terminal Proxy Server->Debug Tool.

The TPS Debug Tool window opens.

2   Enter the following information:

- User Name

- Password

- IP address of TPS

When you finish, click the **OK** button.

3   Click the **Trace Mask** tab.

4   Under the **Terminals** heading, select the MAC address for the i2004 Internet Telephone that will receive the incoming call.

If you are tracing	Do
Q931 messages	Select **Q931Messaging Full**
RAS messages	Select **RAS Messaging Full**
UNIStim messages	Select **Controller Conn 1**

5   Click the **Apply** button.

6   Make calls to the i2004 Internet Telephone. The TPS generates logs that show the messages between the TPS and the telephone.

7   When you finish the calls, return to the TPS Debug tool and deselect all tracing categories that you selected in step 4.

Trace messages for an i2004 Internet Telephone (end)

8	Click the **Apply** button.
9	Click the **OK** button.
10	Open the TPS log file and view the messages.
11	You have completed this procedure.

View or change parameters on an i2004 Internet Telephone

Application

Use this procedure to view or change the parameters on an i2004 Internet Telephone.

Prerequisites

This procedure has the following prerequisites:

- Make sure you have the directory number (DN) key for the i2004 Internet Telephone from the system administrator.

- Make sure you know how the i2004 Internet Telephone will use Dynamic Host Configuration Protocol (DHCP). The i2004 Internet Telephone can use full DHCP, partial DHCP, or no DHCP.

  If the telephone uses partial DHCP or no DHCP, you will manually enter the parameters in the telephone during this procedure. Refer to the "Parameters" section in the "Components and features" chapter in this document.

You can use the following keys to view or change the parameters:

- Use the asterisk (*****) key to enter a period (.) when you enter an IP address.

- Softkey 1 is the **OK** key. The **OK** key accepts the information and continues to the next parameter.

- Softkey 2 is the **Bkspace** key. **The Bkspace** deletes each character.

- Softkey 3 is the **Clear** key. The **Clear** key deletes the entry.

- Softkey 4 is the **Cancel** key. The **Cancel** key aborts the session and forces the i2004 Internet Telephone to perform a hard reset.

Action

Perform the following steps to complete this procedure.

View or change parameters on an i2004 Internet Telephone (continued)

At the i2004 Internet Telephone

1   Enter the default key sequence. Press the following keys in sequence.

- **Mute**
- **Right** navigation key
- **Up** navigation key
- **Left** navigation key
- **Down** navigation key
- **Up** navigation key
- **Mute**
- **Mute**

*The display screen shows **Manual Cfg** and the entry for **DHCP?** parameter.*

2   The **DHCP?** parameter identifies the use of DHCP. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

If you enter	Do
0 (the i2004 uses DHCP)	*The display screen shows the entry for the **DHCP** parameter.* Go to step 3.
1 (the i2004 does not use DHCP)	*The display screen shows the entry for the **SET IP** parameter.* Go to step 4.

3   The **DHCP** parameter is the level of DHCP use. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

If you enter	Do
0 (the i2004 uses full DHCP)	*The display screen shows the message **Locating server....*** Go to step 15.
1 (the i2004 uses partial DHCP)	*The display screen shows the entry for the **S1** parameter.* Go to step 7.

4   The **SET IP** parameter is the IP address of the i2004 Internet Telephone. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **NETMSK** parameter.*

5   The **NETMSK** parameter is the network submask. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **DEF GW** parameter.*

View or change parameters on an i2004 Internet Telephone (continued)

6   The **DEF GW** parameter is the IP address of the subnet router. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S1 IP** parameter.*

7   The **S1 IP** parameter is the IP address of the primary Terminal Proxy Server (TPS). If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S1 PORT** parameter.*

8   The **S1 PORT** parameter is the port number of the primary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S1 ACTION** parameter.*

9   The **S1 ACTION** parameter is the action code for the primary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S1 RETRY COUNT** parameter.*

10   The **S1 RETRY COUNT** parameter is the retry count for the primary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S2 IP** parameter.*

11   The **S2 IP** parameter is the IP address of the secondary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S2 PORT** parameter.*

12   The **S2 PORT** parameter is the port number of the secondary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S2 ACTION** parameter.*

13   The **S2 ACTION** parameter is the action code for the secondary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

*The display screen shows the entry for the **S2 RETRY COUNT** parameter.*

View or change parameters on an i2004 Internet Telephone (end)

14   The **S2 RETRY COUNT** parameter is the retry count for the secondary TPS. If necessary, edit the entry. When you finish, click the **OK** button to save the entry and advance to the next parameter.

The telephone attempts to connect to the server.

If the display shows	Do
Locating server...	Go to step 15.
a blank screen	Press the **Goodbye** key and go to step 17.

15   Wait for the display to show one of the following messages.

If the display shows	Do
Enter the DNkey...	The telephone successfully connected to the server. Go to step 16.
Server unreachable	The telephone did not successfully connect to the server. Go to the troubleshooting chapter in this document.

16   Enter the DN key and press the **OK** button.

   Note: If the display screen remains blank, take the telephone offhook.

17   You have completed this procedure.

View the MAC address of a DN key

Application

Use this procedure to view the media access control (MAC) address associated with a directory number (DN) key. You will need this information to perform call traces and troubleshoot problems with the i2004 Internet Telephone.

Prerequisites

This procedure has no prerequisites.

Action

Perform the following steps to complete this procedure.

From the TPS terminal

1   Start the TPS Debug tool. From the Taskbar, select
Start->Programs->Nortel Networks->Terminal Proxy Server ->Debug Tool.

The TPS Debug Tool window opens.

2   Enter the following information:

- User Name

- Password

- IP address of TPS

When you finish, click the **OK** button.

3   Click the **TPS Table Details** tab.

4   Use the pull-down menu to select the **DnKeyToHwid** table and click the **Dump** button.

5   Find the entry for the DN key. The entry includes the MAC address.

If you	Do
find the entry	The entry includes the MAC address for the DN key. Go to step 6.
do not find the entry	The DN key is not registered with the Gatekeeper. Go to step 6.

6   You have completed this procedure.

View the MAC address of an i2004 Internet Telephone

Application

Use this procedure to view the media access control (MAC) address of an i2004 Internet Telephone.

Prerequisites

This procedure has no prerequisites.

Action

Perform the following steps to complete this procedure.

At the i2004 Internet Telephone

1 Cycle power to the i2004 Internet Telephone.

2 Enter the default key sequence.

    a Press the first three softkeys, in order from left to right.

    b Press the **Up** navigation key.

    The display screen shows the MAC address of the i2004 Internet Telephone.

3 Press the **OK** button.

4 You have completed this procedure.

6 Specifications

This chapter describes the specifications that govern the performance of the i2004 Internet Telephone.

Note: Refer to the "List of terms" chapter in this document for information on the standards organizations described in this chapter. Refer to the "About this document" chapter in this document for information on the measurement abbreviations used in this chapter.

Temperature

The i2004 Internet Telephone complies with the following standards:

- ANSI/EIA/TIA 571
- IEC 721-2-1, Class 1K5
- IEC 721-2-2, Class 2K4
- IEC 721-3-3, Class 3K4

The i2004 Internet Telephone can perform normal operations in temperature ranges from 5° to 40° C. The i2004 Internet Telephone can be stored or transported in temperature ranges from -40 ^{o} to $+70^o$ C.

Relative humidity

The i2004 Internet Telephone complies with the following standards:

- IEC 721-2-2, Class 2K4
- IEC 721-3-3, Class 3K4

The i2004 Internet Telephone can perform normal operations in relative humidity ranges from 5% to 95%. During normal operations, humidity cannot exceed 29g of water per m^3 of dry air. The i2004 Internet Telephone can be stored or transported in relative humidity of 95% at 45° C. During storage or transport, humidity cannot exceed 60g of water per m^3 of dry air.

Electromagnetic compatibility

The i2004 Internet Telephone complies with standards for electromagnetic interference (EMI)/radio frequency interference (RFI) and electrostatic discharge (ESD).

EMI/RFI

The i2004 Internet Telephone complies with EMI/RFI standards for several countries. Table 6-1 lists the country and standard.

Table 6-1 EMI/RFI standards

Country	Standard
United States of America	FCC Part 15, Class B
Canada	ICES 003
Australia/New Zealand	AS/NZS 3548, Class B
European Union	• EN55022, Class B
	• EN55024

ESD

The i2004 Internet Telephone complies with ESD standards for several countries. Table 6-2 lists the country and standard.

Table 6-2 ESD standards

Country	Standard
United States of America	IEC 1000-4-2
Canada	IEC 1000-4-2
Global	IEC 1000-4-2
European Union	EN55024

Safety

The i2004 Internet Telephone complies with the applicable sections of the following standards for product safety:

- UL 1950 Information Technology Equipment, including Electrical Business Equipment, Third edition.

- CSA C22.2 No. 950-M95 Information Technology Equipment, including Electrical Business Equipment

- IEC 950

- Nortel Networks Corporate Safety Standards 9001 series
- European Norm EN 60950
- Australia/N. Zealand Standards AS/NZS 3260and ACA TS001

Atmospheric pollution

The i2004 Internet Telephone complies with standards for air purity and particles.

Air purity

The i2004 Internet Telephone complies with standards for air purity. Table 6-3 lists the attribute and standard for operations and storage/transportation.

Table 6-3 Air purity standards

| Attribute | Normal operations | | Storage/Transportation | |
	Requirement	Standard	Requirement	Standard
Sulphur dioxide	0.1 mg/m^3	IEC 721-3-3 Class 3C1	0.3 mg/m^3	• IEC 721-3-1, Class 1C2
Hydrogen sulphide	0.01 mg/m^3		0.1 mg/m^3	• IEC 721-3-2 Class 2C2
Chlorine	0.1 mg/m^3		0.1 mg/m^3	
Hydrogen cloride	0.1 mg/m^3		0.1 mg/m^3	
Hydrogen fluoride	0.003 mg/m^3		0.01 mg/m^3	
Ammonia	0.3 mg/m^3		1.0 mg/m^3	
Ozone	0.01 mg/m^3		0.06 mg/m^3	
Nitrogen oxides	0.1 mg/m^3		0.5 mg/m^3	

Particles

The i2004 Internet Telephone complies with standards for particles. Table 6-4 lists the attribute and standard for operations and storage/transportation.

Table 6-4 Particle standards

| Attribute | Normal operations | | Storage/Transportation | |
	Requirement	Standard	Requirement	Standard
Dust sediment	0.4 mg/m^2/day	IEC 721-3-3, Class 2S2	3 mg/m^2/hr	IEC 721-3-2, Class 2S3
Dust suspension	0.2 mg/m^3			
Sand	30 g/m^3		30 g/m^3	

Vibration

The i2004 Internet Telephone complies with standards for vibration. Table 6-5 lists the attribute and standard.

Table 6-5 Vibration standards

| Attribute | Normal operations | | Storage/Transportation | |
	Requirement	Standard	Requirement	Standard
Sinusoidal	• 1.5 mm @ 2 to 9 Hz • 5 m/s^2 @ 9 to 200 Hz	IEC 721-3-3, Class 3M3	• 3.5 mm @ 2 to 9 Hz • 10 M/s^2 @ 9 to 200 Hz • 15 m/s^2 @ 200 to 500 Hz	• ANSI/EIA/TIA 571 • IEC 721-3-2, Class 2MS
Non-stationary	70 m/s^2 22 ms, Type L Spectrum	IEC 721-3-3, Class 3M3		
Random			• 1m^2/s^3 @ 10 to 200 Hz • 0.3 m^2/s^3 @ 200 to 2000 Hz	IEC 721-3-2, Class 2M2

Shock

When the i2004 Internet Telephone is unpackaged and performing normal operations, the telephone complies with IEC 721-3-3, Class 3M3. The i2004 Internet Telephone can survive Type L spectrum shocks of 70 m/s^2 ms.

When the i2004 Internet Telephone is packaged for storage or transportation, the telephone complies with IEC 721-3-2, Class 2M2. The i2004 Internet Telephone can survive the following shocks:

• Type I spectrum shocks of 100 m/s^2 11 ms

• Type II spectrum shocks of 300 m/s^2 6 ms

Drops

When the i2004 Internet Telephone is unpackaged and performing normal operations, the telephone complies with ANSI/EIA/TIA 571. The i2004 Internet Telephone can survive 6 random drops from 76 cm.

When the i2004 Internet Telephone is packaged for storage or transportation, the telephone complies with the following standards:

• ANSI/EIA/TIA 571

• IEC 721-3-2, Class 2M2

The i2004 Internet Telephone can survive the following drops:

- drops of 0 to less than 20 kg, 1.2 m

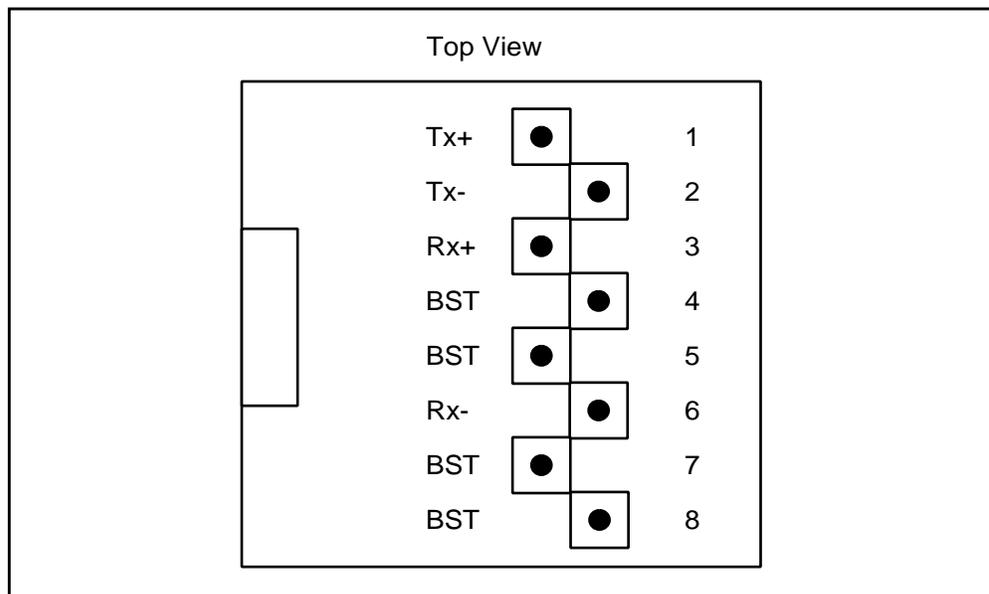- drops of 0 to 9 kg, 76 cm drop on each face and corner

Network interface

The i2004 Internet Telephone supports a single Ethernet loop with the following specifications:

- 10BaseT (IEEE 802.3 1998)

- 10BaseTX

    — IEEE 802.3 1998

    — ASNI X3.263 (1995)

The Ethernet connection on the i2004 Internet Telephone is an inline, 8-pin RJ-45 jack. Figure 6-1 shows the pinouts on the jack.

Figure 6-1 Pinouts for Ethernet jack

```
┌────────────────────────────────────────────┐
│                                            │
│               Top View                     │
│                                            │
│        ┌─────────────────────────┐         │
│        │      Tx+   ● │    1      │         │
│        │      Tx-   │ ●│    2      │         │
│   ┌──┐ │      Rx+   ● │    3      │         │
│   │  │ │      BST   │ ●│    4      │         │
│   │  │ │      BST   ● │    5      │         │
│   │  │ │      Rx-   │ ●│    6      │         │
│   └──┘ │      BST   ● │    7      │         │
│        │      BST   │ ●│    8      │         │
│        └─────────────────────────┘         │
│                                            │
└────────────────────────────────────────────┘
```

TX identifies outputs from the telephone to the network. **RX** identifies inputs to the telephone from the network. **BST** identifies a Bob Smith Termination.

Note: Do not plug the i2004 Internet Telephone into an integrated services digital network (ISDN) connection. The ISDN connection can damage the i2004 Internet Telephone.

7 Ordering information

This chapter lists the product codes, replacement parts and the optional parts for the i2004 Internet Telephone

Product codes

Table 7-1 lists the product engineering codes (PEC) and common product codes (CPC) for the i2004 Internet Telephone.

Table 7-1 Product codes

PEC	CPC	Item	Description
NTEX00BA	B0253074	i2004 Internet Telephone with power supply	Domestic use
NTEX00BB	B0256456	I2004 Internet Telephone without power supply	International use

Replacement parts

The following parts are field-replaceable parts for the i2004 Internet Telephone:

- power supplies
- set parts, such as the handset and line cord

Table 7-2 lists the power supplies available for the i2004 Internet Telephone

Table 7-2 Power supplies

Part Number	Description
TBD	Power supply - Japan
A0619627	Power supply - North America
A0619635	Power supply - Europe
A0619635	Power supply - United Kingdom
A0647042	Power supply - Australia

Table 7-3 lists the set parts that are replaceable on the i2004 Internet Telephone

Table 7-3 Replaceable set parts

Part Number	Description
A0648375	Line cord - Category 5, 7 ft.
A0788682	Handset cord - Ether Grey
A0788874	Handset assembly - Ether Grey
P0744242	Number card lens
P0744243	Number card
P0886045	Stand assembly - charcoal

Optional parts

Table 7-4 lists the optional parts available for the i2004 Internet Telephone.

Table 7-4 Optional parts

Part Number	Description
A0779338	Headset assembly
A0779739	Shoulder rest for handset
NTMN15AA-70	Wall mount kit - charcoal

List of terms

address resolution protocol (ARP)
> A TCP/IP protocol that dynamically binds a network layer IP address to a data link layer physical hardware address.

American National Standards Institute (ANSI)
> An organization supported by the U.S. industry to establish uniformity of standards.

ANSI
> *See* American National Standards Institute (ANSI).

ARP
> *See* address resolution protocol (ARP).

ASCII
> American Standard Code for Information Interchange.

BOOTP
> *See* Bootstrap Protocol (BOOTP).

Bootstrap Protocol (BOOTP)
> Protocol used by node, when booted, to learn about its own IP address and/or the IP address of the server it must contact to download the load it should boot.

CODEC
> Coding/decoding equipment. An analog-to-digital and digital-to-analog converter used to convert analog voice frequency signals to digital bit streams for transmission over a digital medium.

common product code (CPC)
> A unique identifier to every product, component, or material entity designed, manufactured, purchased, or sold by Nortel Networks.

CPC
> *See* common product code (CPC).

DHCP

See Dynamic Host Configuration Protocol (DHCP).

directory number (DN)

The full complement of digits required to designate a subscriber's station within one numbering plan area (NPA)--usually a three-digit central office (CO) code followed by a four-digit station number.

DN

See directory number (DN).

Dynamic Host Configuration Protocol (DHCP)

Protocol used to dynamically assign and unassign an IP address to a host. This is an extension to BOOTP. The DHCP servers also accept and respond to BOOTP requests.

EIA

See Electronic Industries Association (EIA).

electromagnetic interference (EMI)

Any electromagnetic radiation released by an electronic device that disrupts the operation or performance of another device.

Electronic Industries Association (EIA)

An American organization made up of manufacturers of a wide variety of electronic products, including telecommunications equipment.

electrostatic discharge (ESD)

Discharge of a static charge on a surface or body through a conductive path to ground.

EMI

See electromagnetic interference (EMI).

ESD

See electrostatic discharge (ESD).

FCC

See Federal Communications Commission (FCC).

Federal Communications Commission (FCC)

The United States federal regulatory agency charged with regulation of frequency spectrum usage.

File Transfer Protocol (FTP)

> A software protocol that operates over the Internet or other wide area networks. When called, it connects to a specified server or site that is set up to utilize FTP protocol. Files and information are retrieved by the connecting server.

FTP

> *See* File Transfer Protocol (FTP).

ICES

> *See* interference-causing equipment standard (ICES).

ICMP

> *See* Internet Control Message Protocol (ICMP).

IEC

> *See* International Electrotechnical Commission (IEC).

IEEE

> See Institute of Electrical and Electronics Engineers (IEEE)

Institute of Electrical and Electronics Engineers (IEEE)

> International professional society that issues its own standards and is a member of the American National Standards Institute and the International Standards Institute and the International Standards Organization.

integrated services digital network (ISDN)

> A set of standards proposed by CCIT to establish compatibility between the telephone network and various data terminals and device.

interference-causing equipment standard (ICES)

> Any in a set of standards established by Industry Canada that specify the technical requirements for interference-causing equipment.

International Electrotechnical Commission (IEC)

> A regulatory body that defines requirements for Canada, the United States, and most countries in the European Community for mechanical considerations.

Internet Control Message Protocol (ICMP)

> An IP protocol that provides a number of diagnostic function and can send error packets to hosts.

Internet Protocol (IP)

> A direct outward dialing standard protocol designed for use in interconnected systems of packet-switched computer communications networks.

IP

> *See* Internet Protocol (IP).

ISDN

> *See* integrated services digital network (ISDN)

ISDN line trunk controller (LTCI)

> A peripheral module that is a combination of the line group controller and the digital trunk controller and provides all of the services offered by both.

LAN

> *See* local area network (LAN).

local area network (LAN)

> A network that permits the interconnection and intercommunication of multiple computers, primarily for sharing resources such as data storage devices and printers.

LTCI

> *See* ISDN line trunk controller (LTCI).

MAC

> *See* media access control (MAC).

MADN

> *See* multiple-appearance directory number (MADN).

media access control (MAC)

> In LANs, the sublayer of the data link control layer that supports medium-dependent functions and uses the services of the physical layer to provide services to the logical link control (LLC) sublayer. The MAC sublayer includes the method of determining when a device has access to the transmission medium.

multiple-appearance directory number (MADN)

> A directory number that is assigned to more than one telephone.

NAT

> *See* network address translation (NAT).

network address translation (NAT)

> The process that assigns a unique IP address to a WAN interface.

PBX

> *See* private branch exchange (PBX).

PEC

See product engineering code (PEC).

private branch exchange

A private telephone exchange, either automatic or attendant-operated, serving extensions in an organization and providing access to the public network.

product engineering code (PEC)

An eight-digit alphanumeric code that identifies a Nortel Networks hardware or software product.

P-side

Peripheral side. The side of a node facing away from the central control and towards the peripheral modules.

PSTN

See public switched telephone network (PSTN).

public switched telephone network (PSTN)

The worldwide voice telephone network accessible to all those with telephones and access privileges.

radio frequency interference (RFI)

Interference that is generated or induced in electronic circuits and is in the radio frequency region of the electromagnetic spectrum.

Realtime Transport Protocol (RTP)

An IP protocol that supports the realtime transmission of voice and video. An RTP packet rides on top of UDP and includes timestamping and synchronization information in its header for proper reassembly at the receiving end.

RFI

See radio frequency interference (RFI).

RTP

See Realtime Transport Protocol (RTP).

Telecommunications Industry Association (TIA)

The North American telecommunications standards setting association.

Terminal Proxy Server (TPS)

A component of the Centrex IP network. TPS software performs call control services for the i2004 Internet Telephone.

TFTP

See Trivial File Transfer Protocol (TFTP).

TIA

See Telecommunications Industry Association (TIA).

TPS

See terminal proxy server (TPS).

Trivial File Transfer Protocol (TFTP)

A protocol used to download BOOTP files, similar to FTP, but without the security. TFTP uses User Datagram Protocol (UDP) instead of TCP.

UDP

See User Datagram Protocol (UDP).

Unified Network IP Stimulus (UNIStim) Protocol

A Nortel Networks proprietary protocol that provides master/slave control for end devices. UNIStim provides a command set that allows network-based intelligence to control every aspect of the slave device.

UNIStim

See Unified Network IP Stimulus (UNIStim) Protocol.

User Datagram Protocol (UDP)

The UDP is the transport protocol used for packet delivery service. It is a lightweight protocol because it does not have the overhead of creating connections and verifying delivery.

Voice over Internet Protocol (VoIP)

The technology that delivers voice information in digital form in discrete packets using IP rather than the traditional circuit-committed protocols of the PSTN. VoIP involves the conversion of voice from telephone format (analog) into a packet format (digital) that can be transported over an internet.

VoIP

See Voice over Internet Protocol (VoIP).

XMS-based peripheral module (XPM)

The generic name for peripheral modules that use the Motorola 68000 microprocessor.

XPM

See XMS-based peripheral module (XPM).

DMS-100 Family

Centrex IP

i2004 Operations and Maintenance Manual

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference in radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numerique de la classe A est conforme a la norme NMB-003 du Canada.

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Use only with Nortel Networks recommended, approved Limited Power Source; output rated; 16 VAC, 500 mA, 50/60 Hz.

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