



Nortel Communication Server 1000

IP Phones Fundamentals

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Standard 01.02. This document is up-issued to support Communication Server 1000 Release 5.0. This document contains an update due to CR Q01584230, CR Q01642379, CR Q01656411, and CR Q01647741. It also contains an update to the TFTP Server section.

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Standard 01.01. This document is up-issued to support Communication Server 1000 Release 5.0. This document is renamed *IP Phones Fundamentals (NN43001-368)* and contains information previously contained in the following legacy document, now retired: (553-3001-368).

This document is also up-issued to include updates due to CR Q01605678 and CR Q01589713.

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January 2006

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January 2006

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Standard 6.00. This document is up-issued to support the addition of the IP Phone 2007.

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Standard 5.00. This document is up-issued to support the addition of the IP Audio Conference Phone 2033.

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Standard 4.00. This document is up-issued to support the 8.x Firmware Upgrade for IP Phones.

September 2004

Standard 3.00. This document is up-issued to support Communication Server 1000 Release 4.0.

June 2004

Standard 2.00. This document is up-issued to include the Nortel Networks Mobile Voice Client 2050.

October 2003

Standard 1.00. This document is a new NTP for Succession 3.0 Software. It was created to support a restructuring of the Documentation Library. This document contains information previously contained in the following legacy document, now retired: *Internet Terminals Description* (553-3001-217).

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New in this release

The following sections detail what is new in *IP Phones Fundamentals (NN43001-368)* for CS 1000 Release 5.0.

Features

- IP Softphone 2050 Release 3.0 software
- Expansion Module for IP Softphone 2050

Subject

This document contains description, installation, and administration information for the following:

- Nortel IP Audio Conference Phone 2033
- Nortel IP Phone 2001, IP Phone 2002, IP Phone 2004, and IP Phone 2007
- Nortel IP Phone Key Expansion Module (KEM)
- Nortel IP Softphone 2050
- Nortel Mobile Voice Client 2050 for Personal Digital Assistants (PDA)
- Nortel IP Phone 1120E
- Nortel IP Phone 1140E
- Nortel IP Phone 1150E
- Nortel IP Phone 1110
- Expansion Module for IP Phone 1100 Series

Note on legacy products and releases

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

www.nortel.com

NTPs

This document references the following:

- *IP Phone 2001 User Guide (NN43115-102)*
- *IP Phone 2002 User Guide (NN43116-104)*
- *IP Phone 2004 User Guide (NN43117-102)*
- *IP Phone 2007 User Guide (NN43118-100)*
- *IP Phone Audio Conference Phone 2033 User Guide (NN43111-100)*
- *IP Phone 1120E User Guide (NN43112-103)*
- *IP Phone 1140E User Guide (NN43113-106)*
- *IP Phone 1150E User Guide (NN43114-100)*
- *IP Phone 1110 User Guide (NN43110-101)*
- *IP Softphone 2050 User Guide (NN43119-101)*
- *Mobile Voice Client 2050 User Guide (NN43119-103)*
- *IP Phone Key Expansion Module User Guide*
- *Expansion Module for IP Phones 1100 Series User Guide (NN43130-101)*
- *WLAN IP Telephony Installation and Commissioning (NN43001-504)*
- *Converging the Data Network with VoIP Fundamentals (NN43001-260)*
- *Signaling Server Installation and Commissioning (NN43001-312)*
- *IP Peer Networking Installation and Commissioning (NN43001-313)*
- *Security Management Fundamentals (NN43001-604)*
- *Features and Services Fundamentals—Book 4 of 6 (NN43001-106)*
- *Central Answering Position Implementation Guide (NN43011-501)*
- *IP Line Fundamentals (NN43100-500)*
- *Software Input Output Administration (NN43001-611)*
- *Secure Multimedia Controller Implementation Guide (NN43001-325)*

Online

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

www.nortel.com

CD-ROM

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

How to get Help

This chapter explains how to get help for Nortel products and services.

Getting help from the Nortel Web site

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

www.nortel.com/support

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

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

Getting help over the phone from a Nortel Solutions Center

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

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

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

www.nortel.com/callus

Getting help from a specialist by using an Express Routing Code

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

www.nortel.com/erc

Getting help through a Nortel distributor or reseller

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

Nortel IP Phone 2001

Contents

This section contains the following topics:

- "Introduction" (page 27)
- "Description" (page 28)
- "Components and functions" (page 29)
- "Supported features" (page 30)
- "Features not supported" (page 32)
- "Display characteristics" (page 32)
- "Key number assignments" (page 34)
- "Package components" (page 34)
- "Installation and configuration" (page 36)
- "Full Duplex mode" (page 54)
- "Gratuitous Address Resolution Protocol Protection " (page 55)
- "Extensible Authentication Protocol " (page 56)
- "Redeploying an IP Phone 2001" (page 56)
- "Replacing an IP Phone 2001" (page 57)
- "Removing an IP Phone 2001 from service" (page 57)

Introduction

This section explains how to install and maintain the IP Phone 2001. For information about using the IP Phone 2001, see the *IP Phone 2001 User Guide (NN43115-102)*.

This section contains the following procedures:

- Procedure 1 "Configuring the IP Phone 2001" (page 37)
- Procedure 2 "Installing the IP Phone 2001 for the first time using manual configuration" (page 40)

- Procedure 3 "Installing an IP Phone 2001 for the first time using DHCP" (page 47)
- Procedure 4 "Enabling Full Duplex mode" (page 54)
- Procedure 5 "Checking Ethernet Statistics" (page 55)
- Procedure 6 "Changing the TN of an existing IP Phone 2001" (page 56)
- Procedure 7 "Replacing an IP Phone 2001" (page 57)
- Procedure 8 "Removing an IP Phone 2001 from service" (page 57)

After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 2001 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 2001 translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 2001 network and CS 1000 connections.

Figure 1 "IP Phone 2001" (page 28) shows the IP Phone 2001.

Figure 1
IP Phone 2001



Components and functions

This section describes the following components and functions of the IP Phone 2001:

- "Keys and functions" (page 29)
- "Services menu" (page 29)

Keys and functions

Table 1 "IP Phone 2001 keys and functions" (page 29) describes the IP Phone 2001 keys and functions.

Table 1
IP Phone 2001 keys and functions

Key	Function
Speaker	Press the Line key to activate the speaker for on-hook dialing and listening.
Message waiting/ Incoming call indicator	The Message waiting lamp turns on to indicate that a message is left for the user. This lamp also flashes when the IP Phone ringer is on.
Volume control bar	Use the volume control bar to adjust the volume of the Handset, Ringer, and On-hook Dialing/Listen tones. Press the right side of the rocker bar to increase volume; press the left side to decrease volume.
Navigation keys	Use the navigation keys to scroll through menus and lists in the display area.
Line key	Use the Line key to access the single line and activate on-hook dialing. No status icon or light emitting diode (LED) is provided.
Hold key	Press the Hold key to put an active call on hold. Press the Dial/Line key to return to the caller on hold.
Context-sensitive soft keys (self-labeled)	Context-sensitive soft keys (self-labeled) are located below the display area. The LCD label above the key changes, based on the active feature. A triangle before a key label indicates that the key is active.
Message key	Press the Message key to access your voice mailbox.
Goodbye key	Press the Goodbye key to terminate an active call.

Services menu

Table 2 "Services menu" (page 30) shows the Services menu.

Table 2
Services menu

Services key	<p>Press the Services key to access the following items:</p> <ul style="list-style-type: none"> • Telephone Options <ul style="list-style-type: none"> — Volume adjustment — Contrast adjustment — Language — Date/Time — Local DialPad Tone — Set Info — Diagnostics — Ring type — Call Timer — Live Dialpad • Password Admin <ul style="list-style-type: none"> — Station Control Password • Virtual Office Login and Virtual Office Logout (if Virtual Office is configured) • Test Local Mode and Resume Local Mode (if Branch Office is configured) <p>Press the Services key to exit from any menu or menu item.</p> <p>Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see Appendix "IP Phone diagnostic utilities" (page 483).</p>
<p>If a call is presented while the user is manipulating information, the phone rings. However, the display is not updated with the Caller ID, and the programming text is not disturbed.</p> <p>The user can originate a call using Autodial or Last Number Redial while manipulating an option. However, the display is not updated with the dialed digits or Caller ID, and Autodial and Last Number Redial intercept the dialpad.</p>	

Supported features

The IP Phone 2001 supports the following telephony features:

- four context-sensitive soft keys that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- volume control bar to adjust ringer, speaker, handset, and headset volume
- two specialized feature keys
 - Message/Inbox
 - Services
- two call-processing keys
 - Goodbye
 - Hold
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download
- Live Dialpad

The IP Phone 2001 supports the following data network features:

- 10/100 Mb/s Full Duplex mode
- automatic network configuration through DHCP.

For more information about automatic network configuration, see [Table 4 "IP Phone 2001 IP parameters" \(page 39\)](#).

- 802.1ab Link Layer Discovery Protocol (LLDP)

For more information about LLDP, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).

- Secure Real-time Transport Protocol (SRTP) media encryption.

For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).

- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use. VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN

For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 2
- Gratuitous Address Resolution Protocol (GARP) Protection

The IP Phone 2001 supports the following languages: English, French, Swedish, Danish, Norwegian, German, Greek, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, Turkish, and Katakana.

Features not supported

The following features are not supported on the IP Phone 2001:

- External three-port switch to support sharing LAN access with a PC or other data device is not provided. However, the IP Phone 2001 does provide 100 Mb/s full-duplex support.
- Integrated switch
- Personal Directory, Callers List, and Redial List are not supported. However, if the primary DN on an IP Phone 2001 is an MADN of an IP Phone 2002, IP Phone 2004, or IP Softphone 2050, Preferred Name Match and Idle Set Display (new call indication) are supported.
- Corporate Directory
- Automatic Call Distribution
- IP Key Expansion Modules
- Support of accessory modules
- Group Listening
- Set-to-Set messaging
- Handsfree operation
- Headset support

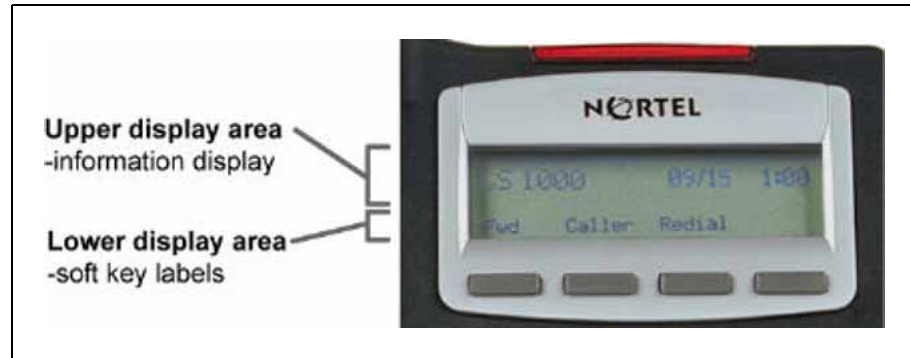
Display characteristics

An IP Phone 2001 has two display areas:

- ["Information Line display" \(page 33\)](#)
- ["Soft key label display" \(page 33\)](#)

[Figure 2 "IP Phone 2001 display areas" \(page 33\)](#) shows these two display areas.

Figure 2
IP Phone 2001 display areas



Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.



CAUTION

Use no any liquids or powders on the IP Phone 2001. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Information Line display

An IP Phone 2001 has a one-line information display area with the following information:

- caller Number
- caller Name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state) or Call Timer (if provisioned in the Telephone options menu)
- set information

The information area changes according to the call-processing state and active features.

Soft key label display

The soft key label has a maximum six characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon appears at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a feature is enabled, the icon state turns

to On. The icon remains in the on state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, and returns the soft key label to its original state.

Use the More soft key to navigate the layers of functions. If only four functions are assigned to the soft keys, the More key does not appear, and all four functions are displayed.

Key number assignments

You can assign a maximum of nine functions to the four soft-labeled, predefined soft keys. Because the soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four soft keys. Labels for the soft keys appear in the display area. For further information, see ["Soft key label display" \(page 33\)](#). [Figure 2 "IP Phone 2001 display areas" \(page 33\)](#) shows the IP Phone 2001 display area.

Key number assignments at the Call Server align with the IP Phone 2002. The mappings between IP Phone 2001 soft key numbers and PBX CPU key numbers are the same as on the IP Phone 2002 and IP Phone 2004.

For a description of the IP Phone function assignment for each soft key, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#)

Package components

The following information applies to Phase II IP Phones. Product codes for Phase II IP Phones are different from previous IP Phones.

See the product code on the back of the phone to confirm whether it is a Phase II IP Phone. The product code for Phase II IP Phones appears as IP Phone 200x. The product code for previous versions of the IP Phones appears with an i in front of the model number (for example, i200x).

You must order the AC power adapter separately if local power using the AC adapter is required, because Phase II IP Phones include integrated support for a number of power over LAN options, including support for IEEE 802.3af standard power.

[Table 3 "IP Phone 2001 components list" \(page 35\)](#) lists the IP Phone 2001 package components and product codes.

Table 3
IP Phone 2001 components list

IP Phone 2001 package contents include	
<ul style="list-style-type: none"> • IP Phone 2001 • handset • handset cord • footstand • 7-ft. Cat5 Ethernet cable • Getting Started card 	
IP Phone 2001 (Ethergray) with Icon keycaps	NTDU90AA16/A0533387
IP Phone 2001 (Ethergray) with English text label keycaps	NTDU90BA16/A0533388
IP Phone 2001 (Charcoal) with Icon keycaps	NTDU90AA70/A0053389
IP Phone 2001 (Charcoal) with English text label keycaps	NTDU90BA70/A0533390
IP Phone 2001 (Charcoal with Bezel) with Icon keycaps	NTDU90AB70
IP Phone 2001 (Charcoal with Bezel) with Icon keycaps (RoHS)	NTDU90AC70E6
IP Phone 2001 (Charcoal with Bezel) with English text label keycaps	NTDU90BB70
IP Phone 2001 (Charcoal with Bezel) with English text label keycaps (RoHS)	NTDU90BC70E6
Replacement parts	
7-ft. Cat5 Ethernet Cable	A0648375
Handset, Ethergray	A0788874
Handset, Charcoal	A0758634
Handset cord, Ethergray; for IP Phone 2004 and IP Phone 2001	A088682
Handset cord, Charcoal; for IP Phone 2004 and IP Phone 2001	N0000764
IP Phone 2001/2002/2004 Power Adapters	
Power transformer (117/120 VAC 50/60 Hz) (North America)	A0619627
Power transformer 3-prong AC to AC, direct plug-in, 8 W, 240 VAC, 50 Hz to 16 VAC at 500 mA (Ireland and UK)	A0656598
Power transformer AC to AC, direct plug-in, 8 W, 230 VAC, 50/60 Hz, to 16 VAC at 500 mA (Europe)	A0619635
Power transformer 2-prong wall plug direct plug-in AC to AC, 8 W, 240 VAC, 50 Hz, to 16 VAC at 500 mA (Australia and New Zealand)	A0647042
Power transformer AC to AC, direct plug-in, 8 W, 100 VAC, 50 Hz, to 16 VAC at 500 mA	A0828858

For more information, and for information about previous versions of the IP Phone, contact your Nortel representative.

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 2001:

- ["Before you begin" \(page 36\)](#)
- ["First-time installation" \(page 36\)](#)
- ["Configuring the IP Phone 2001" \(page 37\)](#)
- ["Startup sequence" \(page 39\)](#)
- ["Installing the IP Phone 2001" \(page 39\)](#)

Before you begin

Before installing the IP Phone 2001, complete the following pre-installation checklist:

- Ensure one IP Phone 2001 boxed package exists for each IP Phone 2001 you install. The package contains:
 - IP Phone 2001
 - handset
 - handset cord
 - 2.1 m (7-ft) CAT5 Ethernet cable
 - Getting Started Card
- Ensure one Software License exists for each IP Phone 2001 you install.
- Ensure the host Call Server is equipped with a Signaling Server that runs the Line Terminal Proxy Server (LTPS) application.
- If an AC power adapter is required, ensure you use the correct AC power transformer. The voltage rating of the transformer must match the wall outlet voltage. See [Table 3 "IP Phone 2001 components list" \(page 35\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* and *IP Line Fundamentals (NN43100-500)*.

**CAUTION**

Do not plug your IP Phone 2001 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 2001

Use [Procedure 1 "Configuring the IP Phone 2001" \(page 37\)](#) to configure the IP Phone 2001 for the first time.

Procedure 1**Configuring the IP Phone 2001****Step Action**

- 1 Configure a virtual loop on the Call Server using LD 97.
For more information about configuring a virtual loop, see *IP Line Fundamentals (NN43100-500)*, and *Software Input Output Administration (NN43001-611)*.
- 2 Configure the IP Phone 2001 on the Call Server using LD 11. At the prompt, enter the following:


```
REQ:chg
TYPE:2001P2
```

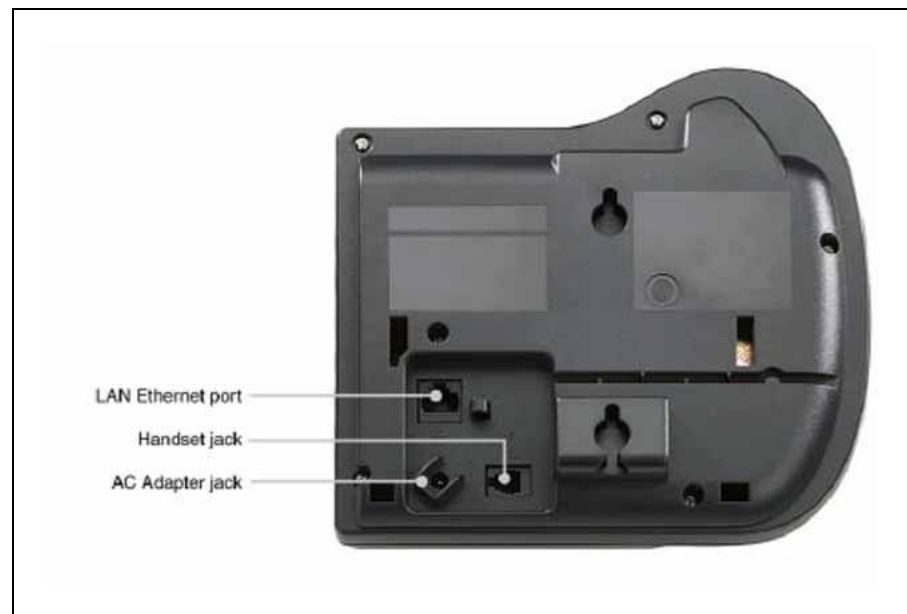
For more information about configuring the IP Phone 2001 using LD 11, see *Software Input Output Administration (NN43001-611)*.
- 3 Connect the IP Phone 2001 components:
 - a. Connect one end of the handset cord to the handset jack on the back of the IP Phone identified with a handset icon.
 - b. Connect the other end of the handset cord to the handset.
- 4 Connect one end of the CAT5 Ethernet cable to the network interface located on the back of the IP Phone (identified with a LAN icon, see [Figure 3 "IP Phone 2001 Ethernet network interface connections" \(page 38\)](#)). The other end of the CAT5 Ethernet cable plugs into the IP network.
- 5 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable and then thread the adapter cord through the channels in the stand.

- Secure the IP Phone footstand to the base of the IP Phone. Use the angle adjustment grip on the top back of the IP Phone to adjust the position.

**CAUTION****Damage to Equipment**

Do not plug any device into your IP Phone 2001 Ethernet port other than one PC.

Figure 3
IP Phone 2001 Ethernet network interface connections



- Power the IP Phone 2001 using either the Power over Ethernet or an AC power transformer (local power). If you are using local power, plug the AC power transformer into the nearest power outlet. Make sure you use the correct AC power transformer is used. The voltage rating of the transformer must match the wall outlet voltage. See [Table 3 "IP Phone 2001 components list" \(page 35\)](#).

The IP Phone 2001 supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 2. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.

- Use [Procedure 2 "Installing the IP Phone 2001 for the first time using manual configuration" \(page 40\)](#) to install the IP Phone 2001 for the

first time using manual configuration, or use [Procedure 3 "Installing an IP Phone 2001 for the first time using DHCP"](#) (page 47) to install the IP Phone 2001 for the first time using DHCP.

—End—

Startup sequence

When an IP Phone 2001 connects to the network, it must perform a startup sequence. The elements of the startup sequence include:

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- connecting to the Call Server
- obtaining a User ID

See [Table 4 "IP Phone 2001 IP parameters"](#) (page 39) for a summary of the IP parameters and how they are obtained.

Table 4
IP Phone 2001 IP parameters

Parameter	Method of Acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Net Mask	Manually entered or automatically retrieved through Partial or Full DHCP.
Default Gateway Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically retrieved through Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Retrieved from local storage on subsequent power cycles.

Installing the IP Phone 2001

To install the IP Phone 2001 for the first time using manual configuration, use [Procedure 2 "Installing the IP Phone 2001 for the first time using manual configuration"](#) (page 40). To install the IP Phone 2001 for the first time using DHCP, use [Procedure 3 "Installing an IP Phone 2001 for the first time using DHCP"](#) (page 47).

ATTENTION**Timing information**

There are only four seconds between plugging in the IP Phone 2001 power transformer and the appearance of the Nortel logo in the middle of the display. When you see the logo, you have 1 second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Phone 2001 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 2**Installing the IP Phone 2001 for the first time using manual configuration****Step Action**

- | Step | Action |
|------|---|
| 1 | When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right. |
| 2 | At the prompt EAP Enable? , enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control. |
| 3 | Enter DeviceID and Password.

If you select 0-No (0 for No), you are not prompted to enter Device ID and Password.

For more information about EAP, see Appendix "802.1x Port-based network access control" (page 469) . |
| 4 | At the prompt, LLDP Enable? , enter 1-Y (1 for Yes, default) to enable the ability to control 802.1Q and 802.1p bits.

For more information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471) . For more information about 802.1Q, see Appendix "802.1Q VLAN description" (page 461) . |

- 5 At the prompt **DHCP Yes/No?**, enter 0-N (0 for No). You are prompted to enter all parameters.

By default, Full DHCP is configured on the IP Phone 2001. Depending on the configuration requirements, you can change the IP Phone 2001 configuration to allow the following IP address assignments:

- Static—enter all parameters
- Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server
- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration. For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

- 6 Enter the following information:

Screen prompt	Description
set IP	A valid IP Phone 2001 IP address.
net msk	A subnet mask.
def gw	The default Gateway for the IP Phone 2001 on the LAN segment to which the IP Phone 2001 connects.

- 7 Enter the information for the primary Connect Server (S1) and the secondary Connect Server (S2):

S1 IP	The primary CS 1000 node IP address for the IP Phone 2001.
S1 Port	This is a fixed value: 4100

S1 action	<p>Choose one of the following:</p> <ul style="list-style-type: none">• for TPS only, enter 1• for TPS and Secure Multimedia Controller, enter 6 or 1 <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p> <p>You are not prompted for S1 PK if S1 Action is set to 1.</p>
S1 retry count	<p>The number of times the IP Phone 2001 attempts to connect to the server. Enter 10.</p>
S1 PK	<p>To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required.</p> <p>Default is ffffffff.</p> <p>The Private key of the Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following:</p> <ul style="list-style-type: none">#1 = A#2 = B#3 = C#4 = D#5 = E#6 = F
S2 IP	<p>The secondary CS 1000 node IP address for the IP Phone 2001.</p>
S2 Port	<p>Same as S1.</p>
S2 action	<p>Same as S1</p> <p>You are not prompted for S2 PK if S2 Action is set to 1.</p>
S2 retry count	<p>Same as S1.</p>

S2 PK	<p>To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required.</p> <p>Default is ffffffff.</p> <p>The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following:</p> <ul style="list-style-type: none">#1 = A#2 = B#3 = C#4 = D#5 = E#6 = F
Cfg XAS? (0-No,1-Yes)	<p>Default 0 (for No).</p> <p>If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.</p>
XAS IP:	<p>Enter the IP address of the XAS server.</p>
Speed (0-A, 1-10, 2-100)	<p>Network interface port speed.</p> <p>Default 0 (for Auto)</p> <ul style="list-style-type: none">0 = Auto1 = 10 BT2 = 100 BT <p>You are not prompted for Speed if PC Port is set to 0 for Off.</p>
Duplex (0-A, 1-F, 2-H)	<p>Default 1 (for Auto).</p> <ul style="list-style-type: none">0 = Auto1 = Full2 = Half <p>You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.</p>
802.1Q (0-No, 1-Yes)	<p>Default 1 (for Yes).</p> <p>You are not prompted for 802.1Q if LLDP is not enabled.</p>

Data VLAN? (0-N, 1-Y)	Default 0 (for No). VLAN settings on the PC port of the IP Phone 2001 is used for the initial DHCP discovery and not for PC traffic, because the IP Phone 2001 does not have a PC port.
Voice VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? 0-Auto, 1-Man:	Default 0 (for Auto). You are not prompted for VLAN Cfg is Voice VLAN is not enabled. 0-Auto Automatically obtains VLAN ID using DHCP or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094.
LLDP-MED? (0-No, 1-Yes)	If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV. You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.
LLDP VLAN? (0-No, 1-Yes)	If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV. You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.
DHCP (0-No, 1-Yes)	If you select 1-Y (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server. You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.

VLANFILTER (0-N, 1-Y)	Default 0 (for No). You are not prompted for VLANFILTER if VLAN is not enabled.
Ctrl pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Ctrl pBits if 802.1Q is not enabled.
Media pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Media pBits if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0 for No, 1 for Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 2001 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0 and later, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 2001 searches for the TFTP Server for firmware upgrade. If the file name specified in i2001.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 2001 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 2001 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 2001 saves the configuration and then reboots. The IP Phone 2001 searches for the connect server.

8 Enter the following information:

Screen prompt	Description
Password	IP Phone Installer Password.
	You are not prompted to enter the IP Phone Installer Password if it has not been configured in your system.
Node	The node ID.
TN	The TN or VTN.

The IP Phone 2001 registers with the Terminal Proxy Server (TPS) and, if needed, begins the firmware download. This takes several minutes. When the download is complete, the IP Phone 2001 resets.

The current system date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

9 Check for a dial tone and the correct DN above the display.

10 (Optional) Customize the feature keys as required. For more information, see *IP Phone 2001 User Guide (NN43115-102)*.

—End—

ATTENTION**Timing information**

There are only four seconds between plugging in the IP Phone 2001 power transformer and the appearance of the Nortel logo in the middle of the display. When you see the logo, you have 1 second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Phone 2001 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 3**Installing an IP Phone 2001 for the first time using DHCP****Step Action**

- | Step | Action |
|------|---|
| 1 | When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right. |
| 2 | At the prompt EAP Enable? , enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control. |
| 3 | Enter DeviceID and Password.

If you select 0-No (0 for No), you are not prompted to enter Device ID and Password.

For more information about EAP, see Appendix "802.1x Port-based network access control" (page 469) . |
| 4 | At the prompt, LLDP Enable? , enter 1-Y (1 for Yes, default).

For more information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471) . For more information about 802.1Q, see Appendix "802.1Q VLAN description" (page 461) . |
| 5 | At the prompt DHCP Yes/No? , select 1-Y (1 for Yes). |

By default, Full DHCP is configured on the IP Phone 2001. Depending on the configuration requirements, you can change the IP Phone 2001 configuration to allow the following IP address assignments:

- Static—enter all parameters
- Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server
- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration. For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

- 6 At the prompt, **Cached IP?**, select 0 (0-No, default) to conform to the DHCP standard and to obtain an IP address from the DHCP server. Only select 1 (1 for Yes) to force the IP Phone to start with a cached IP address if the IP Phone cannot connect to the DHCP server and obtain an IP address.
- 7 Select **Partial** or **Full DHCP**.
 - a. If you select Full DHCP, then the following parameters are retrieved from the DHCP server:
 - a valid IP Phone 2001 IP address
 - a subnet mask
 - the default Gateway for the IP Phone 2001 on the LAN segment to which it connects
 - the S1 IP (the primary CS 1000 node IP address of the IP Phone)
 - the S1 action
 - the S1 retry count (this is the number of times the IP Phone 2001 attempts to connect to the server)
 - the S2 IP (the secondary CS 1000 node IP address of the IP Phone)
 - the S2 action
 - the S2 retry count
 - b. If you select Partial DHCP, then you must enter the following parameters:

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address for the IP Phone 2001.
S1 Port	This is a fixed value: 4100.
S1 action	Choose one of the following: <ul style="list-style-type: none"> • for TPS only, enter 1 • for TPS and Secure Multimedia Controller, enter 6 or 1 <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p> <p>You are not prompted for S1 PK if the S1 action is set to 1.</p>
S1 retry count	The number of times the IP Phone 2001 attempts to connect to the server. Enter 10.
S1 PK	To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required. Default is ffffffffffffff. The Private key of the Secure Multimedia Controller to which the IP Phone connects. If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B #3 = C #4 = D #5 = E #6 = F
S2 IP	The secondary CS 1000 node IP address for the IP Phone 2001.
S2 Port	Same as S1.
S2 action	Same as S1. You are not prompted for S2 PK if the S2 action is set to 1.

Screen prompt	Description
S2 retry count	Same as S1.
S2 PK	<p>To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required.</p> <p>Default is ffffffffffffff.</p> <p>The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following:</p> <p>#1 = A #2 = B #3 = C #4 = D #5 = E #6 = F</p>
Cfg XAS? (0-No,1-Yes)	<p>Default 0 (for No).</p> <p>If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.</p>
XAS IP:	Enter the IP address of the XAS server.
Speed (0-A, 1-10, 2-100)	<p>Network interface port speed.</p> <p>Default 0 (for Auto)</p> <p>0 = Auto 1 = 10 BT 2 = 100 BT</p> <p>You are not prompted for Speed if PC Port is set to 0 for off.</p>
Duplex (0-A, 1-F, 2-H)	<p>Default 1 (for Auto).</p> <p>0 = Auto 1 = Full 2 = Half</p> <p>You are not prompted for Duplex if PC Port is set to 0 for off or if Speed is set to 0 for Auto.</p>

8 Enter the following parameters:

802.1Q (0-No, 1-Yes)	Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). VLAN settings on the PC port of the IP Phone 2001 is used for the initial DHCP discovery and not for PC traffic, because the IP Phone 2001 does not have a PC port.
Voice VLAN (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? (0-Auto, 1-Man)	Default 0 (for Auto). 0-Auto Automatically obtains VLAN ID using DHCP, or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094. You are not prompted for VLAN Cfg if Voice VLAN is not enabled.
LLDP-MED? (0-N, 1-Y)	Default 0 (for No). If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV. You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.
LLDP VLAN? (0-No, 1-Yes)	Default 0 (for No). If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV. You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.

DHCP (0-No, 1-Yes)	Default 0 (for No). If you select 1 (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.
	You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.
VLANFILTER (0-No, 1-Yes)	Default 0 (0 for No). You are not prompted for VLANFILTER if VLAN is not enabled.
Duplex? (0-Auto, 1-Full)	Default 0 (for Auto).
Ctrl pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Ctrl pBits if 802.1Q is not enabled.
Media pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Media pBits if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0 for No, 1 for Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 2001 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5 and later, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 2001 searches for the TFTP Server for firmware upgrade. If the file name specified in i2001.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 2001 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 2001 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 2001 saves the configuration and then reboots. The IP Phone 2001 searches for the connect server.

9 Enter the following information:

Screen prompt	Description
Password	IP Phone Installer Password. You are not prompted to enter the IP Phone Installer Password if it has not been configured in your system.
Node	The node ID.
TN	The TN or VTN.

The IP Phone 2001 registers with the TPS and, if needed, begins the firmware download. This takes several minutes. When the download is complete, the IP Phone 2001 resets.

The current system date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

10 Check for a dial tone and the correct DN above the display.

11 (Optional) Customize the feature keys as required. For more information, see *IP Phone 2001 User Guide (NN43115-102)*.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing the duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 4 "Enabling Full Duplex mode" \(page 54\)](#) to enable Full Duplex mode.

Procedure 4 Enabling Full Duplex mode

Step	Action
1	Reset the phone by disconnecting and reconnecting power.
2	When the Nortel logo appears, press each soft key in sequence. See Procedure 3 "Installing an IP Phone 2001 for the first time using DHCP" (page 47) .
3	If no other configuration changes are required, press OK repeatedly until the Duplex network option appears.
4	Select 1 to enable Full Duplex mode.
5	When the Speed option appears, select one of the following: <ul style="list-style-type: none">• 0 for 10 Mb/s• 1 for 100 Mb/s (default)

- 6 Select **OK** to confirm the change.
- 7 Restart the IP Phone 2001. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use [Procedure 5 "Checking Ethernet Statistics" \(page 55\)](#) to confirm activation of Full Duplex mode.

Procedure 5
Checking Ethernet Statistics

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

- | | |
|---|--|
| 1 | Double-click the Services key. The Network Diagnostics menu appears. |
| 2 | Select Ethernet Statistics . <ul style="list-style-type: none"> • If Full Duplex mode is active, the following is displayed: <ul style="list-style-type: none"> — Link: UP — Duplex: Full — Speed: 10 (Mb) or 100(Mb) — Auto-Negotiate Capability: N — Auto-Negotiate Completed: N |

—End—

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection prevents the IP Phone 2001 from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. The malicious device launches a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 2 "Installing the IP Phone 2001 for the first time using manual configuration"](#) (page 40) or [Procedure 3 "Installing an IP Phone 2001 for the first time using DHCP"](#) (page 47).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control"](#) (page 469).

Redeploying an IP Phone 2001

You can redeploy an existing previously configured IP Phone 2001 on the same system. For example, the IP Phone 2001 can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 2001. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 6

Changing the TN of an existing IP Phone 2001

Step	Action						
1	<p>Repower the IP Phone 2001.</p> <p>During the reboot sequence of a previously configured IP Phone, the IP Phone 2001 displays the existing node number for approximately five seconds.</p>						
2	<p>If the node password is enabled and NULL, choose one of the following:</p> <ol style="list-style-type: none"> Disable the password. Set the password as non-NULL. 						
3	<p>Press OK when the node number displays.</p> <table border="0"> <thead> <tr> <th style="text-align: left;">If</th> <th style="text-align: left;">Then</th> </tr> </thead> <tbody> <tr> <td>the node password is enabled and is not NULL</td> <td>a password screen displays. Go to Step 4.</td> </tr> <tr> <td>the node password is disabled</td> <td>a TN screen displays. Go to Step 5.</td> </tr> </tbody> </table>	If	Then	the node password is enabled and is not NULL	a password screen displays. Go to Step 4 .	the node password is disabled	a TN screen displays. Go to Step 5 .
If	Then						
the node password is enabled and is not NULL	a password screen displays. Go to Step 4 .						
the node password is disabled	a TN screen displays. Go to Step 5 .						
4	<p>Enter password at the password screen, and press OK.</p> <p>A TN screen displays.</p>						

To obtain the password, enter the `nodePwdShow` command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.

- 5 Select the **Clear** soft key to clear the existing TN.
- 6 Enter the new TN.

—End—

Replacing an IP Phone 2001

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 2001 that currently uses the TN.

Procedure 7

Replacing an IP Phone 2001

Step	Action
1	Obtain the node and TN information of the phone you want to replace.
2	Disconnect the IP Phone 2001 that you want to replace.
3	Follow Procedure 1 "Configuring the IP Phone 2001" (page 37) and Procedure 2 "Installing the IP Phone 2001 for the first time using manual configuration" (page 40) or Procedure 3 "Installing an IP Phone 2001 for the first time using DHCP" (page 47) to install and configure the IP Phone 2001.
4	Enter the same TN and Node Number as the IP Phone 2001 you replaced. The system associates the new IP Phone 2001 with the existing TN.

-

—End—

Removing an IP Phone 2001 from service

Procedure 8

Removing an IP Phone 2001 from service

Step	Action
1	Disconnect the IP Phone 2001 from the network or turn off the power.

-

If the IP Phone 2001 was automatically configured, the DHCP lease expires and the IP address returns to the available pool.

- 2 In LD 11, enter OUT at the TN prompt.

—End—

Nortel IP Phone 2002

Contents

This section contains the following topics:

- "Introduction" (page 59)
- "Description" (page 60)
- "Components and functions" (page 61)
- "Supported features" (page 64)
- "Features not currently supported" (page 66)
- "Display characteristics" (page 66)
- "Key number assignments" (page 68)
- "Package components" (page 69)
- "Installation and configuration" (page 70)
- "Full Duplex mode" (page 90)
- "Gratuitous Address Resolution Protocol Protection" (page 92)
- "Extensible Authentication Protocol " (page 92)
- "Redeploying an IP Phone 2002" (page 92)
- "Replacing an IP Phone 2002" (page 93)
- "Removing an IP Phone 2002 from service" (page 94)

Introduction

This section explains how to install and maintain the IP Phone 2002. For information about using the IP Phone 2002, see the *IP Phone 2002 User Guide (NN43116-104)*.

This section contains the following procedures:

- Procedure 9 "Configuring the IP Phone 2002" (page 71).
- Procedure 10 "Installing the IP Phone 2002 for the first time using manual configuration" (page 75).

- Procedure 11 "Installing an IP Phone 2002 for the first time using DHCP" (page 82).
- Procedure 12 "Enabling Full Duplex mode" (page 91).
- Procedure 13 "Checking Ethernet Statistics" (page 91).
- Procedure 14 "Changing the TN of an existing IP Phone 2002" (page 92).
- Procedure 15 "Replacing an IP Phone 2002" (page 93).
- Procedure 16 "Removing an IP Phone 2002 from service" (page 94).

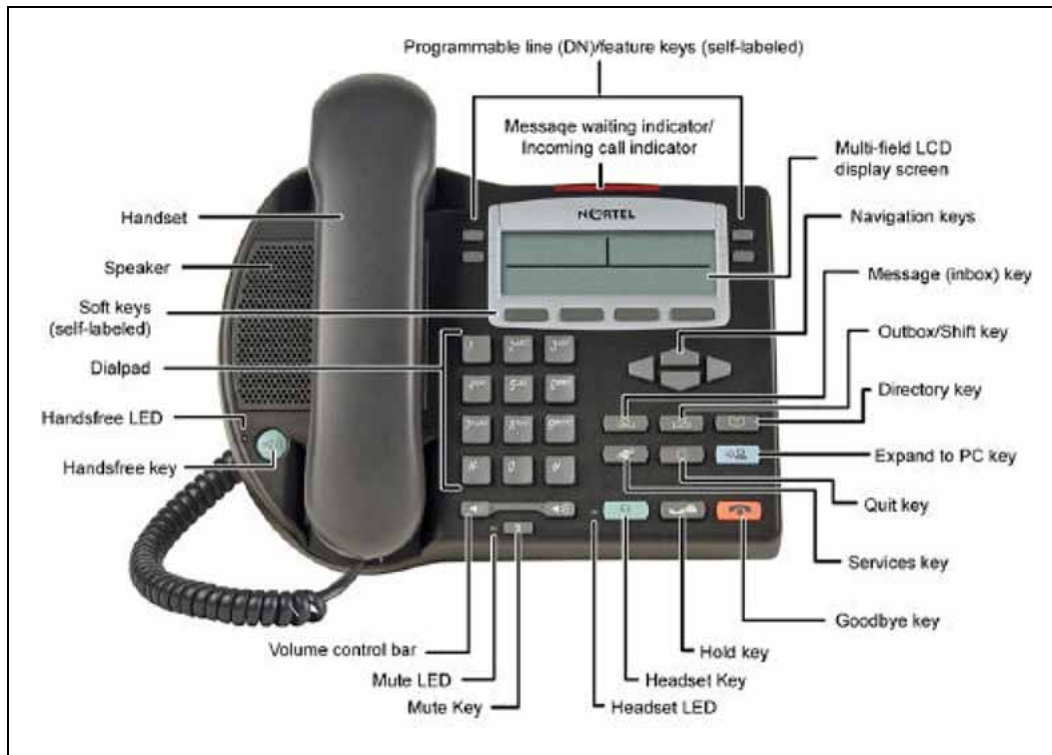
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 2002 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 2002 translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 2002 network and CS 1000 connections.

Figure 4 "IP Phone 2002" (page 61) shows the IP Phone 2002.

Figure 4
IP Phone 2002



Components and functions

This section describes the following components and functions of the IP Phone 2002:

- ["Keys and functions" \(page 61\)](#)
- ["Services menu" \(page 63\)](#)

Keys and functions

[Table 5 "IP Phone 2002 keys and functions" \(page 61\)](#) describes the IP Phone 2002 keys and functions.

Table 5
IP Phone 2002 keys and functions

Key	Function
Speaker	Press the Line key to activate the speaker for on-hook dialing and listening.

Key	Function
Programmable line (DN)/feature keys (self-labeled)	<p>Programmable line (DN)/feature keys (self-labeled) are configured for various features on the IP Phone. One must be the prime DN key.</p> <p>A steady LCD light beside a line (DN) key indicates the feature or line is active. A flashing LCD indicates the line is on hold or the feature is being programmed.</p>
Message waiting light/ Incoming call indicator	The Message waiting light turns ON to indicate that a message has been left for the user. This light also flashes when the set ringer is ON.
Context-sensitive soft keys (self-labeled)	<p>Context-sensitive soft keys (self-labeled) are located below the display area. The LCD label above the key changes, based on the active feature.</p> <p>A triangle before a key label indicates that the key is active.</p>
Navigation keys	Use the navigation keys to scroll through menus and lists in the display area.
Message (Inbox)	Press the Message (Inbox) key to access your voice mailbox.
Outbox/Shift	The Outbox/Shift key is a fixed key that is reserved for future feature development.
Directory	Press the Directory key to access Directory services.
Quit	<p>Press the Quit key to end an active application.</p> <p>Pressing the Quit key does not affect the status of the calls currently on your IP Phone.</p>
Expand to PC	The Expand to PC key is used to access external server applications such as External Application Server (XAS).
Goodbye	Press the Goodbye key to terminate an active call.
Hold	Press the Hold key to put an active call on hold. Press the line (DN) key beside the flashing LCD to return to the caller on hold.
Headset	Press the Headset key to answer a call using the headset or to switch a call from the handset or Handsfree to the headset.
Mute	<p>Press the Mute key to listen to the receiving party without transmitting.</p> <p>Press the Mute key again to return to a two-way conversation.</p> <p>The Mute key applies to Handsfree, Handset, and Headset microphones.</p> <p>The Mute LED flashes when the Mute option is in use.</p>

Key	Function
Volume control bar	Use the volume control bar to adjust the volume of the handset, headset, speaker, ringer, and, Handsfree feature. Press the right side of the rocker bar to increase volume; press the left side to decrease volume.
Handsfree key	Press the Handsfree key to activate the Handsfree feature. The LED lights to indicate when handsfree is active.

Services menu

Table 6 "Services menu" (page 63) shows the Services menu.

Table 6
Services menu

Services key	<p>Press the Services key to access the following items:</p> <ul style="list-style-type: none"> • Telephone Options <ul style="list-style-type: none"> — Volume Adjustment — Contrast Adjustment — Language — Date/Time Format — Display diagnostics — Local Dialpad Tone — Set Info — Ring type — OnHook Default Path — Change Feature key label — Call Timer — Live Dialpad • Password Administration • Virtual Office Login and Virtual Office Logout (if Virtual Office is configured)
--------------	--

- Test Local Mode and Resume Local Mode (if Branch Office is configured)

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

If a call is presented while the user is manipulating an option, the IP Phone 2002 rings and the DN key flashes. However, the display is not updated with the Caller ID, and the programming text is not disturbed.

The user can originate a call using Autodial or Last Number Redial while manipulating an option. However, the display is not updated with the dialed digits or the Caller ID information, and Autodial and Last Number Redial intercept the dialpad.

Supported features

The IP Phone 2002 supports the following telephony features:

- four programmable line (DN)/ feature keys (self-labeled)
- four context-sensitive soft keys (self-labeled) that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- volume control bar to adjust ringer, speaker, handset, and headset volume
- six specialized feature keys
 - Quit
 - Directory
 - Message/Inbox
 - Shift/Outbox
 - Services
 - Copy
- six call-processing fixed keys:
 - Mute
 - Handsfree
 - Goodbye
 - Expand to PC
 - Headset
 - Hold

- Call Duration Timer
- ability to change the programmable line (DN)/feature key labels
- Corporate Directory
- Personal Directory
- Redial List
- Callers List
- Password Administration
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download
- Live Dialpad

The IP Phone 2002 supports the following data network features:

- integrated switch for shared PC access
 - the LAN Ethernet port supports 10/100BT Mb/s Full Duplex mode
 - the PC Ethernet port supports 10/100BT Mb/s Full Duplex mode
- automatic network configuration through DHCP

For more information about automatic network configuration, see [Table 8 "IP Phone 2002 IP parameters" \(page 74\)](#).
- 802.1ab Link Layer Discovery Protocol (LLDP)

For more information about LLDP, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).
- Secure Real-time Transport Protocol (SRTP) media encryption

For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).
- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use
 - full VLAN capability, including a manageable integrated switch in the IP Phone; allows VLAN and priority tagging for the IP Phone traffic and VLAN tagging for PC traffic
 - VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN](#)

[description](#) (page 461) *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

- 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN
For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control"](#) (page 469).
- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 2
- Gratuitous Address Resolution Protocol Protection (GARP)

The IP Phone 2002 supports the following user interface features:

- External Application Server (XAS)
- language support: English, French, Swedish, Danish, Norwegian, German, Greek, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, Turkish, and Katakana
- IP Key Expansion modules

Features not currently supported

The following features are not supported on the IP Phone 2002:

- Group Listening
- Set-to-Set messaging

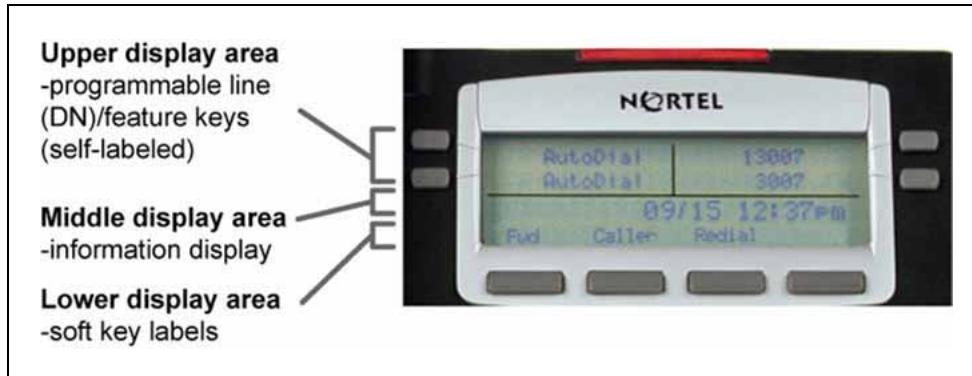
Display characteristics

An IP Phone 2002 has three major display areas:

- ["Programmable line \(DN\)/feature key label display"](#) (page 67)
- ["Information line display"](#) (page 67)
- ["Soft key label display"](#) (page 68)

[Figure 5 "IP Phone 2002 display areas"](#) (page 67) shows these three display areas.

Figure 5
IP Phone 2002 display areas



Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.



CAUTION

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Programmable line (DN)/feature key label display

The feature key label area displays a 10-character string for each of the four feature keys. Each feature key includes the key label and an icon. The icon state can be on, off, or flashing. A telephone icon displays the status of the configured DN. Key labels are left-aligned for keys on the left side of the screen, and right-aligned for keys on the right side of the screen.

If a label is longer than 10 characters, the last 10 characters are displayed and the excess characters are deleted from the beginning of the string.

Information line display

An IP Phone 2002 has a one-line information display area with the following information:

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state) or Call Timer (if provisioned in the Telephone options menu)

The information in the display area changes, according to the call-processing state and active features.

Because the IP Phone 2002 only has a one-line information display area, you are prompted to scroll through any additional lines of information.

During an incoming call, only the Directory Number (DN) displays if the caller name is greater than 10 characters. Press the flashing arrow to display the caller name.

Soft key label display

The soft key label has a maximum six characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon appears at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a feature is enabled, the icon state turns to On. The icon remains in the on state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, and returns the soft key label to its original state.

Use the More soft key to navigate the layers of functions. If only four functions are assigned to the soft keys, the More key does not appear, and all four functions are displayed.

Key number assignments

Key numbers 1 to 15 are used for Programmable line (DN)/feature keys. These keys can be any DN or feature except for Message Waiting and those configured on keys 17 to 26.

You can assign a maximum of nine functions to the four soft-labeled, predefined soft keys. Because the soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the soft keys in layers in LD 11.

The Message key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four soft keys. Labels for the soft keys appear in the display area. For further information, see ["Soft key label display" \(page 68\)](#). [Figure 5 "IP Phone 2002 display areas" \(page 67\)](#) shows the IP Phone 2002 display area.

Key number assignments at the Call Server align with IP Phone 2004. The mappings between IP Phone 2002 soft key numbers and PBX CPU key numbers are the same as on the IP Phone 2004.

For a description of the IP Phone function assignment for each soft key, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

The following information applies to Phase II IP Phones. Product codes for Phase II IP Phones are different from previous sets.

See the product code on the back of the phone to confirm whether it is a Phase II IP Phone. The product code for Phase II IP Phones appears as IP Phone 200x. The product code for previous versions of the IP Phone appears with an i in front of the model number (for example, i200x).

You must order the AC power adapter separately if local power using the AC adapter is required, because Phase II IP Phones include integrated support for a number of power over LAN options, including support for IEEE 802.3af standard power.

[Table 7 "IP Phone 2002 components list" \(page 69\)](#) lists the IP Phone 2002 package components and product codes.

Table 7
IP Phone 2002 components list

IP Phone 2002 package contents include	
<ul style="list-style-type: none"> • IP Phone 2002 • Handset • Handset cord • Footstand • 7ft Cat5 Ethernet cable • Getting Started card 	
IP Phone 2002 (Ethergray) with Icon keycaps	NTDU91AA16/A0533404
IP Phone 2002 (Ethergray) with English text label keycaps	NTDU91BA16/A0533405
IP Phone 2002 (Charcoal) with Icon keycaps	NTDU91AA70/A0533406
IP Phone 2002 (Charcoal) with English text label keycaps	NTDU91BA70/A0533407
IP Phone 2002 (Charcoal with Bezel) with Icon keycaps	NTDU91AB70
IP Phone 2002 (Charcoal with Bezel) with Icon keycaps (RoHS)	NTDU91AC70E6
IP Phone 2002 (Charcoal with Bezel) with English text label keycaps	NTDU91BB70
IP Phone 2002 (Charcoal with Bezel) with English text label keycaps (RoHS)	NTDU91BC70E6
Replacement parts	

7-ft. Cat5 Ethernet cable	A0648375
Handset, Ethergray	A0788874
Handset, Charcoal	A0758634
Handset cord, Ethergray	A0897725
Handset cord, Charcoal	N0000763
Footstand, Charcoal (used for Ethergray and Charcoal models)	A0891619
IP Phone 2001/2002/2004 Power Adaptors	
Power transformer (117/120 VAC 50/60 Hz) (North America)	A0619627
Power transformer 3-prong AC to AC, direct plug-in, 8 W, 240 VAC, 50 Hz to 16 VAC at 500 mA (Ireland and UK)	A0656598
Power transformer AC to AC, direct plug-in, 8 W, 230 VAC, 50/60 Hz, to 16 VAC at 500 mA (Europe)	A0619635
Power transformer 2-prong wall plug direct plug-in AC to AC, 8 W, 240 VAC, 50 Hz, to 16 VAC at 500 mA (Australia and New Zealand)	A0647042
Power transformer AC to AC, direct plug-in, 8 W, 100 VAC, 50 Hz, to 16 VAC at 500 mA	A0828858

For more information, and for information about previous versions of the IP Phone, contact Nortel.

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 2002:

- ["Before you begin" \(page 70\)](#)
- ["First-time installation" \(page 71\)](#)
- ["Configuring the IP Phone 2002" \(page 71\)](#)
- ["Startup sequence" \(page 74\)](#)
- ["Installing the IP Phone 2002" \(page 74\)](#)

Before you begin

Before installing the IP Phone 2002, complete the following pre-installation checklist:

- Ensure one IP Phone 2002 boxed package exists for each IP Phone 2002 you install. The package contains:
 - IP Phone 2002
 - handset
 - handset cord
 - 2.1 m (7-ft) CAT5 Ethernet cable

— Getting Started Card

- Ensure one Software License exists for each IP Phone 2002 you install.
- Ensure the host Call Server is equipped with a Signaling Server that runs the Line Terminal Proxy Server (LTPS) application.
- If an AC power adapter is required, ensure you use the correct AC power transformer. The voltage rating of the transformer must match the wall outlet voltage. See [Table 7 "IP Phone 2002 components list" \(page 69\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* or *IP Line Fundamentals (NN43100-500)*.



CAUTION

Do not plug your IP Phone 2002 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 2002

Use [Procedure 9 "Configuring the IP Phone 2002" \(page 71\)](#) to configure the IP Phone 2002 for the first time.

Procedure 9

Configuring the IP Phone 2002

Step	Action
1	<p>Configure a virtual loop on the Call Server using LD 97.</p> <p>For more information about configuring a virtual loop, see <i>IP Line Fundamentals (NN43100-500)</i> and <i>Software Input Output Administration (NN43001-611)</i>.</p>
2	<p>Configure the IP Phone 2002 on the Call Server using LD 11. At the prompt, enter the following:</p> <pre>REQ:chg TYPE:2002P1,2002P2</pre> <p>For more information about configuring the IP Phone 2002 using LD 11, see <i>Software Input Output Administration (NN43001-611)</i>.</p>
3	<p>Connect the IP Phone 2002 components:</p>

- a. Connect one end of the handset cord to the handset jack on the back of the IP Phone (identified with a handset icon).
 - b. Connect the other end of the handset cord to the handset.
- 4 Choose one of the following connections:
- For an IP Phone not sharing LAN access with a PC:
Connect one end of the CAT5 Ethernet cable to the network interface located on the back of the IP Phone (identified with a LAN icon, see [Figure 6 "IP Phone 2002 Ethernet network interface connections" \(page 73\)](#)). The other end of the CAT5 Ethernet cable plugs into the IP network.
 - For an IP Phone sharing LAN access with a PC:
Connect one end of the CAT5 Ethernet cable to the network interface located on the back of the IP Phone (identified with a LAN icon, see [Figure 6 "IP Phone 2002 Ethernet network interface connections" \(page 73\)](#)) and the other end to the IP network. Insert on end of a second CAT5 Ethernet cable into the PC network interface located on the back of the IP Phone (identified with a PC icon, see [Figure 6 "IP Phone 2002 Ethernet network interface connections" \(page 73\)](#)) and the other end into the computer.

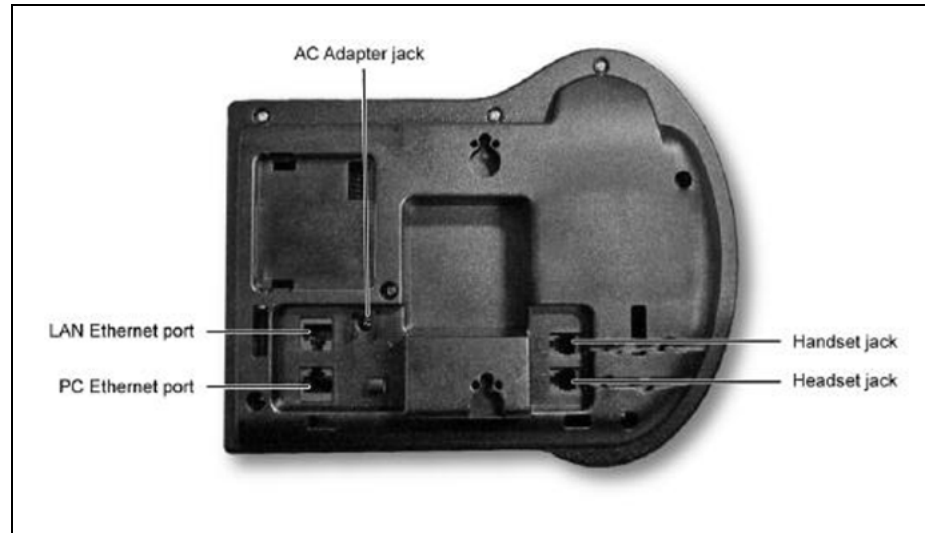


CAUTION

Damage to Equipment

Do not plug any device into your IP Phone 2002 Ethernet port other than one PC. The IP Phone 2002 does not support multiple devices connected through the PC Ethernet port.

Figure 6
IP Phone 2002 Ethernet network interface connections



- 5 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable and then thread the adapter cord through the channels in the stand.
- 6 Secure the IP Phone footstand to the base of the IP Phone. Use the angle adjustment grip on the top back of the IP Phone to adjust the position.
- 7 Power the IP Phone 2002 using either the Power over Ethernet or an AC power transformer (local power). If you are using local power, plug the AC power transformer into the nearest power outlet. Make sure you use the correct AC power transformer is used. The voltage rating of the transformer must match the wall outlet voltage. See [Table 7 "IP Phone 2002 components list" \(page 69\)](#).
 The IP Phone 2002 supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 2. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.
- 8 Use [Procedure 10 "Installing the IP Phone 2002 for the first time using manual configuration" \(page 75\)](#) to install the IP Phone 2002 for the first time using manual configuration, or use [Procedure 11](#)

"Installing an IP Phone 2002 for the first time using DHCP" (page 82) to install the IP Phone 2002 for the first time using DHCP.

—End—

Startup sequence

When an IP Phone 2002 connects to the network, it must perform a startup sequence. The elements of the startup sequence include:

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- connecting to the Call Server
- obtaining a User ID

See [Table 8 "IP Phone 2002 IP parameters" \(page 74\)](#) for a summary of the IP parameters and how they are obtained.

Table 8
IP Phone 2002 IP parameters

Parameter	Method of Acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Net Mask	Manually entered or automatically retrieved through Partial or Full DHCP.
Default Gateway Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically retrieved through Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Retrieved from local storage on subsequent power cycles.

Installing the IP Phone 2002

To install the IP Phone 2002 for the first time using manual configuration, use [Procedure 10 "Installing the IP Phone 2002 for the first time using manual configuration" \(page 75\)](#). To install the IP Phone 2002 for the first time using DHCP, see [Procedure 11 "Installing an IP Phone 2002 for the first time using DHCP" \(page 82\)](#).

ATTENTION**Timing information**

There are only four second(s) between plugging in the IP Phone 2002 power transformer and the appearance of the Nortel logo in the middle of the display. When you see the logo, you have one second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the one-second response time, the IP Phone 2002 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 10**Installing the IP Phone 2002 for the first time using manual configuration****Step Action**

- | Step | Action |
|------|---|
| 1 | When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right. |
| 2 | At the prompt EAP Enable? , enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control. |
| 3 | Enter DeviceID and Password.

If you select No , you are not prompted to enter Device ID and Password.

For more information about EAP, see Appendix "802.1x Port-based network access control" (page 469) . |
| 4 | At the prompt, LLDP Enable? , enter 1-Y (1 for Yes, default).

For more information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471) . For more information about 802.1Q, see Appendix "802.1Q VLAN description" (page 461) . |
| 5 | At the prompt DHCP Yes/No? , enter 0-N (0 for No). |

By default, Full DHCP is configured on the IP Phone 2002. Depending on the configuration requirements, you can change the IP Phone 2002 configuration to allow the following IP address assignments:

- Static—enter all parameters
- Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server
- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration. For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

6 Enter the following information:

Screen prompt	Description
set IP	A valid IP Phone 2002 IP address.
net msk	A subnet mask.
def gw	The default Gateway for the IP Phone 2002 on the LAN segment to which it connects.

7 Enter the information for the primary Connect Server (S1) and the secondary Connect Server (S2):

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address for the IP Phone 2002.
S1 Port	This is a fixed value: 4100.
S1 action	Choose one of the following:

- for TPS only, enter 1.
- for TPS and Secure Multimedia Controller, enter 6 or 1.

For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

Screen prompt	Description
	You are not prompted for S1 PK if S1 Action is set to 1.
S1 retry count	The number of times the IP Phone 2002 attempts to connect to the server. Enter 10.
S1 PK	To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required. Default is ffffffff. The Private key of the Secure Multimedia Controller to which the IP Phone connects. If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. To enter ALPHA digits A to F, enter the following: #1 = A #2 = B #3 = C #4 = D #5 = E #6 = F
S2 IP	The secondary CS 1000 node IP address for the IP Phone 2002.
S2 Port	Same as S1.
S2 action	Same as S1.
	You are not prompted for S2 PK if S2 Action is set to 1.
S2 retry count	Same as S1.
S2 PK	To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required. Default is ffffffff. The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects. If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.

Screen prompt	Description
	To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B #3 = C #4 = D #5 = E #6 = F
Cfg XAS? (0-No,1-Yes)	Default 0 (for No) If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.
XAS IP:	Enter the IP address of the XAS server.
Speed (0-A, 1-10, 2-100)	Network interface port speed. Default 0 (for Auto) 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.
802.1Q (0-No, 1-Yes)	Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.
Voice VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? 0-Auto, 1-Man:	Default 0 (for Auto). You are not prompted for VLAN Cfg is Voice VLAN is not enabled. 0-Auto Automatically obtains VLAN ID using DHCP or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094.

Screen prompt	Description
LLDP-MED? (0-No, 1-Yes)	<p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV.</p> <p>You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.</p>
LLDP VLAN? (0-No, 1-Yes)	<p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV.</p> <p>You are not prompted for LLDP VLAN if VLAN is not set to Auto (2- Auto), or if LLDP is not enabled.</p>
DHCP (0-No, 1-Yes)	<p>If you select 1-Y (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.</p> <p>You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.</p>
VLANFILTER (0-N, 1-Y)	<p>Default 0 (for No)</p> <p>You are not prompted for VLANFILTER if VLAN is not enabled.</p>
Ctrl pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Ctrl pBits if 802.1Q is not enabled.</p>
Media pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Media pBits if 802.1Q is not enabled.</p>
PC Port? (0-Off, 1-On)	Default 1 (for On).
Speed (0-A, 1-10, 2-100)	<p>Default 0 (for Auto).</p> <p>0 = Auto 1 = 10 BT 2 = 100 BT</p> <p>You are not prompted for Speed if PC Port is set to 0 for Off.</p>

Screen prompt	Description
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off and if Speed is set to 0 for Auto.
Data 802.1Q (0-N, 1-Y)	You are not prompted for Data 802.1Q if PC Port is set to 0 for Off.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Data VLAN if PC port is set to 0 for Off.
Data VLAN Cfg? (0-Auto, 1-Man)	Default 1 (for Man). You are not prompted for Data VLAN Cfg if LLDP or Data VLAN are not enabled and PC Port is set to 0 for Off. If you select 0 (for Auto), VLAN ID is automatically configured to the value received in the VLAN NAME TLV.
Data VLAN ID:	You are not prompted for Data VLAN ID if Data VLAN is set to 0 for Auto.
Data pBits (0-7, 8-Au)	Default 8 (for Au). You are not prompted for Data pBits if the PC Port is set to 0 for Off or if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0-No, 1-Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 2002 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt

- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 2002 searches for the TFTP Server for firmware upgrade. If the file name specified in i2002.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 2002 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 2002 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 2002 searches for the connect server.

8 Enter the following information:

Screen prompt	Description
Password	IP Phone Installer Password. You are not prompted to enter the IP Phone Installer Password if it has not been configured in your Call Server.
Node	The node ID.
TN	The TN or VTN.

The IP Phone 2002 registers with the Terminal Proxy Server (TPS) and, if needed, begins the firmware download. This takes several minutes. When download is complete, the IP Phone 2002 resets.

The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 9 Check for a dial tone and the correct DN above the display.
- 10 (Optional) Customize the feature keys as required. For more information, see *IP Phone 2002 User Guide (NN43116-104)*.

—End—

ATTENTION

Timing information

There are only 4 seconds between plugging in the IP Phone 2002 power transformer and the appearance of the Nortel logo in the middle of the display. When you see the logo, you have 1 second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Phone 2002 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 11

Installing an IP Phone 2002 for the first time using DHCP

Step	Action
1	When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right.
2	At the prompt EAP Enable? , enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control.
3	Enter DeviceID and Password.

If you select **No**, you are not prompted to enter Device ID and Password.

For more information about EAP, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

- 4 At the prompt, **LLDP Enable?**, enter 1-Y (1 for Yes, default).
For more information about LLDP, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#). For more information about 802.1Q, see [Appendix "802.1Q VLAN description" \(page 461\)](#).

- 5 At the prompt **DHCP Yes/No?**, enter 1-Y (1 for Yes).
By default, Full DHCP is configured on the IP Phone 2002. Depending on the configuration requirements, you can change the IP Phone 2002 configuration to allow the following IP address assignments:

- Static—enter all parameters
- Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server
- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

- 6 At the prompt, **Cached IP?**, select 0 (0-No, default) to conform to the DHCP standard and to obtain an IP address from the DHCP server. Select 1 (1 for Yes) to force the IP Phone to start with a cached IP address if the IP Phone cannot connect to the DHCP server and obtain an IP address.
- 7 Select Partial or Full DHCP.
- a. If you select Full DHCP, then the following parameters are retrieved from the DHCP server:
- a valid IP Phone 2002 IP address
 - a subnet mask
 - the default Gateway for the IP Phone 2002 on the LAN segment to which it connects

- the S1 IP (the primary CS 1000 node IP address of the IP Phone)
 - the S1 action
 - the S1 retry count (this is the number of times the IP Phone attempts to connect to the server)
 - the S2 IP (the secondary CS 1000 node IP address of the IP Phone)
 - the S2 action
 - the S2 retry count
 - the External Application Server (XAS) IP address
- b. If you select Partial DHCP, then you must enter the following parameters:

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address for the IP Phone 2002.
S1 Port	This is a fixed value: 4100.
S1 action	Choose one of the following: <ul style="list-style-type: none"> • for TPS only, enter 1. • for TPS and Secure Multimedia Controller, enter 6 or 1. <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p> <p>You are not prompted for S1 PK if S1 Action is set to 1.</p>
S1 retry count	The number of times the IP Phone 2002 attempts to connect to the server. Enter 10.

Screen prompt	Description
S1 PK	<p>To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required.</p> <p>Default is ffffffff.</p> <p>The Private key of the Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B #3 = C #4 = D #5 = E #6 = F</p>
S2 IP	The secondary CS 1000 node IP address for the IP Phone 2002.
S2 Port	Same as S1.
S2 action	Same as S1.
	You are not prompted for S2 PK if S2 Action is set to 1.
S2 retry count	Same as S1.
S2 PK	<p>To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required.</p> <p>Default is ffffffff.</p> <p>The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B #3 = C</p>

Screen prompt	Description
	#4 = D #5 = E #6 = F
Cfg XAS? (0-No,1-Yes)	Default 0 (for No). If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.
XAS IP:	Enter the IP address of the XAS server.
Speed (0-A, 1-10, 2-100)	Network interface port speed. Default 0 (for Auto) 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.

8 Enter the following parameters:

Screen prompt	Description
802.1Q (0-No, 1-Yes)	Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.
Voice VLAN (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? (0-Auto, 1-Man)	Default 0 (for Auto). 0-Auto Automatically obtains VLAN ID using DHCP, or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094. You are not prompted for VLAN Cfg if Voice VLAN is not enabled.

Screen prompt	Description
LLDP-MED? (0-N, 1-Y)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV.</p> <p>You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.</p>
LLDP VLAN? (0-No, 1-Yes)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV.</p> <p>You are not prompted for LLDP VLAN if VLAN is not set to Auto (2- Auto), or if LLDP is not enabled.</p>
DHCP (0-No, 1-Yes)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.</p> <p>You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.</p>
VLANFILTER (0-No, 1-Yes)	<p>Default 0 (0 for No).</p> <p>You are not prompted for VLANFILTER if VLAN is not enabled.</p>
Duplex? (0-Auto, 1-Full)	Default 0 (for Auto).
Ctrl pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Ctrl pBits if 802.1Q is not enabled.</p>
Media pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Media pBits if 802.1Q is not enabled.</p>
PC Port? (0-Off, 1-On)	Default 1 (for On).

Screen prompt	Description
Speed (0-A, 1-10, 2-100)	Default 0 (for Auto). 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off and if Speed is set to 0 for Auto.
Data 802.1Q (0-N, 1-Y)	You are not prompted for Data 802.1Q if PC Port is set to 0 for Off.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Data VLAN if PC port is set to 0 for Off.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Data VLAN if PC port is set to 0 for Off.
Data VLAN Cfg? (0-Auto, 1-Man)	Default 1 (for Man) You are not prompted for Data VLAN Cfg if LLDP or Data VLAN are not enabled and PC Port is set to 0 for Off. If you select 0 (for Auto), VLAN ID is automatically configured to the value received in the VLAN NAME TLV.
Data VLAN ID:	You are not prompted for Data VLAN ID if Data VLAN is set to 0 for Auto.
Data pBits (0-7, 8-Au)	Default 8 (for Au). You are not prompted for Data pBits if the PC Port is set to 0 for Off or if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0-No, 1-Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 2002 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt
- For CS 1000 Release 4.5 and later, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 2002 searches for the TFTP Server for firmware upgrade. If the file name specified in i2002.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 2002 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 2002 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 2002 searches for the connect server.

9 Enter the following information:

Screen prompt	Description
Password	IP Phone Installer Password. You are not prompted to enter the IP Phone Installer Password if it has not been configured in your Call Server.
Node	the node ID.
TN	the TN or VTN.

The IP Phone 2002 registers with the TPS and, if needed, begins the firmware download. This takes several minutes. When complete, the IP Phone 2002 resets.

The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 10 Check for a dial tone and the correct DN above the display.
- 11 (Optional) Customize the feature keys as required. For more information, see *IP Phone 2002 User Guide (NN43116-104)*.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing the duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 12 "Enabling Full Duplex mode" \(page 91\)](#) to enable Full Duplex mode.

Procedure 12
Enabling Full Duplex mode

Step Action

- 1 Reset the phone by disconnecting and reconnecting power.
- 2 When the Nortel logo appears in the middle of the display, press each soft key in sequence. See [Procedure 9 "Configuring the IP Phone 2002" \(page 71\)](#).
- 3 If no other configuration changes are required, press the **OK** soft key repeatedly until the Duplex network option appears.
- 4 Select 1 to enable Full Duplex mode.
- 5 When the Speed option appears, select one of the following:
 - 0 for 10 Mb/s
 - 1 for 100 Mb/s (default)
- 6 Select **OK** to confirm the change.
- 7 Restart the IP Phone. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use [Procedure 13 "Checking Ethernet Statistics" \(page 91\)](#) to confirm activation of Full Duplex mode.

Procedure 13
Checking Ethernet Statistics

Step Action

- 1 Double-click the **Services** key. The Network Diagnostics menu appears.
- 2 Select **Ethernet Statistics**.
 - If Full Duplex mode is active, the following is displayed:

- Link: UP
- Duplex: Full
- Speed: 10 (Mb) or 100(Mb)
- Auto-Negotiate Capability: N
- Auto-Negotiate Completed: N

—End—

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection prevents the IP Phone 2002 from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. The malicious device launches a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 10 "Installing the IP Phone 2002 for the first time using manual configuration" \(page 75\)](#) or [Procedure 11 "Installing an IP Phone 2002 for the first time using DHCP" \(page 82\)](#).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

Redeploying an IP Phone 2002

You can redeploy an existing previously configured IP Phone 2002 on the same Call Server. For example, the IP Phone 2002 can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 2002. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 14

Changing the TN of an existing IP Phone 2002

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

1	Repower the IP Phone 2002.
---	----------------------------

During the reboot sequence of a previously configured IP Phone, the IP Phone 2002 displays the existing node number for approximately 5 seconds.

- 2 If the node password is enabled and NULL, choose one of the following:
 - a. Disable the password.
 - b. Set the password as non-NULL.
- 3 Press **OK** when the node number displays.

If	Then
the node password is enabled and is not NULL	a password screen displays. Go to Step 4 .
the node password is disabled	a TN screen displays. Go to Step 5 .

- 4 Enter the password at the password screen and press **OK**.
A TN screen displays.
To obtain the password, enter the nodePwdShow command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.
- 5 Select the **Clear** soft key to clear the existing TN.
- 6 Enter the new TN.

—End—

Replacing an IP Phone 2002

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 2002 that currently uses the TN.

Procedure 15
Replacing an IP Phone 2002

Step	Action
1	Obtain the node and TN information of the phone you want to replace.
2	Disconnect the IP Phone 2002 that you want to replace.

- 3 Follow Procedure 9 "Configuring the IP Phone 2002" (page 71) and Procedure 10 "Installing the IP Phone 2002 for the first time using manual configuration" (page 75) or Procedure 11 "Installing an IP Phone 2002 for the first time using DHCP" (page 82) to install and configure the IP Phone 2002.
- 4 Enter the same TN and Node Number as the IP Phone 2002 you replaced. The Call Server associates the new IP Phone 2002 with the existing TN.

—End—

Removing an IP Phone 2002 from service

Procedure 16

Removing an IP Phone 2002 from service

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

- | | |
|---|---|
| 1 | Disconnect the IP Phone 2002 from the network or turn off the power.

The service to the PC is disconnected as well if the PC connects to the IP Phone 2002.

If the IP Phone 2002 was automatically configured, the DHCP lease expires and the IP address returns to the available pool. |
| 2 | In LD 11, enter OUT at the TN prompt. |
-

—End—

Nortel IP Phone 2004

Contents

This section contains the following topics:

- "Introduction" (page 95)
- "Description" (page 96)
- "Components and functions" (page 97)
- "Supported features" (page 99)
- "Features not currently supported" (page 101)
- "Key number assignments" (page 103)
- "Package components" (page 104)
- "Installation and configuration" (page 106)
- "Full Duplex mode" (page 126)
- "Gratuitous Address Resolution Protocol Protection" (page 128)
- "Extensible Authentication Protocol " (page 128)
- "Redeploying an IP Phone 2004" (page 128)
- "Replacing an IP Phone 2004" (page 129)
- "Removing an IP Phone 2004 from service" (page 130)

Introduction

This section explains how to install and maintain the IP Phone 2004. For information about using the IP Phone 2004, see the *IP Phone 2004 User Guide (NN43117-102)*.

This section contains the following procedures:

- Procedure 17 "Configuring the IP Phone 2004" (page 107).
- Procedure 18 "Installing the IP Phone 2004 for the first time using manual configuration" (page 110).
- Procedure 19 "Installing an IP Phone 2004 for the first time using DHCP" (page 118).

- Procedure 20 "Enabling Full Duplex mode" (page 127).
- Procedure 21 "Checking Ethernet Statistics" (page 127).
- Procedure 22 "Changing the TN of an existing IP Phone 2004" (page 128).
- Procedure 23 "Replacing an IP Phone 2004" (page 129).
- Procedure 24 "Removing an IP Phone 2004 from service" (page 130).

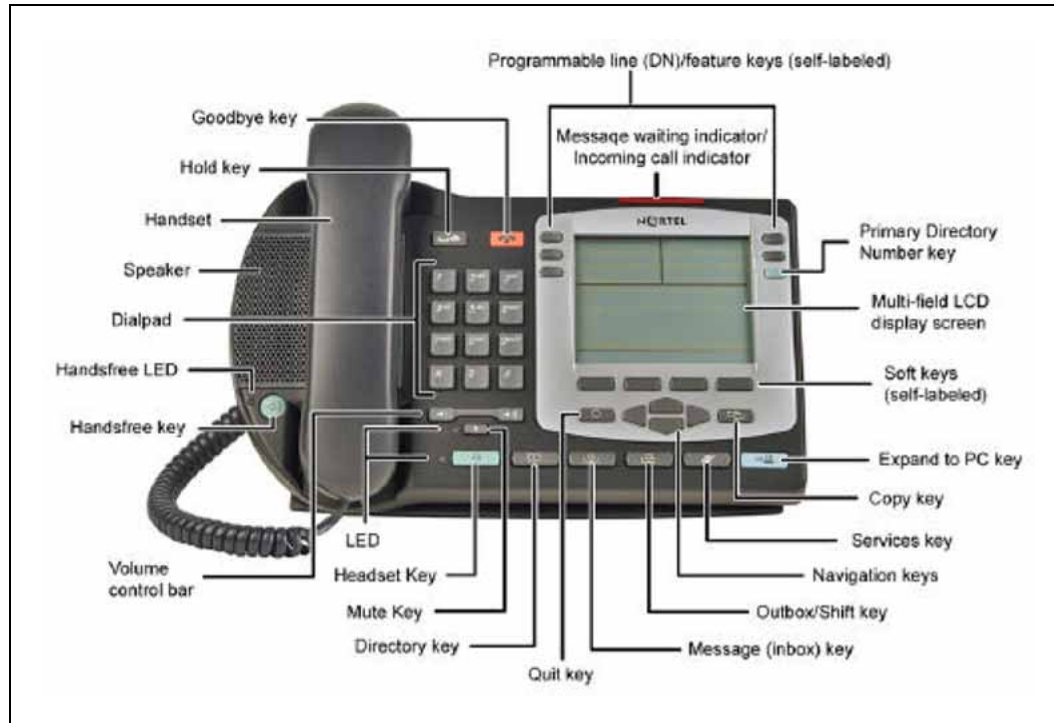
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 2004 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 2004 translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 2004 network and CS 1000 connections.

Figure 7 "IP Phone 2004" (page 96) shows the IP Phone 2004.

Figure 7
IP Phone 2004



Components and functions

This section describes the following components and functions of the IP Phone 2004:

- "Keys and functions" (page 97)
- "Services menu" (page 98)

Keys and functions

Table 9 "IP Phone 2004 keys and functions" (page 97) shows the IP Phone 2004 keys and functions.

Table 9
IP Phone 2004 keys and functions

Key	Function
Hold	Press the Hold key to put an active call on hold. Press the line (DN) key beside the flashing LCD to return to the caller on hold.
Goodbye	Press the Goodbye key to terminate an active call.
Message waiting light/ Incoming call indicator	The Message waiting indicator turns ON to indicate that a message has been left for the user. This indicator also flashes when the set ringer is ON.
Programmable line (DN)/feature keys (self-labeled)	Programmable line (DN)/feature keys (self-labeled) are configured for various features on the IP Phones. A steady LCD light beside a line (DN) key indicates the feature or line is active. A flashing LCD indicates the line is on hold or the feature is being programmed.
Context-sensitive soft keys (self-labeled)	Context-sensitive soft keys (self-labeled) are located below the display area. The LCD label above the key changes, based on the active feature. A triangle before a key label indicates that the key is active.
Fixed feature keys	Use these keys to access non-programmable standard features.
Expand to PC	The Expand to PC key is used to access external server applications such as External Application Server.
Copy	A fixed key reserved for future feature development. An audible non-working tone is generated along with a display message.
Navigation keys	Use the navigation keys to scroll through menus and lists in the display area.
Shift	Press the Shift key to switch between two feature key pages and access an additional six lines/features.
Message (Inbox)	Press the Message (Inbox) key to access your voice mailbox.

Key	Function
Quit	Press the Quit key to end an active application. Pressing the Quit key does not affect the status of the calls currently on your IP Phone.
Directory	Press the Directory key to access Directory services.
Mute	Press the Mute key to listen to the receiving party without transmitting. Press the Mute key again to return to a two-way conversation. The Mute key applies to Handsfree, Handset, and Headset microphones. The Mute LED flashes when the Mute option is in use.
Headset	Press the Headset key to answer a call using the headset or to switch a call from the handset or Handsfree to the headset.
Volume control bar	Use the Volume control bar to adjust the volume of the handset, headset, speaker, ringer, and Handsfree feature. Press the right side of the rocker bar to increase volume, the left side to decrease volume.
Handsfree key	Press the Handsfree key to activate handsfree. The LED lights to indicate when the handsfree feature is active.

Services menu

Table 10 "Services menu" (page 98) shows the Services menu.

Table 10
Services menu

Services key	Press the Services key to access the following items: <ul style="list-style-type: none"> • Telephone Options <ul style="list-style-type: none"> — Volume Adjustment — Contrast Adjustment — Language — Date/Time Format — Display diagnostics — Local Dialpad Tone — Ring type
--------------	---

- Call Timer
- OnHook Default Path
- Change Feature Key Label
- Set Info
- Live Dialpad
- Password Administration
- Virtual Office Login and Virtual Office Logout (if Virtual Office is configured)
- Test Local Mode and Resume Local Mode (if Branch Office is configured)

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

If a call is presented while the user is manipulating an option, the IP Phone 2004 rings and the DN key flashes. However, the display is not updated with the Caller ID, and the programming text is not disturbed.

The user can originate a call using Autodial or Last Number Redial while manipulating an option. However, the display is not updated with the dialed digits or the Caller ID, and Autodial and Last Number Redial intercept the dialpad.

During an incoming call, if the selected feature page does not contain the flashing DN line key, the display reverts to the active feature key page. This enables the user to answer the call without pressing the Shift key.

Supported features

The IP Phone 2004 supports the following telephony features:

- six programmable line (DN)/feature keys (self-labeled)
- four context-sensitive soft keys (self-labeled) that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- volume control bar to adjust ringer, speaker, handset, and headset volume
- six specialized feature keys
 - Quit
 - Directory
 - Message/Inbox
 - Shift/Outbox
 - Services

- Copy
- six call-processing fixed keys
 - Mute
 - Handsfree
 - Goodbye
 - Expand to PC
 - Headset
 - Hold
- Call Duration Timer
- ability to change the programmable line (DN)/feature key labels
- Corporate Directory
- Personal Directory
- Redial List
- Callers List
- Password Administration
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download
- Live Dialpad

The IP Phone 2004 supports the following data network features:

- integrated switch for shared PC access
 - the LAN Ethernet port supports 10/100BT Mb/s Full Duplex mode
 - the PC Ethernet port supports 10/100BT Mb/s Full Duplex mode
- automatic network configuration through DHCP
For more information about automatic network configuration, see [Table 12 "IP Phone 2004 IP parameters" \(page 109\)](#).
- 802.1ab Link Layer Discovery Protocol (LLDP)
For more information about LLDP, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).
- Secure Real-time Transport Protocol (SRTP) media encryption

For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).

- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use
 - full VLAN capability, including a manageable integrated switch in the IP Phone; allows VLAN and priority tagging for the IP Phone traffic and VLAN tagging for PC traffic
 - VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
 - 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN
- For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).
- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 2
 - Gratuitous Address Resolution Protocol (GARP) Protection

The IP Phone 2004 supports the following user interface features:

- External Application Server (XAS)
- language support: English, French, Swedish, Danish, Norwegian, German, Greek, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, Turkish, and Katakana
- IP Key Expansion modules

Features not currently supported

The following features are not supported on the IP Phone 2004:

- Group Listening
- Set-to-Set messaging

Central Answering Position

The Central Answering Position (CAP) operates as an Automatic Call Distribution (ACD) agent on the IP Phone 2004. A CAP provides call-handling features, such as transferring a call, parking a call, and answering a call. You can add an IP Phone Key Expansion Module (KEM) to provide additional lines and features, Direct Station Select, and Busy Lamp Field functionality.

For further information about Central Answering Position, see *Central Answering Position Implementation Guide (NN43011-501)*.

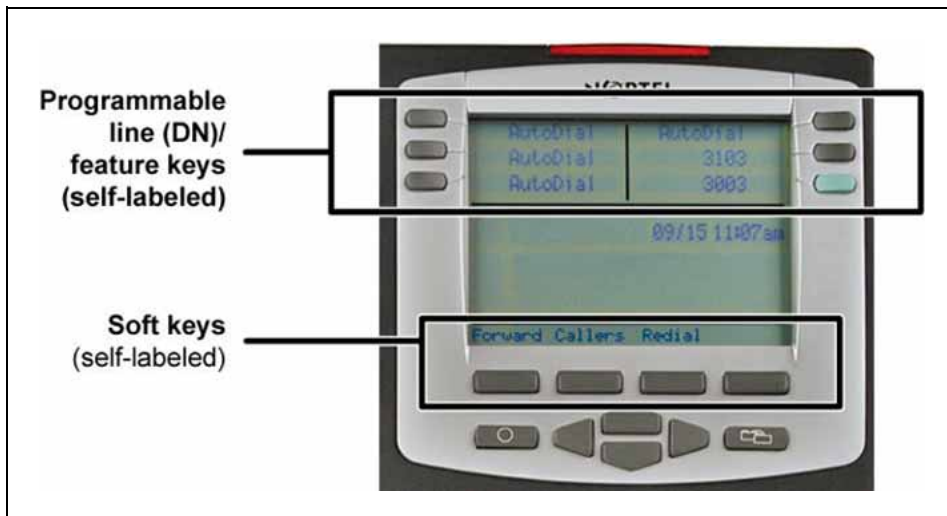
Display characteristics

An IP Phone 2004 has three major display areas:

- "Programmable line (DN)/feature key label display" (page 103)
- "Information line display" (page 103)
- "Soft key label display" (page 103)

Figure 8 "IP Phone 2004 display areas" (page 102) shows the three display areas.

Figure 8
IP Phone 2004 display areas



Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.



CAUTION

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Programmable line (DN)/feature key label display

The feature key label area displays a 10-character string for each of the four feature keys. Each feature key includes the key label and an icon. The icon state can be on, off, or flashing. A telephone icon displays the status of the configured DN. Key labels are left-aligned for keys on the left side of the screen, and right-aligned for keys on the right side of the screen.

If a label is longer than 10 characters, the last 10 characters are displayed, and the excess characters are deleted from the beginning of the string.

Information line display

An IP Phone 2004 has a three-line information display area with the following information:

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state) or Call Timer (if provisioned in the Telephone options menu)

The information in the display area changes, according to the call-processing state and active features.

Soft key label display

The soft key label has a maximum six characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon appears at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a feature is enabled, the icon state turns to On. The icon remains in the on state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, and returns the soft key label to its original state.

Use the More soft key to navigate the layers of functions. If there are only four functions assigned to the soft keys, the More key does not appear, and all four functions are displayed.

Key number assignments

Key numbers 1 to 15 are used for Programmable line (DN)/feature keys. These keys can be any DN or feature except for Message Waiting and those configured on keys 17 to 26.

You can assign a maximum of nine functions to the four soft-labeled, predefined context-sensitive soft keys. Because the context-sensitive soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the context-sensitive soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four context-sensitive soft keys. Labels for the context-sensitive soft keys appear in the display area. For further information, see ["Soft key label display" \(page 103\)](#). [Figure 8 "IP Phone 2004 display areas" \(page 102\)](#) shows the IP Phone 2004 display area.

For a description of the IP Phone function assignment for each of the context-sensitive soft keys, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

The following information applies to Phase II IP Phones. Product codes for Phase II IP Phones are different from previous sets.

See the product code on the back of the phone to confirm whether it is a Phase II IP Phone. The product code for Phase II IP Phones appears as IP Phone 200x. The product code for previous versions of the IP Phone appears with an i in front of the model number (for example, i200x).

You must order the AC power adapter separately if local power using the AC adapter is required, because Phase II IP Phones include integrated support for a number of power over LAN options, including support for IEEE 802.3af standard power.

[Table 11 "IP Phone 2004 component list" \(page 104\)](#) lists the IP Phone 2004 package components and product codes.

Table 11
IP Phone 2004 component list

<p>IP Phone 2004 package contents includes</p>

- | |
|---|
| <ul style="list-style-type: none">• IP Phone 2004• handset• handset cord• footstand• 7-ft. Ethernet cable |
|---|

• Getting Started card	
IP Phone 2004 (Ethergray) with Icon keycaps	NTDU92AA16/A05334 08
IP Phone 2004 (Ethergray) with English text label keycaps	NTDU92BA16/A05334 09
IP Phone 2004 (Charcoal) with Icon keycaps	NTDU92AA70/A05334 10
IP Phone 2004 (Charcoal) with English text label keycaps	NTDU92BA70/A05334 11
IP Phone 2004 (Charcoal with Bezel) with Icon keycaps	NTDU92AB70
IP Phone 2004 (Charcoal with Bezel) with Icon keycaps (RoHS)	NTDU92AC70E6
IP Phone 2004 (Charcoal with Bezel) with English text label keycaps	NTDU92BB70
IP Phone 2004 (Charcoal with Bezel) with English text label keycaps (RoHS)	NTDU92BC70E6
IP Phone 2004 wall mount kit (Charcoal), used with Ethergray and Charcoal models	NTMN15BA70/A05030 76
Replacement parts	
7-ft. Ethernet Cat5 cable	A0648375
Handset (Ethergray)	A0788874
Handset (Charcoal)	A0758634
Handset cord (Ethergray)	A0788682
Handset cord (Charcoal)	N0000764
Footstand (Charcoal), used for Ethergray and Charcoal models	A0538587
IP Phone 2004 Power Adapters	
Power transformer (117/120 VAC 50/60 Hz) (North America)	A0619627
Power transformer 3-prong AC to AC, direct plug-in, 8 W, 240 VAC, 50 Hz to 16 VAC at 500 mA (Ireland and UK)	A0656598
Power transformer AC to AC, direct plug-in, 8 W, 230 VAC, 50/60 Hz, to 16 VAC at 500 mA (Europe)	A0619635
Power transformer 2-prong wall plug direct plug-in AC to AC, 8 W, 240 VAC, 50 Hz, to 16 VAC at 500 mA (Australia and New Zealand)	A0647042
Power transformer AC to AC, direct plug-in, 8 W, 100 VAC, 50 Hz, to 16 VAC at 500 mA	A0828858

For more information, and for information about previous versions of the IP Phone, contact your Nortel representative.

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 2004:

- "Before you begin" (page 106)
- "First-time installation" (page 106)
- "Configuring the IP Phone 2004" (page 107)
- "Startup sequence" (page 109)
- "Installing the IP Phone 2004" (page 110)

Before you begin

Before installing the IP Phone 2004, complete the following pre-installation checklist:

- Ensure one IP Phone 2004 boxed package exists for each IP Phone 2004 you install. The package contains:
 - IP Phone 2004
 - handset
 - handset cord
 - 2.1 m (7-ft) CAT5 Ethernet cable
 - Getting Started Card
- Ensure one Software License exists for each IP Phone 2004 you install.
- Ensure the host Call Server is equipped with a Signaling Server that runs the Line TPS application.
- If an AC power adapter is required, ensure you use the correct AC power transformer. The voltage rating of the transformer must match the wall outlet voltage. See [Table 11 "IP Phone 2004 component list" \(page 104\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* or *IP Line Fundamentals (NN43100-500)*.



CAUTION

Do not plug your IP Phone 2004 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 2004

Procedure 17 "Configuring the IP Phone 2004" (page 107) to configure the IP Phone 2002 for the first time.

Procedure 17

Configuring the IP Phone 2004

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

- | | |
|---|--|
| 1 | <p>Configure a virtual loop on the Call Server using LD 97.</p> <p>For more information about configuring a virtual loop, see <i>IP Line Fundamentals (NN43100-500)</i> and <i>Software Input Output Administration (NN43001-611)</i>.</p> |
| 2 | <p>Configure the IP Phone 2004 on the Call Server using LD 11. At the prompt, enter the following:</p> <pre>REQ:chg TYPE:2004P1,2004P2</pre> <p>For more information about configuring the IP Phone 2004 using LD 11, see <i>Software Input Output Administration (NN43001-611)</i>.</p> |
| 3 | <p>Connect the IP Phone 2004 components:</p> <ol style="list-style-type: none"> Connect one end of the handset cord to the handset jack on the back of the IP Phone (identified with a handset icon). Connect the other end of the handset cord to the handset. |
| 4 | <p>Choose one of the following connections:</p> <ul style="list-style-type: none"> For an IP Phone not sharing a LAN access with a PC: <p>Connect one end of the CAT5 Ethernet cable to the LAN Ethernet port located on the back of the IP Phone 2004 (identified with a LAN icon). The other end of the CAT5 Ethernet cable plugs into the IP network.</p> |

For an IP Phone sharing a LAN access with a PC:

Connect one end of the CAT5 Ethernet cable to the LAN Ethernet port located on the back of the IP Phone (identified with a LAN icon, see [Figure 9 "IP Phone 2004 Ethernet network connections" \(page 108\)](#)) and the other end to the IP network. Insert one end of a second CAT5 Ethernet cable into the PC Ethernet port located on the back of the IP Phone (identified with a PC icon, see [Figure 9 "IP Phone 2004 Ethernet network connections" \(page 108\)](#)) and the other end into the computer.

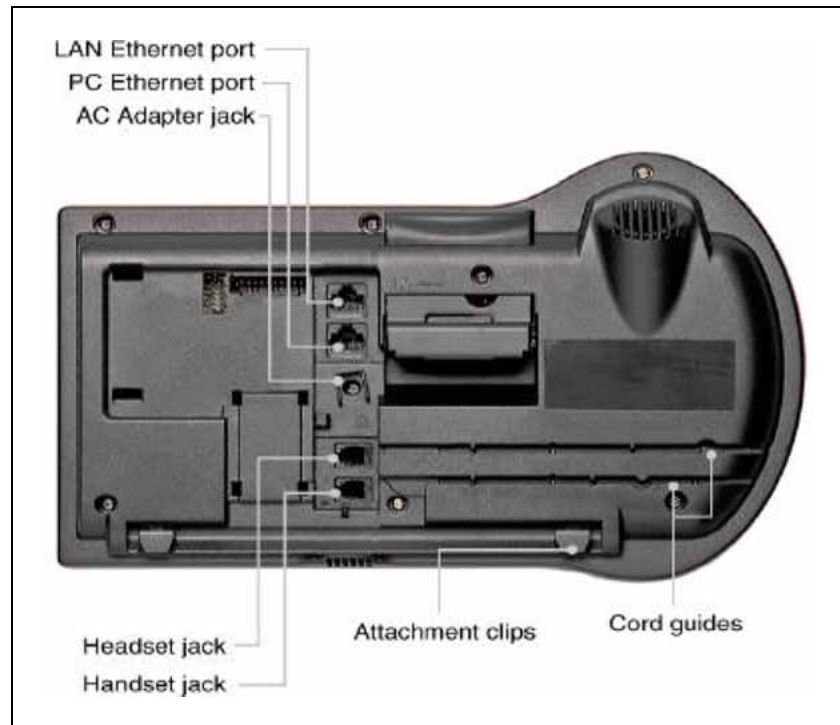


CAUTION

Damage to Equipment

Do not plug any device into your IP Phone 2004 Ethernet port other than one PC. The IP Phone 2004 does not support multiple devices connected through the PC Ethernet port.

Figure 9
IP Phone 2004 Ethernet network connections



- 5 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable and then thread the adapter cord through the channels in the stand.
- 6 Secure the IP Phone footstand to the base of the IP Phone. Use the angle adjustment grip on the top back of the IP Phone to adjust the position.
- 7 Power the IP Phone 2004 using either the Power over Ethernet or an AC power transformer (local power). If you are using local power, plug the AC power transformer into the nearest power outlet. Make sure you use the correct AC power transformer is used. The voltage

rating of the transformer must match the wall outlet voltage. See [Table 11 "IP Phone 2004 component list" \(page 104\)](#).

The IP Phone 2004 supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 2. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.

- 8 Use [Procedure 18 "Installing the IP Phone 2004 for the first time using manual configuration" \(page 110\)](#) to install the IP Phone 2004 for the first time using manual configuration, or use [Procedure 19 "Installing an IP Phone 2004 for the first time using DHCP" \(page 118\)](#) to install the IP Phone 2004 for the first time using DHCP.

—End—

Startup sequence

When an IP Phone 2004 connects to the network, it must perform a startup sequence. The elements of the startup sequence include:

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- connecting to the Call Server
- obtaining a User ID

See [Table 12 "IP Phone 2004 IP parameters" \(page 109\)](#) for a summary of the IP parameters and how they are obtained.

Table 12
IP Phone 2004 IP parameters

Parameter	Method of Acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Net Mask	Manually entered or automatically retrieved through Partial or Full DHCP.
Default Gateway Address	Manually entered or automatically retrieved through Partial or Full DHCP.

Parameter	Method of Acquisition
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically retrieved through Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Retrieved from local storage on subsequent power cycles.

Installing the IP Phone 2004

To install the IP Phone 2004 for the first time using manual configuration, use [Procedure 18 "Installing the IP Phone 2004 for the first time using manual configuration"](#) (page 110). To install the IP Phone 2004 for the first time using DHCP, use [Procedure 19 "Installing an IP Phone 2004 for the first time using DHCP"](#) (page 118).

ATTENTION

Timing information

There are only four seconds between plugging in the IP Phone 2004 power transformer and the appearance of the Nortel logo in the middle of the display. When you see the logo, you have one second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the one-second response time, the IP Phone 2004 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities"](#) (page 483).

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 18

Installing the IP Phone 2004 for the first time using manual configuration

Step	Action
1	When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right.

- 2 At the prompt **EAP Enable?**, enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control.
- 3 Enter DeviceID and Password.
If you select **No**, you are not prompted to enter Device ID and Password.
For more information about EAP, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).
- 4 At the prompt, **LLDP Enable?**, enter 1-Y (1 for Yes, default).
For more information about LLDP, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#). For more information about 802.1Q, see [Appendix "802.1Q VLAN description" \(page 461\)](#).
- 5 At the prompt **DHCP Yes/No?**, enter 0-N (0 for No).
By default, Full DHCP is configured on the IP Phone 2004. Depending on the configuration requirements, you can change the IP Phone 2004 configuration to allow the following IP address assignments:
- Static—enter all parameters
 - Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server
 - Full DHCP— (default) all parameters are obtained from the DHCP server
- A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration. For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 6 Enter the following information:
- | Screen prompt | Description |
|---------------|--|
| set IP | a valid IP Phone 2004 IP address. |
| net msk | a subnet mask. |
| def gw | the default Gateway for the IP Phone 2004 on the LAN segment to which it connects. |
- 7 Enter the information for the primary Connect Server (S1) and the secondary Connect Server (S2):

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address for the IP Phone 2004.
S1 Port	This is a fixed value: 4100
S1 action	Choose one of the following: <ul style="list-style-type: none"> • for TPS only, enter 1. • for TPS and Secure Multimedia Controller, enter 6 or 1. <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p> <p>You are not prompted for S1 PK if S1 Action is set to 1.</p>
S1 retry count	The number of times the IP Phone 2004 attempts to connect to the server. Enter 10.
S1 PK	To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required. <p>Default is ffffffff.</p> <p>The Private key of the Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following:</p> <p>#1 = A #2 = B #3 = C #4 = D #5 = E #6 = F</p>
S2 IP	The secondary CS 1000 node IP address for the IP Phone 2004.
S2 Port	Same as S1.

Screen prompt	Description
S2 action	<p>Same as S1.</p> <p>You are not prompted for S2 PK if S2 Action is set to 1.</p>
S2 retry count	Same as S1.
S2 PK	<p>To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required.</p> <p>Default is ffffffffffffff.</p> <p>The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following:</p> <p>#1 = A #2 = B #3 = C #4 = D #5 = E #6 = F</p>
Cfg XAS? (0-No,1-Yes)	<p>Default 0 (for No).</p> <p>If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.</p>
XAS IP:	Enter the IP address of the XAS server.
Speed (0-A, 1-10, 2-100)	<p>Network interface port speed.</p> <p>Default 0 (for Auto)</p> <p>0 = Auto 1 = 10 BT 2 = 100 BT</p> <p>You are not prompted for Speed if PC Port is set to 0 for Off.</p>

Screen prompt	Description
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.
802.1Q (0-No, 1-Yes)	Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.
Voice VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? 0-Auto, 1-Man:	Default 0 (for Auto). You are not prompted for VLAN Cfg if Voice VLAN is not enabled. 0-Auto Automatically obtains VLAN ID using DHCP or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094.
LLDP-MED? (0-No, 1-Yes)	If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV. You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.
LLDP VLAN? (0-No, 1-Yes)	If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV. You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.

Screen prompt	Description
DHCP (0-No, 1-Yes)	If you select 1-Y (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.
VLANFILTER (0-N, 1-Y)	You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled. Default 0 (for No).
Ctrl pBits (0-7, 8-Au)	You are not prompted for VLANFILTER if VLAN is not enabled. Default 8 (for Auto). You are not prompted for Ctrl pBits if 802.1Q is not enabled.
Media pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Media pBits if 802.1Q is not enabled.
PC Port? (0-Off, 1-On)	Default 1 (for On).
Speed (0-A, 1-10, 2-100)	Default 0 (for Auto). 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off and if Speed is set to 0 for Auto.
Data 802.1Q (0-N, 1-Y)	You are not prompted for Data 802.1Q if PC Port is set to 0 for Off.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Data VLAN if PC port is set to 0 for Off.

Screen prompt	Description
Data VLAN Cfg? (0-Auto, 1-Man)	Default 1 (for Man). You are not prompted for Data VLAN Cfg if LLDP or Data VLAN are not enabled and PC Port is set to 0 for Off. If you select 0 (for Auto), VLAN ID is automatically configured to the value received in the VLAN NAME TLV.
Data VLAN ID:	You are not prompted for Data VLAN ID if Data VLAN is set to 0 for Auto.
Data pBits (0-7, 8-Au)	Default 8 (for Au). You are not prompted for Data pBits if the PC Port is set to 0 for Off or if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0-No, 1-Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 2004 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 2004 searches for the TFTP Server for firmware upgrade. If the file name specified in i2004.cfg is not the same as the current firmware,

the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 2004 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 2004 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 2004 searches for the connect server.

8 Enter the following information

The IP Phone 2004 registers with the TPS and, if needed, begins the firmware download. This takes several minutes. When registration is complete, the IP Phone 2004 resets.

The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

9 Check for a dial tone and the correct DN above the display.

10 (Optional) Customize the feature keys as required. For more information, see *IP Phone 2004 User Guide (NN43117-102)*.

—End—

ATTENTION

Timing information

There are only four seconds between plugging in the IP Phone 2004 power transformer and the appearance of the Nortel logo in the middle of the display. When you see the logo, you have one second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the one-second response time, the IP Phone 2004 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 19

Installing an IP Phone 2004 for the first time using DHCP

Step	Action
1	When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right.
2	At the prompt EAP Enable? , enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control.
3	Enter DeviceID and Password. If you select No , you are not be prompted to enter Device ID and Password. For more information about EAP, see Appendix "802.1x Port-based network access control" (page 469) .
4	At the prompt, LLDP Enable? , enter 1-Y (1 for Yes, default). For more information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471) . For more information about 802.1Q, see Appendix "802.1Q VLAN description" (page 461) .
5	At the prompt DHCP Yes/No? , enter 1-Y (1 for Yes). By default, Full DHCP is configured on the IP Phone 2004. Depending on the configuration requirements, you can change the IP Phone 2004 configuration to allow the following IP address assignments: <ul style="list-style-type: none"> • Static—enter all parameters • Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server • Full DHCP— (default) all parameters are obtained from the DHCP server

- Static—enter all parameters
- Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server
- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

6 At the prompt, **Cached IP?**, select 0 (0-No, default) to conform to the DHCP standard and to obtain an IP address from the DHCP server. Select 1 (1 for Yes) to force the IP Phone to start with a cached IP address if the IP Phone cannot connect to the DHCP server and obtain an IP address.

7 Select Partial or Full DHCP.

a. If you select Full DHCP, then the following parameters are retrieved from the DHCP server:

- a valid IP Phone 2004 IP address
- a subnet mask
- the default Gateway for the IP Phone 2004 on the LAN segment to which it connects
- the S1 IP (the primary CS 1000 node IP address of the IP Phone)
- the S1 Action
- the S1 retry count (this is the number of times the IP Phone attempts to connect to the server)
- the S2 IP (the secondary CS 1000 node IP address of the IP Phone)
- the S2 Action
- the S2 retry count
- the External Application Server (XAS) IP address

b. If you select Partial DHCP, then you must enter the following parameters:

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address for the IP Phone 2004.
S1 Port	This is a fixed value: 4100.

Screen prompt	Description
S1 action	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• for TPS only, enter 1. <li>• for TPS and Secure Multimedia Controller, enter 6 or 1. <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p> <p>You are not prompted for S1 PK if S1 Action is set to 1.</p>
S1 retry count	<p>The number of times the IP Phone 2004 attempts to connect to the server. Enter 10.</p>
S1 PK	<p>To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required.</p> <p>Default is ffffffff.</p> <p>The Private key of the Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following:</p>
S2 IP	<p>The secondary CS 1000 node IP address for the IP Phone 2004.</p>
S2 Port	<p>Same as S1.</p>

Screen prompt	Description
S2 action	Same as S1. You are not prompted for S2 PK if S2 Action is set to 1.
S2 retry count	Same as S1.
S2 PK	To manually configure the PK, set the Action Byte to 6. After you enter the PK, apply the changes and then change the Action Byte to 1, if required. Default is ffffffff. The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects. If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B #3 = C #4 = D #5 = E #6 = F
Cfg XAS? (0-No,1-Yes)	Default 1 (for Yes). If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.
XAS IP:	Enter the IP address of the XAS server.

Screen prompt	Description
Speed (0-A, 1-10, 2-100)	Network interface port speed. Default 0 (for Auto) 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.

8 Enter the following parameters:

Screen prompt	Description
802.1Q (0-No, 1-Yes)	Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.
Voice VLAN (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? (0-Auto, 1-Man)	Default 0 (for Auto). 0-Auto Automatically obtains VLAN ID using DHCP, or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094. You are not prompted for VLAN Cfg if Voice VLAN is not enabled.

Screen prompt	Description
LLDP-MED? (0-N, 1-Y)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV.</p> <p>You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.</p>
LLDP VLAN? (0-No, 1-Yes)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV.</p> <p>You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.</p>
DHCP (0-No, 1-Yes)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.</p> <p>You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.</p>
VLANFILTER (0-No, 1-Yes)	<p>Default 0 (0 for No).</p> <p>You are not prompted for VLANFILTER if VLAN is not enabled.</p>
Duplex? (0-Auto, 1-Full)	Default 0 (for Auto).
Ctrl pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Ctrl pBits if 802.1Q is not enabled.</p>
Media pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Media pBits if 802.1Q is not enabled.</p>
PC Port? (0-Off, 1-On)	Default 1 (for On).

Screen prompt	Description
Speed (0-A, 1-10, 2-100)	Default 0 (for Auto) 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off and if Speed is set to 0 for Auto.
Data 802.1Q (0-N, 1-Y)	You are not prompted for Data 802.1Q if PC Port is set to 0 for Off.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Data VLAN if PC port is set to 0 for Off.
Data VLAN Cfg? (0-Auto, 1-Man)	Default 1 (for Man). You are not prompted for Data VLAN Cfg if LLDP or Data VLAN are not enabled and PC Port is set to 0 for Off. If you select 0 (for Auto), VLAN ID is automatically configured to the value received in the VLAN NAME TLV.
Data VLAN ID:	You are not prompted for Data VLAN ID if Data VLAN is set to 0 for Auto.
Data pBits (0-7, 8-Au)	Default 8 (for Au). You are not prompted for Data pBits if the PC Port is set to 0 for Off or if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0-No, 1-Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 2004 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 2004 searches for the TFTP Server for firmware upgrade. If the file name specified in i2004.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 2004 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 2004 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 2004 searches for the connect server.

9 Enter the following information:

Screen prompt	Description
Password	IP Phone Installer Password.
	You are not prompted to enter the IP Phone Installer Password if it has not been configured in your Call Server.

Screen prompt	Description
Node	The node ID.
TN	The TN or VTN.

The IP Phone 2004 registers with the TPS and, if needed, begins the firmware download. This takes several minutes. When the download is complete, the IP Phone 2004 resets.

The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 10 Check for a dial tone and the correct DN above the display.
- 11 (Optional) Customize the feature keys as required. For more information, see *IP Phone 2004 User Guide (NN43117-102)*.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing the duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 20 "Enabling Full Duplex mode" \(page 127\)](#) to enable Full Duplex mode.

Procedure 20
Enabling Full Duplex mode

Step	Action
1	Reset the IP Phone 2004 by disconnecting and reconnecting power.
2	When the Nortel logo appears in the middle of the display, press each soft key in sequence. See Procedure 19 "Installing an IP Phone 2004 for the first time using DHCP" (page 118) .
3	If no other configuration changes are required, press OK repeatedly until the Duplex network option appears.
4	Select 1 to enable Full Duplex mode.
5	When the Speed option appears, select one of the following: <ul style="list-style-type: none"> • 0 for 10 Mb/s • 1 for 100 Mb/s (default)
6	Select OK to confirm the change.
7	Restart the IP Phone 2004. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use [Procedure 21 "Checking Ethernet Statistics" \(page 127\)](#) to confirm activation of Full Duplex mode.

Procedure 21
Checking Ethernet Statistics

Step	Action
1	Double-click the Services key. The Network Diagnostics menu appears.
2	Select Ethernet Statistics . <ul style="list-style-type: none"> • If Full Duplex mode is active, the following is displayed: <ul style="list-style-type: none"> — Link: UP — Duplex: Full

- Speed: 10 (Mb) or 100(Mb)
- Auto-Negotiate Capability: N
- Auto-Negotiate Completed: N

—End—

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection prevents the IP Phone 2004 from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. The malicious device also launches a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 18 "Installing the IP Phone 2004 for the first time using manual configuration" \(page 110\)](#) or [Procedure 19 "Installing an IP Phone 2004 for the first time using DHCP" \(page 118\)](#).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

Redeploying an IP Phone 2004

You can redeploy an existing previously configured IP Phone 2004 on the same Call Server. For example, the IP Phone 2004 can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 2004. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 22

Changing the TN of an existing IP Phone 2004

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

- | | |
|---|----------------------------|
| 1 | Repower the IP Phone 2004. |
|---|----------------------------|

During the reboot sequence of a previously configured IP Phone, the IP Phone 2004 displays the existing node number for approximately five seconds.

- 2 If the node password is enabled and NULL, choose one of the following:
 - a. Disable the password.
 - b. Set the password as non-NULL.
- 3 Press **OK** when the node number displays.

If	Then
the node password is enabled and is not NULL	a password screen displays. Go to Step 4 .
the node password is disabled	a TN screen displays. Go to Step 5 .

- 4 Enter the password at the password screen, and press **OK**.
A TN screen displays.
To obtain the password, enter the `nodePwdShow` command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.
- 5 Select the **Clear** soft key to clear the existing TN.
- 6 Enter the new TN.

—End—

Replacing an IP Phone 2004

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 2004 that currently uses the TN.

Procedure 23 Replacing an IP Phone 2004

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

- | | |
|---|--|
| 1 | Obtain the node and TN information of the phone you want to replace. |
| 2 | Disconnect the IP Phone 2004 that you want to replace. |

- 3 Follow Procedure 17 "Configuring the IP Phone 2004" (page 107) and Procedure 18 "Installing the IP Phone 2004 for the first time using manual configuration" (page 110) or Procedure 19 "Installing an IP Phone 2004 for the first time using DHCP" (page 118) to install and configure the IP Phone 2004.
- 4 Enter the same TN and Node Number as the IP Phone 2004 you replaced. The Call Server associates the new IP Phone 2004 with the existing TN.

—End—

Removing an IP Phone 2004 from service

Procedure 24

Removing an IP Phone 2004 from service

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

- | | |
|---|---|
| 1 | Disconnect the IP Phone 2004 from the network or turn the power off.

The service to the PC is disconnected as well if the PC connects to the IP Phone 2004.

If the IP Phone 2004 was automatically configured, the DHCP lease expires and the IP address returns to the available pool. |
| 2 | In LD 11, enter OUT at the TN prompt. |
-

—End—

Nortel IP Audio Conference Phone 2033

Contents

- "Introduction" (page 131)
- "Description" (page 132)
- "Extension microphones" (page 133)
- "Components and functions" (page 134)
- "Supported features" (page 136)
- "Display characteristics" (page 138)
- "Key number assignments" (page 140)
- "Package components" (page 140)
- "Installation and configuration" (page 143)
- "Full Duplex mode" (page 160)
- "Extensible Authentication Protocol " (page 162)
- "Redeploying an IP Audio Conference Phone 2033" (page 162)
- "Replacing an IP Audio Conference Phone 2033" (page 163)
- "Removing an IP Audio Conference Phone 2033 from service" (page 164)
- "Connecting an extension microphone" (page 164)

Introduction

This section explains how to install and maintain the IP Audio Conference Phone 2033. For information about using the IP Audio Conference Phone 2033, see the *IP Phone Audio Conference Phone 2033 User Guide (NN43111-100)*.

This section contains the following procedures:

- Procedure 25 "Configuring the IP Audio Conference Phone 2033" (page 144)

- Procedure 26 "Installing the IP Audio Conference Phone 2033 for the first time using manual configuration" (page 148)
- Procedure 27 "Installing an IP Audio Conference Phone 2033 for the first time using DHCP" (page 154)
- Procedure 28 "Enable Full Duplex mode" (page 161)
- Procedure 29 "Checking Ethernet Statistics" (page 161)
- Procedure 30 "Changing the TN of an existing IP Audio Conference Phone 2033" (page 162)
- Procedure 31 "Replacing an IP Audio Conference Phone 2033" (page 163)
- Procedure 32 "Removing an IP Audio Conference Phone 2033 from service" (page 164)

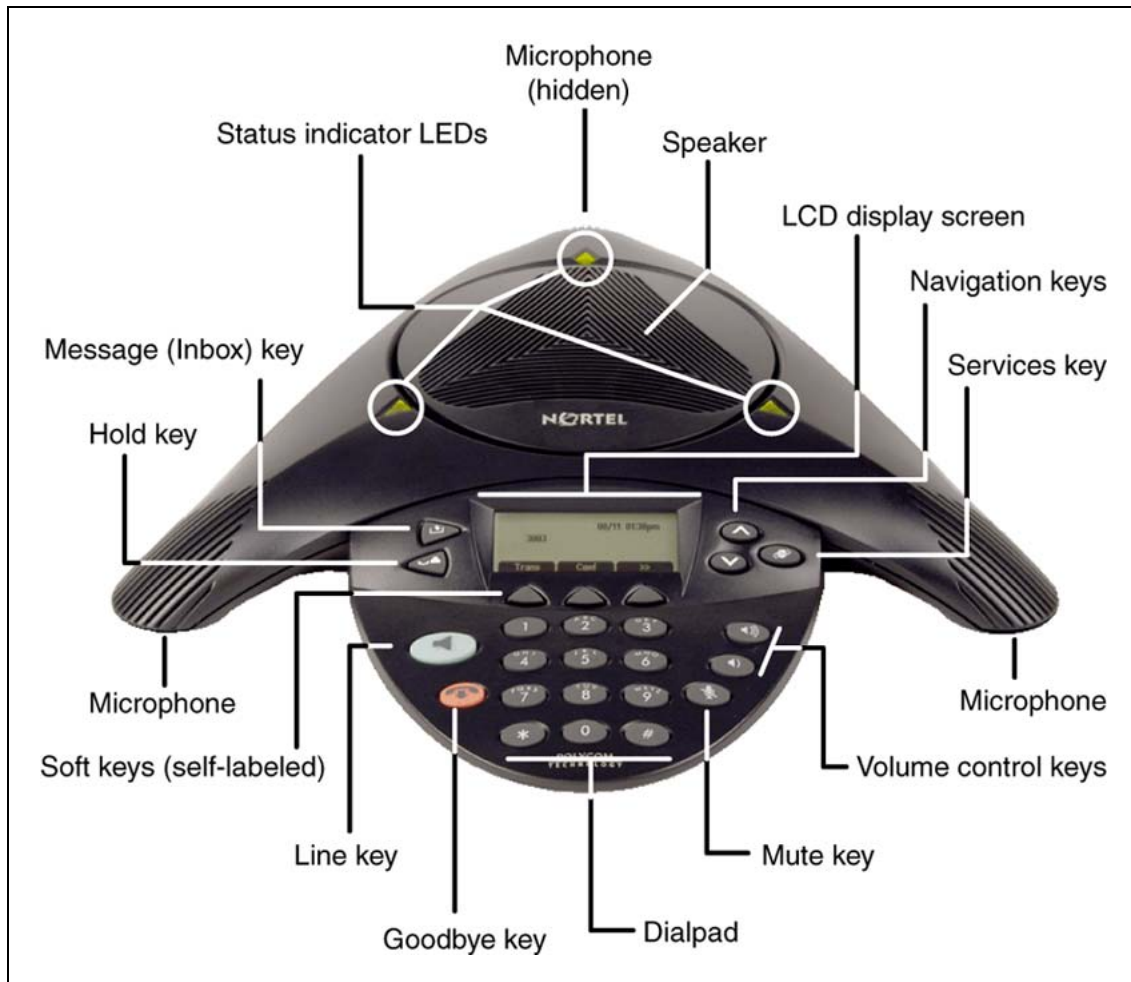
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Audio Conference Phone 2033 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Audio Conference Phone 2033 translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Audio Conference Phone 2033 network and CS 1000 connections.

Figure 10 "IP Audio Conference Phone 2033" (page 133) shows the IP Audio Conference Phone 2033.

Figure 10
IP Audio Conference Phone 2033

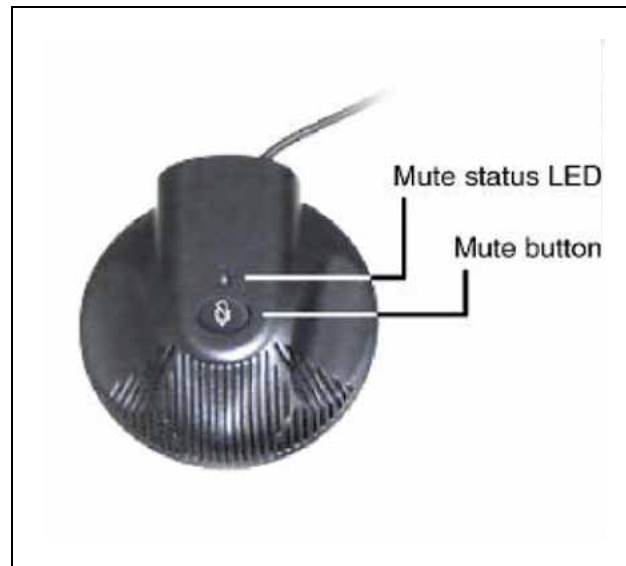


Extension microphones

The IP Audio Conference Phone 2033 supports up to two extension microphones that extend the microphone range in large rooms. Each extension microphone has a Mute button and an LED indicator to indicate the current mute state.

Figure 11 "Extension microphone" (page 134) shows an extension microphone.

Figure 11
Extension microphone



Components and functions

This section describes the following components and functions of the IP Audio Conference Phone 2033:

- ["Keys and functions" \(page 134\)](#)
- ["Services menu" \(page 135\)](#)

Keys and functions

[Table 13 "IP Audio Conference Phone 2033 keys and functions" \(page 134\)](#) describes the IP Audio Conference Phone 2033 keys and functions.

Table 13
IP Audio Conference Phone 2033 keys and functions

Key	Function
Line key	Use the Line key to access the single line and activate on-hook dialing.
Volume control buttons	Use the Volume control buttons to adjust the volume of the ringer and speaker.
Mute button	Use the Mute button on the main unit or any extension microphone to mute the speaker. Pressing the Mute button on the extension microphone toggles the mute state of the entire IP Phone, not just the microphone.
Goodbye key	Use the Goodbye key to terminate an active call.

Key	Function
Hold key	Press the Hold key to put an active call on hold. Press the Line (DN) key to return to the caller on hold.
Message (Inbox) key	Press the Message (Inbox) key to access your voice mailbox.
Navigation keys	Use the Navigation keys to scroll through menus and lists that appear on the LCD display screen.
Context-sensitive soft keys	Arrows appear on the left side of display screen to indicate there is more information to be displayed.
	Context-sensitive soft keys (self-labeled) are located below the LCD screen display. The LCD screen display above the key changes, based on the active feature. See "Soft key label display" (page 139) for further information.
	Press the Shift soft key labelled >> to access the second row of soft keys. When a triangle appears before a key label, the feature is active.

Services menu

[Table 14 "Services menu" \(page 135\)](#) shows the Services menu.

Table 14
Services menu

Services key	<p>Press the Services key to access the following items:</p> <ul style="list-style-type: none"> • Telephone Options <ul style="list-style-type: none"> — Volume adjustment — Contrast adjustment — Language — Date/Time — Local DialPad Tone — Set Info — Diagnostics — Ring type — Call Timer — Live Dialpad • Password Admin
--------------	---

- Station Control Password
- Virtual Office Login and Virtual Office Logout (if Virtual Office is configured)
- Test Local Mode and Resume Local Mode (if Media Gateway 1000B is configured)

Press the Services key to exit from any menu or menu item.

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

Network diagnostic utilities is available in Remote Mode only.

If a call is presented while the user is manipulating information, the phone rings. However, the display is not updated with the Caller ID, and the programming text is not disturbed.

The user can originate a call using Last Number Redial while manipulating an option.

Supported features

The Nortel IP Audio Conference Phone 2033 supports the following telephony features:

- three context-sensitive soft keys that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- volume control keys to adjust ringer, speaker volume
- two specialized feature keys
 - Message/Inbox
 - Services
- three call processing keys
 - Mute
 - Goodbye
 - Hold
- Virtual Office
- Enhanced UNISlim Firmware Download
- IP Call Recording

- UNISlim encryption
- DTMF Tones
- Live Dialpad

The IP Audio Conference Phone 2033 supports the following data network features:

- 10/100 Mb/s Full Duplex mode
- automatic network configuration through DHCP

For more information about automatic network configuration, see [Table 18 "IP Audio Conference Phone 2033 IP parameters" \(page 146\)](#).

- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use
 - VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
 - 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN
- For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).
- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 0

The IP Audio Conference Phone 2033 supports the following languages:

English, French, Swedish, Danish, Norwegian, German, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Japanese, Russian, Latvian, Turkish, and Katakana

Features not currently supported

- External three-port switch to support sharing LAN access with a PC or other data device is not provided. However, the IP Audio Conference Phone 2033 does provide 100 Mb/s full-duplex support.
- Integrated switch
- Personal Directory, Callers List, and Redial List are not supported. However, if the primary DN on an IP Audio Conference Phone 2033 is an MADN of an IP Phone 2001, IP Phone 2002, IP Phone 2004, or IP

Softphone 2050, Preferred Name Match and Idle Set Display (new call indication) are supported.

- Corporate Directory
- Callers List
- Redial List
- Personal Directory
- Automatic Call Distribution
- IP Key Expansion Modules
- Support of accessory modules
- Group Listening
- Set-to-Set messaging
- Headset support
- External Applications Server

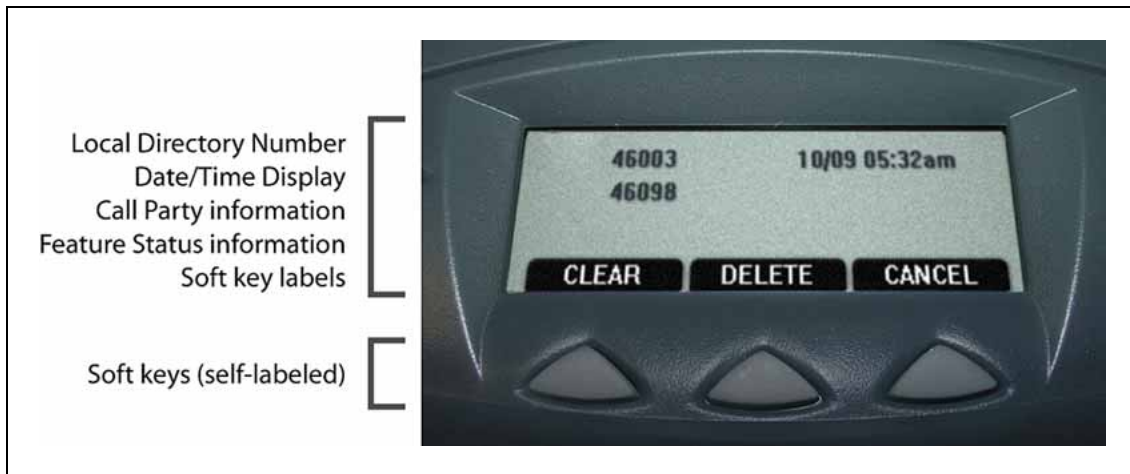
Display characteristics

The IP Audio Conference Phone 2033 has two display areas:

- "Information line display" (page 139)
- "Soft key label display" (page 139)

Figure 12 "IP Audio Conference Phone 2033 display areas" (page 138) on Figure 12 "IP Audio Conference Phone 2033 display areas" (page 138) shows the two display areas.

Figure 12
IP Audio Conference Phone 2033 display areas



Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.



CAUTION

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Information line display

The IP Audio Conference Phone 2033 has a one-line information display area with the following information:

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state) or Call Timer (if provisioned in the Telephone options menu)
- set information

The information in the display area changes, according to the call-processing state and active features.

Soft key label display

The soft key label has a maximum of seven characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon displays at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a soft key is enabled, the icon state changes to on. It remains in the on state until the soft key is pressed again. This cancels the enabled soft key and turns the icon off, returning the soft key label to its original state.

Use the Shift (>>) key to navigate through the layers of functions. If only three functions are assigned to the soft keys, the Shift (>>) key does not appear, and all three functions are displayed.

Figure 13 "Soft keys" (page 140) shows the soft keys on the display area.

Figure 13
Soft keys



Key number assignments

You can assign a maximum of nine functions to the four soft-labeled, predefined context-sensitive soft keys. Because the context-sensitive soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the context-sensitive soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four context-sensitive soft keys. Labels for the context-sensitive soft keys appear in the display area. For further information, see ["Soft key label display" \(page 139\)](#). [Figure 12 "IP Audio Conference Phone 2033 display areas" \(page 138\)](#) shows the IP Phone 2004 display area.

For a description of the IP Phone function assignment for each of the context-sensitive soft keys, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

[Table 15 "Components list for US, CA, CALA, AP, and GC" \(page 141\)](#) lists the components for the IP Audio Conference Phone 2033 for the Americas, Asia Pacific, and Greater China region.

Table 15
Components list for US, CA, CALA, AP, and GC

<p>IP Audio Conference Phone 2033 package contents include</p> <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7-ft. CAT5 Ethernet cable • Power Interface Module (PIM) with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card <p>Universal power supply</p>	NTEX11AA70
<p>IP Audio Conference Phone 2033 package contents include</p> <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7-ft. CAT5 Ethernet cable • Power over Ethernet (PoE) Module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card • 2 Extension microphones (charcoal) <p>Universal power supply</p>	NTEX11BA70
<p>IP Audio Conference Phone 2033 package contents include</p> <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7-ft. CAT5 Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card <p>Universal power supply</p>	NTEX11EA70
Accessories	
Power accessory kit (PIM, Universal power supply, cabling)	NTEX11CA
Power over Ethernet module	NTEX11GAE6
Extension microphone with 7-ft. cable	NTEX11DA70

Table 16 "Components list for EMEA" (page 142) lists the components for Europe, Middle East and Africa (EMEA) regions.

Table 16
Components list for EMEA

<p>IP Audio Conference Phone 2033 package contents include</p> <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7-ft. CAT5 Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable <p>IP Audio Conference Phone 2033 Quick Reference Card</p>	NTEX11AA70E6
<p>IP Audio Conference Phone 2033 package contents include</p> <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7-ft. CAT5 Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card <p>2 Extension microphones (charcoal)</p>	NTEX11BA70E6
<p>IP Audio Conference Phone 2033 package contents include</p> <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7-ft. CAT5 Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card • Universal Power Supply 	NTEX11EA70E6
<p>IP Audio Conference Phone 2033 package contents include</p> <p>IP Audio Conference Phone 2033 (charcoal)</p> <ul style="list-style-type: none"> • 7-ft. CAT5 Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card • 2 Extension microphones (charcoal) with cables • Universal Power Supply 	NTEX11FA70E6
Accessories	

• Universal Power Supply (order power cord separately)	NTEX11CAE6
• Power over Ethernet module	NTEX11GAE6
• Extension microphones (charcoal) with cables	NTEX11DA70E6

Table 17
Power cords

IP Phone IP Audio Conference Phone 2033 Power cords	
NA NEMA 5-15P, 125V 13A (10ft.)	NTTK14AB
Euro CEE (7) VII, 250V, 10A (2.5m)	NTTK16AB
ANZ AS3112, 250V 10A (2.5m)	NTTK15AA
Swiss SEV 1011, 250V 10A (8ft.)	NTTK17AB
UK/Ireland BS1363, 240V 10A (8ft.)	NTTK18AB
Denmark AFSNIT, 250V 10A (2.5m)	NTTK22AB
Argentina IRAM 2073, 250V 10A (8ft.)	A0814961
Japan 1.8 m (5.9 ft), 10 amp, IEC320-C13	NTTK26AAE6

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Audio Conference Phone 2033:

- ["Before you begin" \(page 143\)](#)
- ["First-time installation" \(page 144\)](#)
- ["Configuring the IP Audio Conference Phone 2033" \(page 144\)](#)
- ["Startup sequence" \(page 146\)](#)
- ["Installing the IP Audio Conference Phone 2033" \(page 147\)](#)

Before you begin

Before installing the IP Audio Conference Phone 2033, complete the following pre-installation checklist:

- Ensure one Software License exists for each IP Audio Conference 2033 Phone you install.
- Ensure one IP Audio Conference Phone 2033 boxed package exists for each IP Audio Conference Phone 2033 you install. See [Table 15 "Components list for US, CA, CALA, AP, and GC" \(page 141\)](#) or [Table 16 "Components list for EMEA" \(page 142\)](#) for a list of package contents.
- Ensure the host Call Server is equipped with a Signaling Server that runs the Line TPS application.

- If an AC power adapter is required, ensure you use the correct AC power transformer. The voltage rating of the transformer must match the wall outlet voltage. See [Table 15 "Components list for US, CA, CALA, AP, and GC" \(page 141\)](#) or [Table 16 "Components list for EMEA" \(page 142\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)*, or *IP Line Fundamentals (NN43100-500)*.



CAUTION

Service Interruption

Do not plug your IP Audio Conference Phone 2033 into an ISDN connection. Severe damage can result.

Configuring the IP Audio Conference Phone 2033

Use [Procedure 25 "Configuring the IP Audio Conference Phone 2033" \(page 144\)](#) to configure the IP Phone 2001 for the first time

Procedure 25

Configuring the IP Audio Conference Phone 2033

Step	Action
1	Configure a virtual loop on the system using LD 97. For more information about configuring a virtual loop, see <i>IP Line Fundamentals (NN43100-500)</i> and <i>Software Input Output Administration (NN43001-611)</i> .
2	Configure the IP Audio Conference Phone 2033 on the system using LD 11. At the prompts, enter the following: REQ:chg TYPE:2033 TN cc uu ECHG yes ITEM cls ITEM For more information about configuring the IP Audio Conference Phone 2033 using LD 11, see <i>Software Input Output Administration (NN43001-611)</i> .
3	Connect one end of the CAT5 Ethernet cable to the network interface located on the back of the Power over Ethernet (PoE) module. See

Figure 14 "POE module" (page 145). Plug the other end of the CAT5 Ethernet cable into your IP network interface.

- 4 Connect the CAT5 Ethernet cable attached to the PoE module to the IP Phone. Thread the CAT5 Ethernet cable through the channel on the bottom of the IP Phone and plug it into the PoE module port on the IP Phone.
- 5 Connect the AC power adapter (optional) to the power supply port located on the back of the PoE module. Leave the AC power adapter unplugged from the power outlet. Thread the cord through the channel on the bottom of the PoE module then plug the other end into the AC power source. Ensure you use the correct AC power transformer. The voltage rating of the transformer must match the wall outlet voltage. See [Table 15 "Components list for US, CA, CALA, AP, and GC" \(page 141\)](#) or [Table 16 "Components list for EMEA" \(page 142\)](#).

Figure 14 "POE module" (page 145) shows the Power over Ethernet (PoE) module.

Figure 14
POE module

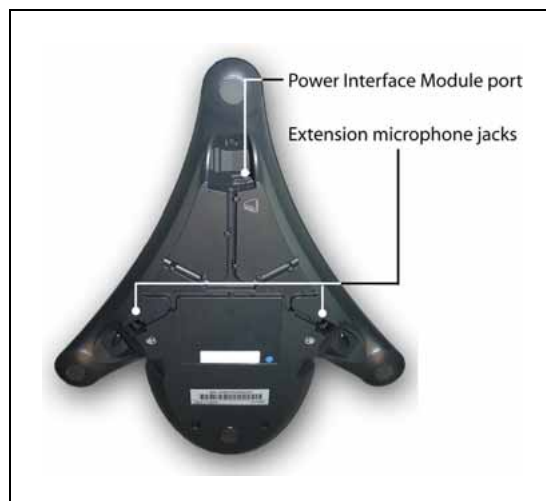


Red LEDs on the IP Audio Conference Phone 2033 indicate power. Messages indicating system start up, such as Loading, Initializing network, and Loading boot parameters appear after a short delay.

Figure 15 "Bottom view of IP Audio Conference Phone 2033" (page 146) shows the bottom view of the IP Audio Conference Phone 2033.

The IP Audio Conference Phone 2033 supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 0. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.

Figure 15
Bottom view of IP Audio Conference Phone 2033



—End—

Startup sequence

When an IP Audio Conference Phone 2033 connects to the network, it must perform a startup sequence. The elements of the startup sequence include:

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- connecting to the Call Server
- obtaining a User ID

See [Table 18 "IP Audio Conference Phone 2033 IP parameters"](#) (page 146) for a summary of the IP parameters and how they are obtained.

Table 18
IP Audio Conference Phone 2033 IP parameters

Parameter	Method of Acquisition
VLAN ID	Manually entered or automatically obtained through DHCP.

Parameter	Method of Acquisition
IP Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Net Mask	Manually entered or automatically retrieved through Partial or Full DHCP.
Default Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically retrieved through Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Retrieved from local storage on subsequent power cycles.

Installing the IP Audio Conference Phone 2033

To install the IP Audio Conference Phone 2033, use [Procedure 26 "Installing the IP Audio Conference Phone 2033 for the first time using manual configuration"](#) (page 148), or [Procedure 27 "Installing an IP Audio Conference Phone 2033 for the first time using DHCP"](#) (page 154).

ATTENTION

Timing information

When you see the text Nortel, you have 1 second to respond by pressing the three soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Audio Conference Phone 2033 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the Local diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities"](#) (page 483).

A tone sounds shortly before the IP Phone is ready to start the Nortel IP Phone application. Once the application has loaded and started, the Nortel logo and Starting DHCP appears at the bottom of the screen.

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 26
Installing the IP Audio Conference Phone 2033 for the first time using manual configuration

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

1	When the Nortel logo appears in the middle of the display, immediately press the three soft keys at the bottom of the display in sequence from left to right.
---	---

2	At the prompt, DHCP <i>Yes/NO?</i> , enter 0 (0 for No). By default, Full DHCP is configured on the IP Audio Conference Phone 2033. Depending on the configuration requirements, you can change the IP Audio Conference Phone 2033 configuration to allow the following IP address assignments:
---	--

- Static—enter all parameters
- Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server
- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

3	Enter the following information:
---	----------------------------------

Screen prompt	Description
set IP	a valid IP Audio Conference Phone 2033 IP address
net msk	a subnet mask
def g w	the default Gateway for the IP Audio Conference Phone 2033 on the LAN segment to which it connects.

The TFTP Server is required to download the current firmware. For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

4	Enter the information for the primary Connect Server (S1) and the secondary Connect Server (S2):
---	--

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address of the IP Audio Conference Phone 2033.
S1 Port	This is a fixed value: 4100.
S1 action	Choose one of the following: <ul style="list-style-type: none"> for TPS only, enter 1. for TPS and Secure Multimedia Controller, enter 6 or 1. <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p>
S1 retry count	The number of times the IP Audio Conference Phone 2033 attempts to connect to the server. Enter 10.
Cfg PK? (0-No, 1-Yes)	If you enter 1 for Yes, enter the PK when the New PK prompt appears. Default is ffffffff. The Private key of the Secure Multimedia Controller to which the IP Phone connects. If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B #3 = C #4 = D #5 = E #6 = F
S2 IP	The secondary CS 1000 node IP address of the IP Audio Conference Phone 2033.
S2 Port	Same as S1.

Screen prompt	Description
S2 action	Same as S1.
S2 retry count	Same as S1.
Cfg PK? (0-No, 1-Yes)	<p>If you enter 1 for Yes, enter the PK when the New PK prompt appears.</p> <p>Default is ffffffffffffff.</p> <p>The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following:</p> <p>#1 = A #2 = B #3 = C #4 = D #5 = E #6 = F</p>
Speed (0-A, 1-10, 2-100)	<p>Network interface port speed.</p> <p>Default 0 (for Auto)</p> <p>0 = Auto 1 = 10 BT 2 = 100 BT</p> <p>You are not prompted for Speed if PC Port is set to 0 for Off.</p>
Duplex (0-A, 1-F, 2-H)	<p>Default 1 (for Auto).</p> <p>0 = Auto 1 = Full 2 = Half</p> <p>You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.</p>
802.1Q (0-No, 1-Yes)	<p>Default 1 (for Yes).</p> <p>You are not prompted for 802.1Q if LLDP is not enabled.</p>
Voice VLAN? (0-N, 1-Y)	<p>Default 0 (for No).</p> <p>You are not prompted for Voice VLAN if 802.1Q is not enabled.</p>

Screen prompt	Description
VLAN Cfg? 0-Auto, 1-Man:	<p>Default 0 (for Auto).</p> <p>You are not prompted for VLAN Cfg is Voice VLAN is not enabled.</p> <p>0-Auto Automatically obtains VLAN ID using DHCP or the 802.1ab data switch.</p> <p>1-Man Enter the VLAN ID manually. This is a number from 1 to 4094.</p>
LLDP-MED? (0-No, 1-Yes)	<p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV.</p> <p>You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.</p>
LLDP VLAN? (0-No, 1-Yes)	<p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV.</p> <p>You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.</p>
DHCP (0-No, 1-Yes)	<p>If you select 1-Y (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.</p> <p>You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.</p>
VLANFILTER (0-N, 1-Y)	<p>Default 0 (for No).</p> <p>You are not prompted for VLANFILTER if VLAN is not enabled.</p>
Ctrl pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Ctrl pBits if 802.1Q is not enabled.</p>

Screen prompt	Description
Media pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Media pBits if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Audio Conference Phone 2033 searches for the TFTP Server for firmware upgrade. If the file name specified in i2033.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Audio Conference Phone 2033 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Audio Conference Phone 2033 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Audio Conference Phone 2033 searches for the connect server.

5 Enter the following information:

Screen prompt	Description
Password	IP Phone Installer Password. You are not prompted to enter the IP Phone Installer Password if it has not been configured in your system.
Node	The node ID.
TN	The TN or VTN.

Select the **Shift** soft key labeled (>>) and press **Clear** to edit the TN field. The IP Audio Conference Phone 2033 by default places you in the units field of the TN. You can not use backspace to move to the loop, shelf or card fields.

The IP Audio Conference Phone 2033 registers with the Terminal Proxy Server (TPS) and, if needed, begins the firmware download. This takes several minutes. When the download is complete, the IP Audio Conference Phone 2033 resets.

The current system date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 6** Check for a dial tone and the correct DN above the display.
- 7** (Optional) Customize the soft keys as required. For more information, see *Software Input Output Administration (NN43001-611)* and *IP Phone Audio Conference Phone 2033 User Guide (NN43111-100)*.

—End—

ATTENTION

Timing information

When you see the text Nortel, you have 1 second to respond by pressing the three soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Audio Conference Phone 2033 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities"](#) (page 483).

A tone sounds shortly before the IP Phone is ready to start the Nortel IP Phone application. Once the application has loaded and started, the Nortel logo and **Starting DHCP** appears at the bottom of the screen.

To edit network configuration, the following soft keys are available:

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 27

Installing an IP Audio Conference Phone 2033 for the first time using DHCP

Step	Action
1	When the Nortel logo appears in the middle of the display, immediately press the three soft keys at the bottom of the display in sequence from left to right.
2	At the prompt DHCP Yes/No?, enter 1 (1 for Yes). By default, Full DHCP is configured on the IP Audio Conference Phone 2033. Depending on the configuration requirements, you can change the IP Audio Conference Phone 2033 configuration to allow the following IP address assignments: <ul style="list-style-type: none"> • Static—enter all parameters • Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server • Full DHCP— (default) all parameters are obtained from the DHCP server <p>A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.</p> <p>For more information about how to set up DHCP servers for use with the IP Phones, see <i>Converging the Data Network with VoIP Fundamentals (NN43001-260)</i>.</p>
3	At the prompt, Cached IP? , select 0 (0-No, default) to conform to the DHCP standard and to obtain an IP address from the DHCP server. Only select 1 (1 for Yes) to force the IP Phone to start with

a cached IP address if the IP Phone cannot connect to the DHCP server and obtain an IP address.

4 Select Partial or Full DHCP.

a. If you select Full DHCP, then the following parameters are retrieved from the DHCP server:

- a valid IP Audio Conference Phone 2033 IP address
- a subnet mask
- the default Gateway for the IP Audio Conference Phone 2033 on the LAN segment to which it connects
- the S1 IP (the primary CS 1000 node IP address of the IP Phone)
- the S1 action
- the S1 retry count (this is the number of times the IP Audio Conference Phone 2033 attempts to connect to the server)
- the S2 IP (the secondary CS 1000 node IP address of the IP Phone)
- the S2 action
- the S2 retry count

b. If you select Partial DHCP, then you must enter the following parameters

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address of the IP Audio Conference Phone 2033.
S1 Port	This is a fixed value: 4100.
S1 action	Choose one of the following: <ul style="list-style-type: none"> • for TPS only, enter 1. • for TPS and Secure Multimedia Controller, enter 6 or 1.

For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

Screen prompt	Description
S1 retry count	The number of times the IP Audio Conference Phone 2033 attempts to connect to the server; enter 10.
Cfg PK? (0-No, 1-Yes)	<p>If you enter 1 for Yes, enter the PK when the New PK prompt appears.</p> <p>Default is ffffffffffffff.</p> <p>The Private key of the Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B #3 = C #4 = D #5 = E #6 = F</p>
S2 IP	The secondary CS 1000 node IP address of the IP Audio Conference Phone 2033.
S2 Port	Same as S1.
S2 action	Same as S1.
S2 retry count	Same as S1.
Cfg PK? (0-No, 1-Yes)	<p>If you enter 1 for Yes, enter the PK when the New PK prompt appears.</p> <p>Default is ffffffffffffff.</p> <p>The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.</p> <p>To enter ALPHA digits from A to F, enter the following: #1 = A #2 = B</p>

Screen prompt	Description
	#3 = C #4 = D #5 = E #6 = F
Speed (0-A, 1-10, 2-100)	Network interface port speed. Default 0 (for Auto) 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).
5 Enter the following parameters:	
802.1Q (0-No, 1-Yes)	Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.
Voice VLAN (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? (0-Auto, 1-Man)	Default 0 (for Auto). 0-Auto Automatically obtains VLAN ID using DHCP, or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094. You are not prompted for VLAN Cfg if Voice VLAN is not enabled.

LLDP-MED? (0-N, 1-Y)	Default 0 (for No). If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV. You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.
LLDP VLAN? (0-No, 1-Yes)	Default 0 (for No). If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV. You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.
DHCP (0-No, 1-Yes)	Default 0 (for No). If you select 1 (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server. You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.
VLANFILTER (0-No, 1-Yes)	Default 0 (0 for No). You are not prompted for VLANFILTER if VLAN is not enabled.
Duplex? (0-Auto, 1-Full)	Default 0 (for Auto).
Ctrl pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Ctrl pBits if 802.1Q is not enabled.
Media pBits (0-7, 8-Au)	Default 8 (for Auto). You are not prompted for Media pBits if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).

PSK SRTP? (0 for No, 1 for Yes) Default 0 (for No).
GARP Ignore? (0-No,1-Yes) Default 0 (for No).

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Audio Conference Phone 2033 searches for the TFTP Server for firmware upgrade. If the file name specified in i2033.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Audio Conference Phone 2033 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Audio Conference Phone 2033 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Audio Conference Phone 2033 searches for the connect server.

6 Enter the following information:

Screen prompt	Description
Password	IP Phone Installer Password. You are not prompted to enter the IP Phone Installer Password if it has not been configured in your system.
Node	The node ID.
TN	The TN or VTN.

Select the **Shift** soft key labeled (>>) and press **Clear** to edit the TN field. The IP Audio Conference Phone 2033 by default places you in the units field of the TN. You can not use backspace to move to the loop, shelf or card fields.

The IP Audio Conference Phone 2033 registers with the TPS and, if needed, begins the firmware download. This takes several minutes. When the download is complete, the IP Audio Conference Phone 2033 resets.

The current system date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 7 Check for a dial tone and the correct DN above the display.
- 8 (Optional) Customize the soft keys as required. For more information, see *Software Input Output Administration (NN43001-611)* and *IP Phone Audio Conference Phone 2033 User Guide (NN43111-100)*.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing the duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 28 "Enable Full Duplex mode" \(page 161\)](#) to enable Full Duplex mode.

Procedure 28
Enable Full Duplex mode

Step	Action
1	Reset the IP Phone by disconnecting and reconnecting power.
2	When the Nortel logo appears, press each soft key in sequence. See Procedure 27 "Installing an IP Audio Conference Phone 2033 for the first time using DHCP" (page 154) .
3	If no other configuration changes are required, press the OK soft key repeatedly until the Duplex network option appears.
4	Select 1 to enable Full Duplex mode.
5	When the Speed option appears, select one of the following: <ul style="list-style-type: none"> • 0 for 10 Mb/s • 1 for 100 Mb/s (default)
6	Select OK to confirm the change.
7	Restart the IP Phone. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use [Procedure 29 "Checking Ethernet Statistics" \(page 161\)](#) to confirm activation of Full Duplex mode.

Procedure 29
Checking Ethernet Statistics

Step	Action
1	Click the Services key. The Network Diagnostics menu appears.

- 2 Select **Telephone Op > Diagnostics > Ether Stats**.
 - If Full Duplex mode is active, the following is displayed:
 - Duplex: Full
 - Speed: 10 (Mb) or 100(Mb)
 - Auto-Negotiate Capability: N
 - Auto-Negotiate Completed: N

—End—

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

Redeploying an IP Audio Conference Phone 2033

You can redeploy an existing previously configured IP Audio Conference Phone 2033 on the same system. For example, the IP Audio Conference Phone 2033 can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Audio Conference Phone 2033. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 30

Changing the TN of an existing IP Audio Conference Phone 2033

Step	Action
1	Repower the IP Audio Conference Phone 2033. During the reboot sequence of a previously configured the IP Audio Conference Phone 2033 displays the existing node number for approximately five seconds.
2	If the node password is enabled and NULL, choose one of the following: <ol style="list-style-type: none"> a. Disable the password. b. Set the password as non-NULL.
3	Press OK when the node number displays.

- | | |
|--|--|
| If | Then |
| the node password is enabled and is not NULL | a password screen displays. Go to Step 4 . |
| the node password is disabled | a TN screen displays. Go to Step 5 . |
- 4 Enter the password at the password screen, and press **OK**.
A TN screen displays.
To obtain the password, enter the `nodePwdShow` command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.
 - 5 Select the **Shift** soft key labeled (>>) and press **Clear** to edit the TN field. The IP Audio Conference Phone 2033 by default places you in the units field of the TN. You cannot use backspace to move to the loop, shelf or card fields.
 - 6 Enter the new TN.

—End—

Replacing an IP Audio Conference Phone 2033

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Audio Conference Phone 2033 that currently uses the TN.

Procedure 31

Replacing an IP Audio Conference Phone 2033

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

- | | |
|---|---|
| 1 | Obtain the node and TN information of the phone you want to replace. |
| 2 | Disconnect the IP Audio Conference Phone 2033 that you want to replace. |
| 3 | Follow Procedure 25 "Configuring the IP Audio Conference Phone 2033" (page 144) and Procedure 26 "Installing the IP Audio Conference Phone 2033 for the first time using manual configuration" (page 148) or Procedure 28 "Enable Full Duplex mode" (page 161) to install and configure the IP Audio Conference Phone 2033. |

- 4 Enter the same TN and Node Number as the IP Audio Conference Phone 2033 you replaced. The system associates the new IP Audio Conference Phone 2033 with the existing TN.

—End—

Removing an IP Audio Conference Phone 2033 from service

Procedure 32

Removing an IP Audio Conference Phone 2033 from service

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

- 1 Disconnect the IP Audio Conference Phone 2033 from the network or turn off the power.

If the IP Audio Conference Phone 2033 was automatically configured, the DHCP lease expires and the IP address returns to the available pool.

- 2 In LD 11, enter OUT at the TN prompt.

—End—

Connecting an extension microphone

Procedure 33

Connecting an extension microphone to the IP Audio Conference Phone 2033

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

- 1 Thread the microphone cord through the channels on the bottom of the IP Phone.

A maximum of two microphone jacks are supported on the IP Audio Conference Phone 2033.

- 2 Connect the microphone cord to one of the microphone jacks on the bottom of the IP Phone.

—End—

Nortel IP Phone 2007

Contents

This section contains the following topics:

- "Introduction" (page 165)
- "Description" (page 166)
- "Components and functions" (page 167)
- "Supported features" (page 170)
- "Features not currently supported" (page 172)
- "Touch panel" (page 173)
- "Dialpad entry" (page 173)
- "Cleaning the IP Phone display screen" (page 174)
- "Display characteristics" (page 174)
- "Local Tools menu password protection" (page 178)
- "Key number assignments" (page 179)
- "Package components" (page 180)
- "Installation and configuration" (page 181)
- "Full Duplex mode" (page 195)
- "Gratuitous Address Resolution Protocol Protection" (page 196)
- "Extensible Authentication Protocol" (page 197)
- "Redeploying an IP Phone 2007" (page 197)
- "Replacing an IP Phone 2007" (page 198)
- "Removing an IP Phone 2007 from service" (page 198)

Introduction

This section explains how to install and maintain the IP Phone 2007. For information about using the IP Phone 2007, see the *IP Phone 2007 User Guide (NN43118-100)*.

This section contains the following procedures:

- Procedure 34 "Configuring the IP Phone 2007" (page 182).
- Procedure 35 "Installing the IP Phone 2007" (page 186).
- Procedure 36 "Enabling Full Duplex mode" (page 195).
- Procedure 37 "Checking Ethernet Statistics" (page 196).
- Procedure 38 "Changing the TN of an existing IP Phone 2007" (page 197).
- Procedure 39 "Replacing an IP Phone 2007" (page 198).
- Procedure 40 "Removing an IP Phone 2007 from service" (page 198).

After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 2007 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 2007 translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 2007 network and CS 1000 connections.

Figure 16 "IP Phone 2007" (page 166) shows the IP Phone 2007.

Figure 16
IP Phone 2007



Components and functions

This section describes the following components and functions of the IP Phone 2007:

- "Keys and functions" (page 167)
- "Services menu" (page 168)
- "Local Tools menu" (page 169)

Keys and functions

Table 19 "IP Phone 2007 keys and functions" (page 167) lists the keys and functions for the IP Phone 2007.

Table 19
IP Phone 2007 keys and functions

Key	Function
Hold	Press the Hold key to put an active call on hold. Tap the flashing line (DN) soft key to return to the caller on hold.
Goodbye	Press the Goodbye key to terminate an active call.
Handsfree	Press the Handsfree key to activate handsfree.
	The LED lights to indicate when the handsfree feature is active.
Headset	Press the Headset key to answer a call using the headset or to switch a call from the handset or handsfree to the headset.
Mute	Press the Mute key to listen to the receiving party without transmitting. Press the Mute key again to return to a two-way conversation. The Mute key applies to handsfree, handset, and headset microphones.
	The Mute LED flashes when the Mute option is in use.
Volume control bar	Use the Volume control bar to adjust the volume of the ringer, handset, headset, speaker, and the Handsfree feature.
	Press the right side of the rocker bar to increase volume, the left side to decrease volume.
Message waiting light/incoming call indicator	The Message waiting indicator turns ON to indicate that a message has been left for the user. This indicator also flashes when the set ringer is ON.

Key	Function
Programmable line (DN)/feature keys (self-labeled)	<p>Programmable line (DN)/feature keys (self-labeled) are located on the touch panel display and are configured for various features on the IP Phones.</p> <p>A steady LCD light beside a programmable line (DN)/feature key indicates the feature or line is active. A flashing LCD indicates the line is on hold or the feature is being programmed.</p>
Context-sensitive soft keys (self-labeled)	<p>Context-sensitive soft keys (self-labeled) are located on the touch panel display. The soft key label changes, based on the active feature.</p> <p>Tap the More soft key to access the next layer of soft key functions.</p>
Navigation keys	Use the navigation keys to scroll through menus and lists on the LCD display screen. The key rocks for up, down, left, and right movement.
Context-sensitive keys	The soft key labels are enabled for the keys on either side of the navigation cluster. The labels are context sensitive. When in an edit box, the soft key labels appear as Clear and Backspace. This allows numeric editing without using the soft keyboard. In normal use the soft key labels show Quit and Copy.

Services menu

Table 20 "Services menu" (page 168) shows the Services menu.

Table 20
Services menu

Services key	<p>Tap the Services key to access the following items:</p> <ul style="list-style-type: none"> • Volume adjustment • Contrast adjustment • Language • Date/Time • Display diagnostics • Local DialPad Tone • Set Info • Diagnostics • Call Log Options • Ring type • Call timer • On hook default path • Change Feature key label
--------------	---

- Name Display Format
- Live Dialpad

- Virtual Office Login and Virtual Office Logout (if Virtual Office is configured)
- Test Local Mode and Resume Local Mode (if Branch Office is configured)
- Password Admin (if configured)

When an option has a sublist, an ellipsis (...) appears after the option.

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

Local Tools menu

Tap the Tools icon to access the Local Tools menu. [Table 21 "Local Tools menu" \(page 169\)](#) shows the options available in the Local Tools menu.

If you are prompted to enter a password when you tap the Tools icon, password protection is enabled. For more information about password protection, see ["Local Tools menu password protection" \(page 178\)](#).

Entering text in the Local Tools menu items is easier with a USB keyboard.

Table 21
Local Tools menu

Network Configuration	<p>Use this menu to configure the IP Phone 2007, or to display the information that was configured when the IP Phone was installed. This menu contains the following items:</p> <ul style="list-style-type: none"> • 802.1x/EAP • DHCP status • IP network settings (IP address, mask, gateway address) • Server 1 and Server 2 IP address, Port, Action, Retry, and PK numbers • Voice VLAN and Filtering • PC port disable • Data VLAN and Filtering • Duplex setting • Ignore GARP protection
-----------------------	---

	<ul style="list-style-type: none"> • Pre-Shared Key SRTP • XAS (S4) IP address, graphical, port
Local Diagnostics	<p>Displays the Local Diagnostics menu containing the following items:</p> <ul style="list-style-type: none"> • Network Diagnostic Tools • Ethernet Statistics • IP Network Statistics • IP Set&DHCP Information <p>For more information about the IP Phone 2007 Local Diagnostics menu, see Appendix "IP Phone diagnostic utilities" (page 483).</p>
Touch Panel Setup	Use the Touch Panel Setup tool to calibrate the touch panel and stylus.
Contrast and Brightness	Use Contrast Brightness tools to alter the display physical settings.
USB Devices	Use USB Devices menu to control the Universal Serial Bus (USB) device plugged into the USB port in the back of the IP Phone.
TFTP Upgrade	Use TFTP Upgrade menu to upgrade the firmware in the IP Phone.
Preferences	Use the Preferences menu to configure individual user preferences.
Lock Menu	Use the Lock menu to prevent unauthorized access to the Local Tools menu.

Supported features

- 12 programmable line (DN)/feature soft keys
- four context-sensitive soft keys (self-labeled) that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.
- large, color touch panel display screen
- volume control bar to adjust ringer, speaker, handset, and headset volume
- speaker for on-hook dialing or on-hook listening
- four call-processing fixed keys:
 - Hold

- Goodbye
- Handsfree
- Mute
- Call Duration Timer
- ability to change the programmable line (DN)/feature key labels
Feature keys support English characters only.
- Corporate Directory
- Personal Directory
- Redial List
- Callers List
- Password Administration
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download
- Live Dialpad

The IP Phone 2007 supports the following data networking features:

- integrated switch for shared PC access
 - the LAN Ethernet port supports 10/100BT Mb/s Full Duplex mode
 - the PC Ethernet port supports 10/100BT Mb/s Full Duplex mode
- automatic network configuration through DHCP
For more information about automatic network configuration, see [Table 24 "IP Phone 2007 IP parameters" \(page 185\)](#).
- 802.1ab Link Layer Discovery Protocol (LLDP)
For more information about LLDP, [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).
- Secure Real-time Transport Protocol (SRTP) media encryption
For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).
- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use

- full VLAN capability, including a manageable integrated switch in the IP Phone; allows VLAN and priority tagging for the IP Phone traffic and VLAN tagging for PC traffic
- VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN
For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).
- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 3
- Gratuitous Address Resolution Protocol (GARP) Protection

The IP Phone 2007 supports the following user interface features:

- a large, color touch panel display that supports color XML/HTML content through an XAS
- USB port, to support USB devices
Powered downstream 1.1 compliant USB hubs are supported, including USB 2.0 hubs, if they offer USB 1.1 backwards compliancy.
- Hearing Aid Compatibility (HAC) as per FCC Part 68
- headset jack with On/Off key
- remote firmware download
- TFTP Server based firmware upgrades
- language support: English, French, Swedish, Danish, Norwegian, German, Greek, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, and Turkish
- External Application Server (XAS)
- Graphical External Application Server (GXAS)

Features not currently supported

The following features are not supported on the IP Phone 2007:

- Group Listening
- Set-to-Set messaging

Touch panel

You perform point and click operations on your IP Phone 2007 using the touch panel. The touch panel is used with the graphical user interface (GUI) to present soft keys directly on the display. You can activate all Line/DN keys and feature soft keys by using the touch panel.

Calibrate the touch panel

Calibrate the touch panel through the Tools menu, which enables you to fine-tune the touch panel. You are prompted to use the stylus to tap three targets.

For further information, see [Procedure 34 "Configuring the IP Phone 2007" \(page 182\)](#).

Stylus

Operate the touch panel using a stylus or your finger. However, use of a stylus is recommended to avoid damage to the touch panel.

Dialpad entry

For ease of use, Nortel recommends the use of the external USB keyboard.

The following rules apply when you enter text and special characters using the dialpad.

- Press a key from 0 to 9 once to enter the corresponding number.
- Press a key from 2 to 9 repeatedly to cycle through the letters assigned to that key, first in lower case and then in upper case.

For example, if you press the **5** key repeatedly, the following characters are displayed, one at a time:

j -> k -> l -> J -> K -> L -> 5 ->

See [Table 22 "Character key mappings" \(page 174\)](#) for character key mappings.

- The insertion point remains in the its current position as long as you continue to press the same key.
- The entry is accepted if either a new key is pressed or if two seconds pass with no entry. The insertion point moves 1 space to the right.

For example, to enter the word Nortel, press the following key sequence:

6 [2 second delay] 6 7 8 3 5

Although special characters are not required, key 1 generates commonly used special characters, such as the period (.), at symbol (@), and underscore (_).

Table 22
Character key mappings

Key	Generates
1	_ - . ! @ \$ % & + 1
2	a b c A B C 2
3	d e f D E F 3
4	g h i G H I 4
5	j k l J K L 5
6	m n o M N O 6
7	p q r s P Q R S 7
8	t u v T U V 8
9	w x y z W X Y Z 9

Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.



CAUTION

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

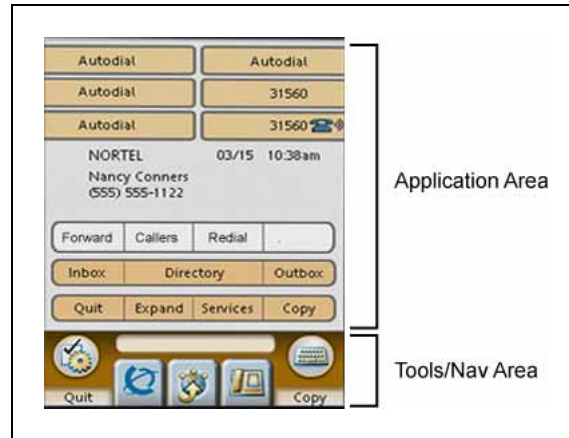
Display characteristics

The IP Phone 2007 window-based user interface has two display areas:

- "Application area" (page 175)
- "Tools/Navigation area" (page 177)

Figure 17 "IP Phone 2007 display areas" (page 175) shows these two display areas.

Figure 17
IP Phone 2007 display areas



The display may differ from the above example.

To extend the life of the LCD panel, the panel goes dark (sleep) after a configured period of time. For further information, see the *IP Phone 2007 User Guide (NN43118-100)*.

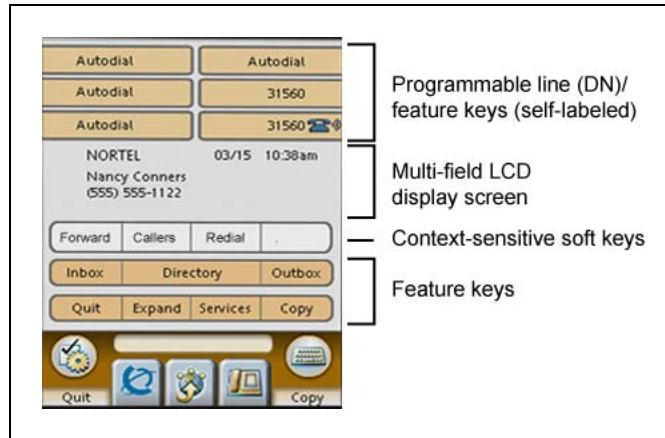
Application area

The Application area provides:

- "Programmable line (DN)/feature key label display" (page 176)
- "Information line display " (page 176)
- "Soft key label display" (page 176)
- "Feature key label display" (page 177)

Figure 18 "IP Phone 2007 Application area" (page 176) shows the Application area.

Figure 18
IP Phone 2007 Application area



Programmable line (DN)/feature key label display

The feature key label area displays a 10-character string for each of the 12 programmable line (DN)/feature keys. Each key includes the key label and an icon. The icon state can be on, off, or flashing. Key labels are left-aligned for keys on the left side of the screen, and right-aligned for keys on the right side of the screen.

If a label is longer than 10 characters, the last 10 characters are displayed, and the excess characters are deleted from the beginning of the string.

Information line display

The information line display area contains the following sections:

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information or Call Timer (if provisioned in the Telephone options menu)
- set information

Soft key label display

Use the More key to navigate through the layers of functions. If only four functions are assigned to the soft keys, the More key does not appear, and all four functions are displayed.

The soft key label has a maximum of seven characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon displays at the beginning of the soft key label, and the label shifts one

character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a soft key is enabled, the icon state changes to on. It remains in the on state until the soft key is pressed again. This cancels the enabled soft key and turns the icon off, returning the soft key label to its original state.

Soft key labels support different languages.

Feature key label display

The feature key labels may show either text or icons. The text labels are displayed by default and are changed using the Tools menu. For further information about the feature keys and their icon equivalents, see the *IP Phone 2007 User Guide (NN43118-100)*.

Tools/Navigation area

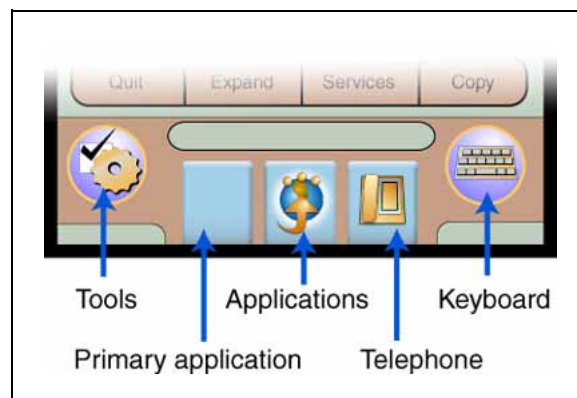
The Tools/Navigation area provides controls for navigating between features and selecting tools.

The following five main elements are presented as touchable keys:

- Tools
- Primary application
- Applications
- Telephone
- Keyboard

Figure 19 "IP Phone 2007 Tools/Navigation area" (page 177) shows the Tools/Navigation area.

Figure 19
IP Phone 2007 Tools/Navigation area



Local Tools menu password protection

If the SECUREMENU parameter was set during Full DHCP configuration, the Local Tools menu is locked to prevent accidental or unwanted changes. You are prompted to enter the fixed password 26567*738 (color*set) whenever the Services key is double-pressed, or whenever the Local Diagnostics and Network Configuration sub menus are accessed.

If the PARTSECURE parameter was set during Full DHCP configuration, you are prompted to enter the fixed password whenever you access Local Diagnostics, or Network Configuration menu items from the Local Tools menu. You are always prompted to enter the fixed password whenever you access the Lock Menu sub menu.

Two ways to control the menu lock are as follows:

- DHCP Secure Menu option—the IP Phone processes the secure menu setting retrieved from the Full DHCP response.
- Lock Menu option—double-press the Services key to access the Local Tools menu. Use the up/down navigation keys to scroll and highlight one of the following Lock Menu options:
 - 1. Manual Secure Local Menu—You are prompted to enter the fixed password whenever the Services key is double-pressed.
 - 2. Manual Partial Secure Menu—You are prompted to enter the fixed password whenever you access the Local Diagnostics and the Network Configuration sub menus.
 - 3. Manual Disable Secure Menu—When this option is selected, the Lock Menu is disabled.
 - 4. DHCP Secure Menu—The IP Phone follows the menu lock configuration received from the Full DHCP string:
 - If SECUREMENU is present, you are prompted to enter a password after you double-press the Services key.
 - If PARTSECURE is present, you are prompted to enter a password whenever you select Local Diagnostics and Network Configuration.
 - If neither SECUREMENU nor PARTSECURE is present, then the menu is not locked.
 - 5. Lock Now—The Lock Now item immediately exits the Tools menu, closes any open Tools menu pages, and locks the Tools menu.

The settings configured in the Lock Menu sub menu override the settings received from the DHCP string.

Configuring Secure Local Menu through Full DHCP

Password protection is enabled during Full DHCP configuration if the SECUREMENU parameter, or the PARTSECURE parameter are present at the end of the S4 part of the Full DHCP string. If neither the SECUREMENU parameter, nor the PARTSECURE parameter is present, password protection is not enabled.

The SECUREMENU/PARTSECURE item is an optional parameter. If it is present, then the full S4 string needs to be present, including the action and retries. The S4 string is already present if the XAS support has been configured through the DHCP. If XAS is not configured, you can still enable password protection by setting the S4 IP address to 0.0.0.0 and by setting the other fields to 0.

Accessing the Local Tools menu

After you enter the password, the Local Tools menu remains active for 5 minutes. You can freely navigate, exit and reenter the Local Tools menu without being prompted to reenter the password. To reset the timer before the 5-minute time expires, double-press the Services key.

You can also press the 5 key to select the Lock Now item from the Lock Menu. The Lock Now item immediately exits the Local Tools menu, closes any open Local Tools menu pages, and locks the Local Tools menu. Alternatively, when time expires, the Local Tools menu and any open submenus are closed. Double-press the Services key to open the password prompt window to reaccess the Local Tools menu.

If you enter an incorrect password, the Local Tools menu does not open. Double-press the Services key to open the password prompt window. Only three incorrect password entries are allowed. Any entry after the three attempts is ignored for 5 minutes. The password prompt window is visible and you can reenter the password but the password is not processed until the 5-minute time expires.

Some text appears dimmed depending on the current state of the menu lock and the configuration of the IP Phone. Only configuration options that are enabled from the current state appear active. Menu options that are not available appear dimmed.

For more information about configuring the Local Tools menu for the IP Phone 2007, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Key number assignments

Key numbers 1 to 15 are used for Programmable line (DN)/feature keys. These keys can be any DN or feature except for Message Waiting and those configured on keys 17 to 26.

You can assign a maximum of nine functions to the four soft-labeled, predefined context-sensitive soft keys. Because the context-sensitive soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the context-sensitive soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four context-sensitive soft keys. Labels for the context-sensitive soft keys appear in the display area. For further information, see ["Soft key label display" \(page 176\)](#). [Figure 18 "IP Phone 2007 Application area" \(page 176\)](#) shows the IP Phone 2007 Application area.

For a description of the IP Phone function assignment for each of the context-sensitive soft keys, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

The IP Phone 2007 includes integrated support for a number of LAN options, including support for IEEE 802.3af Power Classification 3. The Global power adapter must be ordered separately if local power is required.

[Table 23 "IP Phone 2007 component list" \(page 180\)](#) lists the IP Phone 2007 package components and product codes. Contact Nortel for further information.

Table 23
IP Phone 2007 component list

IP Phone 2007 package contents includes	NTDU96AB70
<ul style="list-style-type: none"> • IP Phone 2007 (charcoal with metallic bezel) • Handset • Handset cord • Footstand • 7-ft. (2.1 m) CAT5 Ethernet cable • Getting Started card 	
Replacement parts	
7-ft. CAT5 Ethernet cable	A0648375
Handset (charcoal)	A0758634
Handset cord (charcoal)	N0000764
Footstand (charcoal)	A0538587

IP Phone 2007 power adapter	
Global power adapter	N0014020
IP Phone 2007 power cords	
Cord 9.9 ft. NA Power, NEMA, 125 Vac 13 ^a NA, M.East, Taiwan, Indonesia, Philippines, Korea, Thailand, Vietnam, Japan	NTTK14AB
Cord 8 ft., ANA Power AS-3, 240 Vac 10A Australia, New Zealand, PRC	NTTK15AA
Option 11C Standard European Power Cord 250 Vac Other EMEA, Kenya	NTTK16AB
Option 11C Swiss Power Cord, 9.9 ft. 125 Vac Switzerland	NTTK17AB
Option 11C UK Power Cord 240 Vac Hong Kong, Ireland, UK, Singapore, Malaysia, India, Bangladesh, Pakistan, Brunei, Sri Lanka	NTTK18AB
Option 11C Denmark Power Cord Kit, 9.9 ft. 125 Vac Denmark	NTTK22AB

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 2007:

- ["Before you begin" \(page 181\)](#)
- ["First-time installation" \(page 182\)](#)
- ["Configuring the IP Phone 2007" \(page 182\)](#)
- ["Startup sequence" \(page 184\)](#)
- ["Installing the IP Phone 2007" \(page 185\)](#)

Before you begin

Before installing the IP Phone 2007, complete the following pre-installation checklist:

- Ensure one IP Phone 2007 boxed package exists for each IP Phone 2007 you install. The package contains:
 - IP Phone 2007
 - handset
 - handset cord
 - 2.1 m (7-ft) CAT5 Ethernet cable
 - Getting Started Card

- Ensure one Software License exists for each IP Phone 2007 you install.
- Ensure the host Call Server is equipped with a Signaling Server that runs the Line TPS application.
- If you are not using Power over Ethernet (PoE) you must use the Global power adapter or your phone fails to operate. See [Table 23 "IP Phone 2007 component list"](#) (page 180).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* or *IP Line Fundamentals (NN43100-500)*



CAUTION

Damage to Equipment

Do not plug your IP Phone 2007 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 2007

Procedure 34

Configuring the IP Phone 2007

Step	Action
1	Configure a virtual loop on the system using LD 97. For more information about configuring a virtual loop, see <i>IP Line Fundamentals (NN43100-500)</i> and <i>Software Input Output Administration (NN43001-611)</i> .
2	Configure the IP Phone 2007 on the system using LD 11. At the prompt, enter the following: REQ: chg TYPE: 2007 To configure the IP Phone 2007 using LD 11, see <i>Software Input Output Administration (NN43001-611)</i> .
3	Connect the IP Phone 2007 components: <ol style="list-style-type: none"> Connect one end of the handset cord to the handset jack on the back of the IP Phone (identified with a handset icon). Connect the other end of the handset cord to the handset.
4	Choose one of the following connections:

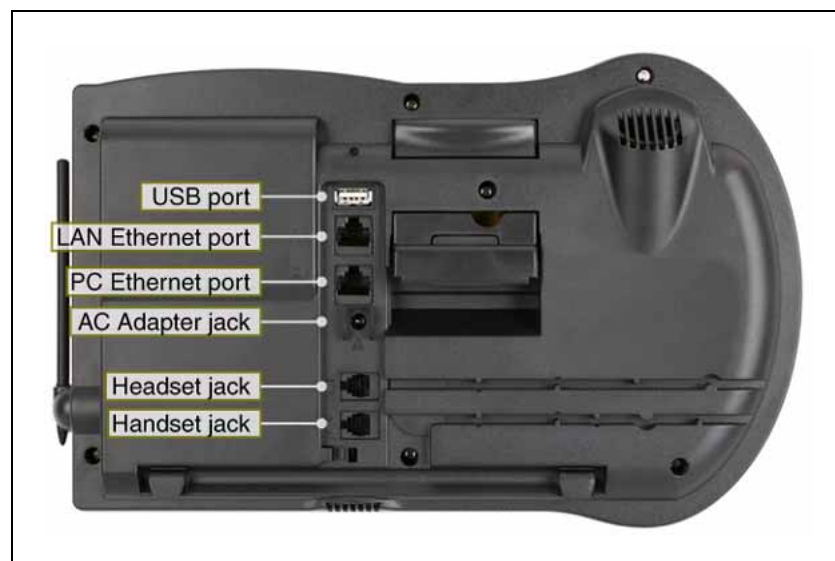
- For an IP Phone not sharing a LAN access with a PC:
Connect one end of the CAT5 Ethernet cable to the LAN Ethernet port located on the back of the IP Phone (identified with a LAN icon). Plug the other end of the CAT5 Ethernet cable into the IP network.
 - For an IP Phone sharing a LAN access with a PC (identified with a PC icon):
Connect one end of the CAT5 Ethernet cable to the LAN Ethernet port located on the back of the IP Phone and the other end to the IP network. Insert one end of a second CAT5 Ethernet cable into the PC Ethernet port located on the back of the IP Phone and the other end into the computer Ethernet port.
- 5 Secure the IP Phone footstand to the base of the IP Phone. Use the angle adjustment grip on the top back of the IP Phone to adjust the position.



CAUTION
Damage to Equipment

Do not plug any device into your IP Phone 2007 Ethernet port other than one PC. The IP Phone 2007 does not support multiple devices connected through the PC Ethernet port.

Figure 20
IP Phone 2007 connections



- 6 Power the IP Phone 2007 using either the Power over Ethernet or the Global power adapter (local power).
 - a. To use local power, plug the Global power adapter into the nearest power outlet. See [Table 23 "IP Phone 2007 component list" \(page 180\)](#).
 - b. Connect the power jack as shown in [Figure 20 "IP Phone 2007 connections" \(page 183\)](#).

The IP Phone 2007 supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 2. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.

A tone sounds shortly before the IP Phone is ready to start the Nortel IP Phone application.

- 7 A blue screen appears with Nortel. Once the set application has loaded and started, Nortel Networks will appear in the middle of the screen. Immediately press the following keys in sequence:
 - a. 0
 - b. 0
 - c. 7
 - d. star (*)

If you miss part of the configuration, unplug the phone from the power for a few seconds and redo this step.

**WARNING**

If you are using local power, you must use the Global power adapter or your phone fails to operate.

—End—

Startup sequence

When an IP Phone 2007 connects to the network, it must perform a startup sequence. The elements of the startup sequence include:

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters

- connecting to the Call Server
- obtaining a User ID

See [Table 24 "IP Phone 2007 IP parameters" \(page 185\)](#) for a summary of the IP parameters and how they are obtained.

Table 24
IP Phone 2007 IP parameters

Parameter	Method of Acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Net Mask	Manually entered or automatically retrieved through Partial or Full DHCP.
Default Gateway Address	Manually entered or automatically retrieved through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically retrieved through Partial or Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Retrieved from local storage on subsequent power cycles.

Installing the IP Phone 2007

To install the IP Phone 2007, use [Procedure 35 "Installing the IP Phone 2007" \(page 186\)](#).

ATTENTION

Timing information

There are only four seconds between plugging in the IP Phone 2007 power adapter and the appearance of Nortel on the display. When Nortel appears in the middle of the screen, you have 1 second to respond by pressing 0, 0, 7, *. If you miss the 1-second response time, the IP Phone 2007 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the network diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

You can press the **Apply&Reset** soft key at any time to apply the current configuration and reset the phone. You can press the **Exit** soft key to exit the menu without saving any changes and return to the **Network Configuration** menu.

When the Network Configuration menu opens, **Enable 802.1x Auth. (EAP)** is the first option in the list.

Procedure 35
Installing the IP Phone 2007

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

- | | |
|----------|--|
| 1 | Use the Right navigation key to scroll and highlight the Enable 802.1x Auth. (EAP) : list box. |
| 2 | Press the Down navigation key to open list box. |
| 3 | Use the Up/Down navigation keys to scroll and highlight Yes to enable 802.1x Authentication, or No to disable 802.1x Authentication. |
| 4 | <p>If 802.1x Authentication is enabled, use the dialpad to fill in the following information:</p> <ul style="list-style-type: none"> • Device ID • Password • Retype the password <p>Use the dialpad to enter digits only. To enter alpha characters, use either the IP Phone 2007 pop-up keyboard, or a USB keyboard.</p> <p>For further information about EAP, see Appendix "802.1x Port-based network access control" (page 469).</p> <p>If you do not enable 802.1x Authentication, you are not prompted to enter Device ID and Password.</p> |
| 5 | <p>Use the Right navigation key to scroll and highlight Enable 802.1x (LLDP Enable).</p> <p>For more information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471).</p> |
| 6 | <p>Use the Up/Down navigation keys to scroll and highlight Yes to enable LLDP, or No to disable LLDP.</p> <p>LLDP is one means in which 801.2 can be automatically provisioned.</p> <p>For more information about 802.1Q, see Appendix "802.1Q VLAN description" (page 461).</p> |
| 7 | Use the Right navigation key to scroll and highlight DHCP list. |
| 8 | Press the Down navigation key to open list box. |
| 9 | <p>Use the Up/Down navigation keys to scroll and highlight one of the following DHCP options:</p> <ul style="list-style-type: none"> • No—disable DHCP support and enter IP network information manually. |

- Partial—IP network information (IP address, network mask, and gateway address) are provided by the DHCP server. Enter Server 1 IP address, Server 2 IP address, Port, Action, Retry, and PK numbers manually.
- Full—IP network information, Server 1 IP address, Server 2 IP address, and XAS information are provided by the DHCP server. All items are dimmed to prevent manual entry.

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

- 10 Use the **Right** navigation key to scroll and highlight **Set IP**. Use the dialpad to fill in the information:
Set IP—a valid IP Phone 2007 IP address
- 11 Use the **Right** navigation key to scroll and highlight **NET MASK**. Use the dialpad to fill in the information:
Network Mask—a subnet mask
- 12 Use the **Right** navigation key to scroll and highlight **Gateway**. Use the dialpad to fill in the information:
Gateway—the default gateway for the IP Phone 2007 on the LAN segment to which it connects
- 13 Use the **Right** navigation key to scroll and highlight **S1 IP**. Use the dialpad to fill in the information:
S1 IP—the primary CS 1000 node IP address for IP Phone 2007
- 14 Use the **Right** navigation key to scroll and highlight **Port**. Use the dialpad to fill in the information:
S1 Port—a fixed value of 4100
- 15 Use the **Right** navigation key to scroll and highlight **S1 Action**. Use the dialpad to fill in the information. Choose one of the following:
 - for TPS only, enter 1
 - for TPS and Secure Multimedia Controller, enter 6 or 1

For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

- 16** Use the **Right** navigation key to scroll and highlight **Retry**. Use the dialpad to fill in the information:
Retry—the number of times the IP Phone 2007 attempts to connect to the server
- 17** Use the **Right** navigation key to scroll and highlight **S1 PK**.
S1 PK— the Private key of the Secure Multimedia Controller to which the IP Phone connects.
- 18** Press the **Enter** key to start the edit mode.
To manually configure the PK, set DHCP to Partial or None.
S1 PK default is ffffffff.
If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.
To enter ALPHA digits from A to F, use the graphical keyboard or a USB keyboard to enter the following:
#1 = A
#2 = B
#3 = C
#4 = D
#5 = E
#6 = F
- 19** Use the **Right** navigation key to scroll and highlight **S2 IP**. Use the dialpad to fill in the information:
S2 IP—the secondary CS 1000 node IP address for IP Phone 2007
IP Phone 2007 can support a primary (S1) and secondary (S1) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.
- 20** Use the **Right** navigation key to scroll and highlight **Port**. Use the dialpad to fill in the information:
Port—same as S1 port
- 21** Use the **Right** navigation key to scroll and highlight **S2 Action**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information. Choose one of the following:
- for TPS only, enter 1
 - for TPS and Secure Multimedia Controller, enter 6 or 1
- For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

- 22** Use the **Right** navigation key to scroll and highlight **Retry**. Use the dialpad to fill in the information:
- Retry—same as S1
- 23** Use the **Right** navigation key to scroll and highlight **S2 PK**.
- S2 PK— the Private key of the alternate Secure Multimedia Controller to which the IP Phone connects
- 24** Press the **Enter** key to start the edit mode.
- To manually configure the PK, set DHCP to Partial or None.
- S2 PK default is ffffffffffffffff.
- If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.
- Use the graphical keyboard or a USB keyboard to enter ALPHA digits from A to F.
- #1 = A
#2 = B
#3 = C
#4 = D
#5 = E
#6 = F
- 25** Use the **Right** navigation key to scroll and highlight **Ntwk Port Speed** box. Press the **Down** navigation key to open the list box.
- Use the **Up/Down** navigation keys to scroll and highlight one of the following options:
- Auto—Link speed is autonegotiated with the network device.
 - 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the network.
 - 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the network.
- 26** Use the **Right** navigation key to scroll and highlight **Ntwk Port Duplex** box. Press the **Down** navigation key to open the list box.
- The **Ntwk Port Duplex** option appears dimmed if **Ntwk Port Speed** is set to Auto.
- Use the **Up/Down** navigation keys to scroll and highlight one of the following options:
- Auto—Duplex mode is autonegotiated with the network device
 - Force Full—Duplex mode is forced to Full Duplex on the network

- Force Half—Duplex mode is forced to Half Duplex on the network
- 27 Use the **Right** navigation key to scroll and highlight **Disable Voice 802.1Q** check box. Press the **Enter** key to switch this item on and off.
- 28 Use the **Right** navigation key to scroll and highlight **VoiceVLAN** box. Press the **Down** navigation key to open the list box.
- 29 Use the **Up/Down** navigation keys to scroll and highlight one of the following options:
- No VLAN
 - DHCP—VLAN ID is configured automatically to one of the values received from the DHCP server
 - LLDP MED—VLAN ID is configured automatically to the value received from 802.1ab LLDP
 - LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
 - Manual

If LLDP is disabled, LLDP MED and LLDP VLAN Name modes do not appear in the list. If DHCP is disabled, DHCP does not appear in the list.

- 30 Use the **Right** navigation key to scroll and highlight **VLAN Filter** check box.

VLAN Filter appears dimmed if **Disable Voice 802.1Q** check box is selected.

If the VLAN Filter is enabled, packets destined for the IP Phone port are filtered on their MAC address and their VLAN tag. Untagged VLAN packets and tagged VLAN packets that differ from the Telephony VLAN ID are prevented from reaching the IP Phone port.

For information about VLAN tagging, [Appendix "802.1Q VLAN description" \(page 461\)](#).

- 31 Use the **Right** navigation key to scroll and highlight **Ctrl Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

Ctrl Priority Bits option appears dimmed if **Disable Voice 802.1Q** check box is selected.

- 32 Use the **Right** navigation key to scroll and highlight **Media Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

Media Priority Bits option appears dimmed if **Disable Voice 802.1Q** check box is selected.

33 Use the **Right** navigation key to scroll and highlight **Disable PC Port** check box. Press the **Enter** key to switch this item on and off.

34 Use the **Right** navigation key to scroll and highlight **PC Port Speed** box. Press the **Down** navigation key to open the list box.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options:

- Auto—Link speed is autonegotiated with the attached PC
- 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the PC port
- 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the PC port

35 Use the **Right** navigation key to scroll and highlight **PC Port Duplex** box. Press the **Down** navigation key to open the list box. Use the **Up/Down** navigation keys to scroll and highlight one of the following options:

- Auto—Duplex mode is autonegotiated with the attached PC
- Force Full—Duplex mode is forced to Full Duplex on the PC
- Force Half—Duplex mode is forced to Half Duplex on the PC

PC Port Duplex appears dimmed if the **PC Port Speed** option is set to Auto.

36 Use the **Right** navigation key to scroll and highlight **Disable Data 802.1Q** check box. Press the **Enter** key to switch this item on and off.

37 Use the **Right** navigation key to scroll and highlight **DataVLAN** box. Press the **Down** navigation key to open the list box.

The **DataVLAN** option appears dimmed if **Disable Data 802.1Q** check box is selected.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options:

- No VLAN
- LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
- VLAN ID value—manual selection of VLAN ID from 1 to 4094

If LLDP is disabled, LLDP VLAN Name does not appear in the list.

- 38 Press the **Enter** key.
- 39 Use the **Right** navigation key to scroll and highlight **Data Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.
- 40 Use the **Right** navigation key to scroll and highlight **PC-Port Untag All** check box. Press the **Enter** key to switch this item on and off.
The PC-Port Untag All option appears dimmed if **Disable Data 802.1Q** check box is selected.
- 41 Use the **Right** navigation key to scroll and highlight **Cached IP** check box. Press the **Enter** key to switch this item on and off.
- 42 Use the **Right** navigation key to scroll to **Enable PSK SRTP**. Select **Yes** to enable SRTP media encryption or select **No** to disable SRTP media encryption.

The SRTP media encryption feature provides encrypted media. A preshared secret is embedded in the Nortel IP Phone to generate and to exchange encryption parameters without any Call Server involvement.

For further information about the SRTP media encryption feature, see "[Media security](#)" (page 447) and *Security Management Fundamentals (NN43001-604)*.
- 43 Use the **Right** navigation key to scroll to **Ignore GARP**. Select **Yes** to enable GARP protection, or **No** to disable GARP protection.

The GARP feature protects the IP Phone from a Gratuitous ARP Spoof attack from the network.

For more information about GARP, see "[Gratuitous Address Resolution Protocol Protection](#)" (page 196).
- 44 If an External Application Server (XAS) is available in the network, use the **Right** navigation key to scroll and highlight the **XAS IP** list. Use the dialpad to enter the XAS IP address.

The XAS delivers business applications to the IP Phone. For more information about XAS, see Nortel Application Gateway 1000 documentation.
- 45 Use the **Right** navigation key to scroll and highlight the **Graphical XAS** check box.
- 46 Use the **Right** navigation key to scroll and highlight the **Port** list. Use the dialpad to fill in the information.
- 47 Upgrade the IP Phone 2007 firmware.

The IP Phone 2007 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

The method to upgrade the firmware depends on the following Call Server software:

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 2007 searches for the TFTP Server for firmware upgrade. If the file name specified in i2007.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 2007 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 2007 can support a primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 2007 searches for the connect server.

The IP Phone 2007 registers with the Terminal Proxy Server (TPS) and, if needed, begins the firmware download. This takes several minutes. When download is complete, the IP Phone 2007 resets.

The current system date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

48 Check for dial tone and the correct DN above the display.

49 (Optional) Customize the feature keys as required. For more information, see the *IP Phone 2007 User Guide (NN43118-100)*.

50 Tap the **Tools** icon to calibrate the touch panel and stylus.

51 Tap the **Touch Panel Setup** soft key.

The screen displays a calibration map, the **Cancel** soft key is displayed, and the following system prompt is displayed:

Touch the center of the red ball.

52 Use the stylus and tap each of the red dots, in order, starting with the lower left portion of the screen, and following the sequence as prompted.

After the third dot is tapped, the display changes to indicate the result of calibration.

- If the calibration is successful, the IP Phone displays the following report:

Data calibration is CORRECT.
Save Data calibration?

YES and **NO** soft keys and calibration statistics are displayed on the screen.

Tap the **YES** soft key to save the calibration settings and exit to the main display or tap the **NO** soft key to abandon the calibration settings and exit to the main display.

- If the calibration is unsuccessful, the IP Phone displays the following report:

Data calibration is WRONG.
Repeat calibration?

YES and **NO** soft keys and calibration statistics are displayed on the screen.

Tap the **YES** soft key to retry the calibration or tap the **NO** soft key to abandon the calibration and return to the main display.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing the duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 36 "Enabling Full Duplex mode" \(page 195\)](#) to enable Full Duplex mode.

Procedure 36 Enabling Full Duplex mode

Step	Action
1	Tap the Tools icon.
2	Enter the Tools menu password (if Password protection is enabled). For information about Password Protection, see " Local Tools menu password protection " (page 178).
3	Tap the Network Configuration menu entry.
4	Use the Right navigation key to scroll and highlight the Duplex list.
5	Press the Down navigation key to open list box.
6	Use the Up/Down navigation keys to scroll and highlight one of the following options: <ul style="list-style-type: none"> • 10BT Full—10 BT Full Duplex mode • 100BT Full—100 BT Full Duplex mode
7	Tap the Apply&Reset soft key to save the changes and to restart the IP Phone. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use [Procedure 37 "Checking Ethernet Statistics" \(page 196\)](#) to confirm activation of Full Duplex mode.

Procedure 37
Checking Ethernet Statistics

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

- | | |
|----------|---|
| 1 | Tap the Tools icon. |
| 2 | Tap the Local Diagnostics soft key. |
| 3 | Tap the Ethernet Statistics soft key.
The following statistics are displayed: <ul style="list-style-type: none">• Link: Up• Duplex: Full• Speed: 10 (Mb) or 100 (Mb)• Auto-Negotiate Capability: N• Auto-Negotiate Completed: N |

—End—

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection prevents the IP Phone 2007 from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. The malicious device launches a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 35 "Installing the IP Phone 2007" \(page 186\)](#).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

Redeploying an IP Phone 2007

You can redeploy an existing, previously-configured IP Phone 2007 on the same system. For example, the IP Phone 2007 can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 2007. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 38

Changing the TN of an existing IP Phone 2007

Step	Action						
1	<p>Repower the IP Phone 2007.</p> <p>During the reboot sequence of a previously configured IP Phone, the IP Phone 2007 displays the existing node number for approximately five seconds.</p>						
2	<p>If the node password is enabled and NULL, choose one of the following:</p> <ol style="list-style-type: none"> Disable the password. Set the password as non-NULL. 						
3	<p>Press OK when the node number displays.</p> <table border="0"> <thead> <tr> <th>If</th> <th>Then</th> </tr> </thead> <tbody> <tr> <td>the node password is enabled and is not NULL</td> <td>a password screen displays. Go to Step 4.</td> </tr> <tr> <td>the node password is disabled</td> <td>a TN screen displays. Go to Step 5.</td> </tr> </tbody> </table>	If	Then	the node password is enabled and is not NULL	a password screen displays. Go to Step 4 .	the node password is disabled	a TN screen displays. Go to Step 5 .
If	Then						
the node password is enabled and is not NULL	a password screen displays. Go to Step 4 .						
the node password is disabled	a TN screen displays. Go to Step 5 .						
4	<p>Enter the password at the password screen, and press OK.</p> <p>A TN screen displays.</p> <p>To obtain the password, enter the <code>nodePwdShow</code> command in Element Manager. For further information, see <i>Element Manager System Reference—Administration (NN43001-632)</i>.</p>						
5	Select the Clear soft key to clear the existing TN.						
6	Enter the new TN.						

—End—

Replacing an IP Phone 2007

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 2007 that currently uses the TN.

Procedure 39

Replacing an IP Phone 2007

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

- | | |
|---|--|
| 1 | Obtain the node and TN information of the phone you want to replace. |
| 2 | Disconnect the IP Phone 2007 that you want to replace. |
| 3 | Follow Procedure 34 "Configuring the IP Phone 2007" (page 182) to install and configure the IP Phone 2007.

Enter the same TN and Node Number as the IP Phone 2007 you replaced. The system associates the new IP Phone 2007 with the existing TN. |
-

—End—

Removing an IP Phone 2007 from service

Procedure 40

Removing an IP Phone 2007 from service

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

- | | |
|---|---|
| 1 | Disconnect the IP Phone 2007 from the network or turn the power off.

The service to the PC is disconnected as well if the PC connects to the IP Phone 2007.

If the IP Phone 2007 was automatically configured, the DHCP lease expires and the IP address returns to the available pool. |
| 2 | In LD 11, enter OUT at the TN prompt. |
-

—End—

IP Phone Key Expansion Module (KEM)

Contents

This section contains the following topics

- "Description" (page 201)
- "Features" (page 202)
- "Display characteristics" (page 202)
- "Key number assignments" (page 203)
- "Package components" (page 203)
- "Configuration" (page 203)
- "Installation" (page 207)
- "IP Phone KEM startup initialization" (page 208)
- "Operating parameters" (page 209)

Description

The Nortel IP Phone Key Expansion Module (KEM) is a hardware component that connects to IP Phone 2002 and IP Phone 2004 and provides additional line appearances and feature keys (see [Figure 21 "IP Phone 2002 with one IP Phone KEM attached"](#) (page 202)).

Up to two IP Phone KEMs can be connected to an IP Phone 2002 or IP Phone 2004. With two IP Phone KEMs connected, the IP Phone can have up to 48 additional line/feature keys.

The IP Phone 2004 can also have up to 48 additional line/feature keys using the **Shift** key functionality and one IP Phone KEM. With two IP Phone KEMs connected, the **Shift** key functionality does not affect the IP Phone KEMs since the maximum number of line/feature keys is already available. The IP Phone 2002 does not support **Shift** key functionality.

Figure 21
IP Phone 2002 with one IP Phone KEM attached



Features

The IP Phone KEM has the following features:

- 12 keys on each side of an LCD provide up to 24 additional self-labeled line/feature keys. Using the **Shift** key functionality, an IP Phone 2004 can have up to 48 additional logical line/feature keys.
- A desk-mount bracket and structural baseplate connect the IP Phone KEM to an IP Phone 2002 or IP Phone 2004, or to another IP Phone KEM.
- A wall-mount bracket installs the IP Phone KEM alongside a wall-mounted IP Phone 2002 or IP Phone 2004.

Display characteristics

The IP Phone KEM has one LCD between the two rows of 12 Line/feature keys (see [Figure 21 "IP Phone 2002 with one IP Phone KEM attached" \(page 202\)](#)). Each of the 24 physical keys on the IP Phone KEM has a 10-character display label. This label is set automatically, however, the user can edit the label using the controls on the IP Phone.

To alter the display and contrast on the IP Phone KEM, use the **Contrast Adjustment** option under the **Telephone Options** menu on the IP Phone. Any contrast changes you make on the IP Phone affect the IP Phone KEM. The IP Phone KEM and IP Phone do not have separate contrast adjustments.

Key number assignments

Since the IP Phone 2002 and IP Phone 2004 have key number assignments from 0 to 31, the IP Phone KEM key number assignments begin at 32. Therefore, the first IP Phone KEM has key number assignments from 32 to 55, and the second IP Phone KEM has key number assignments from 56 to 79.

Package components

Table 25 "IP Phone KEM components list" (page 203) lists the IP Phone KEM package components.

Table 25
IP Phone KEM components list

Components	Order code
IP Phone KEM - Ethergray	A0540989
IP Phone KEM - Charcoal	A0540990
IP Phone KEM wall mount kit - Charcoal	A0555218

Configuration

The IP Phone KEM must be configured in LD 11 before it is used.

Table 26
LD 11: Configure the IP Phone KEM

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	2002P2	IP Phone 2002
	2004P2	IP Phone 2004
...		...
ZONE	0 – 255	Zone number to which the IP Phone 2002 or IP Phone 2004 belongs

Prompt	Response	Description
KEM	(0) – 2	<p>Number of attached IP Phone KEMs</p> <p>Up to two IP Phone KEMs can be attached to an IP Phone. Pressing <CR> without entering a number leaves the value unchanged.</p>
.... KEY	xx aaa yyyy (cccc or D) zz..z	<p>Telephone function key assignments</p> <p>The following key assignments determine calling options and features available to an IP Phone. Note that KEY is prompted until a carriage return <CR> is entered.</p> <p>Where:</p> <p>xx = key number aaa = key name or function yyy = additional information required for the key zz.z = additional information required for the key aaa.</p> <p>The cccc or D entry deals specifically with the Calling Line Identification feature, where:</p> <p>cccc = CLID table entry of (0)-N, where N = the value entered at the SIZE prompt in LD 15 minus 1.</p> <p>D = the character "D". When the character "D" is entered, the system searches the DN keys from key 0 and up, to find a DN key with a CLID table entry. The CLID associated with the found DN key is then used.</p> <p>The position of the (cccc or D) field varies depending on the key name or function.</p> <p>You may enter a CLID table entry if aaa = ACD, HOT d, HOT L, MCN, MCR, PVN, PVR, SCN, or SCR.</p> <p>Type xx NUL to remove a key function or feature.</p> <p>Some data ports require specific key assignments. See the <i>Meridian Data Services</i> NTPs for information regarding these requirements.</p>

Prompt	Response	Description
		<p>Key number limits that can be assigned are as follows:</p> <ul style="list-style-type: none"> 0-7 for Meridian Communications Adapter (MCA) 0 to 5 for M2006 0 to 7 for M2008 0 to 59 for M2616, varies with number of add-on modules 0 to 79 for 2002P2, varies with value of KEM 0 to 79 for 2004P2, varies with value of KEM <p>The first IP Phone KEM is assigned keys 32 to 55, and the second IP Phone KEM is assigned keys 56 to 79.</p> <p>If either the Meridian Programmable Data Adapter (MPDA) or the Display Module is equipped, then key 7 on sets M2008, M2216, and M2616 and key 5 on set M2006 becomes Program keys which cannot be used as function keys.</p> <p>Any printout of the TN block does not show key 7 because it is a local function key.</p> <p>On the M2616, if CLS = HFA, key 15 on the voice TN defaults to the Handsfree key. No other feature assignment is accepted.</p> <p>Primary and secondary data DNs must be unique.</p> <p>A station SCR, SCN, MCR, or MCN DN must be removed as a member from all Group Hunt lists before the DN can be modified.</p> <p>On the M3903, keys 4-15 are blocked. No feature assignment is accepted for keys 2-15.</p> <p>On the M3903, M3904, and M3905, keys 29-31 are reserved. No feature assignment is accepted for keys 29-31 other than NUL.</p> <p>On M3904, no feature assignment is accepted for keys 12-15.</p>

Prompt	Response	Description
PAGEOFST	<Page> <KeyOffset>	<p>On M3905, the craftsperson can assign NUL or a server application on key 5. On key 6, the craftsperson can assign NUL or a local application.</p> <p>On M3905, the craftsperson can assign NUL or the program key on key 7.</p> <p>On M3905, the craftsperson can assign AAG, AMG, ASP, DWC, EMR, MSB, or NRD on keys 8-11. Other features are blocked.</p> <p>Automatically calculates the IP Phone KEM key based on the entered values. This prompt enables the system administrator to enter a Page number of 0 or 1 and a Key Offset number from 0 to 23. Once entered, the KEY prompt is prompted with the appropriate KEY value filled in.</p> <p>Enter <CR> to terminate data entry.</p> <p>Applies to an IP Phone 2004 with KEM = 1, and where <CR> was entered at the KEY prompt. Does not apply to an IP Phone 2002.</p> <p>When values are entered for Page and KeyOffset, the KEY xx prompt displays, followed by PAGEOFST prompt. This loop continues until no values (<CR> only) are entered at the PAGEOFST prompt.</p>
KEY xx		<p>Edit the IP Phone KEM key number specified by PAGEOFST, where: xx = the number of the key (for example, KEY 36)</p>
KEMOFST	<KEM> <KeyOffset>	<p>Enter <CR> to keep the current setting.</p> <p>Automatically calculates the IP Phone KEM key based on the entered values. This prompt enables the system administrator to enter a KEM number of 1 or 2 and a Key Offset number from 0-23. Once entered, the KEY prompt is prompted with the appropriate KEY value filled in.</p> <p>Enter <CR> to terminate data entry.</p> <p>When values are entered for KEM and KeyOffset, the KEY xx prompt displays, followed by KEMOFST prompt. This loop continues until no values (<CR> only) are entered at the KEMOFST prompt.</p> <p>Applies to an IP Phone 2002 if <CR> was entered at the KEY prompt.</p>

Prompt	Response	Description
KEY xx		<p>Applies to an IP Phone 2004 with KEM = 2, and where <CR> was entered at the KEY prompt.</p> <p>Edit the IP Phone KEM key number specified by KEMOFST, where: xx = the number of the key (for example, KEY 36)</p> <p>Enter <CR> to keep the current setting.</p>

Installation

The IP Phone KEM mounts on the right side of an IP Phone 2002 or IP Phone 2004. The IP Phone KEM snaps into the receptacle on the back of the IP Phone using the desk-mount bracket and structural baseplate supplied with the IP Phone KEM (see [Figure 22 "IP Phone KEM attached to an IP Phone 2002"](#) (page 207)).

The IP Phone KEM connects to the IP Phone 2002 or IP Phone 2004 using the Accessory Expansion Module (AEM) port on the IP Phone.

Figure 22
IP Phone KEM attached to an IP Phone 2002



Procedure 41

Connecting the IP Phone KEM to an IP Phone 2002 or IP Phone 2004

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

- | | |
|---|--|
| 1 | <p>Remove the IP Phone from the stand by pressing the IP Phone tilt handle, and pulling the IP Phone away from the stand.</p> <p>For the IP Phone 2004, you can also adjust the stand angle to maximum, instead of removing the stand.</p> |
|---|--|

- 2 Place the connecting arm of the IP Phone KEM behind the IP Phone and align the IP Phone KEM connection plug to the AEM port on the back of the IP Phone.

The IP Phones 2002 with the product codes: NTDU76AB34, NTDU76BB34, NTDU76AB70, and NTDU76BB70 have shorter connector pins than the other IP Phone 2002. Therefore, the ribbon cable connector of the IP Phone KEM must be detached from the retaining clip and pressed manually into the header connector before attaching the IP Phone KEM.

- 3 Press the IP Phone KEM and IP Phone firmly together until the IP Phone KEM locks into place.
- 4 If connecting a second IP Phone KEM, repeat steps 1 to 3.
The second IP Phone KEM is attached to the right side of the first IP Phone KEM.
- 5 Attach the IP Phone stand and the IP Phone KEM stand, if removed. Adjust each IP Phone KEM stand to the same angle as the IP Phone.
The IP Phone KEM powers up.
The IP Phone KEM uses the electrical connection of the IP Phone 2002 or IP Phone 2004 for power. It does not have its own power source.

—End—

IP Phone KEM startup initialization

Once the IP Phone KEM has been installed and powered up on your IP Phone 2002 or IP Phone 2004, the IP Phone KEM initializes (see [Table 27 "Startup initialization process for the IP Phone KEM" \(page 208\)](#)).

Table 27
Startup initialization process for the IP Phone KEM

Phase	Description
1. IP Phone KEM performs self-test	<p>The self-test confirms the operation of the IP Phone KEM local memory, CPU, and other circuitry. While undergoing this self-test, the IP Phone KEM display lights up.</p> <p>If the IP Phone KEM display does not light up, or lights up and then goes blank, or fails to begin flashing, check that the IP Phone KEM is correctly installed and configured.</p>

Phase	Description
2. IP Phone KEM establishes communication with the IP Phone	The IP Phone KEM display flashes until it establishes communication with the IP Phone. If the IP Phone KEM display does not stop flashing, communication has not been established with the IP Phone. Check that the IP Phone KEM is correctly installed and configured.
3. IP Phone KEM downloads keymaps	The key labels download to the IP Phone KEM. During the download, the display is blank.

When the three phases complete successfully, you are ready to use the additional line/feature keys on your IP Phone KEM.

If you have a second IP Phone KEM installed on your IP Phone, the one to the immediate right of the IP Phone must be functional for the subsequent IP Phone KEM to work. This is because the second IP Phone KEM receives its power, and communicates with the IP Phone, through the first IP Phone KEM.

Operating parameters

General

If an IP Phone KEM is not responding, and lines or features are configured on keys 32 to 79, calls can be directed to those keys which the user cannot access. This means the IP Phone 2002 or IP Phone 2004 rings but the call cannot be answered. In such cases, the incoming call receives Call Forward No Answer (CFNA) treatment.

IP Phone 2002

If only one IP Phone KEM is configured in LD 11, but two IP Phone KEMs are detected on an IP Phone 2002, the second IP Phone KEM is ignored. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

If two IP Phone KEMs are configured in LD 11, but only one IP Phone KEM is responding, the keys on the second IP Phone KEM are available for call processing but are not accessible to the user. This means that lines and features on keys 56 to 79 can cause the IP Phone 2002 to ring, but there is no way to answer it. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

IP Phone 2004

If only one IP Phone KEM is configured in LD 11, but two IP Phone KEMs are detected on an IP Phone 2004, the Terminal Proxy Server (TPS) assigns keys 56 to 79 to the second IP Phone KEM. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

If two IP Phone KEMs are configured in LD 11 but only one IP Phone KEM is responding, the TPS assigns keys 32 to 79 to the single IP Phone KEM (using the **Shift** key functionality). An error message displays to alert the administrator that the hardware configuration does not match the administered configuration. When a second IP Phone KEM is detected, the TPS changes the key assignments to display across both IP Phone KEMs, as expected.

Virtual Office

When a Virtual Office (VO) login occurs from an IP Phone 2002 or IP Phone 2004 that does not have the same number of IP Phone KEMs responding as configured on the IP Phone used to log in, call processing may terminate on a key that is not physically available. In other words, the IP Phone rings but the call cannot be answered.

During the VO login process, the existence of any IP Phone KEM is verified. If a mismatch is detected, the login proceeds normally; however, an error message is generated to alert the administrator of the mismatch.

Firmware

The IP Phone KEM firmware is not downloadable. If the IP Phone KEM firmware must be upgraded or changed, the IP Phone KEM must be replaced with a new IP Phone KEM containing the updated firmware.

Nortel IP Softphone 2050

Contents

This section contains the following topics:

- "Introduction" (page 211)
- "Description" (page 212)
- "Components" (page 214)
- "Display characteristics" (page 217)
- "Licenses" (page 224)
- "Key number assignments" (page 230)
- "Minimum system requirements" (page 231)
- "System components" (page 232)
- "Before you begin" (page 233)
- "First-time installation" (page 234)
- "Installing or upgrading the IP Softphone 2050" (page 235)
- "Running the IP Softphone 2050 for the first time" (page 239)
- "Redeploying the IP Softphone 2050" (page 239)
- "Removing an IP Softphone 2050 from service" (page 240)
- "Maintenance" (page 240)

Introduction

This section explains how to install and maintain the IP Softphone 2050. For information about using the IP Softphone, see the *IP Softphone 2050 User Guide (NN43119-101)*.

This section contains the following procedures:

- Procedure 44 "Configuring an IP Softphone 2050 " (page 234).
- Procedure 45 "Upgrading the IP Softphone 2050 on your PC" (page 236).

- Procedure 46 "Removing IP Softphone 2050 (Version 1)" (page 236).
- Procedure 47 "Removing IP Softphone 2050 (Version 2 or Release 3)" (page 237).
- Procedure 48 "Installing the Accessibility Interface" (page 237)
- Procedure 49 "Installing the Windows QoS Packet Scheduler" (page 238)
- Procedure 50 "Redeploying the TN of an existing IP Softphone 2050" (page 239).
- Procedure 51 "Removing an IP Softphone 2050 from service" (page 240).

Description

The IP Softphone 2050 is a Windows-based application that provides voice services for Personal Computers (PC). The IP Softphone 2050 operates on PC that run Windows Vista, Windows XP, and Windows 2000 Professional.

Designed to work with IP-based phone systems, the IP Softphone 2050 provides Voice Over IP (VoIP) services using a telephony server and an enterprise Local Area Network (LAN). The VoIP application is comprised of the following components:

- Settings—used to configure the IP Softphone
- IP Softphone 2050—the IP Softphone user interface
- IP Softphone 2050 QoS

Features

The IP Softphone 2050 supports the following features:

- 12 user-defined feature keys: six programmable line (DN)/feature keys and six lines/features accessed by pressing the Shift key
- four context-sensitive soft keys that provide access to a maximum of nine features

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- four-line display
- directory capabilities stored locally on the PC or linked to external directories, such as LDAP, Microsoft Outlook, and Windows Address Book Directory
- one-click direct dialing from various windows and applications
- user-selected ringer lets the PC speakers or the headset ring for incoming calls

- choice of two window themes, as well as an Accessibility Interface option for the visually-impaired

The Accessibility Interface operates with screen reading software, such as JAWS® for Windows from Freedom Scientific, which enables visually-impaired users to access the full range of IP Softphone 2050 features. Visually-impaired users can follow [Procedure 48 "Installing the Accessibility Interface" \(page 237\)](#) to install the Accessibility Interface from the IP Softphone 2050 CD ROM.

- Secure Real-time Transport Protocol (SRTP) media encryption.
For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).
- UNIStim Security (USec) signaling encryption

ATTENTION

USec signaling encryption requires a Secure Multimedia Controller.

- Global IP Sound (GIPS) Voice Engine
- headset support (for example, Bluetooth wireless technology and USB)
- client-side licensing
- quality monitoring
- programmable hot keys allow single-key access to user-definable features
- two supported input modes: Digit and Alpha
Native mode appears dimmed in the list because it is not supported. For more information about Native mode, see *IP Softphone 2050 User Guide (NN43119-101)*.
- macro functions available for programming long dialing patterns
- support for G.711 and G.729 codecs for operation at a variety of network connection speeds

Additional features

The IP Softphone 2050 supports the following additional features:

- Call Duration Timer
- ability to change the feature key labels
- Corporate Directory
- Personal Directory
- Redial List

- Callers List
 - Password Administration
 - Virtual office
 - Branch Office
 - Call Recording
 - Active Call Failover
 - language support: English, French, Swedish, Danish, Norwegian, German, Dutch, Traditional Chinese, Simplified Chinese, Japanese, Arabic, Hebrew and GreekPortuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Japanese, Russian, Latvian, and Turkish
 - IP Client cookie mechanism (requires patch MPLR 24248 for CS 1000 Release 5.0 and earlier)
 - Call Notification (requires patch MPLR 24100 for CS 1000 Release 5.0 and earlier)
 - Call Disconnect Notification
 - drag and drop dialing
 - Telephony Application Programming Interface (TAPI) 3
- The Telephony Service Provider (TSP) supports basic telephony level functions only, such as making and answering a call and ending an active call. The IP Softphone 2050 Call Recording feature is not accessible from the TAPI feature.
- Expansion Module for IP Softphone 2050
 - network diagnostic utilities

For more information about IP Softphone 2050 features and the IP Softphone 2050 Expansion Module, see *IP Softphone 2050 User Guide (NN43119-101)*.

Language support

The IP Softphone 2050 is affected by the following language controls:

- Operating system language
- IP Softphone 2050 language selection—sets the language displayed in the help screens and in the menus (select the IP Softphone 2050 language from the Application menu or during installation)

Components

The IP Softphone 2050 supports the following main components:

- Call Control window

- Local Directory window
- Settings window
- System tray icon and menu
- third-party supported applications
- 2050.exe application

Call Control window

You can use the 1140 Call Control Window (see [Figure 23 "1140 Call Control window"](#) (page 215)) to make and manage IP Phone calls.

Figure 23
1140 Call Control window

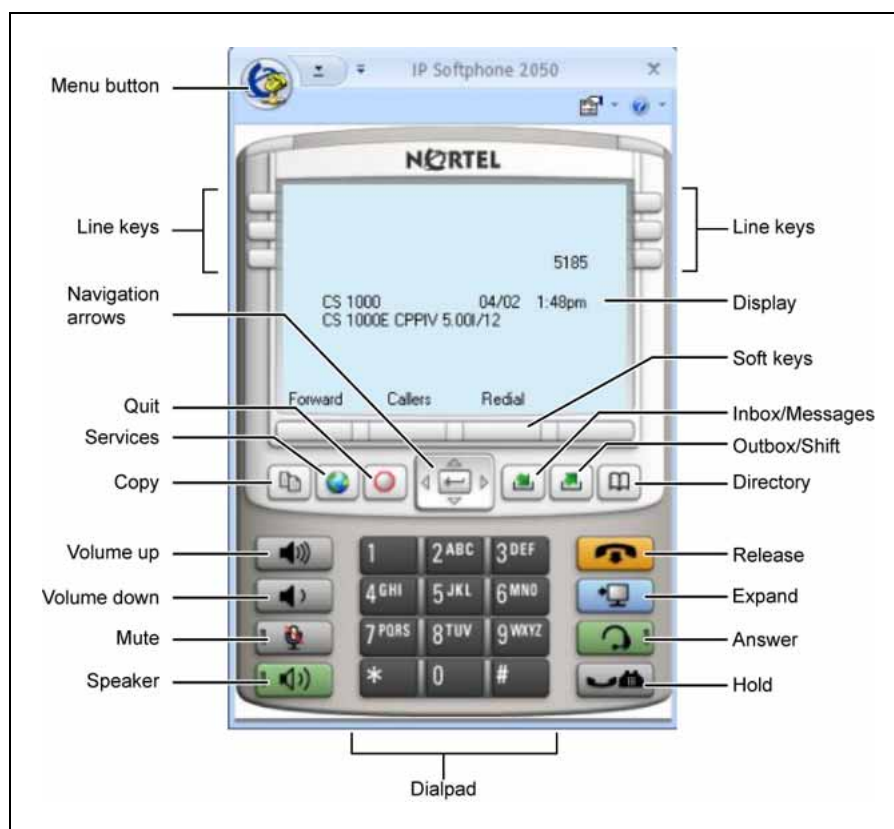


















Table 28 "Call Control window elements and functions" (page 216) lists the elements and functions of the Call Control window.

Table 28
Call Control window elements and functions

Element		Function
Primary display		The primary display area provides call information (for example, Caller ID) and instructions for using certain soft key features. In the idle state, only the date and time are displayed.
Soft keys		Four additional soft-labeled keys on the IP Softphone 2050 support a specific subset of the key features.
Answer		Click the Answer key to answer and make calls.
Hold		Click the Hold key to place an active call on hold. The feature key label for the line placed on hold displays a flashing icon. Click the Line key to return to the call.
Release		Click the Release key to end an active call.
Line keys		Six programmable line keys represent line appearances, DN, or features.
Volume	 	Use the volume keys to increase or decrease the headset volume.
Mute		Click the Mute key to listen to the receiving party without transmitting. Click the Mute key to return to a two-way conversation. The Mute key mutes the headset microphone.
Directory		Click the Directory key to access the Network Directory.
Inbox/Message		Click the Inbox/Message key to access messages or return a call.
Shift/Outbox		Press the Shift key to shift between two feature key pages when a second feature key page exists.
Copy		Click the Copy key to copy a network service, feature, or folder.
Quit		Click the Quit key to quit a network service or feature.
Navigation arrows		Use the navigation arrows to scroll through menus and lists in the display area.

Element		Function
Send/Enter		<p>Press the Send/Enter key, at the center of the Navigation key cluster, to confirm menu selections.</p> <p>The Send/Enter key is only available on the 1140E Call Control window.</p>
Dialpad		Click numbers on the dialpad to dial a number.
Speaker		Click the Speaker key to answer and make calls using the handsfree speaker.
Expand		The Expand key is reserved for future implementation.
Services		<p>Press the Services key access the following items:</p> <ul style="list-style-type: none"> • Language • Date/Time • Set Info • Call Log Options • Ring type • Call Timer • Change Feature Key Label • Name Display Format • Virtual Office Login and Virtual Office Logout (if Virtual Office is configured) • Test Local Mode and Resume Local Mode (if Branch Office is configured) • Password Admin <ul style="list-style-type: none"> — Station Control Password

Display characteristics

The IP Softphone 2050 provides the following display areas:

- information display
- soft key label display
- keypad dialing keys display
- feature keys display

Information display area

The information display area can contain four lines of text, up to a maximum of twenty four characters for each line. The display area consists of 2 areas: Info line and Info window.

Info line

The Info Line is the first (top) line of display text. The left 10-character area shows the Call Server type. The right part of the Info Line shows the current time and date.

Info window

The Info Window display area that shows prompts and information about calls. During a call the information area is used to display dialed digits, calling line ID, called party name, application-specific information, and various messages such as *Release and Try Again*.

When the information exceeds 3 x 24 characters, a scroll icon tells the user to press the scroll keys to view the second line of the display.

Soft key label display

A maximum of 10 functions can be assigned to the soft keys. Functions are assigned to the soft keys in layers in LD 11.

Use the **More** soft key to navigate through the layers of functions. If only 4 functions are assigned to the soft keys, the **More** key does not appear and all four functions are displayed.

The soft key label has a maximum of 7 characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a flashing icon displays at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last, or rightmost, character is truncated.) If a feature is enabled, the icon state turns to ON. It remains in the ON state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, returning the soft key label to its original state.

System Tray

The System Tray provides fast access to most of the IP Softphone 2050 functionality. The user can make, answer, and manage a call, as well as access macros and features from the System Tray without opening the Call Control window.

USB audio adapters

The USB audio adapter enables the user to speak and hear callers and also provides call control features, such as answer a call and place a call. The USB Audio Kit includes the following

- USB Headset Adapter (desktop or mobile)
- Installation Guide
- USB cord

The following USB adapters are supported on the IP Softphone 2050

- Nortel Enhanced USB Adapter (desktop)
- Nortel Mobile USB Adapter (mobile)
- Plantronics USB wireless headsets (digital cordless and Bluetooth wireless technology)
- Algo Analog Terminal Adapter (ATA) is a USB adapter that lets you use analog terminals instead of headsets. With an Algo ATA users can, for example, use a cordless headset with their IP Softphone 2050.

The IP Softphone 2050 is compatible with the Algo ATA. For support, see www.algosolutions.com.

USB Headset Adapter

The USB Headset Adapter provides a controlled high-quality audio environment. For more about USB headset adapters, see *IP Softphone 2050 User Guide (NN43119-101)*.

Registration

When you add an IP Softphone 2050 to the network, depending on configuration, the IP Softphone 2050 can connect to a predefined IP address or can request an IP address from a DHCP server. The IP Softphone 2050 then contacts the Connect Server, which instructs the IP Softphone 2050 to display a message on its display screen requesting the customer node number and TN.

After you enter this information, the IP Softphone 2050 contacts the Node Master, which selects a TPS with sufficient capacity to register the IP Softphone 2050. The IP Softphone 2050 contacts the chosen TPS and, if the IP Softphone 2050 is valid, registers it with the system. The registration information saves to the IP Softphone 2050.

GIPS

GIPS provides the following abilities

- voice encoding and decoding

- sound devices handling
- network voice data flow processing
- voice quality improvement
- Dual-tone Multifrequency
- Telchemy VQMon library

For more information about configurable settings in the Sound Settings tab, see *IP Softphone 2050 User Guide (NN43119-101)*.

Voice encoding and decoding

GIPS supports G.711 A-law, G.711 μ -law, and g.729 codecs.

Sound devices handling

You can change the volume level for input and output devices in the Sound devices tab.

Network voice data flow processing

GIPS uses GQoS API to modify the DiffSERV code point and the 802.1p marker bits (when supported) by setting a GQoS service level that the Windows operating system maps to a Diffserv code point and to a 802.1p setting. According to Microsoft Developer Network (MSDN), these settings are set to the following recommended values for voice applications

- ToS DSCP field is set to 0x28
- 802.1p priority field is set to 5

Voice quality

GIPS implements NetEQ, Echo Cancellation, and Noise Suppression features. NetEQ feature is an integral part of all GIPS codecs. GIPS NetEq software compensates for up to 30% lost packets in a LAN or WAN environment.

The GIPS Echo Cancellation and Noise Suppression features improve the quality of conversations by removing echo and background noise.

You can enable or disable Echo Cancellation and Noise Suppression features in the Sound Settings tab.

Dual-tone Multifrequency

GIPS implements Dual-tone Multifrequency (DTMF) tones playing and sends in accordance to RFC 2833. DTMF supports event numbers from 1 to 16.

Telchemy VQMon

GIPS includes Telchemy VQMon library. The Telchemy VQMon library collects and provides Voice Quality statistics information.

Echo cancellation

Echo can generate electrically when an impedance mismatch occurs, or can generate acoustically by feedback from a speaker or ear piece to a microphone. Any echo that returns to the IP Softphone 2050 is more noticeable to the listener because of the additional delay the IP connection introduces.

The Voice Gateway Media Card includes echo cancelers as part of its function cancels echo which the TDM side of the Media Gateway generates. Echo cancellers enable when audio passes through the Voice Gateway Media Card.

Because the IP Softphone 2050 does not provide an echo canceller, a slight echo from acoustic coupling on the headset can occur in some call situations.

Clock synchronization

Buffer underruns and overruns can occur since no sample clock is at the receiving end of an IP audio stream synchronized to the transmitting clock. The buffer overruns and underruns are corrected by two mechanisms, both of which apply to the IP Phones and the DSPs on the Voice Gateway Media Card.

Jitter buffer

Use the default value sent from the TPS (the value configured in TM-[Nortel recommends that you use the default value]) to configure the IP Softphone 2050 jitter buffer.

The jitter buffer has a desired size and a maximum allowable size. If the jitter buffer exceeds its maximum allowable size, sufficient frames are discarded to reduce the contents of the jitter buffer to the desired setting. If the jitter buffer underruns, frames are held in the jitter buffer until it fills to the desired level. Both underrun and overrun result in a discontinuity in the audio.

For codecs that support silence suppression, the jitter buffer is resynchronized at the beginning of each talk spurt.

QoS

A combination of codec selection, jitter buffer and packet time, and the use of the DiffServ Code Point (DSCP) of the network contributes to the end-to-end Quality of Service (QoS).

However, the IP Softphone 2050 is an application within the context of the PC operating system, so the operating system has an effect on the end-to-end QoS for the IP Softphone 2050. Functionality, which is commonly handled in DSP hardware (such as, the codec packetization implementation from within the Voice Gateway Media Card) is implemented in software for the IP Softphone 2050. It runs as part of the application code on the PC CPU. If the CPU is busy with other tasks, voice quality can be negatively affected.

The number of buffers used to buffer audio data between the application and PC audio hardware device driver is adjustable from the Settings > Sound Devices window. Using fewer buffers reduces the audio path delay but increases the chances of dropouts and choppy speech, depending on the speed and utilization of the PC CPU.

This system-wide registry key setting affects other applications and operating system components but is only effective if Windows QoS Packet Scheduler is installed. For more information about Windows QoS Packet Scheduler, see "[Windows QoS Packet Scheduler](#)" (page 238).

For Windows 2000 the Windows QoS Packet Scheduler is not installed by default and the EnablePriorityBoost registry setting is not created.

For Windows XP the Windows QoS Packet Scheduler is installed by default and the EnablePriorityBoost registry setting is created. The default setting is 1 (enable QoS).

Windows 2000 and Windows XP require a system-wide registry key to enable QoS capabilities. You must have Administrator privileges to create or modify the following value:

```
HKEY_LOCAL_MACHINE/SYSTEM/CurrentControlSet/Services/Qosp/
EnablePriorityBoost
Value 0—do not enable QoS
Value1—enable QoS
```

Trace utilities can be used to verify QoS settings. See "[Ethereal traces](#)" (page 224).

QoS settings

The IP Softphone Version 1 includes a QoS tab in the Configuration utility. You can enable or disable 802.1Q/p settings. The QoS tab provides the following settings:

- Enable—sends 802.1Q/p whether it is supported by the network or not
- Disable—does not send 802.1Q/p whether it is supported by the network or not

- Automatic Detection—sends 802.1Q/p packet, which requires a response from the TPS. If the TPS replies, 802.1Q.p is used. If the TPS does not reply, the same packet is sent without 802.1Q/p. If the TPS replies, then 802.1Q/p is not used.

To prevent improper assignment of these settings, this tab is removed in IP Softphone Version 2. The 802.1Q p settings are automatically detected.

QoS is otherwise supported in IP Softphone 2050 Version 2 as it was in IP Softphone 2050 Version 1.

Application thread priorities

Priorities are determined by thread priorities. The i2050QosSvc.exe application consists of threads, which run the Graphical User Interface (GUI) and audio threads. Thread priorities increase from the base priority of the process, as needed. The audio threads boost to high priority, as recommended by Microsoft, while the GUI maintains a normal priority. Increasing the process priority implies that the operating system may not perform properly. This concern restrains the IP Softphone 2050 to use Windows recommended priorities to avoid an unpredictable degradation in general OS performance.

Codec

The IP Softphone 2050 provides the following codecs:

- G.711 provides the highest quality (if the network facilities can handle the packet flow) because there is no compression.
- G.729 is ranked best; it has 8:1 compression but no voice activity detection.

Frame size

The IP Softphone 2050 supports the following range of frame sizes

- G.711-64 A-law and μ law: 10-960—10 ms increments
- G.729A: 10-960—10 ms frames
- G.729AB: 10-960—10 ms frames

i2050QosSvc.exe

i2050QosSvc.exe provides QoS tagging to outgoing 2050 IP packets. When the IP Softphone 2050 application opens a socket, the i2050QosSvc software monitors traffic destined for the specified IP address and port. i2050QosSvc software sets DiffServ QoS priority bits.

802.1p priority bits in the 802.1Q header can be set. 802.1Q headers must be enabled by the Network Interface Card (NIC) or NIC driver. The i2050QoSSvc does not fill in other fields in the 802.1Q header (for example, no values are assigned to the VLAN ID field).

ATTENTION

The default VLAN ID value in Windows is 0. This can be overwritten for Network Interface Cards (NIC) that support 802.1Q. The 2050 processes do not assign values to the VLAN ID field. This setting is documented with the NIC or the NIC driver.

The VLAN ID for an application must match the VLAN ID for the PC because the PC has only one IP stack for each NIC. A second IP stack is required to assign a specific VLAN ID tag for an application which is different than the PC tag.

You can use two different IP cards, each with different VLAN ID values on a single PC; however, this can cause security gaps on the voice VLAN, which is normally a more secure network than the data VLAN.

DiffSERV (DSCP)

The IP Softphone 2050 uses DSCP settings assigned by the TPS. The IP Softphone 2050 supports DSCP on Windows 2000 Professional and Windows XP. For information about configuring DiffServ values, see *IP Line Fundamentals (NN43100-500)*.

802.1p

For information about configuring 802.1p values, see *IP Line Fundamentals (NN43100-500)*.

Ethereal traces

Current versions of Ethereal show 802.1Q headers, if they are present. 802.1Q must be enabled on the NIC for the headers, which includes 802.1p to be captured.

Licenses

The IP Softphone 2050 Release 3.0 requires a license to operate. If the phone cannot obtain a license from one of the licensing schemes then it cannot connect to a Call Server and an error message appears on the phone screen.

While the IP Softphone 2050 runs, it first goes through three licensing schemes before it connects to Call Server. After the phone obtains a license, it repeats the procedure at a random interval. If the licensing scheme fails then the IP Softphone 2050 disconnects from the Call Server unless you are on an active call, in which case the phone does not disconnect until the call ends.

The licensing schemes are as follows:

- "Check out license" (page 225)
- "Cached license" (page 225)
- "Evaluation period " (page 225)

Check out license

The IP Softphone 2050 tries to obtain or checkout a license from a License Server. These licenses are stored on a License Server machine located on your network. For information about how to install and configure a Licensing Server, see "[Provisioning a License Server](#)" (page 227). After a client successfully checks out a license from the License Server a heartbeat mechanism activates to validate the license every 2 minutes. If the heartbeat is lost then the client attempts to reconnect to the server 5 times before it loses the checked out license.

Cached license

After the IP Softphone 2050 successfully checks out a license from the License Server, it records the license details in a secure location. You can refer to this license as a backup license. The cached license is available for 5 days.

Evaluation period

After you install the IP Softphone 2050, it can run without a license for a period of 30 days. After the expiration date passes, you must run the IP Softphone 2050 Settings tool to specify a License Server. Otherwise, the phone cannot connect to the Call Server.

License restrictions

The following license restrictions apply to the IP Softphone 2050 Release 3.0.

- If at any time you rewind the system date by more than 24 hours, the IP Softphone 2050 evaluation period license and cached license are both invalidated.
- Software reinstallation does not reset the license to provide another 30-day evaluation period.
- After you receive a valid license, you cannot return to the evaluation license even if the evaluation period has not expired.
- The IP Softphone 2050 requires a connection to the Licence Server, a cached license, or time remaining for the evaluation period to place an emergency call.

License types

The following two types of licenses exist:

- "Upgrade licenses" (page 226)
- "Normal R3 licenses" (page 226)
- "Post-R3 licenses" (page 226)

Upgrade licenses

An IP Softphone 2050 that upgrades from the IP Softphone 2050 V2 or lower attempts to check out an Upgrade License before it checks out a Normal R3 license from the License Server. In other words, if you upgrade your IP Softphone 2050 from a previous release then you can use an upgrade license instead of a Normal R3 License.

If you upgrade your IP Softphone 2050 R3 to a later release, use Post-R3 licenses.

Normal R3 licenses

A Normal R3 License is a regular license that non-upgrade clients attempt to check out from the server.

The distinction should be made when you request licenses from your distributor. If your site has prior releases of the IP Softphone 2050 you can be eligible to purchase Upgrade Licenses instead of Normal R3 Licenses.

If you configure redundant license servers, the licenses sold are locked to the Fully Qualified Domain Name (FQDN) of the license server host machine. If the host machine fails, you can reconfigure a computer with the same host domain name to host the licenses (license file). For information about configuring redundant license servers, see "[Configuring redundant License Servers](#)" (page 229).

Post-R3 licenses

Post-R3 (upgrade) licenses convert licenses from a major license version to a later version.

License Server

The License Server Manager and the vendor daemon make up the License Server system. The License Server Manager is the main point of contact for FLEX-enabled applications, which require license certificates. These applications then redirect to the appropriate vendor daemon.

The License Server contains Licenses certificates.

Because the License Server components are lightweight, you can install the components on any machine, which runs one of the following operating systems

- Microsoft Windows 2000
- Microsoft Windows 2000 Server
- Microsoft Windows XP
- Microsoft Windows 2003 Server
- Microsoft Windows Vista

The Licensing Server requires ports 27000 and 27001 to be accessible. You can modify the TCP/IP port number of the License Server Manager (lmgrd) in the Server line. For information about modify the Server line, see "[License file](#) " (page 229).

License Server components

The License Server includes the following components:

- vendor daemon——service which provides license rights to IP Softphone 2050 clients (nortellIP.exe)
- License Server Manager (lmgrd.exe)
- FlexNet Licensing Administration Tools
 - Command line tools available with the installer
- For FlexNet Licensing management tools provided by Macrovision, go to www.macrovision.com.

Provisioning a License Server

This following sections provide steps on how to provision a licensing server with valid licenses:

- "[Installing the License Server](#)" (page 227)
- "[Obtaining a valid license](#)" (page 228)
- "[Starting the License Server Manager](#)" (page 228)

Installing the License Server

Use the following procedure to install the License Server components.

Procedure 42

Installing the License Server

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

- | | |
|---|--|
| 1 | Click Next on the Welcome window. |
|---|--|

- 2 If you agree with the terms of the License Agreement, select the appropriate button and click **Next**.
The Welcome to the InstallShield Wizard opens.
- 3 Click **Next**.
- 4 Choose the Installation Path of the target directory for the License Server component files.
A Confirmation window appears.
- 5 Click **Next**.
A progress bar appears to show the progress of the installation.
- 6 To install the License Server as a Windows Service, select the "Install as a service" checkbox.
- 7 Click **Finish**.

—End—

Obtaining a valid license

To provision the server with licenses for the IP Softphone 2050, follow the instructions at www.nortel.com/support/tools/krs/.

Starting the License Server Manager

Use one of the following options to start the License Server Manager:

- "Manual server " (page 228)
- "Configure as a service" (page 229)

Manual server

If the server is run as "manual server" a console window appears on the desktop, which displays the output of both the Imgrd.exe and nortelip.exe processes.

You can select one of the following options from the Start menu

- Start Up Licensing Server
- Shut Down Licensing Server
- Restart Licensing Server

Configure as a service

If the server is run as “server service” the server can supply licenses even when you are not logged on to the computer. You can observe the status of the service in the Windows Services administrative tool. The output of the `lmgrd.exe` and `nortelip.exe` processes, writes to a log file called “ServiceLog.log” in the installation path of the licensing server.

You can select one of the following options from the Start menu

- Install Licensing Server as a Service
- Uninstall Licensing Server Service
- Restart Licensing Server Service

Configuring redundant License Servers

Select stable machines if you configure redundant license server systems. When a server or servers are no longer available (for example, failure), the Site Administrator can rename the new server with the existing host domain name, then reinstall the licensing server software and the associated `counted.lic` file. For information about installing the licensing server software, see ["Obtaining a valid license" \(page 228\)](#).

License file

You can modify the following elements in the license file

- Host names on the SERVER line
- TCP/IP port numbers on the SERVER line

The SERVER line specifies the host name and `hostid` of the license server system and the TCP/IP port number of the license server manager (`lmgrd`).

The `hostids` from the SERVER line is computed into the license key or signature on every FEATURE and INCREMENT line. For this reason, make sure you keep SERVER line together with any FEATURE/INCREMENT lines as they were sent from the vendor.

Table 29
SERVER line format

Field	Description
<i>host</i>	The system host name or IP address. On NT/2000/XP, <code>ipconfig / all</code> ; on Windows 95/98/ME, <code>winipcfg /all</code> return the host name.
<i>hostid</i>	Usually the string returned by the <code>lmhostid</code> command. This is changed only by your software supplier.

Nortel Keycode Retrieval System

The Nortel Keycode Retrieval System (KRS) generates Activation Responses. The Nortel Server Activation Utility sends the Activation Responses to the License Server.

Key number assignments

The IP Softphone 2050 has 6 keys that present 12 feature keys, with 6 on each feature key page. The keys are numbered from 0 to 11. The Shift key is used to change between two feature pages, 0 to 5 and 6 to 11.

If a feature requires a feature package that is not present for the Call Server installation, that feature does not appear within the default configuration for the IP Softphone 2050.

The Message key is numbered 16. If Message Waiting is not configured, then key 16 must be NUL.

Key numbers between 17 to 31 are assigned to the four soft label keys immediately below the display area. The supported features are: A03, A06, CFW, CHG, CPN, PRK, PRS, RGA, RPN, SCU, SCC, SSU, SSC, and TRN.

[Table 30 "IP Softphone 2050 soft keys" \(page 230\)](#) describes the IP Phone feature assignment for each soft key. Use LD 11 to program keys 16 to 26 on the IP Softphone 2050.

If you attempt to configure anything other than the permitted response, the Call Server generates an error code.

Table 30
IP Softphone 2050 soft keys

Prompt	Response	Description
Key 16	MWK	Message Waiting key
	NUL	Removes function or feature from key
Key 17	TRN	Call Transfer key
	NUL	Removes function or feature from key
Key 18	A03	three-party conference key
	A06	six-party conference key
	NUL	Removes function or feature from key

Prompt	Response	Description
Key 19	CFW	Call Forward key
	NUL	Removes function or feature from key
Key 20	RGA	Ring Again key
	NUL	Removes function or feature from key
Key 21	PRK	Call Park key
	NUL	Removes function or feature from key
Key 22	RNP	Ringing Number pickup key
	NUL	Removes function or feature from key
Key 23	SCU	Speed Call User
	SSU	System Speed Call User
	SCC	Speed Call Controller
	SSC	System Speed Call Controller
	NUL	Removes function or feature from key
Key 24	PRS	Privacy Release key
	NUL	Removes function or feature from key
Key 25	CHG	Charge Account key
	NUL	Removes function or feature from key
Key 26	CPN	Calling Party Number key
	NUL	Removes function or feature from key
Keys 27 to 31		Reserved

Minimum system requirements

The minimum recommended system hardware for the IP Softphone 2050 application are as follows:

- Pentium-compatible CPU (2.5 gigabits or higher)

- 128 megabytes (MB) RAM or higher for Microsoft Windows 2000
- 256 MB RAM or higher for Windows XP
- 55 MB free hard drive space (all languages)
- 800 by 600 resolution monitor (16-bit color)
- Universal Serial Bus (USB) port (version 1.1 or 2.0)
- USB Audio adapter
- For information about supported operating systems, see the *IP Softphone 2050 User Guide (NN43119-101)*.
- Perform the software version upgrade for IP Softphone 2050 manually. The technician must do this at the PC. The Voice Gateway Media Card does not download any software to the IP Softphone 2050. The `isetshow` command on the Voice Gateway Media Card displays the current version of any registered IP Softphone 2050.
- The IP Softphone 2050 does not have an ACD Supervisor headset jack. Agent walkaway is supported with the Nortel Enhanced USB Adapter (desktop) and the Nortel Mobile USB Adapter (mobile).
- An IP Softphone 2050 does not register against a TN configured for any other type of IP Phone.
- Soundcard audio is supported only for incoming call notification. Nortel supports USB Headset Adapter for the speech path.
- 5 menu options available on the IP Phone 2004, not required on the IP Softphone 2050, are
 - Volume adjustment
 - Contrast adjustment
 - Key click

System components

The IP Softphone 2050 is comprised of an external Universal Serial Bus headset adapter (Nortel Enhanced USB Adapter [desktop]) and a software application installed on the user PC. The IP Softphone 2050 also supports a mobile adapter (Nortel Mobile USB Adapter).

[Table 31 "IP Softphone 2050 package components" \(page 232\)](#) lists the IP Softphone 2050 package components.

Table 31
IP Softphone 2050 package components

Component	Code
Nortel Mobile USB Adapter	

Component	Code
Nortel Mobile USB Adapter Monaural Headset IP Softphone 2050 Kit includes	NTEX14MD
<ul style="list-style-type: none"> IP Softphone 2050 application software CD/ROM Nortel Mobile USB Headset Adapter with Monaural Headset (Non-RoHS) 	NTDW83BA NTEX14MB
Nortel Mobile USB Headset Adapter (no headset)	NTEX14MA
Nortel Mobile USB Headset Adapter (no headset) (RoHS)	NTEX14MAE6
Nortel Enhanced USB Adapter (desktop)	
Nortel Enhanced USB Audio (desktop) kit	NTEX14AA
Nortel Enhanced USB Audio Adapter (no headset)	NTEX14AB
USB Audio Kit with GNN DuraPlus Monaural Headset (Non-RoHS)	NTEX14AC
USB Audio kit with GNN DuraPlus Monaural Headset (RoHS)	NTEX14ACE6
Nortel Handset cord (Charcoal) for use with the Nortel Enhanced USB Audio Adapter Kit	NTEX14BA

Before you begin

The following section provides a step-by-step guide through the IP Softphone 2050 configuration process. Complete the following pre-installation checklist.

Procedure 43

Preinstallation checklist

Step	Action
1	Ensure you have the IP Softphone 2050 application software CD.
2	Ensure you install the Licensing Server.
3	To install and configure an IP Softphone 2050, the host Call Server must be equipped with the Voice Gateway Media Card.
4	<p>Understand the following configuration modes from which you can choose from as you proceed through the installation of the IP Softphone 2050.</p> <ul style="list-style-type: none"> Static IP address—During installation, use the dialpad to enter the IP address, subnet mask, and default Gateway address. You must also enter the Connect Server parameters including IP address, port number, action, and retry count. Partial DHCP—During installation, use the dialpad to enter the Connect Server parameters including: IP address, port number,

action, retry count, IP Phone password, node ID, and TN. Other parameters (IP Phone IP address, subnet mask, and default Gateway) are obtained from the DHCP server.

- 5 A DHCP server and DHCP relay agents, if required, must also be installed, configured, and running.

—End—

First-time installation

During the first-time installation, the two IP address parameters entered either manually or automatically, depending on the installation configuration. They are as follows:

- Static IP address assignment
- Partial DHCP

Installing the IP Softphone 2050 for the first time

Use [Procedure 44 "Configuring an IP Softphone 2050 " \(page 234\)](#) to install an IP Softphone 2050 for the first time.

Procedure 44

Configuring an IP Softphone 2050

Step	Action
1	Install the Voice Gateway Media Card. For more information, see <i>IP Line Fundamentals (NN43100-500)</i> .
2	Configure a virtual loop on the Call Server, using LD 97. For more information, see <i>Software Input Output Administration (NN43001-611)</i> .
3	Configure the IP Softphone 2050 using LD 11. At the prompt, enter the following <code>REQ: chg</code> <code>TYPE: 2050PC</code>
4	Install the USB Headset Adapter. If you are using the mobile adapter, connect the headset to the adapter. If you are using the desktop adapter, you must <ol style="list-style-type: none"> a. Connect the coiled lower cord to the headset cord with the Quick Disconnect connector. Ensure the Quick Disconnect connector is securely fastened. b. Connect the headset cord to the RJ9 jack on the adapter.

- 5 Connect the USB cable to the headset adapter and to one of the USB jacks on the back of your PC or USB hub.

The first time the headset adapter is plugged in, a delay occurs while Windows configures the device and locates the appropriate driver software. During the installation, you are prompted to supply the original Windows CD-ROM so Windows can locate the required drivers.

- 6 Install the IP Softphone 2050.

- 7 Configure the IP Softphone 2050 parameters. Click the **Server** tab in the Settings window and choose one of the following

- To manually configure the IP Softphone 2050 parameters, enter the IP address of the Call Server, Server type, port number, and retries.
- For DHCP, select the check box beside Automatic (DHCP). The IP address, Server type, port number, and retries are automatically retrieved from the DHCP Server.

For more information about using partial DHCP, see [Procedure 19 "Installing an IP Phone 2004 for the first time using DHCP" \(page 118\)](#).

- 8 Click **Apply**.

—End—

Installing or upgrading the IP Softphone 2050

Use the following options to obtain Version 1 and Version 2 software for the IP Softphone 2050

- new installation—installing the IP Softphone 2050 for the first time
- upgrade—upgrading the IP Softphone 2050 to the latest version

IP Softphone Version 1 and IP Softphone Version 2 can coexist on a PC, although both versions cannot run at the same time.

After you install Release 3.0, you must remove previous versions of software. License certificates issued for the IP Softphone 2050 work for all minor version variations in the same major release. But when you plan a major software upgrade, you must purchase new license certificates. For information about upgrading to Release 3, see ["Licenses" \(page 224\)](#).

Before performing a new installation or an upgrade, check the version of IP Softphone 2050 software.

ATTENTION

Before you upgrade an IP Softphone 2050, record the information found in the **Server** window. You may require this information later.

Upgrading

Use [Procedure 45 "Upgrading the IP Softphone 2050 on your PC"](#) (page 236) to upgrade the IP Softphone 2050 on the PC.

Procedure 45**Upgrading the IP Softphone 2050 on your PC**

Step	Action
1	Download the IP Softphone 2050 upgrade file from the Nortel Web site and extract all files to a working directory. See the <i>CS 1000 Release 5.0 Product Bulletin</i> about download instructions.
2	Double-click the My Computer icon and navigate to the working directory.
3	Double-click the Setup icon.
4	Follow the instructions on-screen to complete the installation. Compare the values currently in the configuration utility to the values recorded prior to the upgrade. These should be identical.
5	Select Start > Programs > Nortel > IP Softphone 2050 to start the IP Softphone 2050 application.
6	Select Settings to assign a server address, select sound devices, and select a server type.

—End—

Use [Procedure 46 "Removing IP Softphone 2050 \(Version 1\)"](#) (page 236) to uninstall IP Softphone 2050 (Version 1).

Procedure 46**Removing IP Softphone 2050 (Version 1)**

Step	Action
1	Select Start > Settings > Control Panel > Add/Remove Programs .
2	Choose Nortel Networks i2050 Software Phone .

- 3 Select **Remove**.
- 4 Select **Yes** to confirm.

—End—

Procedure 47

Removing IP Softphone 2050 (Version 2 or Release 3)

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

- | | |
|---|---|
| 1 | Select Start > Settings > Control Panel > Add/Remove Programs . |
| 2 | Choose Nortel Softphone 2050 . |
| 3 | Select Remove . |
| 4 | Select Yes to confirm. |

—End—

Visually impaired users can follow [Procedure 48 "Installing the Accessibility Interface" \(page 237\)](#) to install the Accessibility Interface from the IP Softphone 2050 CD-ROM.

Procedure 48

Installing the Accessibility Interface

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

- | | |
|---|--|
| 1 | Press and hold Shift . |
| 2 | Insert the IP Softphone 2050 installation CD into your CD-ROM drive. |
| 3 | Press and hold Shift for several seconds to prevent Autorun from starting. |
| 4 | If the Installation Wizard starts <ol style="list-style-type: none"> a. Wait until the Welcome to the Install Shield Wizard for the Nortel IP Softphone 2050 screen appears. b. Press Tab to select Cancel. c. Press Return. d. Click Yes to confirm that you want to cancel the installation. e. Click Finish. |
| 5 | From Windows Explorer, select your CD-ROM. |

6 Select **Accessibility.bat**.

The file Accessibility.bat executes the command line "setup /s /vqb/vUI508=1". This installs the application and sets the user interface to the Accessibility Interface.

—End—

Windows QoS Packet Scheduler

For Windows XP, the Windows QoS Packet Scheduler is installed and selected by default.

For Windows 2000, you must install the Windows QoS Packet Scheduler.

Use [Procedure 49 "Installing the Windows QoS Packet Scheduler" \(page 238\)](#) to install the Windows QoS Packet Scheduler for Windows 2000.

Procedure 49**Installing the Windows QoS Packet Scheduler**

Step **Action**

- 1** Select **Start > Control Panel**.
- 2** Select **Network Connections** (Classic View or Windows XP), or **Network and Dialup Connections** (Windows 2000).
- 3** Right-click **Local Area Connection**.
- 4** Select **Properties**.
- 5** Click **Install**.
The **Select Network Component Type** window opens.
- 6** Click **Add**.
The **Select Network Service** window opens.
- 7** Select **QoS Packet Scheduler**.
- 8** Click **OK**.

—End—

To verify Windows QoS Packet Scheduler is installed, go to Control Panel > Network Connections (Windows XP) or Network and Dialup Connections (Windows 2000) > Local Area Connection > Properties > QoS Packet Scheduler.

Running the IP Softphone 2050 for the first time

Start the IP Softphone 2050 in one of the following ways

- Select **Start > Programs > Nortel > IP Softphone 2050**.
- Click the desktop shortcut (if one was created during the installation).
- Click **Automatic startup sequence**.

If you want the IP Softphone 2050 to start automatically when the PC starts, create a shortcut to the application in the Startup folder

When an IP Softphone 2050 is started for the first time and connects to the network, the IP Softphone executes the following start-up sequence

1. Obtain the IP parameters.
2. Find a Media Gateway server and authenticate the user.

As the IP Softphone 2050 registers with the Signaling Server, one of the following occurs

- If a non-null node password is enabled, you are prompted to enter the node number and password. Use the keyboard or numeric keypad to enter the prompts for a node number and password. After the password is verified, enter the TN of the IP Softphone 2050. See *IP Line Fundamentals (NN43100-500)* for further information about the password feature.
- If the null node password is configured and enabled, these screens are skipped and no option is provided to change the password.
- If the node password is disabled or not configured, it prompts for a node number and TN. Enter the node number and TN using the keyboard or numeric keypad.

Redeploying the IP Softphone 2050

This procedure is required for a new user of the IP Softphone 2050 application.

Procedure 50

Redeploying the TN of an existing IP Softphone 2050

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

- | | |
|---|---|
| 1 | Exit the IP Softphone 2050 application. |
|---|---|

- 2 Restart the IP Softphone 2050 application.
If you do not configure or enable the node password, go to [step 3](#).
If you configure and enable the node password, go to [step 4](#).
- 3 During startup, the IP Softphone 2050 registers again with the TPS, and the IP Softphone 2050 displays the existing node number and TN for approximately five seconds.
- 4 If you configure and the password for the node, the node number and password prompt displays for approximately 5 seconds; enter the correct password within this 5-second period.

If you activate the Clear soft key during the 5-second period, the existing node and TN clear and you can enter new parameters.

—End—

Removing an IP Softphone 2050 from service

Procedure 51

Removing an IP Softphone 2050 from service

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

- | | |
|---|--|
| 1 | Exit the IP Softphone 2050 application. |
| 2 | Uninstall the IP Softphone 2050 application from the PC using the Windows Add/Remove Programs.

In LD 11, enter OUT at the TN prompt. |

—End—

Maintenance

Diagnostics provides a method to detect and resolve issues you encounter with the IP Softphone 2050. Launch the Diagnostic feature from the Help menu.

The data coverage for this feature includes

- "System data" (page 241)
- "User data" (page 241)
- "Ethernet statistics" (page 242)
- "IP Networking Statistics" (page 243)

- "ICMP Statistics" (page 244)
- "Audio Connection Data" (page 244)
- "USB Headset Data" (page 245)
- "Telchemy VQMon" (page 245)
- "PC System Information" (page 246)
- "Personal Call Recording Data" (page 247)
- "Licensing Data" (page 247)
- "Duplicate Media Stream Call Recording Data" (page 247)

The Diagnostics feature uses an Hyper Text Markup Language (HTML) view, which splits each category of data into tables.

If diagnostics are not available for a specific parameter, the label Unavailable Data appears.

System data

The system data displays the following information which is consistent across all users.

- 2050 Version
- Install Path
- Last Profile Used
- Last Language Used
- Last Theme Used
- Status of the Quick Start & Profiles Dialog
- Auto-Hide Menu
- Hardware ID
- Launch 2050 on Windows Startup

User data

The user data displays the profile configuration for all profiles of the IP Softphone 2050. The user configures the following data by browsing to File > Settings from the main application window:

- DHCP status
- Server IP Address
- Server Name
- Node

- TN
- Server Port
- Server Type
- Number of Retries
- Symposium Status
- Modem Status
- Listener IP Address
- Listener Port
- Echo Cancellation
- NetEq Status
- Language
- Theme Selected
- Action
- FingerPrint
- Expansion Module Display Format (Number, Name/Name, Number)
- Expansion Module View Style (Group/Spatial)
- Show Number on Expansion Module Buttons (Enabled/Disabled)
- Show Annotation on Expansion Module Buttons (Enabled/Disabled)

Ethernet statistics

The Ethernet statistics displays information regarding the state of the network interface card. The Windows Operating system collects and provides the following Ethernet data:

- Adapter Name
- Adapter Description
- Physical Address
- Adaptor Type
- Link Status
- Speed
- MTU
- DHCP Status
- Current IP Address
- Subnet Mask

- Default Gateway

ATTENTION

A maximum of 5 IP addresses display but it is possible to assign more than 5 IP addresses to one NIC.

IP Networking Statistics

The IP Network statistics displays information regarding the state of the IP Network. The Windows Operating system collects and provides the following IP Network data:

- Host Name (for the local PC)
- Domain Name (Domain PC is registered to)
- DNS Servers
- Node Type (Broadcast/P2P/Mixed/Hybrid)
- IP Routing Status
- IP Forwarding Status
- Default Packet Time-to-Live
- Packets Received
- Received Packets with Header Errors
- Received Packets with Address Errors
- Packets Forwarded
- Packet Received with an Unknown Protocol
- Incoming Packets Discarded
- Received Packets Delivered
- Outgoing Packets Requested
- Outgoing Packets Discarded
- Transmitted Packets Discarded
- Number of Network Interfaces for this PC
- Number of IP Addresses for this PC
- Number of Routes in the IP Routing Table

ATTENTION

A maximum of 5 DNS Server addresses display.

ICMP Statistics

ICMP Statistics display information regarding the Internet Control Message Protocol for the PC. ICMP messages send and receive when no errors occur in the packet or in network routing. The following ICMP statistics display:

- Messages Received
- Messages Sent
- Destination-Unreachable Messages Received
- Destination-Unreachable Messages Sent
- Time-To-Live Exceeded Messages Received
- Time-To-Live Exceeded Messages Sent
- Parameter Problem Messages Received (IP Header)
- Parameter Problem Messages Sent (IP Header)
- Redirect Packets Sent
- Redirect Packets Received

Audio Connection Data

The Audio Connection data displays information pertinent to the last call, as well as other general audio parameters.

Last call parameters

The last call parameters for both the RX and TX displays the following parameters:

- Time of Connection
- Codec Used
- Frames per Packet
- Local/Remote RTP Port Used
- Local/Remote RTCP Port Used
- RTCP Type of Service (ToS)/Diffserv Codepoint
- RTP/RTCP 802.1p
- Remote IP Address

General audio parameters

The general audio parameters displays the following parameters:

- PC Audio Buffer
- PC Audio Buffer Range
- Audio Attenuation Percentage

- Jitter
- High Water Mark
- Early Packet Resync
- Late Packet Resync
- Supported codecs
- Echo Cancellation Mode
- Echo Cancellation Type
- Noise Reduction Level
- Microphone Auto Gain Control Status
- SRTP Status for Last Call (Enabled/Disabled)

USB Headset Data

The USB headset data displays the following information on the current and all other supported headsets:

- Default Audio Device
- USB Adapter Status
- USB Adapter Type (Nortel/Algo USB Audio Adapter/Nortel USB IP-ATA)
- Adapter Firmware Version
- Headset Type
- Active Call Indication
- Alert Condition Indication
- Message Waiting Indication
- Headset Disconnected Indication
- Use Backlight
- Supported USB Headsets

Telchemy VQMon

The Telchemy VQMon section displays the following information, which generates using the libraries currently implemented for the IP Softphone 2050:

- Packet Loss Rate
- Packet Discard Rate
- Burst Density Average
- Burst Duration
- Gap Density

- Round Trip Delay
- End System Delay
- RERL
- MOS LQ
- MOS CQ

PC System Information

PC System Information displays information related to hardware, the Operation System, and computer names. The following information displays about the computer in which the IP Softphone 2050 runs.

- OS Name
- OS Version
- Processor Architecture
- Number of Processors
- System Name
- User Name
- Windows Directory
- System Directory
- System Manufacturer
- System Model
- Total Physical Memory
- Free Memory
- Percentage of Memory in use
- Total Page File Limit (MB)
- Total Page File Available (MB)
- Total Virtual Memory (MB)
- Total Virtual Memory Available (MB)
- Number of Page Faults
- Peak Working Set Size (MB)
- Current Working Set Size (MB)
- Peak Paged Pool Usage (MB)
- Current Paged Pool Usage (MB)
- Peak NonPaged Pool Usage (MB)

- Current NonPaged Pool Usage (MB)
- Current PageFile Allocation (MB)
- Peak PageFile Allocation (MB)

Personal Call Recording Data

The IP Softphone 2050 allows a Nortel-certified third party call recording application to record calls. The following diagnostics data reflects the status of this third party application:

- Application Name
- Application Version
- Application Vendor
- Application Path
- Call Recording Status (Enabled/Disabled)
- Launch PCR at 2050 startup (Enabled/Disabled)
- Call recording warning message (Enabled/Disabled)

Duplicate Media Stream Call Recording Data

The IP Softphone 2050 supports centralized duplicate media stream call recording to record calls on a recorder server, which is in a remote location. This is primarily used in Contact Center Solutions. The following information displays for both the TX & RX Stream:

- Local Port Used
- IP Call Recorder Address (Remote)
- IP Call Recorder Port (Remote)

Licensing Data

The Licensing feature provides keycode (software license) protection against reuse of invalid copies of the IP Softphone 2050 application. You can download and copy the IP Softphone 2050 application but the clients do not operate until you purchase legitimate keycodes.

The following diagnostic information displays:

- License Status
- License Type
- License Flavor
- License Server Address
- Current License Expiration

Expansion Module for IP Softphone 2050

Contents

This section contains the following topics:

- "Description" (page 249)
- "Features" (page 250)
- "Display characteristics" (page 250)
- "Configuration" (page 250)
- "Installation" (page 251)

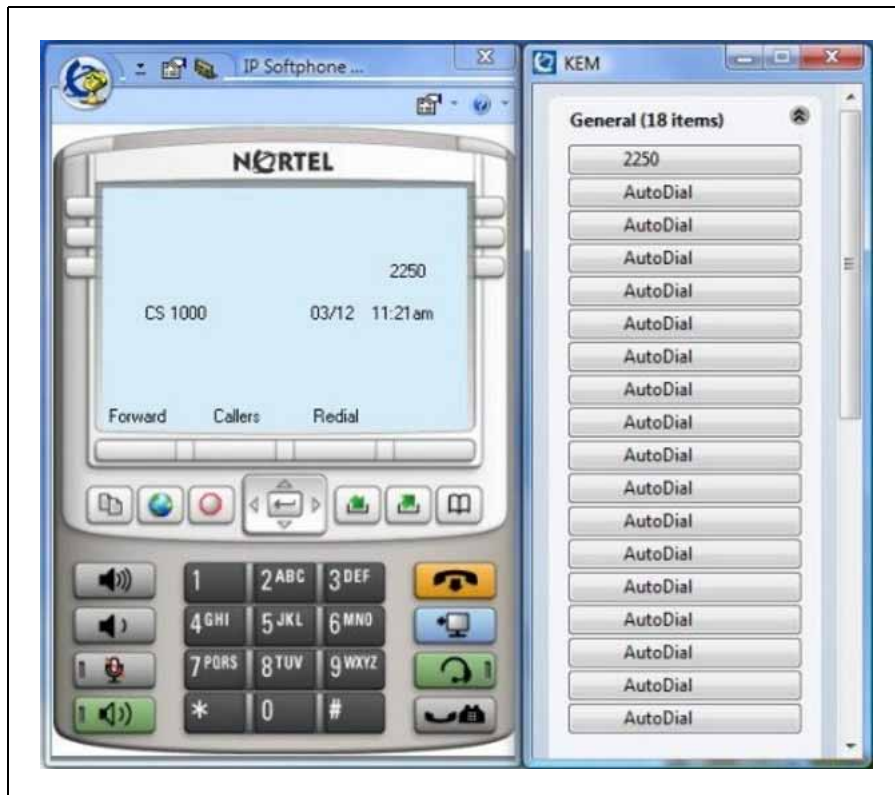
Description

The Nortel Expansion Module for the IP Softphone 2050 is a stimulus device, which provides additional line appearances and feature keys.

You can connect up to three Expansion Module for IP Softphone 2050. With three Expansion Modules connected, the IP Softphone 2050 provides up to 54 additional line/feature keys.

Figure 24 "IP Softphone 2050 with Expansion Module" (page 250) shows the IP Softphone 2050 1140 theme with the Expansion Module.

Figure 24
IP Softphone 2050 with Expansion Module



Features

The Expansion Module provides the following features:

- 54 keys in up to three groups of 18 keys
- docks to the right side or left side of the IP Softphone 2050
- up to 30 characters for button annotation text

For more information, see *IP Softphone 2050 User Guide (NN43119-101)*.

Display characteristics

Each of the 54 keys on the Expansion Module 2050 provides a 10-character display label area. This label is set automatically; however the user can edit the label using the controls from the IP Softphone 2050 Settings panel.

For more information, see the *IP Softphone 2050 User Guide (NN43119-101)*.

Configuration

Use LD 11 to configure the Expansion Module 2050.

LD 11 - Configure the Expansion Module

Prompt	Response	Description
REQ:	NEW/CHG	Add new or change existing data.
TYPE	2050	For IP Softphone 2050
...
KEM	(0) - 3/<CR>	Number of attached Expansion Modules 2050 (0). Supports up to three Expansion Modules 2050.
...
CLS	KEM3	KEM3 CLS must be defined
KEY	0 - <see text>/<CR>	Key number range expanded to support number of Expansion Modules 2050 specified by KEM prompt. The range on the IP Softphone 2050 is as follows: KEM value: KEY range: 0 0 to 31 1 32 to 49 2 50 to 67 3 68 to 85
PAGEOFST	<Page> <KeyOffset> / <CR>	PAGEOFST is prompted if one Expansion Module 2050 is specified at the KEM prompt and <CR> is entered at the KEY prompt. This prompt enables you to enter a Page number of 0, or 1, and a Key Offset number from 0 to 17. Once entered, the KEY is prompted with the appropriate KEY value filled in. <CR> ends the input.
KEY <key>	<keys conf data>/<CR>	<key> is the key number for the Page + Key Offset entered at PAGEOFST. Enter the key configuration <CR> or just <CR>.
KEMOFST	<KEM> <Key-Offset> / <CR>	KEMOFST is prompted if two or three Expansion Modules are specified at the KEM prompt and <CR> is entered for KEY prompt. This prompt enables you to enter a KEM number of 1, 2, or 3 and a KEY Offset number from 0 to 17. Once entered, the KEY prompt is prompted with the appropriate KEY value filled in. <CR> ends the input.
KEY <key>	<keys conf data>/<CR>	<key> is the key number for the KEM + Key Offset entered at KEYOFST. Enter the key configuration <CR> or just <CR>.

Installation

The Expansion Module 2050 can dock to the right side or the left side of the IP Softphone 2050 main window. You can move the Expansion Module 2050 close the IP Softphone 2050 and it snaps into place.

Operation

Before you can operate the Expansion Module 2050, you must configure settings in IP Softphone 2050 Settings. You can set the default value either to Spatial or Group, set the Expansion Module 2050 back to the default state, and configure annotated labels.

For further information about IP Softphone 2050 Settings, see *IP Softphone 2050 User Guide (NN43119-101)*.

Nortel WLAN Handset 2210, WLAN Handset 2211, WLAN Handset 2212, WLAN Handset 6120, and WLAN Handset 6140

For information about WLAN Handset 2210, WLAN Handset 2211, WLAN Handset 2212, WLAN Handset 6120, and WLAN Handset 6140, see *WLAN IP Telephony Installation and Commissioning (NN43001-504)*.

Nortel Mobile Voice Client 2050

Contents

This section contains the following topics:

- "Introduction" (page 255)
- "Description" (page 256)
- "System requirements" (page 256)
- "Supported features" (page 256)
- "MVC 2050 components" (page 258)
- "Operation" (page 264)
- "MVC 2050 installation" (page 265)
- "MVC 2050 removal" (page 267)
- "Configuration" (page 267)
- "802.1p and DiffServ" (page 274)
- "MVC 2050 and WLAN" (page 274)

Introduction

This section describes how to install, configure, and remove the Nortel Mobile Voice Client 2050. For information about using the MVC 2050, see the *Mobile Voice Client 2050 User Guide (NN43119-103)*.

This section contains the following procedures

- Procedure 52 "Starting MVC 2050" (page 264).
- Procedure 53 "Synchronizing a PDA with a desktop PC using ActiveSync" (page 266).
- Procedure 54 "Installing MVC 2050" (page 266).
- Procedure 55 "Removing MVC 2050 from your PDA" (page 267).
- Procedure 56 "Enabling Auto-Create" (page 269).

Description

Mobile Voice Client (MVC) 2050 adds wireless IP Phone services to the convenience of Personal Digital Assistants (PDAs). MVC 2050 functions like an IP Softphone 2050. However, MVC 2050 cannot be used as an Agent or Supervisor in Call Center Portal applications.

MVC 2050 is UNISTim-based software that provide real-time voice communication, over a WLAN, to PDAs.

MVC 2050 operates on PDAs running the following operating systems

- Pocket PC 2003
- Windows Mobile 5.0

WLAN 802.11b can interwork with various enterprise communication servers. MVC 2050 can also interwork with WLAN Access Points (WAP) and can use the WSS 2250 WLAN Security Switch. MVC 2050 can coexist with a secure Virtual Private Network (VPN) client on the same PDA.

MVC 2050 requires access to an enterprise or public WLAN Access Point (WAP).

System requirements

MVC 2050 requires PDAs to meet the following *minimum* specifications

- 240x320 screen size
- 624MHz CPU speed
- 64 MB RAM

Supported features

MVC 2050 supports the following telephony features

- six programmable line/feature keys
- four soft keys (self-labeled)
- six specialized feature keys
 - Messages
 - Directory
 - Shift
 - Copy
 - Quit
 - Services
- call-processing keys

- Hold
- Goodbye
- Mute
- Answer
- Expand
- volume Up/Down keys
- navigation keys
- online help
- 12-button dialpad
- multifield display
- audible notification of connection or disconnection to the server
- macro functions available for programming lengthy dialing patterns
 - Pause is available to build into the macro to introduce a delay which may be required to access some Interactive Voice Response (IVR) applications and voice mail systems.
- Redial List
- Callers List
- profiles
- skins
- connection to user-supplied headsets for the speech path features and services provided by the network (such as call features and voice mail)
- run-in-background application (MVC 2050 interface is closed but the application runs in the background to allow incoming calls)
- 802.11b WLAN interface
- automatic network configuration through DHCP
- G.711 codec for operation without compression

Application software

MVC 2050 is a software application that enables voice communications over a WLAN from a PDA.

The MVC 2050 software application is comprised of the following components

- MVC 2050 software
- NetEQ software (included in MVC 2050 software)

ClearType

MVC 2050 uses a special screen font which requires that Microsoft ClearType® be enabled on your PDA. ClearType software improves the appearance and readability of text on liquid crystal display (LCD), pocket PC screens, and flat panel monitors.

MVC 2050 components

MVC 2050 includes the following components

- MVC 2050 application software, including Global IP Sound NetEQ™ software
- user-supplied compatible PDA
- user-supplied headset

Compatible PDAs

Because the PDA industry evolves at a rapid pace, go to www.nortel.com. Select Products > Phones, Clients, and Accessories > IP Phones and Clients > Mobile Voice Client 2050 > Technical Specifications to determine the latest PDA models tested and supported, along with any known issues.

Headsets

A headset is required in order to send and receive telephone calls using the MVC 2050 and your PDA. The headset is an important part of audio quality.

PDAs that support stereo headphones with microphones are recommended.

The Dell specific headset with a button on the wire, when used with the X51v, allows the MVC 2050 to answer an incoming call or release an active call by pressing the button.

ATTENTION

Bluetooth and 802.11b operate on the same frequency band and use the same WLAN hardware on the PDA. Therefore, the use of Bluetooth accessories with MVC 2050 can lead to poor call quality.

Contact your PDA vendor to obtain headset recommendations.

Automatic Gain Control and feedback

Because MVC 2050 requires a headset to operate properly, disable Automatic Gain Control. Refer to your PDA documentation to disable Automatic Gain Control.

When the PDA is used in handsfree mode, without a headset, the PDA microphone picks up sounds from the speaker, which creates a feedback loop. Automatic Gain Control is used in this instance to avoid feedback.

ATTENTION

When the PDA is used in handsfree mode, without a headset, the PDA microphone picks up sounds from the speaker, creating a feedback loop.

Audio quality

MVC 2050 provides a high-quality audio environment, which includes

- NetEQ software (included with the software package)
- Interworking with G.711 codec that provide high audio quality without compression; MVC 2050 supports G.711-64 A-law and U-law
- Audio selection tab that provide a user-selectable quality slider
- Advanced Audio tab for expert users

For more information about Audio quality, see ["Audio Quality" \(page 272\)](#).

MVC 2050 Call Handling screen

You can access and operate most MVC 2050 features from the Call Handling screen. Select Answer from the Keys menu or use the Headset/Answer icon to answer calls or obtain a dial tone.

The Call Handling screen contains the telephone dialpad. The appearance of the Call Handling screen differs with each available skin. Use the Settings > Skin dialog box to determine the current skin. All skins share common components.

You can use the up, down, left, and right cursor control arrow keys on your PDA as navigation buttons to navigate around the skin and move through the menu items.

Display

The display is located in the central area of the skin. View messages and text on the display.

Dialpad

The 12-button dialpad is located on the left side of the skin.

Soft keys (self-labeled)

Four soft keys (self-labeled) are located in the bottom row of the display. The labels on these keys depend on the call server.

Programmable line/feature keys

Six programmable line/feature keys are located on the right side of the skin. They are aligned vertically and are the same color as the display. The number of features available depends on the call server.

Menus

MVC 2050 provides the following menus

- File
- Keys
- Help

File

The File menu provides the following items

- Run-in-background
- Paste
- Contacts
- Settings
- Exit

Run-in-background Select Run-in-background to close MVC 2050 but allow it to continue running in the background so that incoming calls can ring on your PDA.

After you complete your call, press the X in the upper right-hand corner of the PDA display to close the MVC 2050 application and return it to the background.

Paste Select Paste to paste a telephone number into your PDA from another application rather than entering an existing telephone number through your Call Handling screen dialpad.

Contacts Select Contacts to launch the Contacts dialog box. The Contacts application reads a list of contacts from the PDA Contacts list or from a list, which you synchronized onto your PDA from Microsoft Outlook.

Settings Select Settings to provide access to the Settings submenu. The Settings menu provides windows for Personal settings, System settings, and Connections settings.

The System settings window provides access to settings for memory, power, remove programs, screen and regional settings, iTask settings, and self test.

You must restart MVC 2050 for changes to Profiles, Hardware ID, Sounds, Servers, and Listener IP to take effect.

Exit Select Exit to close MVC 2050. Calls cannot be received until the application restarts.

Select Exit to free up PDA-processing resources.

Keys

The Keys menu provides the following items

- Headset
- Answer
- Goodbye
- Hold
- Features
- Macros

Headset Select Headset to answer an incoming call or to obtain a dial tone. You can also use the Headset/Answer icon located at the top center of the Call Handling screen.

Answer Select Answer to answer an incoming call or to obtain dial tone to place a call. You can also use the Headset/Answer icon located at the top center of the Call Handling screen.

Goodbye Select Goodbye to end a call. You can also use the Goodbye icon located at the top right of the screen.

Hold Select Hold to place a call on hold. You can also use the Hold icon located at the top left of the screen.

Features Select Features from the Keys menu to access a menu of interface keys.

To re-arrange items in the Features list, open the Settings menu and select the Features tab. Items in the Features list cannot be added or removed.

Macros Select Macros from the Keys > Features submenu to access macros (also available through the Settings > Macros dialog box). Macros are used to make speed-dials, access voice mail, and other routine functions quickly and easily. For more information about macros see "[Macros](#)" (page 273)

Help

Select Help to access the MVC 2050 PDA-specific version of Help. The Help menu provides the following items

- Contents
- Diagnostics
- About MVC 2050

Contents Select the Contents menu item to access the Help system.

Diagnostics Select Diagnostics to access to a list of methods to determine server connection state.

Diagnostic methods are as follows

- Ping
- TraceRoute
- RUDP Ping

See "[Profiles](#)" (page 270) for information about importing and exporting profiles to assist in troubleshooting.

About MVC 2050 About MVC 2050 identifies the MVC 2050 application. Select About MVC 2050 to view configuration information for your MVC 2050 (such as system product name, version number, copyright indication, manufacturer name and logo, and Global IP Sound name and logo). MVC 2050 uses packet loss concealment provided by Global IP Sound NetEQ software.

MVC 2050 graphical interface (skins) components

MVC 2050 provides alternative graphical images known as skins. The dialpad, menu, and icon buttons on the skin. Skins are available in several colors and arrangements.

All skins share the following common components

- programmable line/feature keys
- soft keys (self-labeled)
- dialpad
- display
- Call Handling icons
- Toolbar icons
- Menu Bar icons
- retractable toolbar

- Message Waiting light
- System Input Panel icon

Icons

The MVC 2050 Call Handling screen presents icon equivalents for menu items.

Icons are divided into three types

- Call Handling icons
- Toolbar icons
- Menu Bar icons

Call Handling icons

The following three Call Handling icons appear across the top of the Call Handling screen

- Hold
- Headset/Answer
- Release

Menu Bar icons

MVC 2050 provides the following icons, which is used instead of text menu equivalents

- Paste
- Contacts
- Settings
- Toolbar switch
- System Input icon

Toolbar icons

The retractable toolbar contains icons, which are not present on the remainder of the display. The icons at the bottom of the skin and are visible when the Toolbar is retracted. Use the Toolbar switch icon at the bottom of the screen to retract the Toolbar.

The following are the icons visible on the Toolbar

- Mute
- Volume Down
- Volume Up

The following icons are visible when the Toolbar is retracted

- Mute
- Volume Down
- Volume Up
- Directory
- Messages
- Shift
- Services
- Expand
- Copy
- Quit

System Input Panel

To access the System Input Panel from MVC 2050, tap the System Input Panel icon on the Menu Bar on the bottom right-hand corner of the PDA. Consult the PDA documentation for a description of the System Input Panel.

You can use the System Input Panel to enter data for MVC 2050 and other applications. Use the keyboard to enter data.

The default System Input Panels are as follows

- Block Recognizer
- Keyboard
- Letter Recognizer

The MVC 2050 application enables the keyboard to act like a dialpad, interpreting the alphabetical keys as numbers. For example, J, K, or L, are interpreted as the number five (5). Nonalphanumeric keys are ignored.

Operation

Use [Procedure 52 "Starting MVC 2050" \(page 264\)](#) to start MVC 2050.

Procedure 52 Starting MVC 2050

Step	Action
1	From the Main Application screen, select Programs .
2	Select Start .
3	Select Mobile Voice Client 2050 . The Call Handling screen appears.

—End—

**CAUTION**

PDA processor models, speed, and amount of memory vary. To maintain audio quality, do not overload the processor with intensive tasks while using MVC 2050. For example, Nortel does not recommend using your PDA version of Internet Explorer while using MVC 2050.

PDA processor speed can have adverse effects on MVC 2050 performance.

ATTENTION

Set the PDA processor speed to the highest setting or to auto, which changes the processor speed according to system status. To set the PDA processor speed. Refer to the PDA user guide.

ATTENTION

If the Wireless Fidelity (WiFi) application goes down while your PDA is set to Standby mode, you cannot receive incoming calls on your device. To continue the WiFi application running and receive incoming calls, disable the power settings for Standby mode. Go to the Settings option on your PDA.

PDA battery life can affect the MVC 2050 call duration and the call volume.

ATTENTION

PDA vendors offer two types of rechargeable battery: standard and extended-life. The extended-life battery is recommended. It provides longer call duration and increased call volume than the standard-life battery.

MVC 2050 installation

If an older version of MVC 2050 is installed on the PDA, remove it prior to installing a newer version. See "[MVC 2050 removal](#)" (page 267).

To install MVC 2050 on the PDA

1. Place the PDA in its cradle.

2. Synchronize the PDA with a desktop PC running Microsoft® ActiveSync® using [Procedure 53 "Synchronizing a PDA with a desktop PC using ActiveSync" \(page 266\)](#).
3. Install the MVC 2050 from a Desktop using [Procedure 54 "Installing MVC 2050" \(page 266\)](#).

MVC 2050 installation method

MVC 2050 supports installation from a docked PDA with a Microsoft ActiveSync connection to a desktop PC.

Synchronizing a PDA with a desktop PC

Use [Procedure 53 "Synchronizing a PDA with a desktop PC using ActiveSync" \(page 266\)](#) to synchronize your PDA with your desktop PC.

Procedure 53

Synchronizing a PDA with a desktop PC using ActiveSync

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

- | | |
|---|---|
| 1 | Place the PDA in its cradle. |
| 2 | Ensure that ActiveSync is running. |
| 3 | Wait for the PDA and the PC to synchronize. |

—End—

For details about synchronizing a PDA with a desktop PC, see the PDA Users Manual.

Installing MVC 2050 from a Desktop PC using ActiveSync

Use the following procedure to install MVC 2050 using the product CD.

Procedure 54

Installing MVC 2050

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

- | | |
|---|--|
| 1 | Synchronize the PC and PDA. See Procedure 53 "Synchronizing a PDA with a desktop PC using ActiveSync" (page 266) . |
| 2 | Insert the MVC 2050 CD into the CD-ROM drive of your desktop PC. |
| 3 | Go to your desktop and double-click My Computer . The PC files and folders menu appears. |

- 4 Select the **CD Drive**.
- 5 Select **Setup**.
- 6 Follow the instructions on the screen until the Install Wizard asks you if you want to modify, install, or remove MVC 2050.
- 7 Select **Install**. The Install Wizard installs MVC 2050. When installation finishes, *Attend to your device (PDA)* message displays on the PC and *Do you want to perform a soft restart?* message displays on the PDA.
- 8 Select **Yes** to restart your PDA.

—End—

MVC 2050 removal

Use the following procedure to remove MVC 2050 from your PDA.

Procedure 55

Removing MVC 2050 from your PDA

Step	Action
1	Select Start . A drop-down menu appears.
2	Select Settings . A Windows folder with a number of programs, usually shown as icons with names and a row of tabs across the bottom, opens.
3	Select the <i>System</i> tab. Another Windows program folder opens.
4	Select Remove Programs . A list of programs opens.
5	Select Nortel MVC 2050 .
6	Select Remove . A confirmation dialog box opens.
7	Select Yes . There is a brief pause during removal of MVC 2050. After the pause, a confirmation dialog box opens.
8	Select Yes . Your PDA restarts and MVC 2050 has been removed.

—End—

Configuration

MVC 2050 has a flexible interface which enables end users to customize configurations for a variety of connections.

Settings

For information about settings, see ["Settings" \(page 260\)](#).

Server

The Server tab, accessible from the Settings screen, contains all the settings necessary for MVC 2050 to contact a server. On the Server tab, you can perform the following

- change the settings on the Server tab to access a different server
- implement the profile containing the desired server

For more information about Profiles, see ["Profiles" \(page 270\)](#).

Connection history

Connection history writes connection and disconnection indication messages to the registry key *HKCU\Software\Nortel\MVC2050\Log*. This is a circular queue of 29 entries. Each time a connection or disconnection event occurs, a log entry containing a date, time, and a description of the connection or disconnection event is written.

The descriptions of the connection and disconnection events are as follows

- Soft reset, server *n*
- Server connected
- Recovering: Server unreachable
- Hard reset
- Hardware ID

Soft reset, server *n* **Server *n*** indicates that the server has instructed MVC 2050 to reset and connect to a server *n* where *n* and its value is determined, and possibly written, by the server. This message maps directly to a UNISlim message.

Server connected **Server connected** indicates that MVC 2050 has successfully connected to the server. It means that MVC 2050 received the *Assign TerminalID* UNISlim message, which is the last message received by MVC 2050 before a normal session is started.

Recovering: Server unreachable The Recovering: Server unreachable message generates after MVC 2050 loses connection with the server. It indicates that the UNISlim watchdog timer has expired and indicates loss of network connection.

Hard Reset The Hard Reset message indicates that the server has instructed MVC 2050 to reset and clear its UNISlim-related memory. This message maps directly to a UNISlim message.

Hardware ID

The Hardware ID screen is used to select the MAC address that MVC 2050 reports to the communication server. The MAC address can be reset.

View the Hardware ID in the MVC 2050 Settings on the Hardware ID tab.

Hardware IDs are generated by reading MAC addresses from the PDA Network Interface Card (NIC). When MVC 2050 is used with most server types, the Hardware ID must be unique.

Some software, such as VPN client software, creates artificial network interfaces with MAC addresses, which are not unique. Without a unique MAC address, the following conflicts can occur

- MVC 2050 cannot connect to a server
- MVC 2050 connects to the server but another device with the same Hardware ID is disconnected from the server
- MVC 2050 disconnects from the server then automatically attempts to reconnect

To prevent conflicts with other devices, enable Auto-Create. Auto-Create fabricates a MAC address with a random value that is unlikely to be repeated by another device.

Use [Procedure 56 "Enabling Auto-Create" \(page 269\)](#) to enable **Auto-Create**.

Procedure 56 Enabling Auto-Create

Step	Action
1	Select Settings .
2	Select Hardware ID .
3	Select Auto-Create .

—End—

[Table 32 "Hardware ID screen" \(page 270\)](#) provides information about the Hardware ID screen.

Table 32
Hardware ID screen

Selection	Description
Hardware ID	This box contains the MAC address for the Ethernet hardware installed in your device. MVC 2050 uses the MAC address of the Ethernet hardware as its hardware ID. You may have to change this value if there is more than one MAC address, or if the device is using an extranet client that hides the true MAC address. For example, the Nortel Contivity Extranet Switch uses a single MAC address for all clients. This might cause connection problems with your communication server.
Auto-create	This changes the MAC address that appears in the Hardware ID box. If your device has more than one MAC address, tap the Auto-Create button to cycle through the set of MAC addresses on your computer. Auto-Create also makes up random hardware IDs in case the Ethernet hardware addresses are not unique to the communication server.
Firmware Version	Shows the build number of MVC 2050 installed on your device. This value is the version number of the application last reported by the server.

Dialing formats

Dialing Locations settings set the dialing rules to be applied to properly route a call when an end user dials a number. The dialing rules establish prefixes to access local and long-distance numbers using the location of the user server. To establish the dialing rules and dialing patterns, see *Mobile Voice Client 2050 User Guide (NN43119-103)*.

Profiles

Each profile is a named file, which contains a combination of servers and other attributes that control connection, behavior, and appearance of the MVC 2050.

A number of profiles can be created and saved to allow easy switching among different servers, feature programming, and audio programming.

Profiles can be created, selected, modified, or deleted. When you select profile you can change the name, modify it, or delete it.

When a profile is selected, all other Settings tabs see the selected profile. The name of the selected profile is shown in the lower right corner on each tab.

From the Profiles screen you can do the following

- create profiles
- delete profiles
- modify a profile name
- change the profile used by the application
- export profiles
- import profiles

When a new profile is created and selected, the values on all of the other tabs are set to the defaults for this profile. Any value modified on any of the other tabs are associated with this profile until another profile is selected. To change settings on other tabs for this profile, select the tab you wish to change. For example, go to the Server tab to modify the server settings.

Sounds

MVC 2050 can make sounds to indicate server connection or disconnection.

Sound files and sound settings are not saved when Profiles are saved, so the user must program the sounds. Up to three sounds can be programmed for use with audible notification of server connection or disconnection.

Following are descriptions of the events for which the sounds are used.

Descriptions of the events for which the sounds are used are as follows

- Server unreachable
- Server unresponsive
- Server connected

Server unreachable The sound you select for this event plays when MVC 2050 loses contact with the server. The message "Server unreachable" displays on the PDA screen.

Server unresponsive The sound you select for this event plays if MVC 2050 fails to connect to the server. The message *Server unresponsive* displays on the PDA screen.

Server connected The sound you select for this event plays when MVC 2050 connects to a server.

Audio Quality

Audio quality is controlled from the following screens

- Audio quality slider tab
- Advanced Audio

Audio quality slider tab To control audio quality, use the slider tab to reduce audio delay and increase audio clarity. control audio quality. This slider controls the number of audio buffers the PDA uses to smooth out incoming audio streams.

If you experience audio delay, use the slider on the Audio screen to decrease the number of buffers.

If you experience broken or choppy speech at either end of the call, or the dial tone sounds choppy, use the volume controls on the MVC 2050 toolbar to adjust volume while using the MVC 2050.

If you experience reduced audio clarity in the receive audio stream, increase the Audio clarity setting. This increases the number of audio buffers used to process incoming audio. If the delay is too large, you can decrease the Audio clarity setting.

Advanced Audio Global IP Sound NetEQ software provides loss concealment and compensation.

NetEQ is the default setting and MVC 2050 Advanced Audio settings cannot be adjusted.

[Table 33 "Advanced Audio screen" \(page 272\)](#) provides information about the Advanced Audio screen.

Table 33
Advanced Audio screen

Selection	Description
NetEQ (Global IP Sound)	NetEQ packet loss concealment software is the default mode of operation.
Jitter Buffer	A Jitter Buffer is used to minimize a change in rate for arriving voice frames. The Jitter Buffer sends voice frames to your PDA sound system at a fixed rate. The rate of arrival of voice frames is variable. The value of "jitter" is the normal number of voice frames the application should have in its jitter buffer.

Selection	Description
Highwater Mark	Highwater Mark indicates the maximum number of voice frames the application should have in its jitter buffer before it starts discarding packets. This value should be at least 2.5 times the value of jitter. If a smaller value is assigned, MVC 2050 regards it as an error and corrects it.
Early Packet and Late Packet Resync	Early Packet Resync and Late Packet Resync indicate the points at which MVC 2050 discards and restarts the jitter buffer contents. This value should be at least five times the Highwater Mark.

Listener IP

Use the Listener IP screen to override the port assignments when there is a conflicting application on the PDA.

See [Table 34 "Listener IP screen" \(page 273\)](#) for information about selections available on the Listener IP screen .

Table 34
Listener IP screen

Selection	Description
Use a specific address	MVC 2050 normally listens to all IP addresses on the device for communication server-to-terminal (UNISim) messaging on all the network interface cards on the device. This is the default mode of operation. To override this behavior, select the check box and enter a specific IP address.
Use a specific port	MVC 2050 listens to IP port 5000 on the device for communication server-to-terminal (UNISim) messaging.

Macros

The Mobile Voice Client (MVC) 2050 **Macros** tab enables you to record and use macros. A macro is a recorded sequence of steps that saves you keystrokes.

For example, you can create macros that select a particular line and then dials the telephone number automatically, or program voice mail access numbers and codes for faster access.

Macro screen To enter a new macro name, or to select an existing macro to modify or delete, select the New icon to the right of the list box.

To select an existing macro, tap the down arrow in the Macro list box and make your selection.

To delete a selected macro, tap the Delete icon (the button to the right of the list box).

Keys Once you have selected a macro name, tap the down arrow in the **Keys** drop-down list to select a key to add to the macro. Press the **Add** button to add the key.

Use the Pause key to insert a short pause in the macro. A pause introduces a delay which may be required to access some Interactive Voice Response (IVR) applications and the voice mail systems.

Contents A list of the macro contents appears in the Contents list box. Once there are two or more entries in this box, use the up and down buttons, which appear on the right of the box to move around the keystrokes.

To remove keystrokes from the Contents box, select the keystroke and press the Remove button.

Preview To preview your macro in a single view, view the read-only field under the Contents box.

Dialpad To enter numbers into your macro, select the Keys list box, press the Add button, or use the numbers on the dialpad.

802.1p and DiffServ

MVC 2050 does not support 802.1p and DiffServ.

Global Packet Loss Concealment algorithm

The Global Packet Loss Concealment (GIPS) algorithm searches for missing incoming packets. When one is found, GIPS algorithm stretches the previous packet to conceal the loss and to remove noises associated with the audio system starting and stopping at volume. Part of this concealment alters the pitch of the sound to make it appear more natural. It assumes that human is the type of sound, which permits better pitch changes. For more information, see www.globalipsound.com

MVC 2050 and WLAN

802.11b wireless ethernet networking

MVC 2050 uses an 802.11b WLAN interface.

Audio quality is affected by the distance from the AP and enclosed spaces. Audio quality is also affected by using Bluetooth accessories while on a voice call due to interference and contention.

QoS

Due to device constraints, 802.11 p/q is not supported.

Wireless Fidelity

ActiveSync of a PDA with a PC can be accomplished using Wireless Fidelity (WiFi).

**CAUTION**

When you return the PDA to its cradle, if you want to maintain the MVC 2050 connection to the server, deactivate ActiveSync. Otherwise the connection is lost because ActiveSync uses Point-to-Point Protocol (PPP). This causes the PDA connection to the voice network to be dropped and connected to the PC.

Roaming and handover

If you experience slight gaps and pauses in transmission and reception during calls, MVC 2050 may be experiencing roaming/handover difficulties attributable to the wireless network.

Nortel IP Phone 1110

Contents

This section contains the following topics:

- "Introduction" (page 277)
- "Description" (page 278)
- "Components and functions" (page 279)
- "Supported features" (page 282)
- "Features not currently supported" (page 284)
- "Display characteristics" (page 284)
- "Cleaning the IP Phone display screen" (page 285)
- "Local Tools menu password protection" (page 286)
- "Key number assignments" (page 287)
- "Package components" (page 288)
- "Installation and configuration" (page 289)
- "Full Duplex mode" (page 312)
- "TFTP firmware upgrade " (page 313)
- "Gratuitous Address Resolution Protocol Protection" (page 314)
- "Extensible Authentication Protocol " (page 314)
- "Redeploying an IP Phone 1110" (page 314)
- "Replacing an IP Phone 1110" (page 315)
- "Removing an IP Phone 1110 from service" (page 316)

Introduction

This section explains how to install and maintain the IP Phone 1110. For information about using the IP Phone 1110, see the *IP Phone 1110 User Guide (NN43110-101)* or the *IP Phone 1110 Getting Started Card (NN43100-300)*.

This section contains the following procedures

[Procedure 57 "Configuring the IP Phone 1110 "](#) (page 290)

[Procedure 58 "Installing the IP Phone 1110 for the first time using manual configuration"](#) (page 297)

[Procedure 59 "Installing an IP Phone 1110 for the first time using DHCP"](#) (page 304)

[Procedure 60 "Enabling Full Duplex mode"](#) (page 312)

[Procedure 62 "Changing the TN of an existing IP Phone 1110"](#) (page 314)

[Procedure 63 "Replacing an IP Phone 1110"](#) (page 315)

[Procedure 64 "Removing an IP Phone 1110 from service"](#) (page 316)

Description

The IP Phone 1110 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000) . The IP Phone 1110 translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 1110 network and CS 1000 connections.

[Figure 25 "IP Phone 1110"](#) (page 279) shows the IP Phone 1110.

Figure 25
IP Phone 1110



Components and functions

This section describes the following components and functions of the IP Phone 1110

- ["Keys and functions"](#) (page 279)
- ["Services menu"](#) (page 280)
- ["Local Tools menu"](#) (page 281)

Keys and functions

[Table 35 "IP Phone 1110 keys and functions"](#) (page 279) describes the IP Phone 1110 keys and functions.

Table 35
IP Phone 1110 keys and functions

Key	Function
Line key	Press the Line key to access the single DN and make a call.

Key	Function
Hold	Press the Hold key to put an active call on hold. Press the green Line (DN) key to return to the caller on hold.
Goodbye	Press the Goodbye key to terminate an active call.
Visual Alerter/Message waiting indicator	When a message is waiting, the red Visual Alerter/Message waiting indicator lights. Also, when the ringer sounds, this indicator flashes.
Feature Status Lamp indicator	When the firmware is updating, the blue Feature Status Lamp indicator flashes. This function requires server support and, therefore, is not available on all phones.
Context-sensitive soft keys	Soft keys are located below the display area. The LCD label above the key changes, based on the active feature. A triangle before a key label indicates that the key is active.
Expand	The Expand key is used to access external server applications, such as External Application Server (XAS). The Expand key is reserved for future feature development.
Navigation keys	Use the Navigation keys to scroll through menus and lists that appear on the LCD display screen. The outer part of this key cluster rocks for up, down, left, and right movements. Use Up and Down keys to scroll up and down in lists, and the Left and Right keys to position the cursor. You can also use the Left and Right keys to select editable fields that appear on the phone. Press the Right key to select the field below the current position, or press the Left key to select the field above the current position.
Enter	Press the Enter key, at the center of the Navigation key cluster, to confirm menu selections. In many cases, you can use the Enter key instead of the Select soft key.
Message/Inbox	Press the Message/Inbox key to access your voice mailbox.
Volume control keys	Press the volume control keys to adjust the volume of the handset, headset, speaker, ringer, and, Handsfree feature. Press the volume key with the loudspeaker icon to increase volume; press the volume key without the loudspeaker icon to decrease volume.

Services menu

Table 36 "Services menu" (page 281) shows the Services menu.

Table 36
Services menu

Services	<p>Press the Services key to access the following items</p> <ul style="list-style-type: none"> • Telephone Options <ul style="list-style-type: none"> — Volume Adjustment — Contrast Adjustment — Language — Date/Time — Display diagnostics — Local Dialpad Tone — Set Info — Diagnostics — Call Log Options — Ring type — Call Timer — Live Dialpad • Virtual Office Login and Virtual Office Logout (if Virtual Office is configured) • Test Local Mode and Resume Local Mode (if Branch Office is configured) • Password Admin <p>The user can originate a call using Last Number Redial while manipulating an option. However, the display is not updated with the dialed digits or the Caller ID information, and Autodial and Last Number Redial intercept the dialpad.</p>
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Local Tools menu

[Table 37 "Local Tools menu" \(page 281\)](#) shows the Local Tools menu.

Table 37
Local Tools menu

<p>Press the Services key twice to access the Local Tools menu. The following items appear in the Local Tools menu</p> <ol style="list-style-type: none"> 1. Preferences <ul style="list-style-type: none"> • 1. Contrast • 2. Language • 3. Backlight Timer

2. Network Configuration
 - 1. IP Set&DHCP Information
 - 2. Network Diagnostic Tools
 - 3. Ethernet Statistics
 - 4. IP Network Statistics
3. Network Configuration
4. Lock Menu
 - 1. Manual Secure Local Menu
 - 2. Manual Partial Secure Menu
 - 3. Manual Disable Secure Menu
 - 4. DHCP Secure Menu
 - 5. Lock Now

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see "[Local Tools menu password protection](#)" (page 286)

To make a selection, press the number associated with the menu item, or use the navigation keys to scroll through the menu items. Press the Enter key to select the highlighted menu item.

Press the Quit/Stop key to exit from any menu or menu item.

Supported features

The IP Phone 1110 supports the following telephony features

- four context-sensitive soft keys

Functions for the context-sensitive soft keys are configured in LD 11.
For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.
- volume control keys to adjust ringer, listen-only speaker, and handset volume
- two specialized feature keys
 - Message/Inbox
 - Services
- four call-processing fixed keys
 - Line key

- Goodbye
- Expand—reserved for future feature development
- Hold
- Call Duration Timer
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download

The IP Phone 1110 supports the following data network features

- integrated 10/100BT Ethernet switch for shared PC access
 - the LAN Ethernet port supports 10/100BT Mb/s Full Duplex mode
 - the PC Ethernet port supports 10/100BT Mb/s Full Duplex mode
- automatic network configuration through DHCP.
For more information about automatic network configuration, see [Table 39 "IP Phone 1110 IP parameters" \(page 296\)](#).
- 802.1ab Link Layer Discovery Protocol (LLDP).
For more information about LLDP, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).
- Secure Real-time Transport Protocol (SRTP) media encryption.
For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).
- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use
 - full VLAN capability, including a manageable integrated switch in the IP Phone for VLAN and priority tagging for PC and IP Phone traffic
 - VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN

For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 2

- Gratuitous Address Resolution Protocol (GARP) Protection

The IP Phone 1110 supports the following user interface features

- Hearing Aid Compatibility (HAC) as per FCC Part 68
- language support: English, French, Greek, Swedish, Danish, Norwegian, German, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, Turkish, and Katakana

Features not currently supported

The following features are not supported on the IP Phone 1110

- Group Listening
- Set-to-Set messaging
- Headset
- Callers List
- Redial List
- Personal Directory
- Corporate Directory
- Expansion Module for IP Phone 1100 Series
- Call status indicator

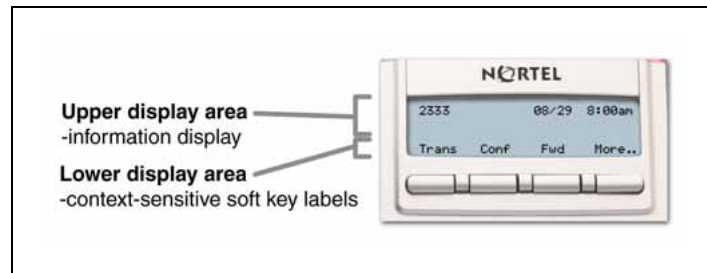
Display characteristics

An IP Phone 1110 has two major display areas

- ["Context-sensitive soft key label display" \(page 285\)](#)
- ["Information line display" \(page 285\)](#)

[Figure 26 "IP Phone 1110 display area" \(page 285\)](#) shows the two display areas.

Figure 26
IP Phone 1110 display area



Context-sensitive soft key label display

The context-sensitive soft key label has a maximum of seven characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon displays at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a feature is enabled, the icon state turns to On. It remains in the on state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, returning the soft key label to its original state. Use the More soft key to navigate through the layers of functions. If only four functions are assigned to the soft keys, the More key does not appear and all four functions are displayed.

Information line display

An IP Phone 1110 has a one-line information display area with the following information

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state), or Call Timer (if provisioned in the Telephone options menu)

The information in the display area changes, according to the call-processing state and active features.

Cleaning the IP Phone display screen

Gently wipe the IP Phone display with a soft, dry cloth.

ATTENTION

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Local Tools menu password protection

If the SECUREMENU parameter was set during Full DHCP configuration, the Local Tools menu is locked to prevent accidental or unwanted changes. You are prompted to enter the fixed password 26567*738 (color*set) whenever the Services key is double-pressed, or whenever the Local Diagnostics and Network Configuration sub menus are accessed.

If the PARTSECURE parameter was set during Full DHCP configuration, you are prompted to enter the fixed password whenever you access 2. Local Diagnostics, or 3. Network Configuration menu items from the Local Tools menu. You are always prompted to enter the fixed password whenever you access the 4. Lock Menu sub menu.

Two ways to control the menu lock are as follows

- DHCP Secure Menu option—the IP Phone processes the secure menu setting retrieved from the Full DHCP response.
- Lock Menu option—double-press the Services key to access the Local Tools menu. Press 4 on the dialpad to access the Lock Menu items, or use the up/down navigation keys to scroll and highlight one of the following Lock Menu options
 - 1. Manual Secure Local Menu
 - 2. Manual Partial Secure Menu
 - 3. Manual Disable Secure Menu
 - 4. DHCP Secure Menu
 - 5. Lock Now

The settings configured in the Lock Menu sub menu override the settings received from the DHCP string.

For more information about 4. Lock Menu manual user settings, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Configuring Secure Local Menu through Full DHCP

Password protection is enabled during Full DHCP configuration if the SECUREMENU parameter, or the PARTSECURE parameter are present at the end of the S4 part of the Full DHCP string. If neither the SECUREMENU parameter, nor the PARTSECURE parameter is present, password protection is not enabled.

The SECUREMENU/PARTSECURE item is an optional parameter. If it is present, then the full S4 string needs to be present, including the action and retries. The S4 string is already present if the XAS support has been

configured through the DHCP. If XAS is not configured, you can still enable password protection by setting the S4 IP address to 0.0.0.0 and by setting the other fields to 0.

ATTENTION

With Full DHCP, the vendor-specific or site-specific options must be configured depending on the customer's DHCP server configuration.

For further information about configuring Full DHCP, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Accessing the Local Tools menu

After you enter the password, the Local Tools menu remains active for 5 minutes. You can freely navigate, exit and reenter the Local Tools menu without being prompted to reenter the password. To reset the timer before the 5-minute time expires, double-press the Services key.

You can also press the 5 key to select the Lock Now item from the Lock Menu. The Lock Now item immediately exits the Local Tools menu, closes any open Local Tools menu pages, and locks the Local Tools menu. Alternatively, when time expires, the Local Tools menu and any open submenus are closed. Double-press the Services key to open the password prompt window to reaccess the Local Tools menu.

If you enter an incorrect password, the Local Tools menu does not open. Double-press the Services key to open the password prompt window. Only three incorrect password entries are allowed. Any entry after the three attempts is ignored for 5 minutes. The password prompt window is visible and you can reenter the password but the password is not processed until the 5-minute time expires.

Depending on the current state of the menu lock and the configuration of the IP Phone, some items appear with a black box at the beginning of the menu item. Only configuration options that are enabled from the current state appear active. Menu options that are not available appear with a black box.

For more information about configuring the Local Tools menu for the IP Phone 1110, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Key number assignments

Key numbers 1 to 15 are used for Programmable line (DN)/feature keys. These keys can be any DN or feature except for Message Waiting and those configured on keys 17 to 26.

You can assign a maximum of nine functions to the four soft-labeled, predefined context-sensitive soft keys. Because the context-sensitive soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the context-sensitive soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four context-sensitive soft keys. Labels for the context-sensitive soft keys appear in the display area. For further information, see [Figure 26 "IP Phone 1110 display area" \(page 285\)](#).

"Context-sensitive soft key label display" ([page 285](#)) shows the IP Phone 1110 display area.

Key number mappings at the Call Server align with the IP Phone 2001.

For a description of the IP Phone function assignment for each of the context-sensitive soft keys, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

The IP Phone 1110 includes integrated support for a number of Power over Ethernet options, including support for IEEE 802.3af Power Classification 2.

[Table 38 "IP Phone 1110 components list" \(page 288\)](#) lists the IP Phone 1110 package components and product codes.

Table 38
IP Phone 1110 components list

IP Phone 1110 package contents include	
<ul style="list-style-type: none"> • IP Phone 1110 • handset • handset cord • 2.1 m (7-ft.) CAT5 Ethernet cable • Number plate and lens • Getting Started Card 	
IP Phone 1110 with icon key caps, without power supply (RoHS)	NTYS02AAE6
IP Phone 1110 with English key caps, without power supply (RoHS)	NTYS02BAE6
Replacement parts	
Handset, Charcoal	NTYS09AA70

Handset cord, Charcoal		NTYS10AA70
Footstand kit, Charcoal (includes the stand and stand cover)		NTYS11AA70
Phone number label and lens kit		NTYS12AA
2.1 m (7-ft) CAT5 Ethernet cable		NTYS13AA
Power adapter		
Global power supply (for local power)		N0089601
IEC cables	RoHS	Non-RoHS
1.8 m (5.9 ft), 10 amp, IEC320-C13 North America Nortel recommends you use the thinner cord (NTYS14AA) as an alternative to NTTK14AB.	NTYS14AAE6	NTYS14AA
3 m (9.9 ft), 125 VAC 13 amp, NA power cord, NEMA North America, Middle East, Taiwan, Philippines, Thailand, and Japan	NTTK14ABE6	NTTK14AB
2.4 m (8 ft), 240 VAC 10 amp, ANZ power cord AS-3, Australia, New Zealand	N/A	NTTK15AA
250 VAC, Option 11C Standard European power cord, Other EMEA, Kenya, Korea, Thailand, Indonesia, Vietnam, India, Pakistan	NTTK16ABE6	NTTK16AB
3 m (9.9 ft) 125 VAC, Option 11C Swiss power cord Switzerland	NTTK17ABE6	NTTK17AB
240 VAC, Option 11C UK power cord Hong Kong, Ireland, United Kingdom, Singapore, Malaysia, Bangladesh, Brunei, Sri Lanka	NTTK18ABE6	NTTK18AB
3 m (9.9 ft), 125 VAC, Option 11C Denmark power cord Denmark	NTTK22ABE6	NTTK22AB
Argentina	N/A	A0814961
1.8 m (5.9 ft), 10 amp, IEC320-C13 Japan	NTTK26AAE6	N/A

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 1110

- ["Before you begin" \(page 290\)](#)
- ["First-time installation" \(page 290\)](#)
- ["Configuring the IP Phone 1110" \(page 290\)](#)
- ["Startup sequence" \(page 295\)](#)
- ["Installing the IP Phone 1110" \(page 296\)](#)

Before you begin

Before installing the IP Phone 1110, complete the following pre-installation checklist

- Ensure one IP Phone 1110 boxed package exists for each IP Phone 1110 you install. The package contains
 - IP Phone 1110
 - handset
 - handset cord
 - 2.1 m (7-ft) CAT5 Ethernet cable
 - number plate and lens
 - Getting Started Card
- Ensure one Software License exists for each IP Phone 1110 you install.
- Ensure the host Call Server is equipped with a Signaling Server that runs the Line TPS application.
- If an AC power adapter is required, ensure the approved Nortel AC adapter (model number N0089601) is used. See [Table 38 "IP Phone 1110 components list" \(page 288\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* or *IP Line Fundamentals (NN43100-500)*.



CAUTION

Do not plug your IP Phone 1110 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1110

You must configure the IP Phone 1110 before you can use it. Use Procedure 58 to configure the IP Phone 1110 for the first time.

Procedure 57

Configuring the IP Phone 1110

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

- | | |
|---|--|
| 1 | Configure a virtual loop on the Call Server using LD 97. |
|---|--|

For more information about configuring a virtual loop, see *IP Line Fundamentals (NN43100-500)* and *Software Input Output Administration (NN43001-611)*.

- 2 Configure the IP Phone 1110 on the Call Server using LD 11. At the prompt, enter the following

```
REQ: chg
TYPE: 1110
```

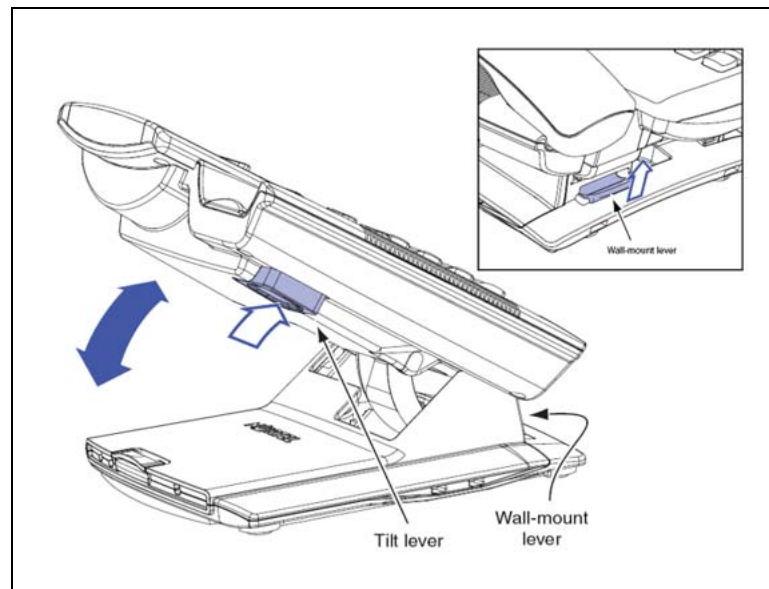
For more information about configuring the IP Phone 1110 using LD 11, see *Software Input Output Administration (NN43001-611)*.



CAUTION

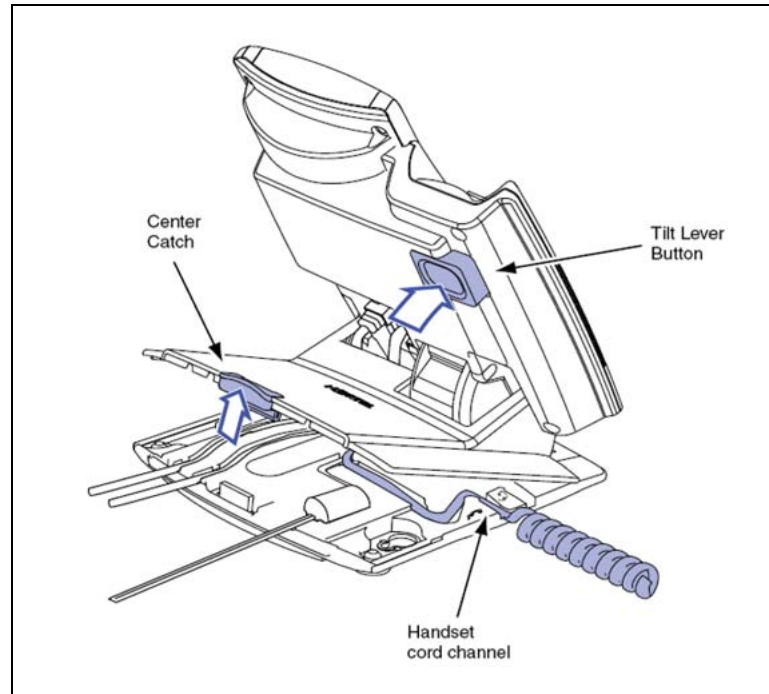
The IP Phone 1110 is shipped with the stand and stand cover locked in position. To avoid damaging the IP Phone, press the wall-mount lever to release the stand and pull it away from the base using the tilt lever. See [Figure 27 "Release the IP Phone 1110 from the stand"](#) (page 291). To release the stand cover, see and [Figure 28 "Stand cover removed"](#) (page 292).

Figure 27
Release the IP Phone 1110 from the stand



- 3 Pull upward on the center catch and remove the stand cover, as indicated in [Figure 28 "Stand cover removed"](#) (page 292). The cable routing tracks are now accessible.

Figure 28
Stand cover removed



- 4 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable, and then thread the adapter cord through the channels in the stand.



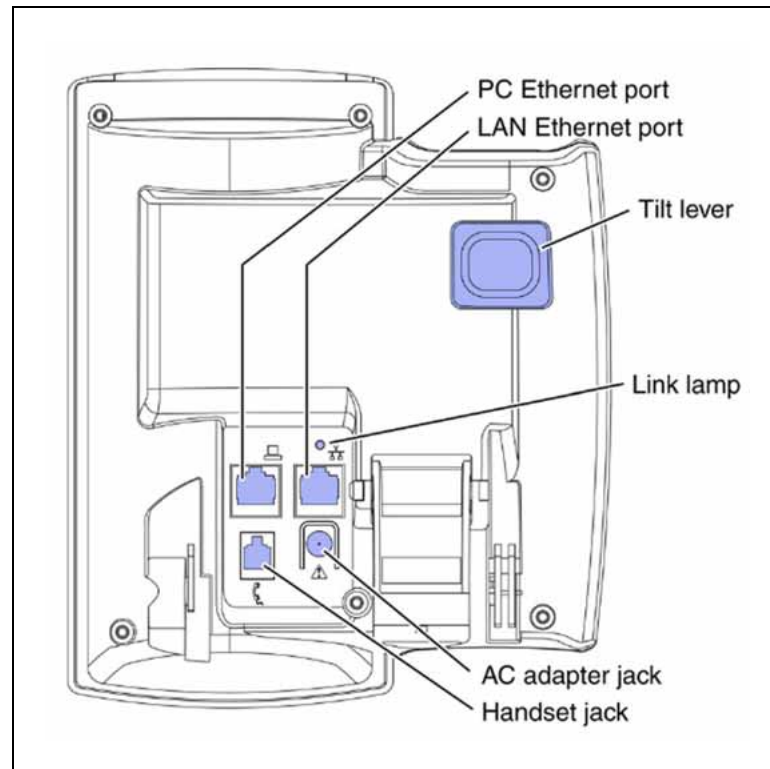
WARNING

Use your IP Phone 1110 with the approved Nortel AC adapter (model number N0089601).

The IP Phone 1110 supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 2. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.

[Figure 29 "IP Phone 1110 connections" \(page 293\)](#) shows the IP Phone 1110 connections.

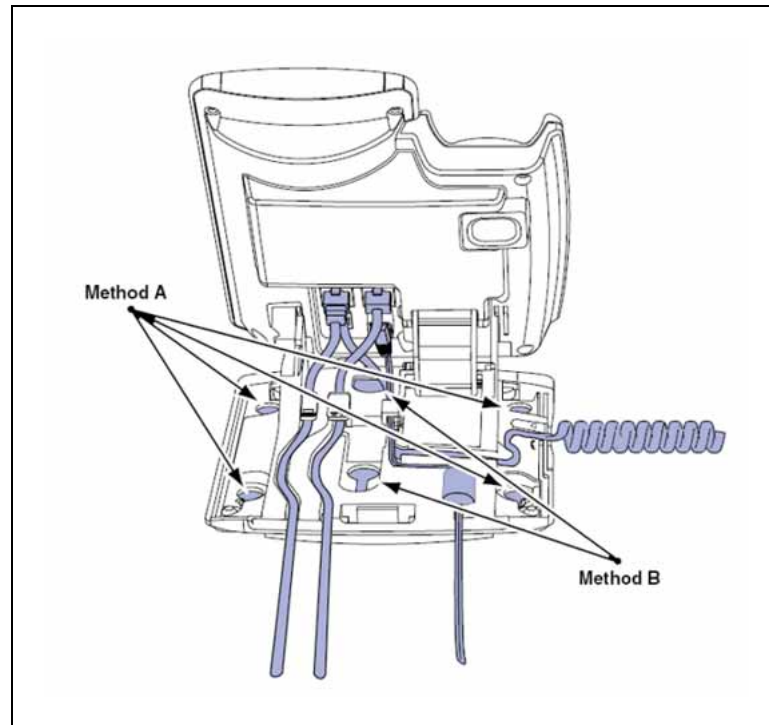
Figure 29
IP Phone 1110 connections



- 5 Install the handset. Connect the end of the handset cable with the short straight section into the handset. Connect the end of the handset cable with the long straight section to the back of the phone, using the RJ-9 handset jack. Form a small bend in the cable, and then thread the handset cord through the channels in the stand so that it exits behind the handset on the right side, in the channel exit in the stand base. See [Figure 30 "Cable routing tracks" \(page 294\)](#).

Although a headset cord channel appears on the base of the IP Phone 1110, the IP Phone 1110 does not support a headset port.

Figure 30
Cable routing tracks



- 6 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5 cable (not provided), and thread the network cable through the channel.
- 7 If you are connecting your PC through the phone a second CAT5 cable is required. Only one cable is included with the IP Phone 1110 package. Connect one end of the PC Ethernet cable to your phone using the CAT5 connector (PC Ethernet port), and thread it through the channel. Connect the other end to the LAN connector on the back of your PC.



CAUTION
Damage to Equipment

Do not plug any device into your IP Phone 1110 Ethernet port other than one PC. The IP Phone 1110 does not support multiple devices connected through the PC Ethernet Port.

Complete steps 1 to 9, as needed, before wall-mounting the IP Phone.

- 8 Wall-mount your phone (optional). Use Method A or Method B to wall-mount the IP Phone. See Method A—using the mounting holes on the bottom of the phone stand, or Method B—using the traditional-style wall-mount box with a CAT5 connector and a 15 cm (6 inch) CAT5 cord (not provided). See [Figure 30 "Cable routing tracks" \(page 294\)](#).
 - Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see step 3), mark the wall-mount holes by pressing the bottom of the stand cover firmly against the wall in the location where you wish to install the phone. Four small pins on the bottom of the stand cover make the marks on the wall. Use the marks as a guideline to install the wall-mount screws (not provided).

Install the screws so that they protrude 3 mm (1/8 inch) from the wall, and then install the phone stand mounting holes over the screw heads. You may need to remove the phone from the wall to adjust the lower screws. When the lower screws are snug, install the phone on the mounting screws, and then tighten the top screws.
 - Method B: Attach the 15 cm (6 inch) CAT5 cable (not provided), position the stand over the mounting rivets, and slide the phone down the wall so that the rivets fit into the slots on the stand.
- 9 Replace the stand cover. Ensure that all cables are neatly routed and press the stand cover into place until you hear a click.
- 10 If you wall-mount the phone, put it in the wall-mount position by holding the tilt lever and press the phone towards the base until the phone is parallel with the base. Release the tilt lever and continue to push the phone towards the base until you hear an audible click. Ensure the phone is securely locked in to position.
- 11 Connect additional cables. Connect the Ethernet cable to the LAN Ethernet connection. If you are using an AC power adapter, plug the adapter into an AC outlet.

—End—

Startup sequence

When an IP Phone 1110 connects to the network, it must perform a startup sequence. The elements of the startup sequence include

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters

- connecting to the Call Server
- obtaining a User ID

See [Table 39 "IP Phone 1110 IP parameters" \(page 296\)](#) for a summary of the IP parameters and how they are obtained.

Table 39
IP Phone 1110 IP parameters

Parameter	Method of acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically obtained through Partial or Full DHCP.
Net Mask	Manually entered or automatically obtained through Partial or Full DHCP.
Default Gateway Address	Manually entered or automatically obtained through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically obtained through Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Obtained from local storage on subsequent power cycles.

Installing the IP Phone 1110

To install the IP Phone 1110, use the following procedures

- Installing the IP Phone 1110 for the first time using manual configuration
- Installing the IP Phone 1110 for the first time using DHCP

Installing the IP Phone 1110 using manual configuration

ATTENTION

Timing information

There are approximately 30 seconds between plugging in the IP Phone 1110 power adapter and the appearance of the text Nortel. When you see the text Nortel on the phone, you have 1 second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Phone 1110 attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the Local diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see "[Local Tools menu password protection](#)" (page 286).

To edit network configuration, the following soft keys are available

- OK—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- BkSpace—erase a configuration entry to change it
- Clear—clear an entire configuration entry
- Cancel—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 58

Installing the IP Phone 1110 for the first time using manual configuration

Step	Action
1	When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right.
2	At the prompt EAP Enable? , enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control.
3	Enter DeviceID and Password. If you select No , you are not prompted to enter Device ID and Password. For more information about EAP, see Appendix "802.1x Port-based network access control" (page 469).
4	At the prompt, LLDP Enable? , enter 1-Y (1 for Yes, default). For more information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471). For more information about 802.1Q, see Appendix "802.1Q VLAN description" (page 461).
5	At the prompt DHCP Yes/No? , enter 0-N (0 for No). By default, Full DHCP is configured on the IP Phone 1110. Depending on the configuration requirements, you can change the IP Phone 1110 configuration to allow the following IP address assignments <ul style="list-style-type: none"> • Static—enter all parameters • Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server

- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration. For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

6 Enter the following information.

Screen prompt	Description
set IP	a valid IP Phone 1110 IP address.
net msk	a subnet mask.
def gw	the default Gateway for the IP Phone 1110 on the LAN segment to which it connects.

7 Enter the information for the primary Connect Server (S1) and the secondary Connect Server (S2).

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address for the IP Phone 1110.
S1 Port	This is a fixed value: 4100.
S1 action	Choose one of the following: <ul style="list-style-type: none"> • for TPS only, enter 1. • for TPS and Secure Multimedia Controller, enter 6 or 1. <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p> <p>You are not prompted for S1 PK if S1 Action is set to 1.</p>
S1 retry count	The number of times the IP Phone 1110 attempts to connect to the server. Enter 10.

Screen prompt	Description
S1 PK	<p>To manually configure the PK, set DHCP to Partial or None.</p> <p>Default is ffffffff.</p> <p>The Private key of the Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. Use a USB keyboard to enter ALPHA digits from A to F.</p> <p># 1 = A # 2 = B # 3 = C # 4 = D # 5 = E # 6 = F</p>
S2 IP	The secondary CS 1000 node IP address for the IP Phone 1110.
S2 Port	Same as S1.
S2 action	<p>Same as S1.</p> <p>You are not prompted for S2 PK if S2 Action is set to 1.</p>
S2 retry count	Same as S1.
S2 PK	<p>To manually configure the PK, set DHCP to Partial or None.</p> <p>Default is ffffffff.</p> <p>The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. Use a USB keyboard to enter ALPHA digits from A to F.</p> <p># 1 = A # 2 = B # 3 = C # 4 = D # 5 = E # 6 = F</p>

Screen prompt	Description
Cfg XAS? (0-No,1-Yes)	Default 0 (for No). If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.
XAS IP:	Enter the IP address of the XAS server. The IP Phone 1110 currently does not support XAS.
Speed (0-A, 1-10, 2-100)	Network interface port speed. Default 0 (for Auto) 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.
802.1Q (0-No, 1-Yes)	Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.
Voice VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.
VLAN Cfg? 0-Auto, 1-Man:	Default 0 (for Auto). You are not prompted for VLAN Cfg if Voice VLAN is not enabled. 0-Auto Automatically obtains VLAN ID using DHCP or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094.

Screen prompt	Description
LLDP-MED? (0-No, 1-Yes)	<p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV.</p> <p>You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.</p>
LLDP VLAN? (0-No, 1-Yes)	<p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV.</p> <p>You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.</p>
DHCP (0-No, 1-Yes)	<p>If you select 1-Y (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.</p> <p>You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.</p>
VLANFILTER (0-N, 1-Y)	<p>Default 0 (for No).</p> <p>You are not prompted for VLANFILTER if VLAN is not enabled.</p>
Ctrl pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Ctrl pBits if 802.1Q is not enabled.</p>
Media pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Media pBits if 802.1Q is not enabled.</p>
PC Port? (0-Off, 1-On)	<p>Default 1 (for On).</p>
Speed (0-A, 1-10, 2-100)	<p>Default 0 (for Auto).</p> <p>0 = Auto 1 = 10 BT 2 = 100 BT</p> <p>You are not prompted for Speed if PC Port is set to 0 for Off.</p>

Screen prompt	Description
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off and if Speed is set to 0 for Auto.
Data 802.1Q (0-N, 1-Y)	You are not prompted for Data 802.1Q if PC Port is set to 0 for Off.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Data VLAN if PC port is set to 0 for Off.
Data VLAN Cfg? (0-Auto, 1-Man)	Default 1 (for Man) You are not prompted for Data VLAN Cfg if LLDP or Data VLAN are not enabled and PC Port is set to 0 for Off. If you select 0 (for Auto), VLAN ID is automatically configured to the value received in the VLAN NAME TLV.
Data VLAN ID:	You are not prompted for Data VLAN ID if Data VLAN is set to 0 for Auto.
Data pBits (0-7, 8-Au)	Default 8 (for Au). You are not prompted for Data pBits if the PC Port is set to 0 for Off or if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0-No, 1-Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 1110 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software

- For CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.

- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For CS 1000 Release 4.0, the IP Phone 1110 searches for the TFTP Server for firmware upgrade. If the file name specified in 1110.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 1110 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 1110 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 1110 saves the configuration and then reboots. The IP Phone 1110 searches for the connect server.

- 8 The IP Phone 1110 registers with the TPS and, if needed, begins the firmware download. This takes several minutes. When registration is complete, the IP Phone 1110 resets.

The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 9 Check for a dial tone and the correct DN above the display.

—End—

Installing the IP Phone 1110 using Full DHCP

Use [Procedure 59 "Installing an IP Phone 1110 for the first time using DHCP" \(page 304\)](#) to install the IP Phone 1110 for the first time using DHCP.

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see "[Local Tools menu password protection](#)" (page 286).

To edit network configuration, the following soft keys are available

- **OK**—accept current settings and proceed to the next configuration option. If all configuration options are presented, the configuration is saved and the IP Phone reboots with the saved changes.
- **BkSpace**—erase a configuration entry to change it
- **Clear**—clear an entire configuration entry
- **Cancel**—cancels network configuration. The IP Phone reboots without saving changes.

Procedure 59

Installing an IP Phone 1110 for the first time using DHCP

Step	Action
1	When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right.
2	At the prompt EAP Enable? , enter 1-Yes (1 for Yes) if the network infrastructure supports 802.1x port-based network access control.
3	Enter DeviceID and Password. If you select No , you are not be prompted to enter Device ID and Password. For more information about EAP, see Appendix "802.1x Port-based network access control" (page 469).
4	At the prompt, LLDP Enable? , enter 1-Y (1 for Yes, default). For more information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471). For more information about 802.1Q, see Appendix "802.1Q VLAN description" (page 461).
5	At the prompt DHCP Yes/No? , enter 1-Y (1 for Yes). By default, Full DHCP is configured on the IP Phone 1110. Depending on the configuration requirements, you can change the IP Phone 1110 configuration to allow the following IP address assignments <ul style="list-style-type: none"> • Static—enter all parameters • Partial DHCP—IP Phone address, subnet mask, and default Gateway are obtained from the DHCP server

- Full DHCP— (default) all parameters are obtained from the DHCP server

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

- 6 At the prompt, **Cached IP?**, select 0 (0-No, default) to conform to the DHCP standard and to obtain an IP address from the DHCP server. Select 1 (1 for Yes) to force the IP Phone to start with a cached IP address if the IP Phone cannot connect to the DHCP server and obtain an IP address.
- 7 Select Partial or Full DHCP.
 - a. If you select Full DHCP, then the following parameters are retrieved from the DHCP server
 - a valid IP Phone 1110 IP address
 - a subnet mask
 - the default Gateway for the IP Phone 1110 on the LAN segment to which it connects
 - the S1 IP (the primary CS 1000 node IP address of the IP Phone)
 - the S1 Action
 - the S1 retry count (this is the number of times the IP Phone attempts to connect to the server)
 - the S2 IP (the secondary CS 1000 node IP address of the IP Phone)
 - the S2 Action
 - the S2 retry count
 - the External Application Server (XAS) IP address
 - b. If you select Partial DHCP, then you must enter the following parameters.

Screen prompt	Description
S1 IP	The primary CS 1000 node IP address for the IP Phone 1110.
S1 Port	This is a fixed value: 4100.

Screen prompt	Description
S1 action	<p>Choose one of the following:</p> <ul style="list-style-type: none"> • for TPS only, enter 1. • for TPS and Secure Multimedia Controller, enter 6 or 1. <p>For more information about Secure Multimedia Controller, see <i>Secure Multimedia Controller Implementation Guide (NN43001-325)</i>.</p> <p>You are not prompted for S1 PK if S1 Action is set to 1.</p>
S1 retry count	The number of times the IP Phone 1110 attempts to connect to the server. Enter 10.
S1 PK	<p>To manually configure the PK, set DHCP to Partial or None.</p> <p>Default is ffffffff.</p> <p>The Private key of the Secure Multimedia Controller to which the IP Phone connects.</p> <p>If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. Use a USB keyboard to enter ALPHA digits from A to F.</p> <p># 1 = A # 2 = B # 3 = C # 4 = D # 5 = E # 6 = F</p>
S2 IP	The secondary CS 1000 node IP address for the IP Phone 1110.
S2 Port	Same as S1.

Screen prompt	Description
S2 action	Same as S1. You are not prompted for S2 PK if S2 Action is set to 1.
S2 retry count	Same as S1.
S2 PK	To manually configure the PK, set DHCP to Partial or None. Default is ffffffff. The Private key of the alternate Secure Multimedia Controller to which the IP Phone connects. If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number. Use a USB keyboard to enter ALPHA digits from A to F. # 1 = A # 2 = B # 3 = C # 4 = D # 5 = E # 6 = F
Cfg XAS? (0-No,1-Yes)	Default 1 (for Yes). If no External Application Server (XAS) is present, enter 0 (for No). You are not prompted to enter the XAS IP address.
XAS IP:	Enter the IP address of the XAS server. The IP Phone 1110 currently does not support an XAS.

Screen prompt	Description
Speed (0-A, 1-10, 2-100)	<p>Network interface port speed. Default 0 (for Auto) 0 = Auto 1 = 10 BT 2 = 100 BT</p> <p>You are not prompted for Speed if PC Port is set to 0 for Off.</p>
Duplex (0-A, 1-F, 2-H)	<p>Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half</p> <p>You are not prompted for Duplex if PC Port is set to 0 for Off or if Speed is set to 0 for Auto.</p>

8 Enter the following parameters

Screen prompt	Description
802.1Q (0-No, 1-Yes)	<p>Default 1 (for Yes). You are not prompted for 802.1Q if LLDP is not enabled.</p>
Voice VLAN (0-N, 1-Y)	<p>Default 0 (for No). You are not prompted for Voice VLAN if 802.1Q is not enabled.</p>
VLAN Cfg? (0-Auto, 1-Man)	<p>Default 0 (for Auto). 0-Auto Automatically obtains VLAN ID using DHCP, or the 802.1ab data switch. 1-Man Enter the VLAN ID manually. This is a number from 1 to 4094. You are not prompted for VLAN Cfg if Voice VLAN is not enabled.</p>

Screen prompt	Description
LLDP-MED? (0-N, 1-Y)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the Network Policy TLV.</p> <p>You are not prompted for LLDP-MED if VLAN is not set to Auto (2-Auto,) or if LLDP is not enabled.</p>
LLDP VLAN? (0-No, 1-Yes)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), VLAN ID is configured automatically to the value received in the VLAN NAME TLV.</p> <p>You are not prompted for LLDP VLAN if VLAN is not set to Auto (2-Auto), or if LLDP is not enabled.</p>
DHCP (0-No, 1-Yes)	<p>Default 0 (for No).</p> <p>If you select 1 (1 for Yes), the VLAN ID is configured automatically to a value received from the DHCP server.</p> <p>You are not prompted for DHCP if VLAN is not set to Auto (2-Au), or if DHCP is not enabled.</p>
VLANFILTER (0-No, 1-Yes)	<p>Default 0 (0 for No).</p> <p>You are not prompted for VLANFILTER if VLAN is not enabled.</p>
Duplex? (0-Auto, 1-Full)	Default 0 (for Auto).
Ctrl pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Ctrl pBits if 802.1Q is not enabled.</p>
Media pBits (0-7, 8-Au)	<p>Default 8 (for Auto).</p> <p>You are not prompted for Media pBits if 802.1Q is not enabled.</p>
PC Port? (0-Off, 1-On)	Default 1 (for On).

Screen prompt	Description
Speed (0-A, 1-10, 2-100)	Default 0 (for Auto). 0 = Auto 1 = 10 BT 2 = 100 BT You are not prompted for Speed if PC Port is set to 0 for Off.
Duplex (0-A, 1-F, 2-H)	Default 1 (for Auto). 0 = Auto 1 = Full 2 = Half You are not prompted for Duplex if PC Port is set to 0 for Off and if Speed is set to 0 for Auto.
Data 802.1Q (0-N, 1-Y)	You are not prompted for Data 802.1Q if PC Port is set to 0 for Off.
Data VLAN? (0-N, 1-Y)	Default 0 (for No). You are not prompted for Data VLAN if PC port is set to 0 for Off.
Data VLAN Cfg? (0-Auto, 1-Man)	Default 1 (for Man). You are not prompted for Data VLAN Cfg if LLDP or Data VLAN are not enabled and PC Port is set to 0 for Off. If you select 0 (for Auto), VLAN ID is automatically configured to the value received in the VLAN NAME TLV.
Data VLAN ID:	You are not prompted for Data VLAN ID if Data VLAN is set to 0 for Auto.
Data pBits (0-7, 8-Au)	Default 8 (for Au). You are not prompted for Data pBits if the PC Port is set to 0 for Off or if 802.1Q is not enabled.
PCUntagAll? (0-N, 1-Y)	Default 0 (for No).
PSK SRTP? (0-No, 1-Yes)	Default 0 (for No).
GARP Ignore? (0-No,1-Yes)	Default 0 (for No).

The IP Phone 1110 supports remote firmware upgrades through a TFTP process and an automated UFTP process.

You are prompted to enter the TFTP Server IP address if you are using a TFTP Server to download the current firmware.

The method to upgrade the firmware depends on the following Call Server software

- For CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For CS 1000 Release 4.0, the IP Phone 1110 searches for the TFTP Server for firmware upgrade. If the file name specified in 1110.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 1110 reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 1110 can support primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.

The IP Phone 1110 saves the configuration and then reboots. The IP Phone 1110 searches for the connect server.

- 9 The IP Phone 1110 registers with the TPS and, if needed, begins the firmware download. This takes several minutes. When registration is complete, the IP Phone 1110 resets.

The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 10 Check for a dial tone and the correct DN above the display.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing the duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 60 "Enabling Full Duplex mode" \(page 312\)](#) to enable Full Duplex mode.

Procedure 60 Enabling Full Duplex mode

Step	Action
1	Reset the phone by disconnecting and reconnecting power.
2	When the Nortel logo appears, press each soft key in sequence.
3	If no other configuration changes are required, press OK repeatedly until the Duplex network option appears.
4	Select 1 to enable Full Duplex mode.
5	When the Speed option appears, select one of the following <ul style="list-style-type: none"> • 0 for 10 Mb/s • 1 for 100 Mb/s (default)
6	Select OK to confirm the change.
7	Restart the IP Phone 1110. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use [Procedure 61 "Checking Ethernet Statistics" \(page 313\)](#) to confirm activation of Full Duplex mode.

Procedure 61

Checking Ethernet Statistics

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

- | | |
|---|--|
| 1 | Double-press the Services key. |
| 2 | Press 2 to select Local Diagnostics , then press 3 to open the Ethernet Statistics menu. |

If Full Duplex mode is active, the following is displayed

- Link Status: UP
- Duplex Mode: Full
- Network Speed: 10 Mb or 100 Mb
- Auto Sense/Negotiate
 - Auto-Negotiate Capability: No
 - Auto-Negotiate Completed: No

—End—

TFTP firmware upgrade

When you enter Cfg TFTP = 1 (for yes), and enter an IP address, the IP Phone searches for an upgrade file on the TFTP Server.

Users of CS 1000 Release 4.5, or later do not need to enter a TFTP IP address.

For further information about TFTP firmware upgrade, see [Appendix "TFTP Server" \(page 547\)](#).

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection protects the IP Phone 1110 from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. This allows the malicious device to launch a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 58 "Installing the IP Phone 1110 for the first time using manual configuration" \(page 297\)](#) or [Procedure 59 "Installing an IP Phone 1110 for the first time using DHCP" \(page 304\)](#).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

Redeploying an IP Phone 1110

You can redeploy an existing previously configured IP Phone 1110 on the same Call Server. For example, the IP Phone 1110 can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 1110. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 62

Changing the TN of an existing IP Phone 1110

Step	Action
1	Repower the IP Phone 1110. During the reboot sequence of a previously configured IP Phone, the IP Phone 1110 displays the existing node number for approximately 5 seconds.
2	If the node password is enabled and NULL, choose one of the following <ol style="list-style-type: none"> Disable the password. Set the password as non-NULL.
3	Press OK when the node number displays.

- | | | | |
|-----------|--|-------------|--|
| If | the node password is enabled and is not NULL | Then | a password screen displays. Go to Step 4 . |
| | the node password is disabled | | a TN screen displays. Go to Step 5 . |
- 4 Enter the password at the password screen and press **OK**.
A TN screen displays.
To obtain the password, enter the `nodePwdShow` command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.
 - 5 Select the **Clear** soft key to clear the existing TN.
 - 6 Enter the new TN.

—End—

Replacing an IP Phone 1110

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1110 that currently uses the TN.

Procedure 63 Replacing an IP Phone 1110

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

- | | |
|---|---|
| 1 | Obtain the node and TN information of the phone you want to replace. |
| 2 | Disconnect the IP Phone 1110 that you want to replace. |
| 3 | Follow Procedure 57 "Configuring the IP Phone 1110" (page 290) to install and configure the IP Phone 1110. |
| 4 | Enter the same TN and Node Number as the IP Phone 1110 you replaced. The Call Server associates the new IP Phone 1110 with the existing TN. |

—End—

Removing an IP Phone 1110 from service

Procedure 64

Removing an IP Phone 1110 from service

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

- | | |
|---|---|
| 1 | Disconnect the IP Phone 1110 from the network or turn off the power.

The service to the PC is disconnected as well if the PC connects to the IP Phone 1110.

If the IP Phone 1110 was automatically configured, the DHCP lease expires and the IP address returns to the available pool. |
| 2 | In LD 11, enter OUT at the TN prompt. |
-

—End—

Nortel IP Phone 1120E

Contents

This section contains the following topics:

- "Introduction" (page 317)
- "Description" (page 318)
- "Components and functions" (page 319)
- "Supported features" (page 323)
- "Features not currently supported" (page 325)
- "Display characteristics" (page 325)
- "Local Tools menu password protection" (page 327)
- "Key number assignments" (page 329)
- "Package components" (page 330)
- "Installation and configuration" (page 331)
- "Full Duplex mode" (page 347)
- "Gratuitous Address Resolution Protocol Protection" (page 350)
- "Extensible Authentication Protocol " (page 350)
- "Redeploying an IP Phone 1120E" (page 350)
- "Replacing an IP Phone 1120E" (page 351)
- "Removing an IP Phone 1120E from service" (page 352)

Introduction

This section explains how to install and maintain the IP Phone 1120E. For information about using the IP Phone 1120E, see the *IP Phone 1120E User Guide (NN43112-103)* or the *IP Phone 1120E Getting Started Card (NN43112-100)*.

This section contains the following procedures

- Procedure 65 "Configuring the IP Phone 1120E" (page 332).

- Procedure 66 "Installing the IP Phone 1120E" (page 339).
- Procedure 67 "Enabling Full Duplex mode" (page 347).
- Procedure 70 "Changing the TN of an existing IP Phone 1120E" (page 350).
- Procedure 71 "Replacing an IP Phone 1120E" (page 351).
- Procedure 72 "Removing an IP Phone 1120E from service" (page 352).

After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 1120E uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 1120E translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 1120E network and CS 1000 connections.

Figure 31 "IP Phone 1120E" (page 318) shows the IP Phone 1120E.

Figure 31
IP Phone 1120E



Components and functions

This section describes the following components of the IP Phone 1120E

- "Keys and functions" (page 319)
- "Services menu" (page 321)
- "Local Tools menu" (page 322)

Keys and functions

Table 40 "IP Phone 1120E keys and functions" (page 319) lists the keys and functions for the IP Phone 1120E.

Table 40
IP Phone 1120E keys and functions

Key	Function
Hold	Press the Hold key to put an active call on hold. Press the line (DN) key beside the flashing LCD to return to the caller on hold.
Goodbye	Press the Goodbye key to terminate an active call.
Visual Alerter/Message waiting indicator	When a message is waiting, the red Visual Alerter/Message waiting indicator lights. Also, when the ringer sounds, this indicator flashes.
Feature Status Lamp indicator	When the firmware is updating, the blue Feature Status Lamp indicator flashes. This function requires server support and, therefore, is not available on all phones.
Self-labeled line/programmable feature keys	Self-labeled line/programmable feature key labels are configured for various features on the IP Phones. A steady LCD light beside a line (DN) key indicates the feature or line is active. A flashing LCD indicates the line is on hold or the feature is being programmed.
Context-sensitive soft keys	Context-sensitive soft keys are located below the display area. The LCD label above the key changes, based on the active feature. A triangle before a key label indicates that the key is active.
Fixed feature keys	Use these keys to access non-programmable standard features.
Expand	The Expand key is used to access an External Application Server such as, Nortel Application Server.

Key	Function
Navigation keys	Use the Navigation keys to scroll through menus and lists that appear on the LCD display screen. The outer part of this key cluster rocks for up, down, left, and right movements.
	Use Up and Down keys to scroll up and down in lists, and the Left and Right keys to position the cursor. You can also use the Left and Right keys to select editable fields that appear on the phone. Press the Right key to select the field below the current position, or press the Left key to select the field above the current position.
Enter	Press the Enter key, at the center of the Navigation key cluster, to confirm menu selections. In many cases, you can use the Enter key instead of the Select soft key.
Message/Inbox	Press the Message/Inbox key to access your voice mailbox.
Shift/Outbox	The Shift/Outbox key is a fixed key that is reserved for future feature development.
Quit/Stop	Press the Quit/Stop key to end an active application.
	Pressing the Quit/Stop key does not affect the status of the calls currently on your IP Phone.
Directory	Press the Directory key to access Directory services.
Mute	Press the Mute key to listen to the receiving party without transmitting.
	Press the Mute key again to return to a two-way conversation.
	The Mute key applies to Handsfree, Handset, and Headset microphones.
	The Mute LED flashes when the Mute option is in use.
Headset	Press the Headset key to answer a call using the headset or to switch a call from the handset or Handsfree to the headset.
	The Headset LED flashes when the Headset option is in use.
Volume control keys	Press the volume control keys to adjust the volume of the handset, headset, speaker, ringer, and, Handsfree feature.
	Press the volume key with the loudspeaker icon to increase volume; press the volume key without the loudspeaker icon to decrease volume.
Copy	Press the Copy Key to copy entries to your Personal Directory from other lists, such as the Caller List, Redial List and Corporate Directory.

Key	Function
Speaker	Press the Handsfree key to activate the speaker.
Handsfree	Press the Handsfree key to activate the Handsfree feature. The LED lights to indicate when handsfree is active.

Services menu

Table 41 "Services menu" (page 321) shows the Services menu.

Table 41
Services menu

Services	<p>Press the Services key to access the following items</p> <ul style="list-style-type: none"> • Telephone Options <ul style="list-style-type: none"> — Volume Adjustment — Contrast Adjustment — Language — Date/Time — Display diagnostics — Local Dialpad Tone — Set Info — Diagnostics — Call Log Options — Ring type — Call Timer — OnHook Default Path — Change Feature Key Label — Name Display Format — Live Dialpad • Virtual Office Login and Virtual Office Logout (if Virtual Office is configured) • Test Local Mode and Resume Local Mode (if Branch Office is configured) • Password Admin <p>If a call is presented while the user is manipulating an option, the IP Phone 1120E rings and the DN key flashes. However, the display is not updated with the Caller ID, and the programming text is not disturbed.</p>
----------	---

The user can originate a call using Autodial or Last Number Redial while manipulating an option. However, the display is not updated with the dialed digits or the Caller ID, and Autodial and Last Number Redial intercept the dialpad.

Local Tools menu

Table 42 "Local Tools menu" (page 322) shows the Local Tools menu.

Table 42
Local Tools menu

Press the Services key twice to access the Local Tools menu. The following items appear in the Local Tools menu

1. Preferences
 - a. Display Settings
 - b. Languages
2. Local Diagnostics
 - a. IP Set&DHCP Information
 - b. Network Diagnostic Tools
 - c. Ethernet Statistics
 - d. IP Network Statistics
 - e. USB Devices
3. Network Configuration
4. Lock Menu
 - a. Manual Secure Local Menu
 - b. Manual Partial Secure Menu
 - c. Manual Disable Secure Menu
 - d. DHCP Secure Menu
 - e. Lock Now

To make a selection, press the number associated with the menu item, or use the navigation keys to scroll through the menu items. Press the Enter key to select the highlighted menu item.

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see "[Local Tools menu password protection](#)" (page 327).

Press the Quit/Stop key to exit from any menu or menu item.

For information about configuring IP Phone 1120E Local Tools menu, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Supported features

The IP Phone 1120E supports the following telephony features

- four self-labeled line/programmable feature keys with labels and indicators
- four context-sensitive soft keys that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- high quality speaker phone
- volume control keys to adjust ringer, speaker, handset, and headset volume
- six specialized feature keys
 - Quit
 - Directory
 - Message/Inbox
 - Shift/Outbox
 - Services
 - Copy
- six call-processing fixed keys
 - Mute
 - Handsfree
 - Goodbye
 - Expand
 - Headset
 - Hold
- Call Duration Timer
- ability to change the self-labeled line/programmable feature key labels
- Corporate Directory
- Personal Directory

- Redial List
- Callers List
- Password Administration
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download
- Live Dialpad

The IP Phone 1120E supports the following data network features

- integrated Gigabit Ethernet switch for shared PC access
 - the LAN Ethernet port supports 10/100/1000 Mb/s Full Duplex mode
 - the PC Ethernet port supports 10/100/1000 Mb/s Full Duplex mode
- automatic network configuration through DHCP
For more information about automatic network configuration, see [Table 44 "IP Phone 1120E IP parameters" \(page 338\)](#).
- 802.1ab Link Layer Discovery Protocol (LLDP)
For more information about LLDP, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).
- Secure Real-time Transport Protocol (SRTP) media encryption
For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).
- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use
 - full VLAN capability, including a manageable integrated switch in the IP Phone; allows VLAN and priority tagging for the IP Phone traffic and VLAN tagging for PC traffic
 - VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN

For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 3
- Gratuitous Address Resolution Protocol (GARP) Protection

The IP Phone 1120E supports the following user interface features

- graphical, high-resolution LCD display, backlit, with adjustable contrast
- USB port, to support USB devices

Powered downstream 1.1 compliant USB hubs are supported, including USB 2.0 hubs, if they offer USB 1.1 backwards compliancy.

- Hearing Aid Compatibility (HAC) as per FCC Part 68
- External Application Server (XAS)
- Graphical External Application Server (GXAS)
- headset jack with On/Off key
- language support: English, French, Swedish, Danish, Norwegian, German, Greek, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, Turkish, and Katakana

With the appropriate downloaded fonts, the IP Phone supports Arabic, Chinese Simplified, Chinese Traditional, Hebrew, Japanese, and Korean.

For more information about language support, see [Appendix "Language enhancement" \(page 545\)](#).

- Expansion Module for IP Phone 1100 Series (Expansion Module)

For more information about the Expansion Module, see ["Expansion Module for IP Phone 1100 Series" \(page 431\)](#).

Features not currently supported

The following features are not supported on the IP Phone 1120E

- Group Listening
- Set-to-Set messaging

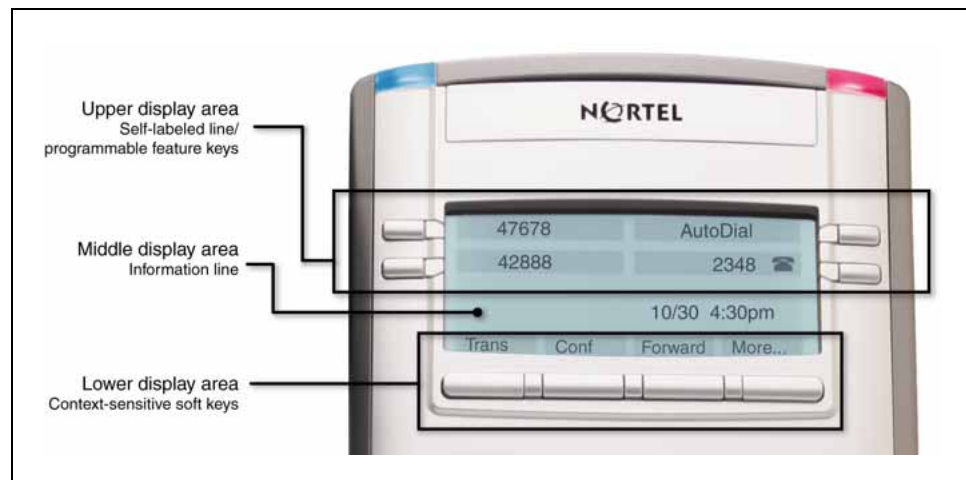
Display characteristics

An IP Phone 1120E has three major display areas

- ["Self-labeled line/programmable feature key label display" \(page 326\)](#)
- ["Information line display" \(page 326\)](#)
- ["Context-sensitive soft key label display" \(page 327\)](#)

Figure 32 "1120E IP display area" (page 326) shows these three display areas.

Figure 32
1120E IP display area



Self-labeled line/programmable feature key label display

The feature key label area displays a 10-character string for each of the four feature keys. Each feature key includes the key label and an icon. The icon state can be on, off, or flashing. A telephone icon displays the status of the configured DN. Key labels are left-aligned for keys on the left side of the screen, and right-aligned for keys on the right side of the screen. To change the feature key label, press the Services key to access Telephone Options > Change Feature key label option. For more information about changing the feature key label, see the *IP Phone 1120E User Guide (NN43112-103)*.

If a label is longer than 10 characters, the last 10 characters are displayed and the excess characters are deleted from the beginning of the string.

Information line display

An IP Phone 1120E has a one-line information display area with the following information

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state) or Call Timer (if provisioned in the Telephone options menu)

The information in the display area changes, according to the call-processing state and active features.

Because the IP Phone 1120E only has a one-line information display area, you are prompted to scroll through any additional lines of information.

During an incoming call, only the Directory Number (DN) displays if the caller name is greater than 10 characters. Press the flashing arrow to display the caller name.

Context-sensitive soft key label display

The context-sensitive soft key label has a maximum of seven characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon displays at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a feature is enabled, the icon state turns to On. It remains in the on state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, returning the soft key label to its original state.

Use the More soft key to navigate through the layers of functions. If only four functions are assigned to the soft keys, the More key does not appear, and all four functions are displayed.

Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.



CAUTION

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Local Tools menu password protection

If the SECUREMENU parameter was set during Full DHCP configuration, the Local Tools menu is locked to prevent accidental or unwanted changes. You are prompted to enter the fixed password 26567*738 (color*set) whenever the Services key is double-pressed, or whenever the Local Diagnostics and Network Configuration sub menus are accessed.

If the PARTSECURE parameter was set during Full DHCP configuration, you are prompted to enter the fixed password whenever you access 2. Local Diagnostics, or 3. Network Configuration menu items from the Local Tools menu. You are always prompted to enter the fixed password whenever you access the 4. Lock Menu sub menu.

Two ways to control the menu lock are as follows

- DHCP Secure Menu option—the IP Phone processes the secure menu setting retrieved from the Full DHCP response.
- Lock Menu option—double-press the Services key to access the Local Tools menu. Press **4** on the dialpad to access the Lock Menu items, or use the up/down navigation keys to scroll and highlight one of the following Lock Menu options
 - 1. Manual Secure Local Menu
 - 2. Manual Partial Secure Menu
 - 3. Manual Disable Secure Menu
 - 4. DHCP Secure Menu
 - 5. Lock Now

The settings configured in the Lock Menu sub menu override the settings received from the DHCP string.

For more information about 4. Lock Menu manual user settings, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Configuring Secure Local Menu through Full DHCP

Password protection is enabled during Full DHCP configuration if the SECUREMENU parameter, or the PARTSECURE parameter are present at the end of the S4 part of the Full DHCP string. If neither the SECUREMENU parameter, nor the PARTSECURE parameter is present, password protection is not enabled.

The SECUREMENU/PARTSECURE item is an optional parameter. If it is present, then the full S4 string needs to be present, including the action and retries. The S4 string is already present if the XAS support has been configured through the DHCP. If XAS is not configured, you can still enable password protection by setting the S4 IP address to 0.0.0.0 and by setting the other fields to 0.

ATTENTION

With Full DHCP, the vendor-specific or site-specific options must be configured depending on the customers DHCP server configuration.

For further information about configuring Full DHCP, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Accessing the Local Tools menu

After you enter the password, the Local Tools menu remains active for 5 minutes. You can freely navigate, exit and reenter the Local Tools menu without being prompted to reenter the password. To reset the timer before the 5-minute time expires, double-press the Services key.

You can also press the 5 key to select the Lock Now item from the Lock Menu. The Lock Now item immediately exits the Local Tools menu, closes any open Local Tools menu pages, and locks the Local Tools menu. Alternatively, when time expires, the Local Tools menu and any open submenus are closed. Double-press the Services key to open the password prompt window to reaccess the Local Tools menu.

If you enter an incorrect password, the Local Tools menu does not open. Double-press the Services key to open the password prompt window. Only three incorrect password entries are allowed. Any entry after the three attempts is ignored for 5 minutes. The password prompt window is visible and you can reenter the password but the password is not processed until the 5-minute time expires.

Some text appears dimmed depending on the current state of the menu lock and the configuration of the IP Phone. Only configuration options that are enabled from the current state appear active. Menu options that are not available appear dimmed.

For more information about configuring the Local Tools menu for the IP Phone 1120E, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Key number assignments

Key numbers 1 to 15 are used for Programmable line (DN)/feature keys. These keys can be any DN or feature except for Message Waiting and those configured on keys 17 to 26.

You can assign a maximum of nine functions to the four soft-labeled, predefined soft keys. Because the soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four soft keys. Labels for the soft keys appear in the display area. For further information, see ["Context-sensitive soft key label display" \(page 327\)](#). [Figure 32 "1120E IP display area" \(page 326\)](#) shows the IP Phone 1120E display area.

Key number mappings at the Call Server align with the IP Phone 2002.

For a description of the IP Phone function assignment for each soft key, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

The IP Phone 1120E includes integrated support for a number of Power over Ethernet options, including support for IEEE 802.3af Power Classification 3.

[Table 43 "IP Phone 1120E components list" \(page 330\)](#) lists the IP Phone 1120E package components and product codes.

Table 43
IP Phone 1120E components list

IP Phone 1120E package contents include		
<ul style="list-style-type: none"> • IP Phone 1120E • handset • handset cord • 2.1 m (7-ft.) CAT5 Ethernet cable • Number plate and lens • Getting Started Card 		
IP Phone 1120E with icon key caps (Graphite)	NTYS03AC	
IP Phone 1120E with English key caps (Graphite)	NTYS03BC	
IP Phone 1120E with icon key caps (Graphite) RoHS	NTYS03ACE6	
IP Phone 1120E with English key caps (Graphite) RoHS	NTYS03BCE6	
Replacement parts		
Handset, Charcoal	NTYS09AA70	
Handset cord, Charcoal	NTYS10AA70	
Footstand kit, Charcoal	NTYS11AA70	
Phone number label and lens kit	NTYS12AA	
2.1 m (7-ft) CAT5 Ethernet cable	NTYS13AA	
Power adapter		
Global power supply (for local power)	N0089601	
IEC cables	RoHS	Non-RoHS
1.8 m (5.9 ft), 10 amp, IEC320-C13 North America	NTYS14AAE6	NTYS14AA

2.4 m (8 ft), 240 VAC 10 amp, ANZ power cord AS-3, Australia, New Zealand	N/A	NTTK15AA
250 VAC, Option 11C Standard European power cord, Other EMEA, Kenya, Korea, Thailand, Indonesia, Vietnam, India, Pakistan	NTTK16ABE6	NTTK16AB
3 m (9.9 ft) 125 VAC, Option 11C Swiss power cord Switzerland	NTTK17ABE6	NTTK17AB
240 VAC, Option 11C UK power cord Hong Kong, Ireland, United Kingdom, Singapore, Malaysia, Bangladesh, Brunei, Sri Lanka	NTTK18ABE6	NTTK18AB
3 m (9.9 ft), 125 VAC, Option 11C Denmark power cord Denmark	NTTK22ABE6	NTTK22AB
Argentina	N/A	A0814961
1.8 m (5.9 ft), 10 amp, IEC320-C13 Japan	NTTK26AAE6	N/A

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 1120E

- ["Before you begin" \(page 331\)](#)
- ["First-time installation" \(page 332\)](#)
- ["Configuring the IP Phone 1120E" \(page 332\)](#)
- ["Startup sequence" \(page 337\)](#)
- ["Installing the IP Phone 1120E" \(page 338\)](#)

Before you begin

Before installing the IP Phone 1120E, complete the following pre-installation checklist

- Ensure one IP Phone 1120E boxed package exists for each IP Phone 1120E you install. The package contains
 - IP Phone 1120E
 - handset
 - handset cord
 - 2.1 m (7-ft) CAT5 Ethernet cable
 - Number plate and lens
 - Getting Started Card
- Ensure one Software License exists for each IP Phone 1120E you install.

- Ensure the host Call Server is equipped with the a voice Gateway Media Card and a Signaling Server with the Line TPS application.
- If an AC power adapter is required, ensure the approved Nortel global power supply (model number N0089601) is used. See [Table 43 "IP Phone 1120E components list" \(page 330\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* or *IP Line Fundamentals (NN43100-500)*.



CAUTION

Do not plug your IP Phone 1120E into an ISDN connection. Severe damage can result. The IP Phone 1120E does not support multiple devices connected through the PC Ethernet port.

Configuring the IP Phone 1120E

You must configure the IP Phone 1120E before you can use it. Use [Procedure 65 "Configuring the IP Phone 1120E" \(page 332\)](#) to configure the IP Phone 1120E for the first time.

Procedure 65

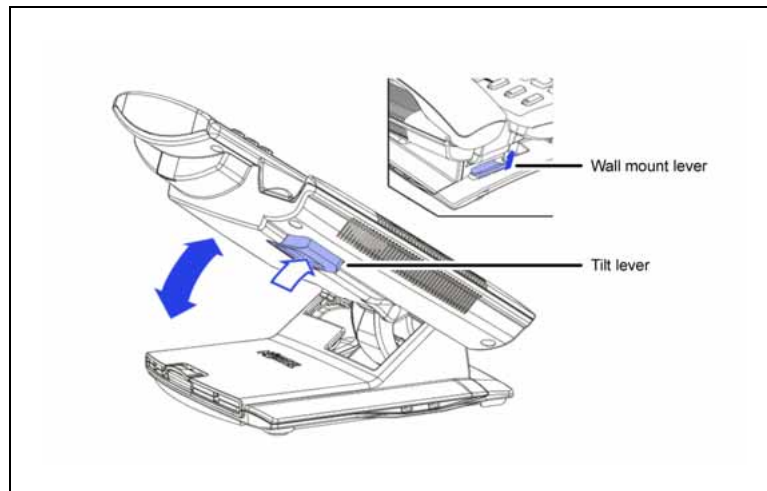
Configuring the IP Phone 1120E

Step	Action
1	Configure a virtual loop on the Call Server using LD 97. For more information about configuring a virtual loop, see <i>IP Line Fundamentals (NN43100-500)</i> , and <i>Software Input Output Administration (NN43001-611)</i> .
2	Configure the IP Phone 1120E on the Call Server using LD 11. At the prompt, enter the following REQ: chg TYPE: 1120 For more information about configuring the IP Phone 1120E using LD 11, see <i>Software Input Output Administration (NN43001-611)</i> .

**CAUTION**

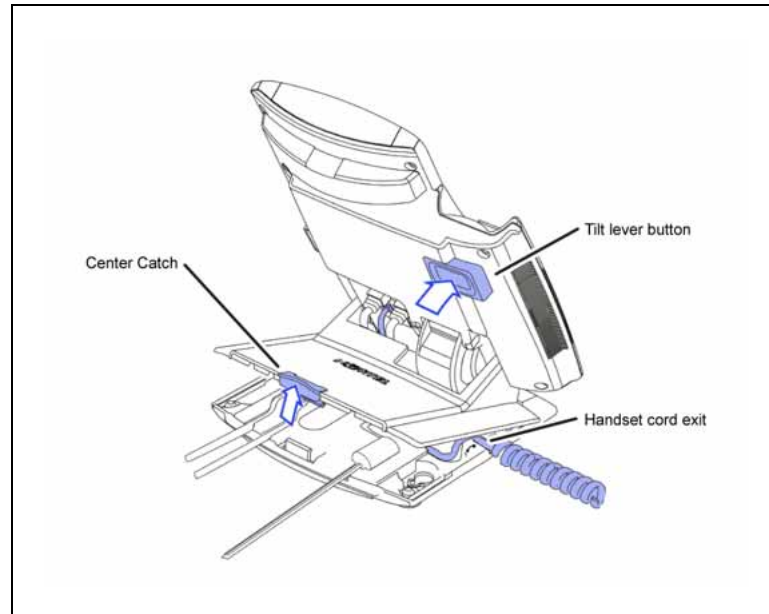
The IP Phone 1120E is shipped with the stand locked in position. To avoid damaging the IP Phone, press the wall-mount lever located under the Handsfree key to release the stand and pull it away from the phone. See [Figure 33 "Release the IP Phone 1120E from the stand"](#) (page 333).

Figure 33
Release the IP Phone 1120E from the stand



- 3** Remove the stand cover. Pull upward on the center catch and remove the stand cover. The cable routing tracks are now accessible. See [Figure 34 "Stand cover removed"](#) (page 334).

Figure 34
Stand cover removed



- 4 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable, and then thread the adapter cord through the channels in the stand.

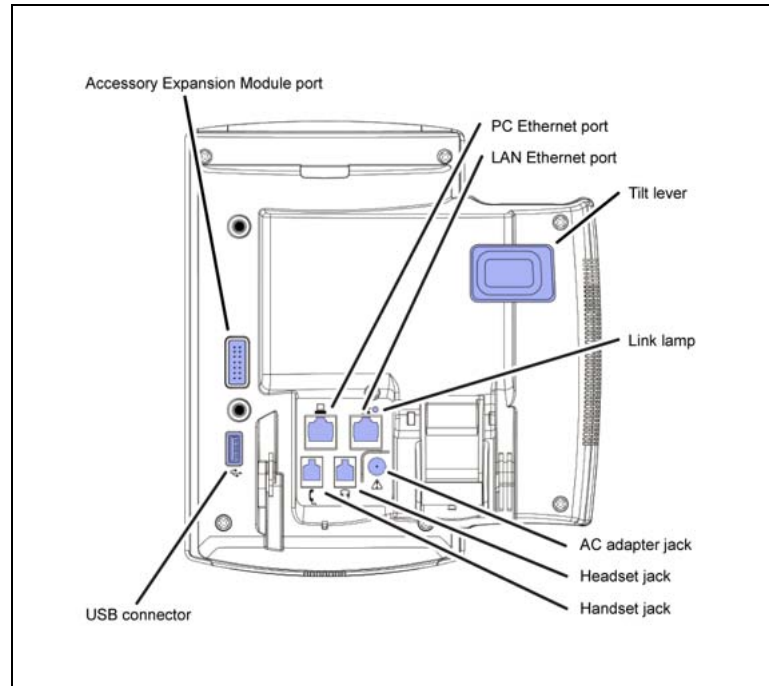


WARNING

Use your IP Phone 1120E with the approved Nortel global power supply (model number N0089601).

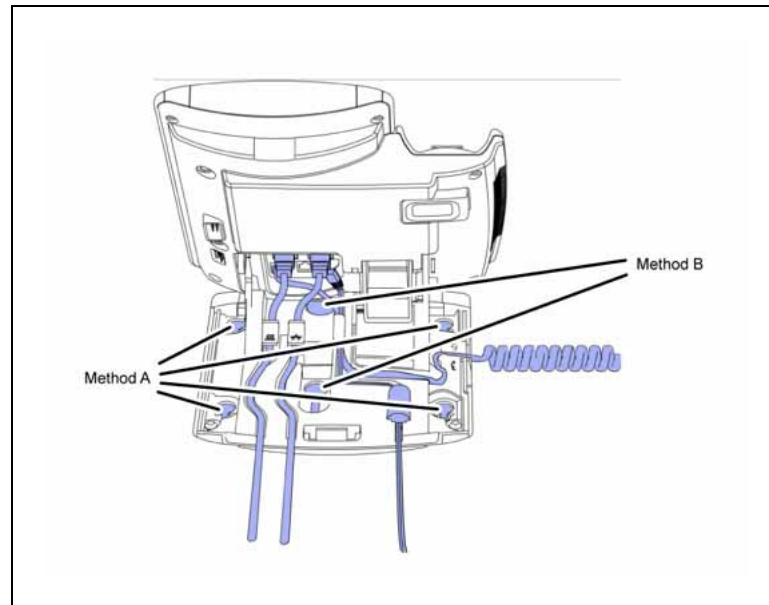
The IP Phone 1120E supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 3. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately. You must use CAT5e (or later) cables if you want to use Gigabit Ethernet.

Figure 35
IP Phone 1120E connections



- 5 Install the handset. Connect the end of the handset cable with the short straight section into the handset. Connect the end of the handset cable with the long straight section to the back of the phone, using the RJ-9 handset jack. Form a small bend in the cable, and then thread the handset cord through the channels in the stand so that it exits behind the handset on the right side, in the channel exit in the stand base. See [Figure 36 "Cable routing tracks" \(page 336\)](#).

Figure 36
Cable routing tracks



- 6 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5 connector (LAN Ethernet port), and thread the network cable through the channel (LAN Ethernet port).
- 7 If you are connecting your PC through the phone, a second CAT5 cable is required. Only one cable is included with the IP Phone 1120E package. Install the Ethernet cable connecting the PC to the phone (optional). Connect one end of the PC Ethernet cable to your phone using the CAT5 connector (PC Ethernet port), and thread it through the channel. Connect the other end to the LAN connector on the back of your PC.



CAUTION

Damage to Equipment

Do not plug any device into your IP Phone 1120E PC Ethernet port other than a PC.

- 8 Connect additional cables. If applicable, plug in optional USB devices. Connect the Ethernet cable to the LAN Ethernet connection. If you are using an AC power adapter, plug the adapter into an AC outlet.

Complete steps 1 to 9, as needed, before wall-mounting the IP Phone.

- 9 Wall-mount your phone (optional). Use Method A or Method B to wall-mount the IP Phone. See Method A—using the mounting holes on the bottom of the phone stand, or Method B—using the traditional-style wall-mount box with a CAT5 connector and a 15 cm (6 inch) CAT5 cord (not provided).
 - Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see [step 3](#)), mark the wall-mount holes by pressing the bottom of the stand cover firmly against the wall in the location where you wish to install the phone. Four small pins on the bottom of the stand cover make the marks on the wall. Use the marks as a guideline to install the wall-mount screws (not provided).

Install the screws so that they protrude 3 mm (1/8 inch) from the wall, and then install the phone stand mounting holes over the screw heads. You may need to remove the phone from the wall to adjust the lower screws. When the lower screws are snug, install the phone on the mounting screws, and then tighten the top screws.
 - Method B: Attach the 15 cm (6 inch) CAT5 cable, position the stand over the mounting rivets, and slide the phone down the wall so that the rivets fit into the slots on the stand.
- 10 Replace the stand cover. Ensure that all cables are neatly routed and press the stand cover into place until you hear a click.
- 11 If you wall-mount the phone, put it in the wall-mount position by holding the tilt lever and press the phone towards the base until the phone is parallel with the base. Release the tilt lever and continue to push the phone towards the base until you hear a click. Ensure the phone is securely locked in to position.

—End—

Startup sequence

When an IP Phone 1120E connects to the network, it must perform a startup sequence. The elements of the startup sequence include

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- connecting to the Call Server
- obtaining a User ID

See [Table 44 "IP Phone 1120E IP parameters" \(page 338\)](#) for a summary of the IP parameters and how they are obtained.

Table 44
IP Phone 1120E IP parameters

Parameter	Method of acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically obtained through Partial or Full DHCP.
Net Mask	Manually entered or automatically obtained through Partial or Full DHCP.
Default Gateway Address	Manually entered or automatically obtained through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically obtained through Full DHCP.
User ID (No de ID, Node Password and TN)	Manually entered for first-time configuration. Obtained from local storage on subsequent power cycles.

Installing the IP Phone 1120E

To install the IP Phone 1120E, use [Procedure 66 "Installing the IP Phone 1120E" \(page 339\)](#).

ATTENTION

Timing information

There are approximately 45 seconds between plugging in the IP Phone 1120E power adapter and the appearance of the text Nortel. When you see the text Nortel on the phone, you have 1 second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Phone 1120E attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the Local diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see ["Local Tools menu password protection" \(page 327\)](#).

Procedure 66
Installing the IP Phone 1120E

Step	Action
1	<p>When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right. The 3. Network Configuration menu opens.</p> <p>You can press the Apply&Reset soft key to save the following settings and to reset the IP Phone. You can press the Exit soft key exit the menu to exit the menu without saving any changes and return to the 3. Network Configuration menu.</p> <p>When the 3. Network Configuration menu opens, the Enable 802.1x (EAP) check box is highlighted.</p>
2	<p>Press the Enter key to switch this item on and off. A check mark appears to indicate the item is active.</p> <p>If 802.1x Authentication is enabled, press the Enter key to start the edit mode. Use the keypad to fill in the following information</p> <ul style="list-style-type: none"> • Device ID • Password • Retype password <p>For further information about EAP, see Appendix "802.1x Port-based network access control" (page 469).</p> <p>If you do not enable 802.1x Authentication, you are not prompted to enter Device ID and Password.</p>
3	<p>Use the Right navigation key to scroll and highlight Enable 802.1x (LLDP Enable) check box. Press the Enter key to switch this item on and off.</p> <p>For information about LLDP, see Appendix "802.1ab Link Layer Discovery Protocol" (page 471).</p>
4	Use the Right navigation key to scroll and highlight DHCP list.
5	Press the Enter key.
6	Press the Down navigation key to open list box.
7	<p>Use the Up/Down navigation keys to scroll and highlight one of the following DHCP options</p> <ul style="list-style-type: none"> • No—disable DHCP support and enter IP network information manually.

- Partial—IP network information (IP address, network mask, and gateway address) are provided by the DHCP server. Enter Server 1 IP address, Server 2 IP address, Port, Action, Retry, and PK numbers manually.
- Full—IP network information, Server 1 IP address, Server 2 IP address, and XAS information are provided by the DHCP server. All items are dimmed to prevent manual entry.

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

- 8 Press the **Enter** key.
- 9 Use the **Right** navigation key to scroll and highlight **SET IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
Set IP—a valid IP Phone 1120E IP address
- 10 Use the **Right** navigation key to scroll and highlight **NET MASK**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
Net Mask—a subnet mask
- 11 Use the **Right** navigation key to scroll and highlight **Gateway**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
Gateway—the default gateway for the IP Phone 1120E on the LAN segment to which it connects
- 12 Use the **Right** navigation key to scroll and highlight **S1 IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
S1 IP—the primary CS 1000 node IP address for the IP Phone 1120E
- 13 Use the **Right** navigation key to scroll and highlight **Port**.
S1 Port—a fixed value of 4100
- 14 Use the **Right** navigation key to scroll and highlight **S1 Action**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information. Choose one of the following

- for TPS only, enter 1
- for TPS and Secure Multimedia Controller, enter 6 or 1

For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

- 15** Use the **Right** navigation key to scroll and highlight **Retry**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
- Retry—the number of times the IP Phone 1120E attempts to connect to the server
- 16** Use the **Right** navigation key to scroll and highlight **S1 PK**.
- S1 PK—the Private key of the Secure Multimedia Controller to which the IP Phone connects.
- 17** Press the **Enter** key to start the edit mode.
- To manually configure the PK, set DHCP to Partial or None. S1 PK Default is ffffffff.
- If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.
- To enter ALPHA digits, use a USB keyboard to enter the following:
- # 1 = A
 - # 2 = B
 - # 3 = C
 - # 4 = D
 - # 5 = E
 - # 6 = F
- 18** Use the **Right** navigation key to scroll and highlight **S2 IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
- S2 IP—the secondary CS 1000 node IP address for the IP Phone 1120E
- The IP Phone 1120E can support a primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.
- 19** Use the **Right** navigation key to scroll and highlight **Port**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
- Port—same as S1 port

- 20** Use the **Right** navigation key to scroll and highlight **S2 Action**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information. Choose one of the following

- for TPS only, enter 1
- for TPS and Secure Multimedia Controller, enter 6 or 1

For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

- 21** Use the **Right** navigation key to scroll and highlight **Retry**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:

Retry—same as S1

- 22** Use the **Right** navigation key to scroll and highlight **S2 PK**.

S2 PK—the Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.

- 23** Press the **Enter** key to start the edit mode.

To manually configure the PK, set DHCP to Partial or None. S2 PK Default is ffffffff.

If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.

To enter ALPHA digits, use a USB keyboard to enter the following:

- # 1 = A
- # 2 = B
- # 3 = C
- # 4 = D
- # 5 = E
- # 6 = F

- 24** Use the **Right** navigation key to scroll and highlight **Ntwk Port Speed** box. Press the **Down** navigation key to open the list box.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—Link speed is autonegotiated with the network device
- 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the network
- 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the network

- 25** Use the **Right** navigation key to scroll and highlight **Ntwk Port Duplex** box. Press the **Down** navigation key to open the list box.

The **Ntwk Port Duplex** option appears dimmed if **Ntwk Port Speed** is set to Auto.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—Duplex mode is autonegotiated with the network device
- Force Full—Duplex mode is forced to Full Duplex on the network
- Force Half—Duplex mode is forced to Half Duplex on the network

26 Use the **Right** navigation key to scroll and highlight **Disable Voice 802.1Q** check box. Press the **Enter** key to switch this item on and off.

27 Use the **Right** navigation key to scroll and highlight **VoiceVLAN** box. Press the **Down** navigation key to open the list box.

28 Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- No VLAN
- DHCP—VLAN ID is configured automatically to one of the values received from the DHCP server
- LLDP MED—VLAN ID is configured automatically to the value received from 802.1ab LLDP
- LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
- Manual

If LLDP is disabled, LLDP MED and LLDP VLAN Name modes do not appear in the list. If DHCP is disabled, DHCP does not appear in the list.

29 Use the **Right** navigation key to scroll and highlight **VLAN Filter** check box.

VLAN Filter appears dimmed if **Disable Voice 802.1Q** check box is selected.

If the VLAN Filter is enabled, packets destined for the IP Phone port are filtered on their MAC address and their VLAN tag. Untagged VLAN packets and tagged VLAN packets that differ from the Telephony VLAN ID are prevented from reaching the IP Phone port.

For information about VLAN tagging, [Appendix "802.1Q VLAN description" \(page 461\)](#).

- 30** Use the **Right** navigation key to scroll and highlight **Ctrl Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.
- Ctrl Priority Bits** option appears dimmed if **Disable Voice 802.1Q** check box is selected.
- 31** Use the **Right** navigation key to scroll and highlight **Media Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.
- Media Priority Bits** option appears dimmed if **Disable Voice 802.1Q** check box is selected.
- 32** Use the **Right** navigation key to scroll and highlight **Disable PC Port** check box. Press the **Enter** key to switch this item on and off.
- 33** Use the **Right** navigation key to scroll and highlight **PC Port Speed** box. Press the **Down** navigation key to open the list box.
- Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- Auto—Link speed is autonegotiated with the attached PC
 - 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the PC port.
 - 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the PC port.
- 34** Use the **Right** navigation key to scroll and highlight **PC Port Duplex** box. Press the **Down** navigation key to open the list box. Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- Auto—Duplex mode is autonegotiated with the attached PC
 - Force Full—Duplex mode is forced to Full Duplex on the PC
 - Force Half—Duplex mode is forced to Half Duplex on the PC
- PC Port Duplex** appears dimmed if the **PC Port Speed** option is set to Auto.
- 35** Use the **Right** navigation key to scroll and highlight **Disable Data 802.1Q** check box. Press the **Enter** key to switch this item on and off.
- 36** Use the **Right** navigation key to scroll and highlight **DataVLAN** box. Press the **Down** navigation key to open the list box.
- The **DataVLAN** option appears dimmed if **Disable Data 802.1Q** check box is selected.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- No VLAN
- LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
- VLAN ID value—manual selection of VLAN ID from 1 to 4094

If LLDP is disabled, LLDP VLAN Name does not appear in the list.

- 37** Press the **Enter** key.
- 38** Use the **Right** navigation key to scroll and highlight **Data Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.
- 39** Use the **Right** navigation key to scroll and highlight **PC-Port Untag All** check box. Press the **Enter** key to switch this item on and off.
- The PC-Port Untag All** option appears dimmed if **Disable Data 802.1Q** check box is selected.
- 40** Use the **Right** navigation key to scroll and highlight **Cached IP** check box. Press the **Enter** key to switch this item on and off.
- 41** Use the **Right** navigation key to scroll to **Enable PSK SRTP**. Press the **Enter** key to switch this item on and off.
- The SRTP media encryption feature provides encrypted media. A preshared secret is embedded in the Nortel IP Phone to generate and to exchange encryption parameters without any Call Server involvement.
- For further information about the SRTP media encryption feature, see "[Media security](#)" (page 447) and *Security Management Fundamentals (NN43001-604)*.
- 42** Use the **Right** navigation key to scroll and highlight **Ignore GARP** check box. Press the **Enter** key to switch this item on and off.
- The GARP feature protects the IP Phone from a Gratuitous ARP Spoof attack from the network.
- For more information about GARP, see "[Gratuitous Address Resolution Protocol Protection](#)" (page 350).
- 43** If an External Application Server (XAS) is available in the network, use the **Right** navigation key to scroll and highlight the **XAS IP** list. Use the dialpad to enter the XAS IP address.

The XAS delivers business applications to the IP Phone. For more information about XAS, see Nortel Application Gateway 1000 documentation.

44 If the XAS supports graphical displays, use the **Right** navigation key to scroll and highlight **Graphical XAS** check box. Press the **Enter** key to switch this item on and off.

45 Use the **Right** navigation key to scroll and highlight **Port** list. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information.

46 Upgrade the IP Phone 1120E firmware.

The IP Phone 1120E supports remote firmware upgrades through a TFTP process and an automated UFTP process.

The method to upgrade the firmware depends on the following Call Server software

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 1120E searches for the TFTP Server for firmware upgrade. If the file name specified in 1120e.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 1120E reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

- 47 The IP Phone 1120E searches for the connect server.
The IP Phone 1120E registers with the Terminal Proxy Server (TPS) and, if needed, begins the firmware download. This takes several minutes. When download is complete, the IP Phone 1120E resets.
The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.
- 48 Check for a dial tone and the correct DN on the display.
- 49 (Optional) Customize the feature keys as required. For more information, see *IP Line Fundamentals (NN43100-500)*.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 67 "Enabling Full Duplex mode" \(page 347\)](#) to enable Full Duplex mode.

Procedure 67 Enabling Full Duplex mode

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

- | | |
|---|---|
| 1 | Double-press the Services key to open the Local Tools menu. |
|---|---|

- 2 Press **3** on the dialpad to access the **Network Configuration** menu or use the Up/Down navigation keys to scroll and highlight the Network Configuration option.
- 3 Use the **Right** navigation key to scroll and highlight the **Duplex** list.
- 4 Press **Enter** to start the edit mode.
- 5 Press the **Down** navigation key to open list box.
- 6 Use the **Up/Down** navigation keys to scroll and highlight one of the following options
 - 10BT Full—10 BT Full Duplex mode
 - 100BT Full—100 BT Full Duplex mode
- 7 Press **Enter** to exit the edit mode.
- 8 Press the **Apply&Reset** soft key to save the changes and to restart the IP Phone 1120E. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Procedure 68

Disabling Auto Negotiate and enabling Full Duplex mode

Step	Action
1	Double-press the Services key to open the Local Tools menu.
2	Press 3 on the dialpad to access the Network Configuration menu or use the Up/Down navigation keys to scroll and highlight the Network Configuration option.
3	Use the Right navigation key to scroll and highlight the Duplex box.
4	Press Enter to start the edit mode.
5	Press the Down navigation key to open list box.
6	Use the Up/Down navigation keys to scroll and highlight one of the following options <ul style="list-style-type: none"> • 10BT Full—10 BT Full Duplex mode

- 100BT Full—100 BT Full Duplex mode
- 7 Press **Enter** to exit the edit mode.
 - 8 Press the **Apply&Reset** soft key to save the changes and to restart the IP Phone 1120E.

—End—

When the IP Phone 1120E restarts, the firmware reads the setting for Full Duplex mode and sets both port 0, network interface port, and port 1, PC interface port, accordingly.

Use [Procedure 69 "Checking Ethernet Statistics" \(page 349\)](#) to confirm activation of Full Duplex mode.

Procedure 69
Checking Ethernet Statistics

Step Action

- 1 Double-press the **Services** key.
- 2 Press **2** to select **Local Diagnostics**, then press **3** to open the **Ethernet Statistics** menu.

If Full Duplex mode is active, the following is displayed

- Link Status: UP
- Duplex Mode: Full
- Network Speed: 10 MB, 100 MB, or 1 G
- Auto Sense/Negotiate
 - Auto-Negotiate Capability: No
 - Auto-Negotiate Completed: No

—End—

TFTP firmware upgrade

When you enter Cfg TFTP = 1 (for yes), and enter an IP address, the IP Phone searches for an upgrade file on the TFTP Server.

Users of CS 1000 Release 4.5, or later do not need to enter a TFTP IP address.

For further information about TFTP firmware upgrade, see [Appendix "TFTP Server" \(page 547\)](#).

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection protects the IP Phone 1120E from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. This allows the malicious device to launch a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 66 "Installing the IP Phone 1120E" \(page 339\)](#).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

Redeploying an IP Phone 1120E

You can redeploy an existing previously configured IP Phone 1120E on the same Call Server. For example, the IP Phone 1120E can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 1120E. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 70

Changing the TN of an existing IP Phone 1120E

Step	Action
1	Repower the IP Phone 1120E. During the reboot sequence of a previously configured IP Phone, the IP Phone 1120E displays the existing node number for approximately 5 seconds.
2	If the node password is enabled and NULL, choose one of the following <ol style="list-style-type: none"> Disable the password. Set the password as non-NULL.

- 3 Press **OK** when the node number displays.
- | If | Then |
|--|--|
| the node password is enabled and is not NULL | a password screen displays. Go to Step 4 . |
| the node password is disabled | a TN screen displays. Go to Step 5 . |
- 4 Enter the password at the password screen and press **OK**.
A TN screen displays.
To obtain the password, enter the `nodePwdShow` command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.
- 5 Select the **Clear** soft key to clear the existing TN.
- 6 Enter the new TN.

—End—

Replacing an IP Phone 1120E

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1120E that currently uses the TN.

Procedure 71

Replacing an IP Phone 1120E

Step	Action
1	Obtain the node and TN information of the phone you want to replace.
2	Disconnect the IP Phone 1120E that you want to replace.
3	Follow Procedure 65 "Configuring the IP Phone 1120E" (page 332) to install and configure the IP Phone 1120E.
4	Enter the same TN and Node Number as the IP Phone 1120E you replaced. The Call Server associates the new IP Phone 1120E with the existing TN.

—End—

Removing an IP Phone 1120E from service

Procedure 72

Removing an IP Phone 1120E from service

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

1	Disconnect the IP Phone 1120E from the network or turn off the power.
---	---

The service to the PC is disconnected as well if the PC connects to the IP Phone 1120E.

If the IP Phone 1120E was automatically configured, the DHCP lease expires and the IP address returns to the available pool.

2	In LD 11, enter OUT at the TN prompt.
---	---------------------------------------

—End—

Nortel IP Phone 1140E

Contents

This section contains the following topics:

- "Introduction" (page 354)
- "Description" (page 354)
- "Components and functions" (page 355)
- "Supported features" (page 359)
- "Features not currently supported" (page 362)
- "Display characteristics" (page 362)
- "Cleaning the IP Phone display screen" (page 364)
- "Local Tools menu password protection" (page 364)
- "Key number assignments" (page 366)
- "Package components" (page 366)
- "Installation and configuration" (page 368)
- "Full Duplex mode" (page 384)
- "TFTP firmware upgrade " (page 385)
- "Gratuitous Address Resolution Protocol Protection" (page 386)
- "Extensible Authentication Protocol " (page 386)
- "Bluetooth wireless technology" (page 386)
- "Redeploying an IP Phone 1140E" (page 386)
- "Replacing an IP Phone 1140E" (page 387)
- "Removing an IP Phone 1140E from service" (page 388)

Introduction

This section explains how to install and maintain the IP Phone 1140E. For information about using the IP Phone 1140E, see the *IP Phone 1140E User Guide (NN43113-106)* or the *IP Phone 1140E Getting Started Card (NN43113-103)*.

This section contains the following procedures

- [Procedure 73 "Configuring the IP Phone 1140E" \(page 369\)](#).
- [Procedure 74 "Installing the IP Phone 1140E" \(page 375\)](#).
- [Procedure 75 "Enabling Full Duplex mode" \(page 384\)](#).
- [Procedure 76 "Checking Ethernet Statistics" \(page 385\)](#).
- [Procedure 77 "Changing the TN of an existing IP Phone 1140E" \(page 386\)](#).
- [Procedure 78 "Replacing an IP Phone 1140E" \(page 387\)](#).
- [Procedure 79 "Removing an IP Phone 1140E from service" \(page 388\)](#).

After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 1140E uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000) . The IP Phone 1140E translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 1140E network and CS 1000 connections.

[Figure 37 "IP Phone 1140E" \(page 355\)](#) shows the IP Phone 1140E.

Figure 37
IP Phone 1140E



Components and functions

This section describes the following components of the IP Phone 1140E

- ["Keys and functions" \(page 355\)](#)
- ["Services menu" \(page 357\)](#)
- ["Local Tools menu" \(page 358\)](#)

Keys and functions

[Table 45 "IP Phone 1140E keys and functions" \(page 355\)](#) lists keys and functions for the IP Phone 1140E.

Table 45
IP Phone 1140E keys and functions

Key	Function
Hold	Press the Hold key to put an active call on hold. Press the line (DN) key beside the flashing LCD to return to the caller on hold.
Goodbye	Press the Goodbye key to terminate an active call.
Visual Alerter/Message waiting indicator	When a message is waiting, the red Visual Alerter/Message waiting indicator lights. Also, when the ringer sounds, this indicator flashes.

Key	Function
Feature Status Lamp indicator	<p>When the firmware is updating, the blue Feature Status Lamp indicator flashes.</p> <p>This function requires server support and, therefore, is not available on all phones.</p>
Self-labeled line/programmable feature keys labels	<p>Self-labeled line/programmable key labels are configured for various features on the IP Phones.</p> <p>A steady LCD light beside a line (DN) key indicates the feature or line is active. A flashing LCD indicates the line is on hold or the feature is being programmed.</p>
Context-sensitive soft keys	<p>Context-sensitive soft keys are located below the display area. The LCD label above the key changes, based on the active feature.</p> <p>A triangle before a key label indicates that the key is active.</p>
Fixed feature keys Expand	<p>Use these keys to access non-programmable standard features.</p> <p>The Expand key is used to access external server applications, such as Nortel Application Server.</p>
Navigation keys	<p>Use the Navigation keys to scroll through menus and lists that appear on the LCD display screen. The outer part of this key cluster rocks for up, down, left, and right movements.</p> <p>Use Up and Down keys to scroll up and down in lists, and the Left and Right keys to position the cursor. You can also use the Left and Right keys to select editable fields that appear on the phone. Press the Right key to select the field below the current position, or press the Left key to select the field above the current position.</p>
Enter	<p>Press the Enter key, at the center of the Navigation key cluster, to confirm menu selections. In many cases, you can use the Enter key instead of the Select soft key.</p>
Message/Inbox Shift/Outbox	<p>Press the Message/Inbox key to access your voice mailbox.</p> <p>The Shift/Outbox key is a fixed key that is reserved for future feature development.</p>
Quit/Stop	<p>Press the Quit/Stop key to end an active application.</p> <p>Pressing the Quit/Stop key does not affect the status of the calls currently on your IP Phone.</p>
Directory	<p>Press the Directory key to access Directory services.</p>

Key	Function
Mute	<p>Press the Mute key to listen to the receiving party without transmitting.</p> <p>Press the Mute key again to return to a two-way conversation.</p> <p>The Mute key applies to Handsfree, Handset, and Headset microphones.</p> <p>The Mute LED flashes when the Mute option is in use.</p>
Headset	<p>Press the Headset key to answer a call using the headset or to switch a call from the handset or Handsfree to the headset.</p> <p>Press the Headset key twice to access Bluetooth Setup menu. If Bluetooth wireless technology is not enabled, this menu is not available.</p>
Volume control keys	<p>Use the Volume control keys to adjust the volume of the handset, headset, speaker, ringer, and Handsfree feature.</p> <p>Press the volume key with the loudspeaker icon to increase volume; press the volume key without the loudspeaker icon to decrease volume.</p>
Copy	<p>Press the Copy Key to copy entries to your Personal Directory from other lists, such as the Caller List, Redial List and Corporate Directory.</p>
Speaker	<p>Press the Handsfree key to activate the speaker.</p>
Handsfree key	<p>Press the Handsfree key to activate handsfree.</p> <p>The LED lights to indicate when the handsfree feature is active.</p>

Services menu

Table 46 "Services menu" (page 357) shows the Services menu.

Table 46
Services menu

Services	<p>Press the Services key to access the following items</p> <ul style="list-style-type: none"> • Telephone Options <ul style="list-style-type: none"> — Volume Adjustment — Contrast Adjustment — Language — Date/Time
----------	--

- Display diagnostics
 - Local Dialpad Tone
 - Set Info
 - Diagnostics
 - Call Log Options
 - Ring type
 - Call Timer
 - OnHook Default Path
 - Change Feature Key Label
 - Name Display Format
 - Live Dialpad
- Virtual Office Login and Virtual Office Logout (if Virtual Office is configured)
 - Test Local Mode and Resume Local Mode (if Branch Office is configured)
 - Password Admin

If a call is presented while the user is manipulating an option, the IP Phone 1140E rings and the DN key flashes. However, the display is not updated with the Caller ID, and the programming text is not disturbed.

The user can originate a call using Autodial or Last Number Redial while manipulating an option. However, the display is not updated with the dialed digits or the Caller ID, and Autodial and Last Number Redial intercept the dialpad.

Local Tools menu

Table 47 "Local Tools menu" (page 358) shows the Local Tools menu.

Table 47
Local Tools menu

Press the Services key twice to access the Local Tools menu. The following items appear in the Local Tools menu

1. Preferences
 - a. Display Settings
 - b. Languages
 - c. Bluetooth Setup
2. Local Diagnostics
 - a. IP Set&DHCP Information

- b. Network Diagnostic Tools
 - c. Ethernet Statistics
 - d. IP Network Statistics
 - e. USB Devices
3. Network Configuration
 4. Lock Menu
 - a. Manual Secure Local Menu
 - b. Manual Partial Secure Menu
 - c. Manual Disable Secure Menu
 - d. DHCP Secure Menu
 - e. Lock Now

To make a selection, press the number associated with the menu item, or use the navigation keys to scroll through the menu items. Press the Enter key to select the highlighted menu item.

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see ["Local Tools menu password protection" \(page 364\)](#).

Press the Quit/Stop key to exit from any menu or menu item.

For information about configuring IP Phone 1140E Local Tools menu, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Supported features

The IP Phone 1140E supports the following telephony features

- six self-labeled line/programmable feature keys with labels and indicators

Supports up to 12 DN's or features on 2 pages. Use the Shift/Outbox key to access the second page of DN's or features.

- four context-sensitive soft keys that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- high quality speaker phone

- volume control keys to adjust ringer, speaker, handset, and headset volume
- six specialized feature keys
 - Quit/Stop
 - Directory
 - Message/Inbox
 - Shift/Outbox
 - Services
 - Copy
- six call-processing fixed keys
 - Mute
 - Handsfree
 - Goodbye
 - Expand
 - Headset
 - Hold
- Call Duration Timer
- ability to change user-defined feature key labels
- Corporate Directory
- Personal Directory
- Redial List
- Callers List
- Password Administration
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download
- Live Dialpad

The IP Phone 1140E supports the following Data network features

- integrated Gigabit Ethernet switch for shared PC access
 - the LAN Ethernet port supports 10/100/1000 Mb/s Full Duplex mode

- the PC Ethernet port supports 10/100/1000 Mb/s Full Duplex mode
- automatic network configuration through DHCP
For more information about automatic network configuration, see [Table 49 "IP Phone 1140E IP parameters" \(page 374\)](#).
- 802.1ab Link Layer Discovery Protocol (LLDP)
For more information about LLDP, [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).
- Secure Real-time Transport Protocol (SRTP) media encryption
For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).
- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use
 - full VLAN capability, including a manageable integrated switch in the IP Phone; allows VLAN and priority tagging for the IP Phone traffic and VLAN tagging for PC traffic
 - VLAN filtering allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN
For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).
- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 3
- Gratuitous Address Resolution Protocol Protection (GARP)

The IP Phone 1140E supports the following user interface features

- graphical, high-resolution LCD display, backlit, with adjustable contrast
- USB port, to support USB devices
Powered downstream 1.1 compliant USB hubs are supported, including USB 2.0 hubs, if they offer USB 1.1 backwards compliancy.
- Hearing Aid Compatibility (HAC) as per FCC Part 68
- wireless headset support through Bluetooth® 1.2 compliant Audio Gateway Headset Profile

- External Application Server (XAS)
- Graphical External Application Server (GXAS)
- language support: English, French, Swedish, Danish, Norwegian, German, Greek, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, Turkish, and Katakana

With the appropriate downloaded fonts, the IP Phone supports Arabic, Chinese Simplified, Chinese Traditional, Hebrew, Japanese, and Korean. For more information about language support, see [Appendix "Language enhancement" \(page 545\)](#).

- headset jack with On/Off key
- Expansion Module for IP Phone 1100 Series (Expansion Module)

For more information about the Expansion Module, see ["Expansion Module for IP Phone 1100 Series" \(page 431\)](#).

Features not currently supported

The following features are not supported on the IP Phone 1140E

- Group Listening
- Set-to-Set messaging

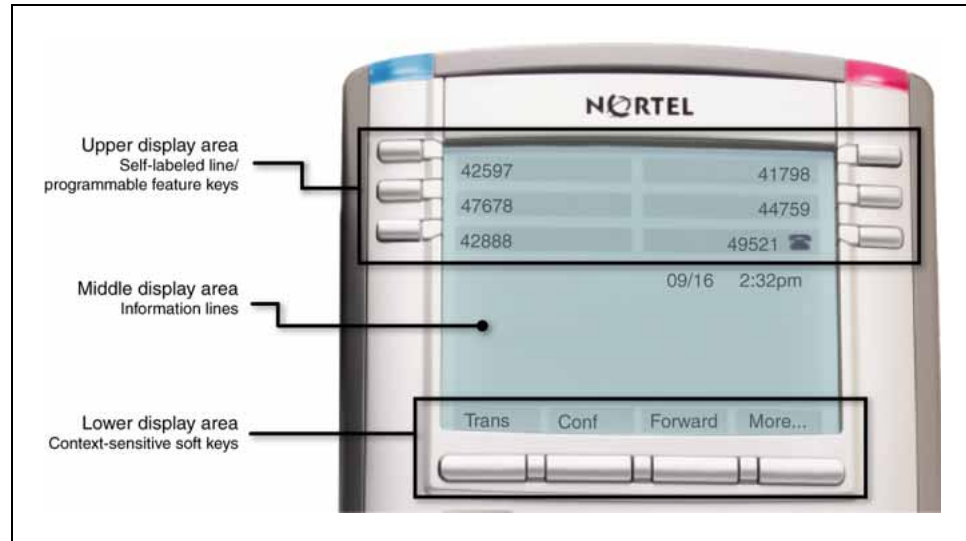
Display characteristics

The IP Phone 1140E has three major display areas

- ["Self-labeled line/programmable feature key label display" \(page 363\)](#)
- ["Information line display" \(page 363\)](#)
- ["Context-sensitive soft key label display" \(page 364\)](#)

[Figure 38 "IP Phone 1140E display area" \(page 363\)](#) shows the three display areas.

Figure 38
IP Phone 1140E display area



Self-labeled line/programmable feature key label display

The feature key label area displays a 10-character string for each of the six feature keys. Each feature key includes the key label and an icon. The icon state can be on, off, or flashing. A telephone icon displays the status of the configured DN. Key labels are left-aligned for keys on the left side of the screen, and right-aligned for keys on the right side of the screen. To change the feature key label, press the Services key to access Telephone Options > Change Feature key label option. For more information about changing the feature key label, see the *IP Phone 1140E User Guide (NN43113-106)*.

If a label is longer than 10 characters, the last 10 characters are displayed and the excess characters are deleted from the beginning of the string.

Information line display

The IP Phone 1140E has a three-line information display area with the following information

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state) or Call Timer (if provisioned in the Telephone options menu)

The information in the display area changes, according to the call-processing state and active features.

Context-sensitive soft key label display

The context-sensitive soft key label has a maximum of seven characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon displays at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last or rightmost character is truncated.) If a feature is enabled, the icon state turns to On. It remains in the on state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, returning the soft key label to its original state.

Use the More soft key to navigate through the layers of functions. If only four functions are assigned to the soft keys, the More key does not appear, and all four functions are displayed.

Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.



CAUTION

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Local Tools menu password protection

If the SECUREMENU parameter was set during Full DHCP configuration, the Local Tools menu is locked to prevent accidental or unwanted changes. You are prompted to enter the fixed password 26567*738 (color*set) whenever the Services key is double-pressed, or whenever the Local Diagnostics and Network Configuration sub menus are accessed.

If the PARTSECURE parameter was set during Full DHCP configuration, you are prompted to enter the fixed password whenever you access 2. Local Diagnostics, or 3. Network Configuration menu items from the Local Tools menu. You are always prompted to enter the fixed password whenever you access the 4. Lock Menu sub menu.

Two ways to control the menu lock are as follows

- DHCP Secure Menu option—the IP Phone processes the secure menu setting retrieved from the Full DHCP response.
- Lock Menu option—double-press the Services key to access the Local Tools menu. Press **4** on the dialpad to access the Lock Menu items, or use the up/down navigation keys to scroll and highlight one of the following Lock Menu options
 - 1. Manual Secure Local Menu
 - 2. Manual Partial Secure Menu

- 3. Manual Disable Secure Menu
- 4. DHCP Secure Menu
- 5. Lock Now

The settings configured in the Lock Menu sub menu override the settings received from the DHCP string.

For more information about 4. Lock Menu manual user settings, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Configuring Secure Local Menu through Full DHCP

Password protection is enabled during Full DHCP configuration if the SECUREMENU parameter, or the PARTSECURE parameter are present at the end of the S4 part of the Full DHCP string. If neither the SECUREMENU parameter, nor the PARTSECURE parameter is present, password protection is not enabled.

The SECUREMENU/PARTSECURE item is an optional parameter. If it is present, then the full S4 string needs to be present, including the action and retries. The S4 string is already present if the XAS support has been configured through the DHCP. If XAS is not configured, you can still enable password protection by setting the S4 IP address to 0.0.0.0 and by setting the other fields to 0.

ATTENTION

With Full DHCP, the vendor-specific or site-specific options must be configured depending on the customers DHCP server configuration.

For further information about configuring Full DHCP, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Accessing the Local Tools menu

After you enter the password, the Local Tools menu remains active for 5 minutes. You can freely navigate, exit and reenter the Local Tools menu without being prompted to reenter the password. To reset the timer before the 5-minute time expires, double-press the Services key.

You can also press the 5 key to select the Lock Now item from the Lock Menu. The Lock Now item immediately exits the Local Tools menu, closes any open Local Tools menu pages, and locks the Local Tools menu. Alternatively, when time expires, the Local Tools menu and any open submenus are closed. Double-press the Services key to open the password prompt window to reaccess the Local Tools menu.

If you enter an incorrect password, the Local Tools menu does not open. Double-press the Services key to open the password prompt window. Only three incorrect password entries are allowed. Any entry after the three attempts is ignored for 5 minutes. The password prompt window is visible and you can reenter the password but the password is not processed until the 5-minute time expires.

Some text appears dimmed depending on the current state of the menu lock and the configuration of the IP Phone. Only configuration options that are enabled from the current state appear active. Menu options that are not available appear dimmed.

For more information about configuring the Local Tools menu for the IP Phone 1140E, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Key number assignments

Key numbers 1 to 15 are used for Programmable line (DN)/feature keys. These keys can be any DN or feature except for Message Waiting and those configured on keys 17 to 26.

You can assign a maximum of nine functions to the four soft-labeled, predefined soft keys. Because the soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four soft keys. Labels for the soft keys appear in the display area. For further information, see ["Context-sensitive soft key label display" \(page 364\)](#). [Figure 38 "IP Phone 1140E display area" \(page 363\)](#) shows the IP Phone 1140E display area.

Key number mappings at the Call Server align with the IP Phone 2004.

For a description of the IP Phone function assignment for each of the context-sensitive soft keys, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

The IP Phone 1140E includes integrated support for a number of Power over Ethernet options, including support for IEEE 802.3af Power Classification 3.

[Table 48 "IP Phone 1140E component list" \(page 367\)](#) lists the IP Phone 1140E package components and product codes.

Table 48
IP Phone 1140E component list

IP Phone 1140E package contents includes		
<ul style="list-style-type: none"> • IP Phone 1140E • handset • handset cord • 2.1 m (7-ft) CAT5 Ethernet cable • Number plate and lens • Getting Started Card 		
IP Phone 1140E with icon keycaps (Graphite)	NTYS05AC	
IP Phone 1140E with English keycaps (Graphite)	NTYS05BC	
IP Phone 1140E with icon keycaps (Graphite) RoHS	NTYS05ACE6	
IP Phone 1140E with English keycaps (Graphite) RoHS	NTYS05BBE6	
Replacement parts		
Handset, Charcoal	NTYS09AA70	
Handset cord, Charcoal	NTYS10AA70	
Footstand kit, Charcoal	NTYS11AA70	
Phone number label and lens kit	NTYS12AA	
2.1 m (7-ft) CAT5 Ethernet cable	NTYS13AA	
Power adapter		
Global power supply	N0089601	
IEC cable	RoHS	Non-RoHS
1.8 m (5.9 ft), 10 amp, IEC320-C13 North America	NTYS14AAE6	NTYS14AA
2.4 m (8 ft), 240 VAC 10 amp, ANZ power cord AS-3, Australia, New Zealand	N/A	NTTK15AA
250 VAC, Option 11C Standard European power cord, Other EMEA, Kenya, Korea, Thailand, Indonesia, Vietnam, India, Pakistan	NTTK16ABE6	NTTK16AB
3 m (9.9 ft) 125 VAC, Option 11C Swiss power cord Switzerland	NTTK17ABE6	NTTK17AB
240 VAC, Option 11C UK power cord Hong Kong, Ireland, United Kingdom, Singapore, Malaysia, Bangladesh, Brunei, Sri Lanka	NTTK18ABE6	NTTK18AB
3 m (9.9 ft), 125 VAC, Option 11C Denmark power cord Denmark	NTTK22ABE6	NTTK22AB

Argentina	N/A	A0814961
1.8 m (5.9 ft), 10 amp, IEC320-C13 Japan	NTTK26AAE6	N/A

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 1140E

- ["Before you begin" \(page 368\)](#)
- ["First-time installation" \(page 368\)](#)
- ["Configuring the IP Phone 1140E" \(page 369\)](#)
- ["Startup sequence" \(page 374\)](#)
- ["Installing the IP Phone 1140E" \(page 374\)](#)

Before you begin

Before installing the IP Phone 1140E, complete the following pre-installation checklist

- Ensure one IP Phone 1140E boxed package exists for each IP Phone 1140E you install. The package contains
 - IP Phone 1140E
 - handset
 - handset cord
 - 2.1 m (7-ft) CAT5 Ethernet cable
 - Number plate and lens
 - Getting Started Card
- Ensure one Software License exists for each IP Phone 1140E you install.
- Ensure the host Call Server is equipped with a Voice Gateway Media Card and a Signaling Server with the Line TPS application.
- If an AC power adapter is required, ensure the approved Nortel global power supply (model number N0089601) is used. See [Table 48 "IP Phone 1140E component list" \(page 367\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* or *IP Line Fundamentals (NN43100-500)*.

**CAUTION****Damage to Equipment**

Do not plug your IP Phone 1140E into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1140E

You must configure the IP Phone 1140E before you can use it. Use [Procedure 73 "Configuring the IP Phone 1140E" \(page 369\)](#) to configure the IP Phone 1140E for the first time.

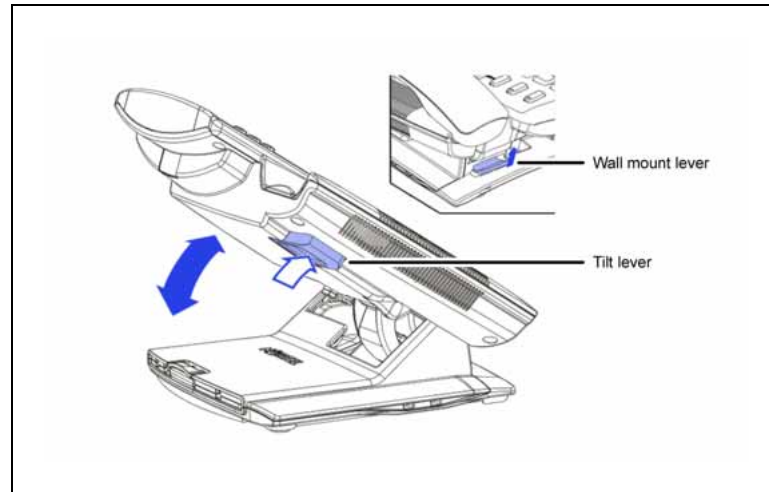
Procedure 73**Configuring the IP Phone 1140E****Step Action**

- | Step | Action |
|------|--|
| 1 | <p>Configure a virtual loop on the Call Server using LD 97.</p> <p>For more information about configuring a virtual loop, see <i>IP Line Fundamentals (NN43100-500)</i> and <i>Software Input Output Administration (NN43001-611)</i>.</p> |
| 2 | <p>Configure the IP Phone 1140E on the Call Server using LD 11. At the prompt, enter the following</p> <pre>REQ: chg TYPE: 1140</pre> <p>For more information about configuring the IP Phone 1140E using LD 11, see <i>Software Input Output Administration (NN43001-611)</i>.</p> |

**CAUTION**

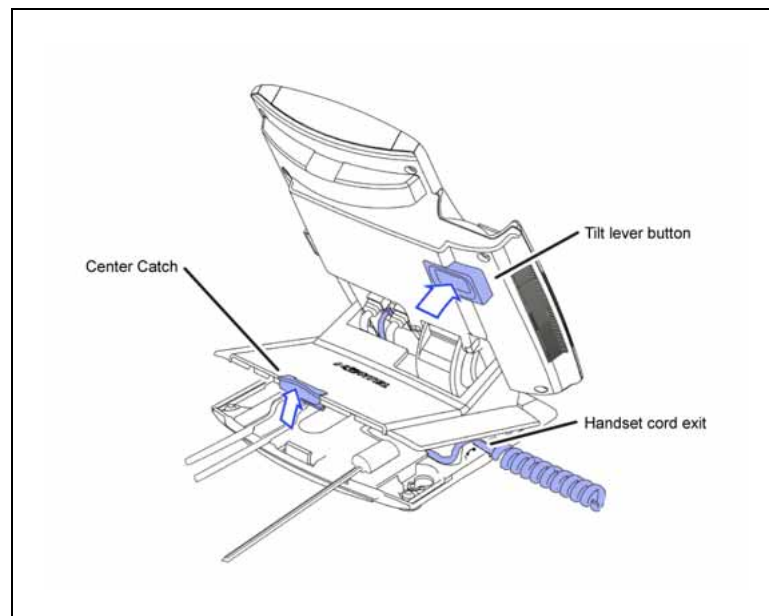
The IP Phone 1140E is shipped with the stand locked in position. To avoid damaging the IP Phone, press the wall-mount lever located under the Handsfree key to release the stand and pull it away from the phone. See [Figure 39 "Release the IP Phone 1140E from the stand" \(page 370\)](#).

Figure 39
Release the IP Phone 1140E from the stand



- 3 Remove the stand cover. Pull upward on the center catch and remove the stand cover. The cable routing tracks are now accessible. See [Figure 40 "Stand cover removed"](#) (page 370).

Figure 40
Stand cover removed



- 4 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable, and then thread the adapter cord through the channels in the stand.

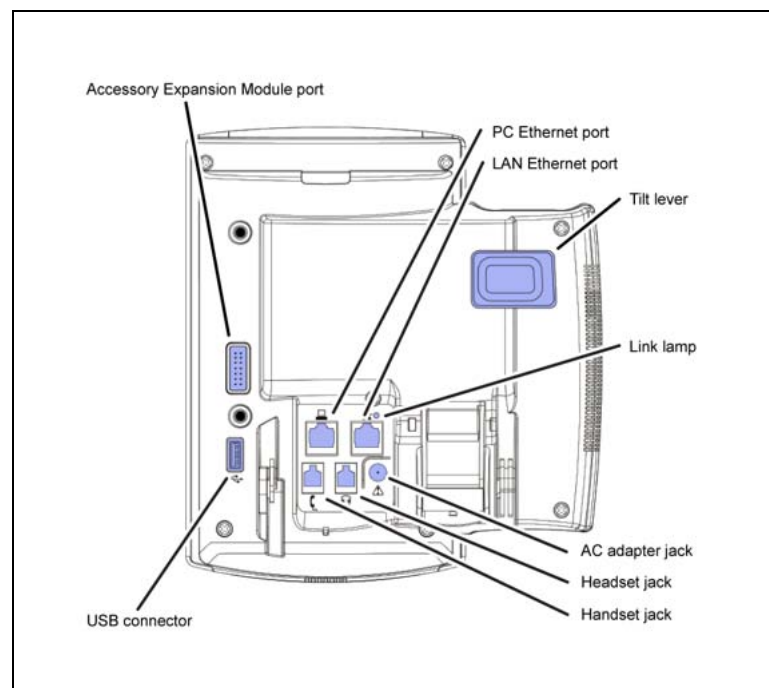
**WARNING**

Use your IP Phone 1140E with the approved Nortel global power supply (model number N0089601).

The IP Phone 1140E supports both AC power and Power over Ethernet options, including IEEE 802.3af Power Classification 3. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.

You must use CAT5e (or later) cables if you want to use Gigabit Ethernet.

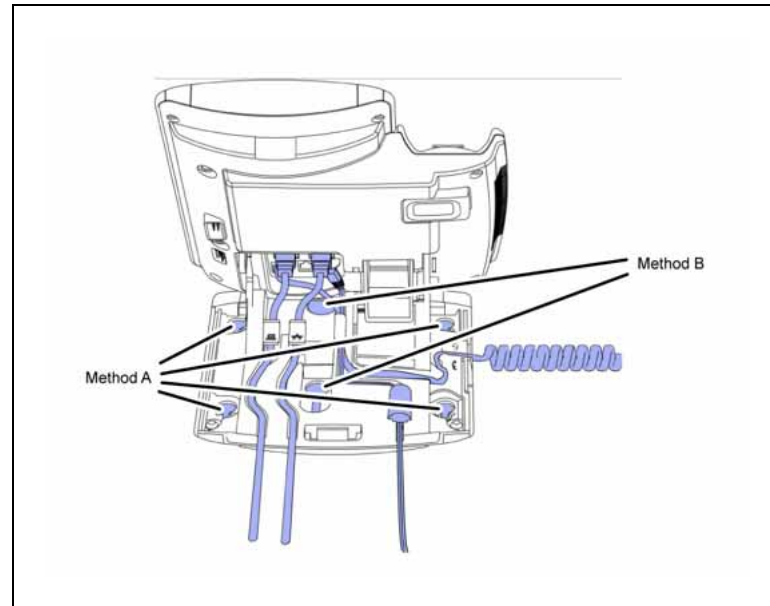
Figure 41
IP Phone 1140E connections



- 5 Install the handset. Connect the end of the handset cable with the short straight section into the handset. Connect the end of the handset cable with the long straight section to the back of the phone, using the RJ-9 handset jack. Form a small bend in the cable, and then thread the handset cord through the channels in the stand so that it exits behind the handset on the right side, in the channel exit

in the stand base marked with the handset symbol. See [Figure 42 "Cable routing tracks"](#) (page 372).

Figure 42
Cable routing tracks



- 6** Install the headset (optional). If you are installing a headset, plug the connector into the RJ-9 headset jack on the back of the phone, and thread the headset cord along with the handset cord through the channels in the stand, so that the headset cord exits the channel marked with the handset symbol. See [Figure 42 "Cable routing tracks"](#) (page 372).
- 7** Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5 connector (LAN Ethernet port), and thread the network cable through the channel.
- 8** If you are connecting your PC through the phone, a second CAT5 cable is required. Only one cable is included with the IP Phone 1140E package. Install the Ethernet cable connecting the PC to the phone (optional). Connect one end of the PC Ethernet cable to your phone using the CAT5 (PC Ethernet port), and thread it through the channel marked with the symbol. Connect the other end to the LAN connector on the back of your PC.

**CAUTION****Damage to Equipment**

Do not plug any device into your IP Phone 1140E PC Ethernet port other than a PC. The IP Phone 1140E does not support multiple devices connected through the PC Ethernet port.

- 9** Connect additional cables. If applicable, plug in optional USB devices. Connect the Ethernet cable to the LAN Ethernet connection. If you are using an AC power adapter, plug the adapter into an AC outlet.

Complete steps 1 to 9, as needed, before wall-mounting the IP Phone.

- 10** Wall-mount your phone (optional). Use Method A or Method B to wall-mount the IP Phone. See Method A—using the mounting holes on the bottom of the phone stand, or Method B—using the traditional-style wall-mount box with a CAT5 connector and a 15 cm (6 inch) CAT5 cord (not provided).

- Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see [step 3](#)), mark the wall-mount holes by pressing the bottom of the stand cover firmly against the wall in the location where you wish to install the phone. Four small pins on the bottom of the stand cover make the marks on the wall. Use the marks as a guideline to install the wall-mount screws (not provided).

Install the screws so that they protrude 3 mm (1/8 inch) from the wall, and then install the phone stand mounting holes over the screw heads. You may need to remove the phone from the wall to adjust the lower screws. When the lower screws are snug, install the phone on the mounting screws, and then tighten the top screws.

- Method B: Attach the 15 cm (6 inch) CAT5 cable, position the stand over the mounting rivets, and slide the phone down the wall so that the rivets fit into the slots on the stand.
- 11** Replace the stand cover. Ensure that all cables are neatly routed and press the stand cover into place until you hear a click.
- 12** If you wall-mount the phone, put it in the wall-mount position by holding the tilt lever and press the phone towards the base until the phone is parallel with the base. Release the tilt lever and continue

to push the phone towards the base until you hear a click. Ensure the phone is securely locked in to position.

—End—

Startup sequence

When an IP Phone 1140E connects to the network, it must perform a startup sequence. The elements of the startup sequence include

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- connecting to the Call Server
- obtaining a User ID

See [Table 49 "IP Phone 1140E IP parameters" \(page 374\)](#) for a summary of the IP parameters and how they are obtained.

Table 49
IP Phone 1140E IP parameters

Parameter	Method of acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically obtained through Partial or Full DHCP.
Net Mask	Manually entered or automatically obtained through Partial or Full DHCP.
Default Gateway address	Manually entered or automatically obtained through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically obtained through Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Obtained from local storage on subsequent power cycles.

Installing the IP Phone 1140E

To install the IP Phone 1140E, use [Procedure 74 "Installing the IP Phone 1140E" \(page 375\)](#).

ATTENTION**Timing information**

There are approximately 45 second(s) between plugging in the IP Phone 1140E power adapter and the appearance of the text Nortel. When you see the text Nortel on the phone, you have 1 second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Phone 1140E attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the Local diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see ["Local Tools menu password protection" \(page 364\)](#).

Procedure 74**Installing the IP Phone 1140E****Step Action**

- 1 When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right. The **3. Network Configuration** menu opens.

You can press the **Apply&Reset** soft key to save the following settings and to reset the IP Phone. You can press the **Exit** soft key exit the menu to exit the menu without saving any changes and return to the **3. Network Configuration** menu.

When the **3. Network Configuration** menu opens, the **Enable 802.1x (EAP)** check box is highlighted.
- 2 Press the **Enter** key to switch this item on and off. A check mark appears to indicate the item is active.

If 802.1x Authentication is enabled, press the **Enter** key to start the edit mode. Use the dialpad to fill in the following information
 - Device ID
 - Password
 - Retype password

For further information about 802.1x Authentication, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

If you do not enable 802.1x Authentication, you are not prompted to enter Device ID and Password.

- 3 Use the **Right** navigation key to scroll and highlight **Enable 802.1x (LLDP Enable)**. check box.
For information about 802.1x Authentication, see [Appendix "802.1ab Link Layer Discovery Protocol"](#) (page 471).
- 4 Use the **Right** navigation key to scroll and highlight **DHCP** list.
- 5 Press the **Enter** key.
- 6 Press the Down navigation key to open list box.
- 7 Use the **Up/Down** navigation keys to scroll and highlight one of the following DHCP options
 - No—disable DHCP support and enter IP network information manually.
 - Partial—IP network information (IP address, network mask, and gateway address) are provided by the DHCP server. Enter Server 1 IP address, Server 2 IP address, Port, Action, Retry, and PK numbers manually.
 - Full—IP network information, Server 1 IP address, Server 2 IP address, and XAS information are provided by the DHCP server. All items are dimmed to prevent manual entry.

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 8 Press the **Enter** key.
- 9 Use the **Right** navigation key to scroll and highlight **SET IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
Set IP—a valid IP Phone 1140E IP address
- 10 Use the **Right** navigation key to scroll and highlight **NET MASK**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
Net Mask—a subnet mask
- 11 Use the **Right** navigation key to scroll and highlight **Gateway**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:

Gateway—the default gateway for the IP Phone 1140E on the LAN segment to which it connects

- 12 Use the **Right** navigation key to scroll and highlight **S1 IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:

S1 IP—the primary CS 1000 node IP address for the IP Phone 1140E

- 13 Use the **Right** navigation key to scroll and highlight **Port**.

S1 Port—a fixed value of 4100

- 14 Use the **Right** navigation key to scroll and highlight **S1 Action**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information. Choose one of the following

- for TPS only, enter 1
- for TPS and Secure Multimedia Controller, enter 6 or 1

For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

- 15 Use the **Right** navigation key to scroll and highlight **Retry**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:

Retry—the number of times the IP Phone 1140E attempts to connect to the server

- 16 Use the **Right** navigation key to scroll and highlight **S1 PK**.

S1 PK—the Private key of the Secure Multimedia Controller to which the IP Phone connects.

- 17 Press the **Enter** key to start the edit mode.

To manually configure the PK, set DHCP to Partial or None. S1 PK Default is ffffffff.

If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.

To enter ALPHA digits, use a USB keyboard to enter the following:

- # 1 = A
- # 2 = B
- # 3 = C
- # 4 = D
- # 5 = E
- # 6 = F

- 18** Use the **Right** navigation key to scroll and highlight **S2 IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
- S2 IP—the secondary CS 1000 node IP address for the IP Phone 1140E
- The IP Phone 1140E can support a primary (S1) and secondary (S1) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*.
- 19** Use the **Right** navigation key to scroll and highlight **Port**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
- Port—same as S1 port
- 20** Use the **Right** navigation key to scroll and highlight **S2 Action**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information. Choose one of the following
- for TPS only, enter 1
 - for TPS and Secure Multimedia Controller, enter 6 or 1
- For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.
- 21** Use the **Right** navigation key to scroll and highlight **Retry**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
- Retry—same as S1
- 22** Use the **Right** navigation key to scroll and highlight **S2 PK**.
- S2 PK—the Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.
- 23** Press the **Enter** key to start the edit mode.
- To manually configure the PK, set DHCP to Partial or None. S2 PK Default is ffffffff.
- If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.
- To enter ALPHA digits, use a USB keyboard to enter the following:
- # 1 = A
 - # 2 = B
 - # 3 = C
 - # 4 = D
 - # 5 = E

6 = F

- 24** Use the **Right** navigation key to scroll and highlight **Ntwk Port Speed** box. Press the **Down** navigation key to open the list box.
- Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- Auto—Link speed is autonegotiated with the network device
 - 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the network
 - 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the network
- 25** Use the **Right** navigation key to scroll and highlight **Ntwk Port Duplex** box. Press the **Down** navigation key to open the list box.
- The **Ntwk Port Duplex** option appears dimmed if **Ntwk Port Speed** is set to Auto.
- Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- Auto—Duplex mode is autonegotiated with the network device
 - Force Full—Duplex mode is forced to Full Duplex on the network device
 - Force Half—Duplex mode is forced to Half Duplex on the network device
- 26** Use the **Right** navigation key to scroll and highlight **Disable Voice 802.1Q** check box. Press the **Enter** key to switch this item on and off.
- 27** Use the **Right** navigation key to scroll and highlight **VoiceVLAN** box. Press the **Down** navigation key to open the list box.
- 28** Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- No VLAN
 - DHCP—VLAN ID is configured automatically to one of the values received from the DHCP server
 - LLDP MED—VLAN ID is configured automatically to the value received from 802.1ab LLDP
 - LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
 - Manual

If LLDP is disabled, LLDP MED and LLDP VLAN Name modes do not appear in the list. If DHCP is disabled, DHCP does not appear in the list.

- 29 Use the **Right** navigation key to scroll and highlight **VLAN Filter** check box.

VLAN Filter appears dimmed if **Disable Voice 802.1Q** check box is selected.

If the VLAN Filter is enabled, packets destined for the IP Phone port are filtered on their MAC address and their VLAN tag. Untagged VLAN packets and tagged VLAN packets that differ from the Telephony VLAN ID are prevented from reaching the IP Phone port.

For information about VLAN tagging, [Appendix "802.1Q VLAN description" \(page 461\)](#).

- 30 Use the **Right** navigation key to scroll and highlight **Ctrl Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **11**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

Ctrl Priority Bits option appears dimmed if **Disable Voice 802.1Q** check box is selected.

- 31 Use the **Right** navigation key to scroll and highlight **Media Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **11**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

Media Priority Bits option appears dimmed if **Disable Voice 802.1Q** check box is selected.

- 32 Use the **Right** navigation key to scroll and highlight **Disable PC Port** check box. Press the **Enter** key to switch this item on and off.

- 33 Use the **Right** navigation key to scroll and highlight **PC Port Speed** box. Press the **Down** navigation key to open the list box.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—Link speed is autonegotiated with the attached PC
- 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the PC port.
- 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the PC port.

- 34 Use the **Right** navigation key to scroll and highlight **PC Port Duplex** box. Press the **Down** navigation key to open the list box. Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—Duplex mode is autonegotiated with the attached PC
- Force Full—Duplex mode is forced to Full Duplex on the PC
- Force Half—Duplex mode is forced to Half Duplex on the PC

PC Port Duplex appears dimmed if the **PC Port Speed** option is set to Auto.

35 Use the **Right** navigation key to scroll and highlight **Disable Data 802.1Q** check box. Press the **Enter** key to switch this item on and off.

36 Use the **Right** navigation key to scroll and highlight **DataVLAN** box. Press the **Down** navigation key to open the list box.

The **DataVLAN** option appears dimmed if **Disable Data 802.1Q** check box is selected.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- No VLAN
- LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
- VLAN ID value—manual selection of VLAN ID from 1 to 4094

If LLDP is disabled, LLDP VLAN Name does not appear in the list.

37 Press the **Enter** key.

38 Use the **Right** navigation key to scroll and highlight **Data Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

39 Use the **Right** navigation key to scroll and highlight **PC-Port Untag All** check box. Press the **Enter** key to switch this item on and off.

The **PC-Port Untag All** option appears dimmed if **Disable Data 802.1Q** check box is selected.

40 Use the **Right** navigation key to scroll and highlight **Cached IP** check box. Press the **Enter** key to switch this item on and off.

41 Use the **Right** navigation key to scroll and highlight the **Enable PSK SRTP** check box. Press the **Enter** key to switch this item on and off.

The SRTP media encryption feature provides encrypted media. A preshared secret is embedded in the Nortel IP Phone to generate and to exchange encryption parameters without any Call Server involvement.

For further information about the SRTP media encryption feature, ["Media security" \(page 447\)](#).

- 42** Use the **Right** navigation key to scroll and highlight **Ignore GARP** check box. Press the **Enter** key to switch this item on and off.

The GARP feature protects the IP Phone from a Gratuitous ARP Spoof attack from the network.

For more information about GARP, see ["Gratuitous Address Resolution Protocol Protection" \(page 386\)](#).

- 43** If an External Application Server (XAS) is available in the network, use the **Right** navigation key to scroll and highlight the **XAS IP** list. Use the dialpad to enter the XAS IP address.

The XAS delivers business applications to the IP Phone. For more information about XAS, see Nortel Application Gateway 1000 documentation.

- 44** If the XAS supports graphical displays, use the **Right** navigation key to scroll and highlight **Graphical XAS** check box. Press the **Enter** key to switch this item on and off.

- 45** Use the **Right** navigation key to scroll and highlight **Port** list. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information.

- 46** Use the **Right** navigation key to scroll and highlight **Enable Bluetooth** list. Press the **Enter** key. Press the **Down** navigation key to open the list box.

- 47** Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—(default) Bluetooth wireless technology setting received through TFTP configuration
- Yes—Bluetooth wireless technology is enabled on the IP Phone
- No—Bluetooth wireless technology is disabled on the IP Phone

For further information about Bluetooth wireless technology, [Appendix "Bluetooth wireless technology" \(page 531\)](#).

- 48** Upgrade the IP Phone 1140E firmware.

Use the **Right** navigation key to scroll and highlight **TFTP IP** list. The IP Phone 1140E supports remote firmware upgrades through a TFTP process and an automated UFTP process.

The method to upgrade the firmware depends on the following Call Server software

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 1140E searches for the TFTP Server for firmware upgrade. If the file name specified in 1140e.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 1140E reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5, or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 1140E searches for the connect server.

- 49** The IP Phone 1140E registers with the Terminal Proxy Server (TPS) and, if needed, begins the firmware download. This takes several minutes. When download is complete, the IP Phone 1140E resets.

The current Call Server date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 50** Check for a dial tone and the correct DN on the display.
- 51** (Optional) Customize the feature keys as required. For more information, see *Software Input Output Administration (NN43001-611)* and the *IP Phone 1140E User Guide (NN43113-106)*.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 75 "Enabling Full Duplex mode" \(page 384\)](#) to enable Full Duplex mode.

Procedure 75

Enabling Full Duplex mode

Step	Action
1	Double-press the Services key to open the Local Tools menu.
2	Press 3 on the dialpad to access the Network Configuration menu or use the Up/Down navigation keys to scroll and highlight the Network Configuration option.
3	Use the Right navigation key to scroll and highlight the Duplex list.
4	Press Enter to start the edit mode.
5	Press the Down navigation key to open list box.
6	Use the Up/Down navigation keys to scroll and highlight one of the following options <ul style="list-style-type: none"> • 10BT Full—10 BT Full Duplex mode • 100BT Full—100 BT Full Duplex mode

- 7 Press **Enter** to exit the edit mode.
- 8 Press the **Apply&Reset** soft key to save the changes and to restart the IP Phone 1140E. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use [Procedure 76 "Checking Ethernet Statistics" \(page 385\)](#) to confirm activation of Full Duplex mode.

Procedure 76
Checking Ethernet Statistics

Step Action

- 1 Double-press the **Services** key to open the **Local Tools** menu.
- 2 Press **2** to select **Local Diagnostics**, then press **3** to open the **Ethernet Statistics** menu.

If Full Duplex mode is active, the following is displayed

- Link Status: UP
- Duplex Mode: Full
- Network Speed: 10 MB, 100 MB, or 1 G
- Auto Sense/Negotiate
 - Auto-Negotiate Capability: No
 - Auto-Negotiate Completed: No

—End—

TFTP firmware upgrade

When you enter Cfg TFTP = 1 (for yes), and enter an IP address, the IP Phone searches for an upgrade file on the TFTP Server.

Users of CS 1000 Release 4.5, or later do not need to enter a TFTP IP address.

For further information about TFTP firmware upgrade, see [Appendix "TFTP Server" \(page 547\)](#).

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection protects the IP Phone 1140E from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. The malicious device launches a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 74 "Installing the IP Phone 1140E" \(page 375\)](#).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

Bluetooth wireless technology

The IP Phone 1140E supports Bluetooth wireless technology. For information about configuring Bluetooth wireless technology on the IP Phone 1140E, see [Appendix "Bluetooth wireless technology" \(page 531\)](#).

Redeploying an IP Phone 1140E

You can redeploy an existing previously configured IP Phone 1140E on the same Call Server. For example, the IP Phone 1140E can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 1140E. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 77

Changing the TN of an existing IP Phone 1140E

Step	Action
1	<p>Repower the IP Phone 1140E.</p> <p>During the reboot sequence of a previously configured IP Phone, the IP Phone 1140E displays the existing node number for approximately five seconds.</p>

- 2 If the node password is enabled and NULL, choose one of the following
 - a. Disable the password.
 - b. Set the password as non-NULL.
- 3 Press **OK** when the node number displays.

If	Then
the node password is enabled and is not NULL	a password screen displays. Go to Step 4 .
the node password is disabled	a TN screen displays. Go to Step 5 .
- 4 Enter the password at the password screen, and press **OK**.
A TN screen displays.
To obtain the password, enter the `nodePwdShow` command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.
- 5 Select the **Clear** soft key to clear the existing TN.
- 6 Enter the new TN.

—End—

Replacing an IP Phone 1140E

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1140E that currently uses the TN.

Procedure 78

Replacing an IP Phone 1140E

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

- | | |
|---|--|
| 1 | Obtain the node and TN information of the phone you want to replace. |
| 2 | Disconnect the IP Phone 1140E that you want to replace. |
| 3 | Follow Procedure 73 "Configuring the IP Phone 1140E" (page 369) to install and configure the IP Phone 1140E. |

- 4 Enter the same TN and Node Number as the IP Phone 1140E you replaced. The Call Server associates the new IP Phone 1140E with the existing TN.

—End—

Removing an IP Phone 1140E from service

Procedure 79

Removing an IP Phone 1140E from service

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

- | | |
|---|---|
| 1 | Disconnect the IP Phone 1140E from the network or turn the power off. |
|---|---|

The service to the PC is disconnected as well if the PC connects to the IP Phone 1140E.

If the IP Phone 1140E was automatically configured, the DHCP lease expires and the IP address returns to the available pool.

- | | |
|---|---------------------------------------|
| 2 | In LD 11, enter OUT at the TN prompt. |
|---|---------------------------------------|
-

—End—

Nortel IP Phone 1150E

Contents

This section contains the following topics:

- "Introduction" (page 390)
- "Description" (page 390)
- "Components and functions" (page 392)
- "Supported features" (page 398)
- "Features not currently supported" (page 401)
- "Display characteristics" (page 401)
- "Headset support" (page 403)
- "Local Tools menu password protection" (page 403)
- "Key number assignments" (page 405)
- "Package components" (page 406)
- "Installation and configuration" (page 408)
- "Full Duplex mode" (page 425)
- "TFTP firmware upgrade " (page 426)
- "Gratuitous Address Resolution Protocol Protection " (page 427)
- "Extensible Authentication Protocol " (page 427)
- "Bluetooth wireless technology" (page 427)
- "Redeploying an IP Phone 1150E" (page 427)
- "Replacing an IP Phone 1150E" (page 428)
- "Removing an IP Phone 1150E from service" (page 429)

Introduction

This section explains how to install and maintain the IP Phone 1150E. For information about using the IP Phone 1150E, see the *IP Phone 1150E User Guide (NN43114-100)* or the *IP Phone 1150E Getting Started Card (NN43114-101)*.

This section contains the following procedures

- [Procedure 80 "Configuring an IP Phone 1150E" \(page 409\)](#).
- [Procedure 81 "Installing the IP Phone 1150E " \(page 416\)](#).
- [Procedure 82 "Enabling Full Duplex mode" \(page 425\)](#).
- [Procedure 83 "Checking Ethernet Statistics" \(page 426\)](#).
- [Procedure 84 "Changing the TN of an existing IP Phone 1150E" \(page 427\)](#).
- [Procedure 85 "Replacing an IP Phone 1150E" \(page 428\)](#).
- [Procedure 86 "Removing an IP Phone 1150E from service" \(page 429\)](#).

After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

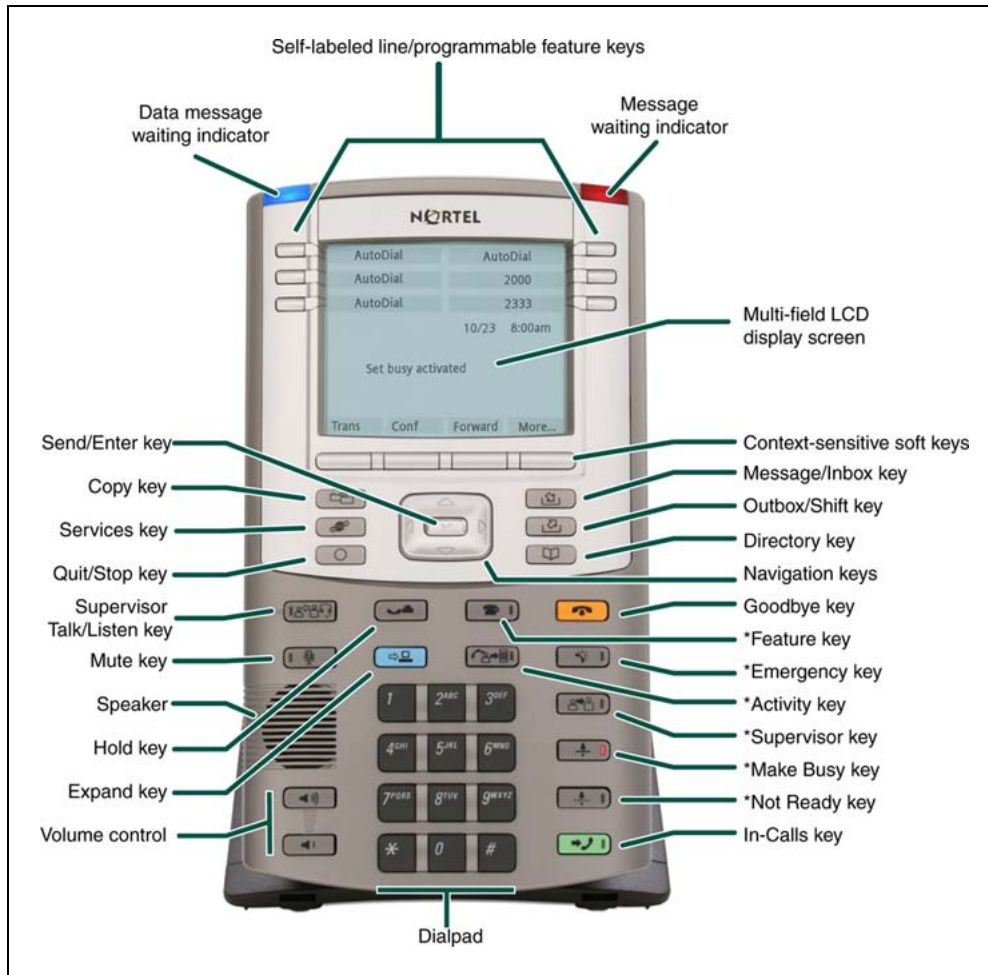
Description

The IP Phone 1150E uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000) . The IP Phone 1150E translates voice into data packets for transport using Internet Protocol. Use a Dynamic Host Configuration Protocol (DHCP) server to provide information that you can use for the IP Phone 1150E network and CS 1000 connections.

The IP Phone 1150E is configured for either an Agent, or a Supervisor. The IP Phone 1150E is shipped with Agent key configuration but can be modified to support Supervisor key configuration by replacing the key caps. Remove the key caps using the Key Cap removal tool (product number NTN19AA). For information about IP Phone 1150E components, see ["Package components" \(page 406\)](#).

[Figure 43 "IP Phone 1150E default Agent key configuration" \(page 391\)](#) shows the IP Phone 1150E default Agent key configuration.

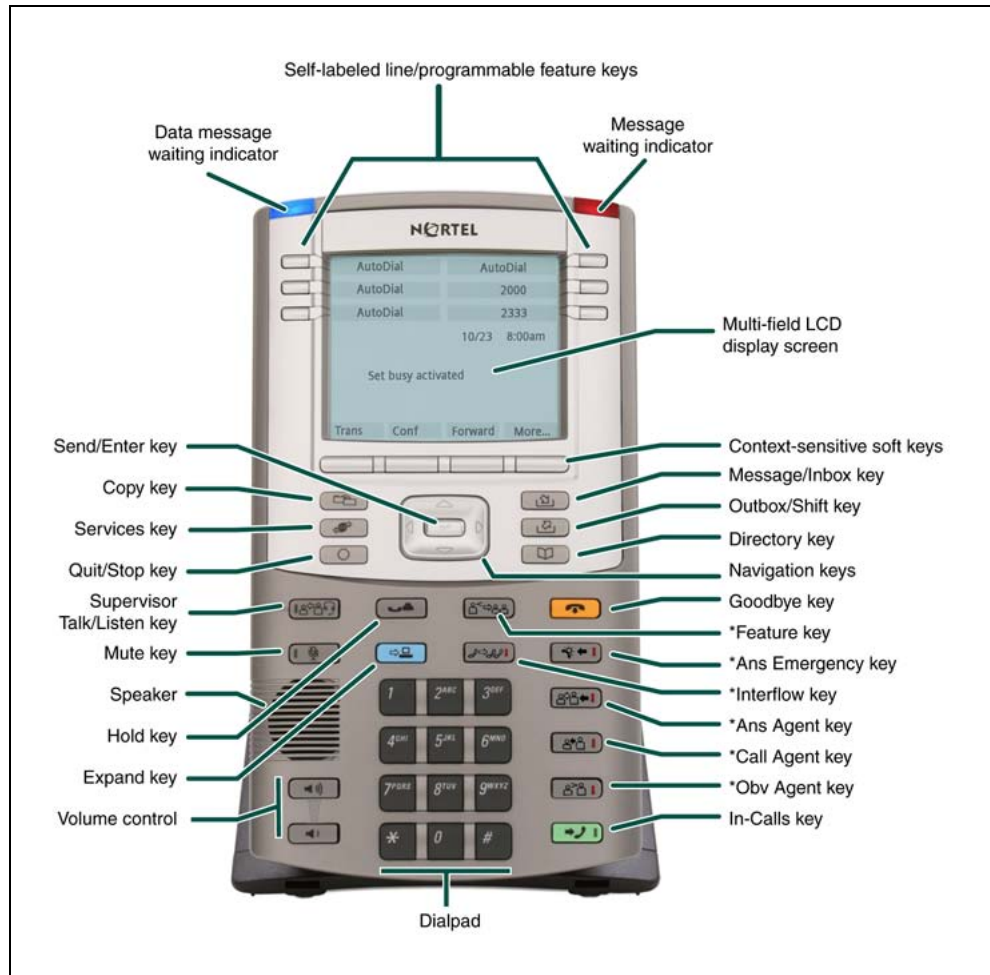
Figure 43
IP Phone 1150E default Agent key configuration



You can program the keys indicated with asterisks for different functions.

Figure 44 "IP Phone 1150E Supervisor key configuration" (page 392) shows the IP Phone 1150E Supervisor key configuration.

Figure 44
IP Phone 1150E Supervisor key configuration



You can program the keys indicated with asterisks for different functions.

Components and functions

This section describes the following components of the IP Phone 1150E

- "Keys and functions" (page 392)
- "Services menu" (page 395)
- "Local Tools menu" (page 396)

Keys and functions

Table 50 "IP Phone 1150E keys and functions" (page 393) shows the keys and functions for the IP Phone 1150E.

Table 50
IP Phone 1150E keys and functions

Key	Function
Hold	Press the Hold key to put an active call on hold. Press the Line (DN) key beside the flashing LCD to return to the caller on hold.
Goodbye	Press the Goodbye key to terminate an active call.
Visual Alerter/Message waiting indicator	When a message is waiting, the red Visual Alerter/Message waiting indicator lights. Also, when the ringer sounds, this indicator flashes.
Feature Status Lamp indicator	When the firmware is updating, the blue Feature Status Lamp indicator flashes.
Self-labeled line/programmable feature keys labels	Self-labeled line/programmable feature key labels are configured for various features on IP Phones. A steady LCD light beside a line (DN) key indicates that the feature or line is active. A flashing LCD indicates the line is on hold, or the feature is being programmed.
Context-sensitive soft keys	Context-sensitive soft keys are located below the display area. The LCD label above the key changes, based on the active feature. A triangle before a key label indicates that the key is active.
Fixed feature keys	Use these keys to access non-programmable features.
Expand	The Expand key is used to access external server applications, such as Nortel Application Server.
Navigation keys	Use the Navigation keys to scroll through menus and lists that appear on the LCD display screen. The outer part of this key cluster rocks for up, down, left, and right movements. Use Up and Down keys to scroll up and down in lists, and use the Left and Right keys to position the cursor. You can also use the Left and Right keys to select editable fields that appear on the phone. Press the Right key to select the field below the current position, or press the Left key to select the field above the current position.
Enter	Press the Enter key, at the center of the Navigation key cluster, to confirm menu selections. In many cases, you can use the Enter key instead of the Select soft key.
Message/Inbox	Press the Message/Inbox key to access your voice mailbox.
Shift/Outbox	Press the Shift/Outbox key to switch between two feature key pages, or any Expansion Modules for IP Phones 1100 Series attached to the phone.

Key	Function
Copy	Press the Copy Key to copy entries to your Personal Directory from other lists, such as the Caller List, Redial List and Corporate Directory.
Quit/Stop	Press the Quit/Stop key to end an active application. Pressing the Quit/Stop key does not affect the status of the calls currently on your IP Phone.
Directory	Press the Directory key to access Directory services.
Mute	Press the Mute key to listen to the receiving party without transmitting. Press the Mute key again to return to a two-way conversation. The Mute key applies to Headset microphones. The Mute LED flashes when the Mute option is in use.
Volume control keys	Use the Volume control keys to adjust the volume of the headset, ringer, and alerter/pager. Press the volume key with the plus sign icon to increase volume; press the volume key with the minus sign icon to decrease volume.
Supervisor Talk/Listen key	For Supervisor use. Press the Supervisor Talk/Listen key to participate in an active conversation. The LED lights to indicate talk/listen mode is on. If the LED is off, the Supervisor can only listen to an active conversation. A headset must be connected to the Supervisor port on the IP Phone 1150E to use this feature.
In-Calls key	Press the In-Calls key to answer incoming calls. This mirrors the key function and state of the Primary DN key. The In-Calls LED lights when the In-Calls key is in use.

Agent default configuration

[Table 51 "IP Phone 1150E keys and functions for default Agent key configuration" \(page 395\)](#) shows IP Phone 1150E keys and functions for default Agent key configuration. You can configure these keys for different functions.

Table 51
IP Phone 1150E keys and functions for default Agent key configuration

Key	Function
Activity key	Press the Activity key and enter the appropriate activity code to record the activity the agent is performing. This key is reserved for future implementation.
Feature key	The Feature key supports the assignment of any telephony feature. This key is reserved for future implementation.
Not Ready	Press the Not Ready key to exit the Automatic Call Distribution (ACD) queue without logging out.
Make Set Busy	Press the Make Set Busy key to log out of the ACD queue and agent position.
Supervisor	Press the Supervisor key to open a direct line between the agent IP Phone and the supervisor IP Phone.
Emergency	Press the Emergency key to place an emergency call to the Supervisor.

Supervisor key configuration

Table 52 "IP Phone 1150E keys and functions for Supervisor key configuration" (page 395) shows IP Phone 1150E components and functions for Supervisor key configuration. You can configure these keys for different functions.

Table 52
IP Phone 1150E keys and functions for Supervisor key configuration

Key	Function
Display Agents	Press the Dsply Agents key to obtain a summary of the current status of all agent positions.
Interflow	Press the Interflow key to forward calls to a predefined target queue when the call backlog, or the waiting time in the queue exceeds a set threshold.
Answer Emergency	Press the Ans Emerg key to join the agent in an emergency situation call.
Answer Agent	The Ans Agent key corresponds to the agent Supervisor key. Press the Ans Agent key to open the direct line between the Supervisor and the agent.
Call Agent	Press the Call Agent key to connect to an agent position.
Observe Agent	Press the Obv Agent key to monitor activity on the agent phone.

Services menu

Table 53 "Services menu" (page 396) shows the Services menu.

Table 53
Services menu

<p>Press the Services key to access the following items</p> <ul style="list-style-type: none">• Telephone Options<ul style="list-style-type: none">— Volume Adjustment— Contrast Adjustment— Language— Date/Time— Display diagnostics— Local Dialpad Tone— Set Info— Diagnostics— Headset Type— Call Log Options— Ring type— Call Timer— Call Indicator Light— Change Feature Key Label— Name Display Format— Live Dialpad• Virtual Office Login and Virtual Office Logout (if Virtual Office is configured)• Test Local Mode and Resume Local Mode (if Branch Office is configured)• Password Admin <p>If a call is presented while the user is manipulating an option, the IP Phone 1150E rings and the DN key flashes. However, the display is not updated with the Caller ID, and the programming text is not disturbed.</p> <p>The user can originate a call using Autodial or Last Number Redial while manipulating an option. However, the display is not updated with the dialed digits or the Caller ID, and Autodial and Last Number Redial intercept the dialpad.</p>
--

Local Tools menu

Table 54 "Local Tools menu" (page 397) shows the Local Tools menu.

Table 54
Local Tools menu

Press the Services key twice to access the Local Tools menu. The following items appear in the Local Tools menu

1. Preferences
 - a. Display Settings
 - b. Languages
 - c. Bluetooth Setup
2. Local Diagnostics
 - a. IP Set&DHCP Information
 - b. Network Diagnostic Tools
 - c. Ethernet Statistics
 - d. IP Network Statistics
 - e. USB Devices
3. Network Configuration
4. Lock Menu
 - a. Manual Secure Local Menu
 - b. Manual Partial Secure Menu
 - c. Manual Disable Secure Menu
 - d. DHCP Secure Menu
 - e. Lock Now

To make a selection, press the number associated with the menu item or use the navigation keys to scroll through the menu items. Press the Enter key to select the highlighted menu item.

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see "[Local Tools menu password protection](#)" (page 403).

Press the Quit/Stop key to exit from any menu or menu item.

For information about configuring IP Phone 1150E Local Tools menu, see [Appendix "Configuring the Local Tools menu"](#) (page 473).

Supported features

The IP Phone 1150E supports the following telephony features

- six self-labeled line/programmable feature keys with labels and indicators

Supports up to 12 DNs or features on two pages. Use the Shift/Outbox key to access the second page of DNs or features.

- four context-sensitive soft keys that provide access to a maximum of nine features

Functions for the context-sensitive soft keys are configured in LD 11.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

- seven specialized feature keys

- Copy
- Services
- Quit/Stop
- Shift/Outbox
- Inbox/Message
- Directory
- Feature key (reserved for future implementation)

- seven dedicated Automatic Call Distribution (ACD) fixed keys for default Agent key configuration with an integrated LED

- Supervisor Talk/Listen
- Emergency
- Supervisor
- Make Busy
- Not Ready
- In-Calls
- Activity (reserved for future implementation)

- eight dedicated ACD fixed keys for Supervisor key configuration with an integrated LED

- Supervisor Talk/Listen
- Display Agents
- Interflow
- Answer Emergency

- Answer Agent
- Call Agent
- Observe Agent
- In-Calls
- five call-processing fixed keys
 - Mute
 - Release
 - Expand
 - Hold
 - Volume increase/decrease
- Call Duration Timer
- ability to change user-defined feature key labels
- Corporate Directory
- Personal Directory
- Redial List
- Callers List
- Password Administration
- Virtual Office
- Branch Office
- Active Call Failover
- Enhanced UNISlim Firmware Download
- Live Dialpad

The IP Phone 1150E supports the following Data network features

- integrated Gigabit Ethernet switch for shared PC access
 - the LAN Ethernet port supports 10/100/1000 Mb/s Full Duplex mode
 - the PC Ethernet port supports 10/100/1000 Mb/s Full Duplex mode
 - automatic network configuration through DHCP
- For more information about automatic network configuration, see [Table 58 "IP Phone 1150E IP parameters" \(page 415\)](#).
- 802.1ab Link Layer Discovery Protocol (LLDP)

For more information about LLDP, [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).

- Secure Real-time Transport Protocol (SRTP) media encryption

For more information about SRTP media encryption, see ["Features overview" \(page 443\)](#).

- 802.1Q VLAN and 802.1p priority support, industry standards to manage bandwidth use
 - full VLAN capability, including a manageable integrated switch in the IP Phone; allows VLAN and priority tagging for the IP Phone traffic and VLAN tagging for PC traffic
 - VLAN filtering which allows the IP Phone to see Voice VLAN traffic only. The integrated switch passes DATA VLAN traffic to the PC Ethernet port. This prevents the Data VLAN broadcast traffic from reaching the IP Phone. For more information, see [Appendix "802.1Q VLAN description" \(page 461\)](#) and *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 802.1x Port-based network access control, industry standards to pass Extensible Authentication Protocol (EAP) over a LAN

For more information about 802.1x port-based network access control, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

- integrated hardware to support Power over Ethernet (PoE) for IEEE 802.3af Power Classification 3
- Gratuitous Address Resolution Protocol Protection (GARP)

The IP Phone 1150E supports the following user interface features

- graphical, high-resolution LCD display, backlit, with adjustable contrast
- USB port, to support USB devices
 - Powered downstream 1.1 compliant USB hubs are supported, including USB 2.0 hubs, if they offer USB 1.1 backwards compliancy.
- Hearing Aid Compatibility (HAC) as per FCC Part 68
- wireless device support (Agent port, *only*) through Bluetooth® 1.2 compliant Audio Gateway Headset Profile
- External Application Server (XAS)
- Graphical External Application Server (GXAS)
- language support: English, French, Swedish, Danish, Norwegian, German, Greek, Dutch, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, Turkish, and Katakana

With the appropriate downloaded fonts, the IP Phone supports Arabic, Chinese Simplified, Chinese Traditional, Hebrew, Japanese, and Korean. For more information about language support, see [Appendix "Language enhancement" \(page 545\)](#).

- Expansion Module for IP Phone 1100 Series (Expansion Module)

For more information about the Expansion Module, see ["Expansion Module for IP Phone 1100 Series" \(page 431\)](#).

Features not currently supported

The following features are not supported on the IP Phone 1150E

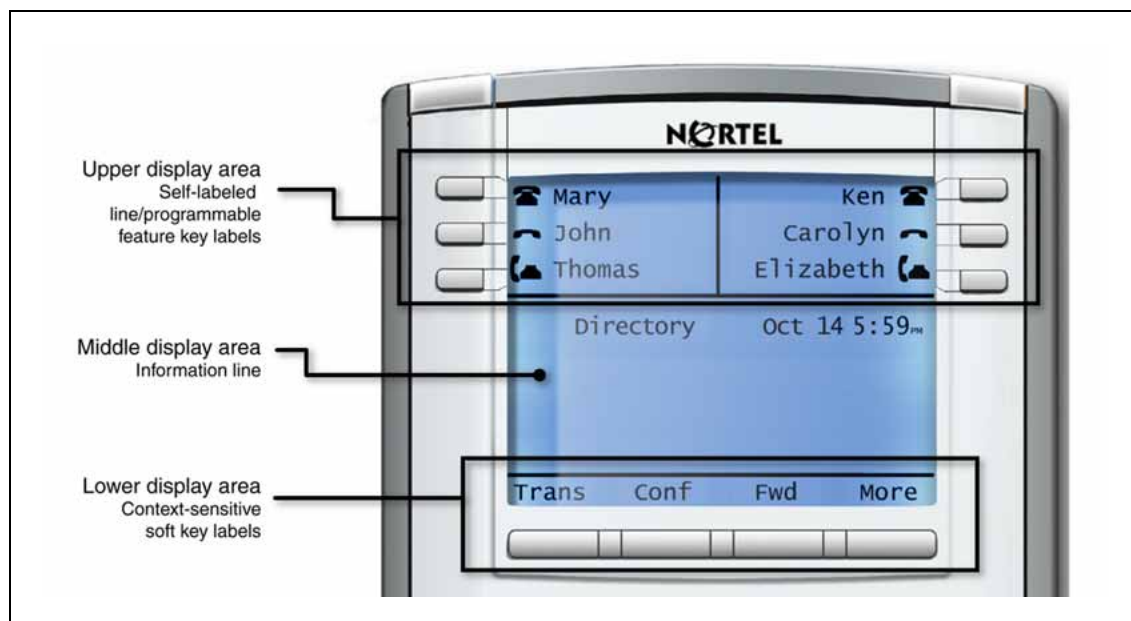
- Group Listening
- Set-to-Set messaging
- dedicated handset port
- handsfree operation

Display characteristics

An IP Phone 1150E has three major display areas

- ["Self-labeled line/programmable feature key label" \(page 402\)](#)
- ["Information line display" \(page 402\)](#)
- ["Context-sensitive soft key labels" \(page 402\)](#)

Figure 45
IP Phone 1150E display area



Self-labeled line/programmable feature key label

The self-labeled line/programmable feature key label area displays a 10-character string for each of the six self-labeled line/programmable feature keys. Each self-labeled line/programmable feature key includes the key label and an icon. The icon state can be on, off, or flashing. A telephone icon displays the status of the configured DN. Key labels are left-aligned for keys on the left side of the screen, and right-aligned for keys on the right side of the screen. To change the self-labeled line/programmable feature key label, press the Services key to access Telephone Options > Change Feature key label option. For more information about changing the feature key label, see the *IP Phone 1150E User Guide (NN43114-100)*.

If a label is longer than 10 characters, the last 10 characters are displayed, and the excess characters are deleted from the beginning of the string.

Information line display

An IP Phone 1150E has a four-line information display area with the following information

- caller number
- caller name
- feature prompt strings
- user-entered digits
- date and time information (if the IP Phone is in an idle state), or Call Timer (if provisioned in the Telephone options menu)

The information in the display area changes, according to the call-processing state and active features.

Context-sensitive soft key label

The context-sensitive soft key label has a maximum of seven characters. Each soft key includes the soft key label and an icon. When a soft key is in use, a triangle icon displays at the beginning of the soft key label, and the label shifts one character to the right. (If the label is six characters in length, the last, or rightmost character is truncated.) If a feature is enabled, the icon state turns to On. It remains in the on state until the feature key is pressed again. This cancels the enabled feature and turns the icon off, returning the soft key label to its original state.

Use the More soft key to navigate through the layers of functions. If there are only four functions assigned to the soft keys, the More key does not appear, and all four functions are displayed.

Cleaning the IP Phone display screen

Gently wipe the IP Phone display screen with a soft, dry cloth.

**CAUTION**

Use no any liquids or powders on the IP Phone. Using anything other than a soft, dry cloth can contaminate IP Phone components and cause premature failure.

Headset support

Press the Services key to open the Telephone Options menu and to access the Headset Type menu item.

The IP Phone 1150E supports the following headsets

- Type 1: Plantronics P251N, P261N, CS55, Voyager 510S
- Type 2: GNNetcom GN 2120 NCD, GN9120 Flex
- GNNetcom Liberation

Local Tools menu password protection

If the SECUREMENU parameter was set during Full DHCP configuration, the Local Tools menu is locked to prevent accidental or unwanted changes. You are prompted to enter the fixed password 26567*738 (color*set) whenever the Services key is double-pressed, or whenever the Local Diagnostics and Network Configuration sub menus are accessed.

If the PARTSECURE parameter was set during Full DHCP configuration, you are prompted to enter the fixed password whenever you access 2. Local Diagnostics, or 3. Network Configuration menu items from the Local Tools menu. You are always prompted to enter the fixed password whenever you access the 4. Lock Menu sub menu.

There are two ways to control the menu lock

- DHCP Secure Menu option—the IP Phone processes the secure menu setting retrieved from the Full DHCP response.
- Lock Menu option—double-press the Services key to access the Local Tools menu. Press 4 on the dialpad to access the Lock Menu items, or use the up/down navigation keys to scroll and highlight one of the following Lock Menu options
 - 1. Manual Secure Local Menu
 - 2. Manual Partial Secure Menu
 - 3. Manual Disable Secure Menu
 - 4. DHCP Secure Menu
 - 5. Lock Now

The settings configured in the Lock Menu sub menu override the settings received from the DHCP string.

For more information about 4. Lock Menu manual user settings, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Configuring Secure Local Menu through Full DHCP

Password protection is enabled during Full DHCP configuration if the SECUREMENU parameter, or the PARTSECURE parameter are present at the end of the S4 part of the Full DHCP string. If neither the SECUREMENU parameter, nor the PARTSECURE parameter is present, password protection is not enabled.

The SECUREMENU/PARTSECURE item is an optional parameter. If it is present, then the full S4 string needs to be present, including the action and retries. The S4 string is already present if the XAS support has been configured through the DHCP. If XAS is not configured, you can still enable password protection by setting the S4 IP address to 0.0.0.0 and by setting the other fields to 0.

ATTENTION

With Full DHCP, the vendor-specific or site-specific options must be configured depending on the customers DHCP server configuration.

For further information about configuring Full DHCP, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Accessing the Local Tools menu

After you enter the password, the Local Tools menu remains active for 5 minutes. You can freely navigate, exit and reenter the Local Tools menu without being prompted to reenter the password. To reset the timer before the 5-minute time expires, double-press the Services key.

You can also press the 5 key to select the Lock Now item from the Lock Menu. The Lock Now item immediately exits the Local Tools menu, closes any open Local Tools menu pages, and locks the Local Tools menu. Alternatively, when time expires, the Local Tools menu and any open submenus are closed. Double-press the Services key to open the password prompt window to reaccess the Local Tools menu.

If you enter an incorrect password, the Local Tools menu does not open. Double-press the Services key to open the password prompt window. Only three incorrect password entries are allowed. Any entry after the three

attempts is ignored for 5 minutes. The password prompt window is visible and you can reenter the password but the password is not processed until the 5-minute time expires.

Some text appears dimmed depending on the current state of the menu lock and the configuration of the IP Phone. Only configuration options that are enabled from the current state appear active. Menu options that are not available appear dimmed.

For more information about configuring the Local Tools menu for the IP Phone 1150E, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

Key number assignments

This section describes the following keys supported on the IP Phone 1150E

- ["Self-labeled line/programmable feature keys" \(page 405\)](#)
- ["ACD fixed feature keys" \(page 405\)](#)
- ["Soft keys" \(page 406\)](#)

Self-labeled line/programmable feature keys

The IP Phone 1150E has six self-labeled line/programmable feature keys, which can support up to 12 DNs or features on two pages. When a call is presented on a feature key which is not currently shown, the message *Shift for Call* appears in the display area. Press the Shift/Outbox key to access the second page of a feature or DNs, or to access any Expansion Module 1100s attached to the phone.

The six self-labeled line/programmable feature keys are numbered 0-5 for the first key page, and 6 to 11 for the second key page.

When key 0 is programmed as the ACD In-Calls key, the default features are assigned to the Automatic Call Distribution (ACD) fixed keys.

ACD fixed feature keys

Key numbers 12 to 15 are used for the ACD fixed features. See [Table 55 "ACD default Agent fixed feature keys" \(page 406\)](#) for a list of the ACD default Agent fixed feature keys or [Table 56 "Supervisor fixed feature keys" \(page 406\)](#) for a list of Supervisor fixed feature keys.

For a description of supported call features, see [Appendix "Call features" \(page 563\)](#).

Table 55
ACD default Agent fixed feature keys

Key number	Response	Description
Key 12	NRD	Not Ready
Key 13	MSB	Make Set Busy
Key 14	ASP	Call Supervisor
Key 15	EMR	Emergency

The In-Calls key mirrors the programming of key 0; it is not separately programmable.

Table 56
Supervisor fixed feature keys

Key number	Response	Description
Key 12	OBV	Observe Agent
Key 13	RAG	Call Agent
Key 14	AAG	Answer Agent
Key 15	AMG	Answer Emergency

Soft keys

You can assign a maximum of nine functions to the four soft-labeled, predefined soft keys. Because the soft keys are predefined, the user cannot change the key number assignment. Functions are assigned to the soft keys in layers in LD 11.

The Message Waiting key is numbered 16.

Functions mapped to key numbers 17 to 26 are assigned to the four soft keys. Labels for the soft keys appear in the display area. For further information, see ["Context-sensitive soft key label" \(page 402\)](#). [Figure 45 "IP Phone 1150E display area" \(page 401\)](#) shows the IP Phone 1150E display area.

Key number mappings at the Call Server align with the IP Phone 2004.

For a description of the IP Phone function assignment for each soft key, see [Appendix "IP Phone context-sensitive soft keys" \(page 561\)](#).

Package components

The IP Phone 1150E includes integrated support for a number of Power over Ethernet options, including support for IEEE 802.3af Power Classification 3.

Table 57 "IP Phone 1150E component list" (page 407) lists the IP Phone 1150E package components and product codes.

Table 57
IP Phone 1150E component list

IP Phone 1150E package contents includes		
<ul style="list-style-type: none"> • IP Phone 1150E • 2.1 m (7-ft) CAT5 Ethernet cable • Getting Started Card <p>If you are using local power, the approved Nortel global power supply and a standard local power cord must be ordered separately.</p>		
IP Phone 1150E with Agent icon keycaps	NTYS06AA	
IP Phone 1150E with English keycaps	NTYS06BA	
IP Phone 1150E with Supervisor icon key caps	NTYS15AAE6	
Replacement parts		
Footstand kit, Charcoal	NTYS11BA70	
2.1 m (7-ft) CAT5 Ethernet cable	NTYS13AA	
Accessories		
Key cap removal tool	NTNM19AA	
Expansion Module for IP Phone 1100 Series	NTYS08AA	
Power adapter		
Global power supply	N0089601	
IEC cable	RoHS	Non-RoHS
1.8 m (5.9 ft), 10 amp, IEC320-C13 North America	NTYS14AAE6	NTYS14AA
2.4 m (8 ft), 240 VAC 10 amp, ANZ power cord AS-3, Australia, New Zealand	N/A	NTTK15AA
250 VAC, Option 11C Standard European power cord, Other EMEA, Kenya, Korea, Thailand, Indonesia, Vietnam, India, Pakistan	NTTK16ABE6	NTTK16AB
3 m (9.9 ft) 125 VAC, Option 11C Swiss power cord Switzerland	NTTK17ABE6	NTTK17AB

240 VAC, Option 11C UK power cord Hong Kong, Ireland, United Kingdom, Singapore, Malaysia, Bangladesh, Brunei, Sri Lanka	NTTK18ABE6	NTTK18AB
3 m (9.9 ft), 125 VAC, Option 11C Denmark power cord Denmark	NTTK22ABE6	NTTK22AB
Argentina	N/A	A0814961
1.8 m (5.9 ft), 10 amp, IEC320-C13 Japan	NTTK26AAE6	N/A

Installation and configuration

The following sections provide a step-by-step guide to install and configure the IP Phone 1150E

- ["Before you begin" \(page 408\)](#)
- ["First-time installation" \(page 408\)](#)
- ["Configuring the IP Phone 1150E" \(page 409\)](#)
- ["Startup sequence" \(page 415\)](#)
- ["Installing the IP Phone 1150E" \(page 415\)](#)

Before you begin

Before installing the IP Phone 1150E, complete the following pre-installation checklist

- Ensure one IP Phone 1150E boxed package exists for each IP Phone 1150E you install. The package contains
 - IP Phone 1150E
 - 2.1 m (7-ft) CAT5 Ethernet cable
 - Getting Started Card
- Ensure one Software License exists for each IP Phone 1150E you install.
- Ensure the host Call Server is equipped with a voice Gateway Media Card and a Signaling Server with the Line TPS application.
- If an AC power adapter is required, ensure the approved Nortel global power supply (model number N0089601) is used. See [Table 57 "IP Phone 1150E component list" \(page 407\)](#).

First-time installation

You must first install an IP telephony node with the Communication Server. For information about installing an IP telephony node, see *Signaling Server Installation and Commissioning (NN43001-312)* or *IP Line Fundamentals (NN43100-500)*.

**CAUTION****Damage to Equipment**

Do not plug your IP Phone 1150E into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1150E

You must configure the IP Phone 1150E before you can use it. Use [Procedure 80 "Configuring an IP Phone 1150E" \(page 409\)](#) to configure the IP Phone 1150E for the first time.

Procedure 80**Configuring an IP Phone 1150E****Step Action**

- | Step | Action |
|------|--|
| 1 | Configure a virtual loop on the Call Server using LD 97.

For more information about configuring a virtual loop, see <i>IP Line Fundamentals (NN43100-500)</i> and <i>Software Input Output Administration (NN43001-611)</i> . |
| 2 | Configure the IP Phone 1150E on the Call Server using LD 11. At the prompt, enter the following: |

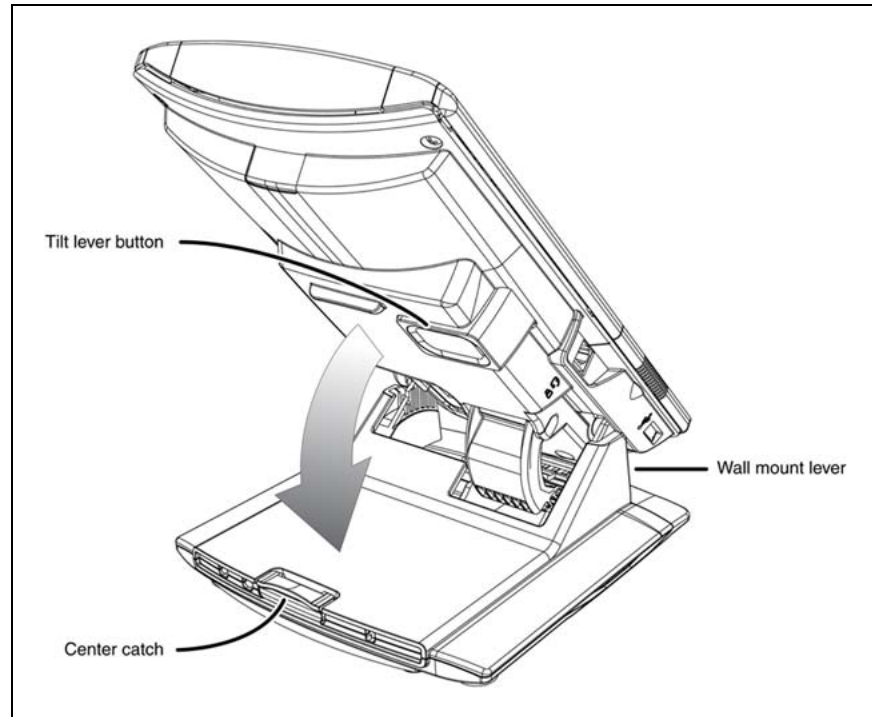
```
REQ: chg
TYPE: 1150
```

For more information about configuring the IP Phone 1150E using LD 11, see *Software Input Output Administration (NN43001-611)*.

**CAUTION**

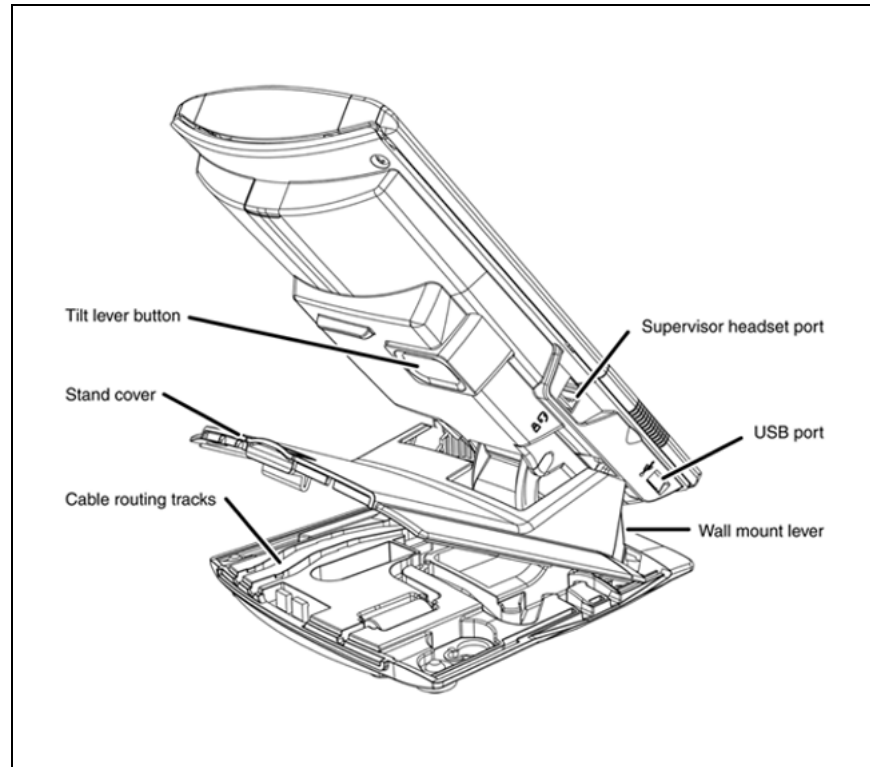
The IP Phone 1150E is shipped with the stand locked in position. To avoid damaging the IP Phone, press the wall-mount lever located under the base to release the stand and pull it away from the phone.

Figure 46
Release the IP Phone 1150E from the stand



- 3** Remove the stand cover. Pull upward on the center catch and remove the stand cover. The cable routing tracks are now accessible. See [Figure 47 "Remove the stand cover"](#) (page 411).

Figure 47
Remove the stand cover



- 4 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable, and then thread the adapter cord through the channels in the stand.



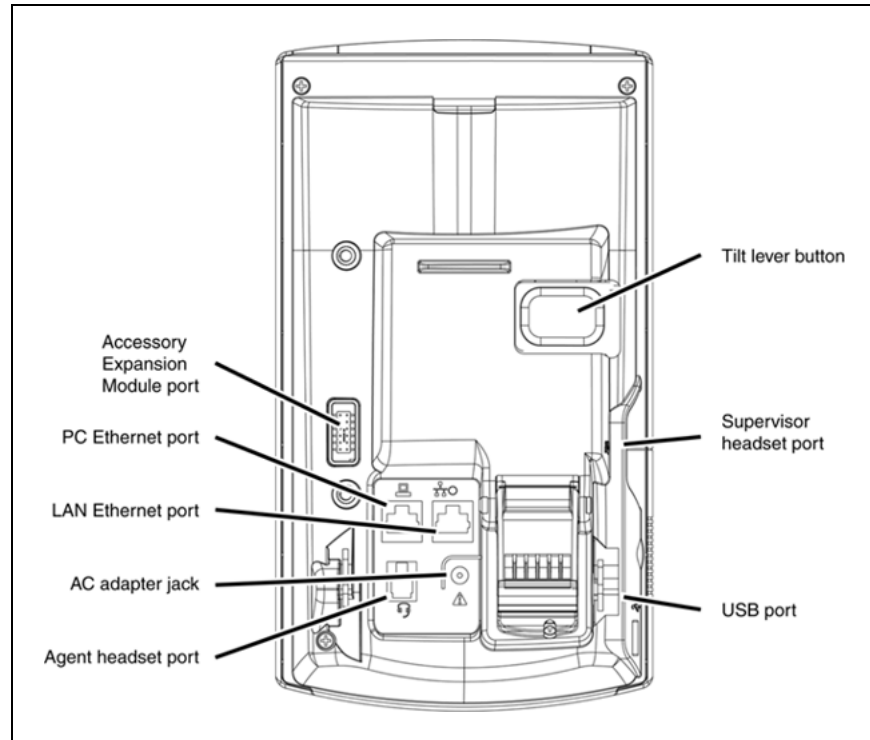
WARNING

Use your IP Phone 1150E with the approved Nortel global power supply (model number N0089601).

The IP Phone 1150E supports both AC power and Power over Ethernet options, including IEEE 802.3af Power Classification 3. To use Power over Ethernet, where power is delivered over the CAT5 cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately.

You must use CAT5e (or later) cables if you want to use Gigabit Ethernet.

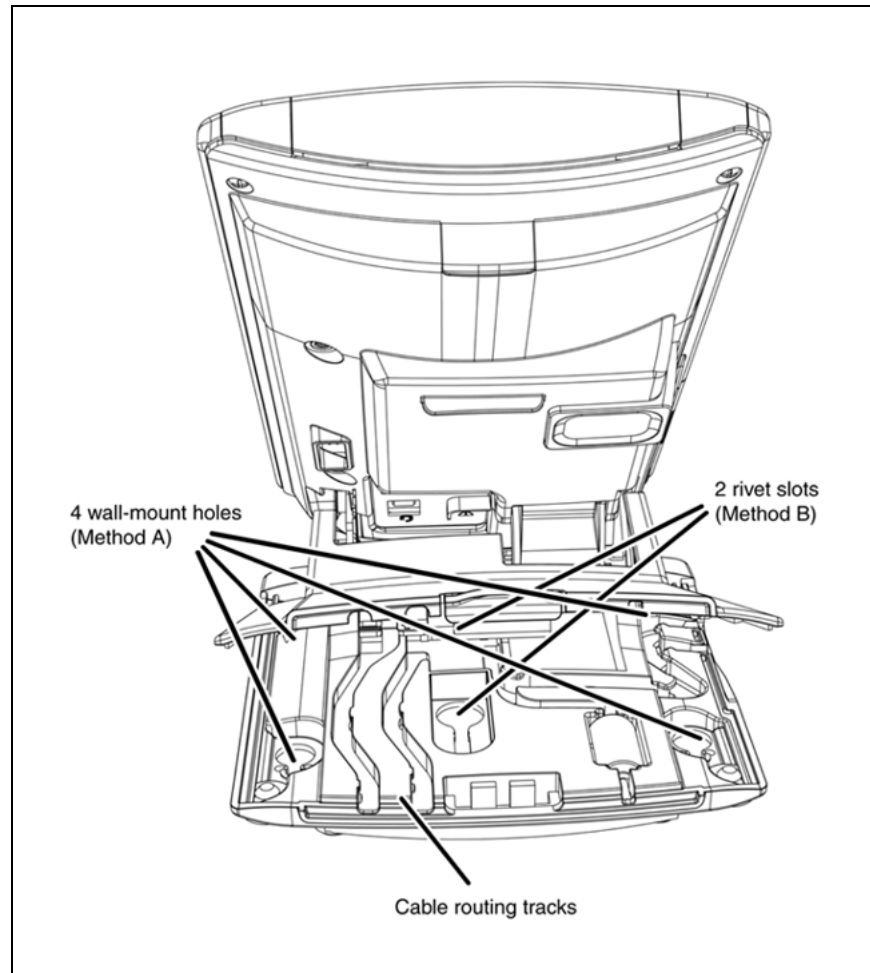
Figure 48
IP Phone 1150E connections



- 5 Install the headset. If you are installing a headset, plug the connector into the RJ-9 headset jack, and thread the headset cord along with the handset cord through the channels in the stand, so that the headset cord exits the channel.

Although a handset cord channel appears on the base of the IP Phone 1150E, the IP Phone 1150E does not support a handset port.

Figure 49
Cable routing tracks



- 6** Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5 connector (LAN Ethernet port), and thread the network cable through the channel.
- 7** If you are connecting your PC through the phone, a second CAT5 cable is required. Only one cable is included with the IP Phone 1150E package. Install the Ethernet cable connecting the PC to the phone (optional). Connect one end of the PC Ethernet cable to your phone using the CAT5 connector (PC Ethernet port) and thread it through the channel. Connect the other end to the LAN connector on the back of your PC.

**CAUTION****Damage to Equipment**

Do not plug any device into your IP Phone 1150E Ethernet port other than a PC. The IP Phone 1150E does not support multiple devices connected through the PC Ethernet port.

- 8 Connect additional cables. If applicable, plug in optional USB devices. Connect the Ethernet cable to the LAN Ethernet connection. If you are using an AC power adapter, plug the adapter into an AC outlet.

Complete steps 1 to 6, as needed, before wall-mounting the IP Phone.
- 9 Wall-mount your phone (optional). Use Method A or Method B to wall-mount the IP Phone. See Method A—using the mounting holes on the bottom of the phone stand, or Method B—using the traditional-style wall-mount box with a CAT5 connector and a 15 cm (6 inch) CAT5 cord (not provided).
 - Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see Remove the stand cover), mark the wall-mount holes by pressing the bottom of the stand cover firmly against the wall in the location where you wish to install the phone. Four small pins on the bottom of the stand cover make the marks on the wall. Use the marks as a guideline to install the wall-mount screws (not provided). See [Figure 49 "Cable routing tracks" \(page 413\)](#).

Install the screws so that they protrude 3 mm (1/8 inch) from the wall, and then install the phone stand mounting holes over the screw heads. You may need to remove the phone from the wall to adjust the lower screws. When the lower screws are snug, install the phone on the mounting screws, and then tighten the top screws.
 - Method B: Attach the 15 cm (6 inch) CAT5 cable, position the stand over the mounting rivets, and slide the phone down the wall so that the rivets fit into the slots on the stand. See [Figure 49 "Cable routing tracks" \(page 413\)](#).
- 10 Replace the stand cover. Ensure that all cables are neatly routed and press the stand cover into place until you hear a click.
- 11 If you wall-mount the phone, put it in the wall-mount position by holding the tilt lever and press the phone towards the base until the

phone is parallel with the base. Release the tilt lever and continue to push the phone towards the base until you hear a click. Ensure the phone is securely locked in to position.

—End—

Startup sequence

When an IP Phone 1150E connects to the network, it must perform a startup sequence. The elements of the startup sequence include

- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- connecting to the Call Server
- obtaining a User ID

See [Table 58 "IP Phone 1150E IP parameters" \(page 415\)](#) for a summary of the IP parameters and how they are obtained.

Table 58
IP Phone 1150E IP parameters

Parameter	Method of acquisition
VLAN ID	Manually entered or automatically obtained through DHCP, and LLDP.
IP Address	Manually entered or automatically obtained through Partial or Full DHCP.
Net Mask	Manually entered or automatically obtained through Partial or Full DHCP.
Default Gateway address	Manually entered or automatically obtained through Partial or Full DHCP.
Connect Server (IP address, port, action and retry count—primary and secondary)	Manually entered or automatically obtained through Full DHCP.
User ID (Node ID, Node Password and TN)	Manually entered for first-time configuration. Obtained from local storage on subsequent power cycles.

Installing the IP Phone 1150E

To install the IP Phone 1150E, use [Procedure 81 "Installing the IP Phone 1150E " \(page 416\)](#).

ATTENTION**Timing information**

There are approximately 45 seconds between plugging in the IP Phone 1150E power adapter and the appearance of the text Nortel. When you see the text Nortel on the phone, you have 1 second to respond by pressing the four soft keys at the bottom of the display in sequence from left to right, one at a time. If you miss the 1-second response time, the IP Phone 1150E attempts to locate the connect server. You can begin the power-up sequence again, or you can double-press the Services key to open the Local diagnostic utilities to access the IP Phone settings. See [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

If you are prompted to enter a password when you double-press the Services key, password protection is enabled. For more information about password protection, see ["Local Tools menu password protection" \(page 403\)](#).

Procedure 81**Installing the IP Phone 1150E****Step Action**

- 1** When the Nortel logo appears in the middle of the display, immediately press the four soft keys at the bottom of the display in sequence from left to right. The **3. Network Configuration** menu opens.

You can press the **Apply&Reset** soft key to save the following settings and to reset the IP Phone. You can press the **Exit** soft key exit the menu to exit the menu without saving any changes and return to the **3. Network Configuration** menu.

When the **3. Network Configuration** menu opens, the **Enable 802.1x (EAP)** check box is highlighted.

- 2** Press the **Enter** key to switch this item on and off. A check mark appears to indicate the item is active.

If 802.1x Authentication is enabled, press the **Enter** key to start the edit mode. Use the dialpad to fill in the following information

- Device ID
- Password
- Retype password

For further information about 802.1x Authentication, see [Appendix "802.1x Port-based network access control" \(page 469\)](#).

If you do not enable 802.1x Authentication, you are not prompted to enter Device ID and Password.

- 3 Use the **Right** navigation key to scroll and highlight **Enable 802.1x (LLDP Enable)**. check box.
For information about 802.1x Authentication, see [Appendix "802.1ab Link Layer Discovery Protocol" \(page 471\)](#).
- 4 Use the **Right** navigation key to scroll and highlight **DHCP** list.
- 5 Press the **Enter** key.
- 6 Press the **Down** navigation key to open list box.
- 7 Use the **Up/Down** navigation keys to scroll and highlight one of the following DHCP options
 - No—disable DHCP support and enter IP network information manually.
 - Partial—IP network information (IP address, network mask, and gateway address) are provided by the DHCP server. Enter Server 1 IP address, Server 2 IP address, Port, Action, Retry, and PK numbers manually.
 - Full—IP network information, Server 1 IP address, Server 2 IP address, and XAS information are provided by the DHCP server. All items are dimmed to prevent manual entry.

A DHCP server and DHCP relay agents must also be installed, configured, and running if you choose Partial DHCP, or Full DHCP configuration.

For more information about how to set up DHCP servers for use with the IP Phones, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.
- 8 Press the **Enter** key.
- 9 Use the **Right** navigation key to scroll and highlight **SET IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
Set IP—a valid IP Phone 1150E IP address
- 10 Use the **Right** navigation key to scroll and highlight **NET MASK**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:
Net Mask—a subnet mask
- 11 Use the **Right** navigation key to scroll and highlight **Gateway**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:

Gateway—the default gateway for the IP Phone 1150E on the LAN segment to which it connects

- 12** Use the **Right** navigation key to scroll and highlight **S1 IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information:

S1 IP—the primary CS 1000 node IP address for the IP Phone 1150E

- 13** Use the **Right** navigation key to scroll and highlight **Port**.

S1 Port—a fixed value of 4100

- 14** Use the **Right** navigation key to scroll and highlight **S1 Action**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information. Choose one of the following

- for TPS only, enter 1
- for TPS and Secure Multimedia Controller, enter 6 or 1

For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.

- 15** Use the **Right** navigation key to scroll and highlight **Retry**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information.

Retry—the number of times the IP Phone 1150E attempts to connect to the server

- 16** Use the **Right** navigation key to scroll and highlight **S1 PK**.

S1 PK—the Private key of the Secure Multimedia Controller to which the IP Phone connects

- 17** Press the **Enter** key to start the edit mode.

To manually configure the PK, set DHCP to Partial or None. S1 PK Default is ffffffff.

If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.

To enter ALPHA digits, use a USB keyboard to enter the following:

- # 1 = A
- # 2 = B
- # 3 = C
- # 4 = D
- # 5 = E
- # 6 = F

- 18** Use the **Right** navigation key to scroll and highlight **S2 IP**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information.
- S2 IP—the secondary CS 1000 node IP address for the IP Phone 1150E
- The IP Phone 1150E can support a primary (S1) and secondary (S2) connect server. If you require IP Phones to register on multiple nodes, see *IP Line Fundamentals (NN43100-500)*
- 19** Use the **Right** navigation key to scroll and highlight **Port**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information.
- Port—same as S1 port
- 20** Use the **Right** navigation key to scroll and highlight **S2 Action**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information. Choose one of the following
- for TPS only, enter 1
 - for TPS and Secure Multimedia Controller, enter 6 or 1
- For more information about Secure Multimedia Controller, see *Secure Multimedia Controller Implementation Guide (NN43001-325)*.
- 21** Use the **Right** navigation key to scroll and highlight **Retry**. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information.
- Retry—same as S1
- 22** Use the **Right** navigation key to scroll and highlight **S2 PK**.
- S2 PK—the Private key of the alternate Secure Multimedia Controller to which the IP Phone connects.
- 23** Press the **Enter** key to start the edit mode.
- To manually configure the PK, set DHCP to Partial or None. S2 PK Default is ffffffff.
- If you use a Secure Multimedia Controller, enter a 16-digit hexadecimal number.
- To enter ALPHA digits, use a USB keyboard to enter the following:
- # 1 = A
 - # 2 = B
 - # 3 = C
 - # 4 = D
 - # 5 = E

6 = F

- 24** Use the **Right** navigation key to scroll and highlight **Ntwk Port Speed** box. Press the **Down** navigation key to open the list box.
- Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- Auto—Link speed is autonegotiated with the network device
 - 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the network
 - 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the network
- 25** Use the **Right** navigation key to scroll and highlight **Ntwk Port Duplex** box. Press the **Down** navigation key to open the list box.
- The **Ntwk Port Duplex** option appears dimmed if **Ntwk Port Speed** is set to Auto.
- Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- Auto—Duplex mode is autonegotiated with the network
 - Force Full—Duplex mode is forced to Full Duplex on the network
 - Force Half—Duplex mode is forced to Half Duplex on the network
- 26** Use the **Right** navigation key to scroll and highlight **Disable Voice 802.1Q** check box. Press the **Enter** key to switch this item on and off.
- 27** Use the **Right** navigation key to scroll and highlight **VoiceVLAN** box. Press the **Down** navigation key to open the list box.
- 28** Use the **Up/Down** navigation keys to scroll and highlight one of the following options
- No VLAN
 - DHCP—VLAN ID is configured automatically to one of the values received from the DHCP server
 - LLDP MED—VLAN ID is configured automatically to the value received from 802.1ab LLDP
 - LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
 - Manual

If LLDP is disabled, LLDP MED and LLDP VLAN Name modes do not appear in the list. If DHCP is disabled, DHCP does not appear in the list.

- 29 Use the **Right** navigation key to scroll and highlight **VLAN Filter** check box.

VLAN Filter appears dimmed if **Disable Voice 802.1Q** check box is selected.

If the VLAN Filter is enabled, packets destined for the IP Phone port are filtered on their MAC address and their VLAN tag. Untagged VLAN packets and tagged VLAN packets that differ from the Telephony VLAN ID are prevented from reaching the IP Phone port.

For information about VLAN tagging, [Appendix "802.1Q VLAN description" \(page 461\)](#).

- 30 Use the **Right** navigation key to scroll and highlight **Ctrl Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **11**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

Ctrl Priority Bits option appears dimmed if **Disable Voice 802.1Q** check box is selected.

- 31 Use the **Right** navigation key to scroll and highlight **Media Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **11**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

Media Priority Bits option appears dimmed if **Disable Voice 802.1Q** check box is selected.

- 32 Use the **Right** navigation key to scroll and highlight **Disable PC Port** check box. Press the **Enter** key to switch this item on and off.

- 33 Use the **Right** navigation key to scroll and highlight **PC Port Speed** box. Press the **Down** navigation key to open the list box.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—Link speed is autonegotiated with the attached PC
- 10BT Full—Link speed is available for up to 10 Megabit Full Duplex on the PC port.
- 100BT Full—Link speed is available for up to 100 Megabit Full Duplex on the PC port.

- 34 Use the **Right** navigation key to scroll and highlight **PC Port Duplex** box. Press the **Down** navigation key to open the list box. Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—Duplex mode is autonegotiated with the attached PC
- Force Full—Duplex mode is forced to Full Duplex on the PC
- Force Half—Duplex mode is forced to Half Duplex on the PC

PC Port Duplex appears dimmed if the **PC Port Speed** option is set to Auto.

35 Use the **Right** navigation key to scroll and highlight **Disable Data 802.1Q** check box. Press the **Enter** key to switch this item on and off.

36 Use the **Right** navigation key to scroll and highlight **DataVLAN** box. Press the **Down** navigation key to open the list box.

The **DataVLAN** option appears dimmed if **Disable Data 802.1Q** check box is selected.

Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- No VLAN
- LLDP VLAN Name—VLAN ID is configured automatically to the value received from 802.1ab LLDP
- VLAN ID value—manual selection of VLAN ID from 1 to 4094

If LLDP is disabled, LLDP VLAN Name does not appear in the list.

37 Press the **Enter** key.

38 Use the **Right** navigation key to scroll and highlight **Data Priority Bits** box. Press the **Down** navigation key to open the list box. Select **Auto** (default), **1**, **2**, **3**, **4**, **5**, **6**, or **7** from the list.

39 Use the **Right** navigation key to scroll and highlight **PC-Port Untag All** check box. Press the **Enter** key to switch this item on and off.

The **PC-Port Untag All** option appears dimmed if **Disable Data 802.1Q** check box is selected.

40 Use the **Right** navigation key to scroll and highlight **Cached IP** check box. Press the **Enter** key to switch this item on and off.

41 Use the **Right** navigation key to scroll and highlight the **Enable PSK SRTP** check box. Press the **Enter** key to switch this item on and off.

The SRTP media encryption feature provides encrypted media. A preshared secret is embedded in the Nortel IP Phone to generate and to exchange encryption parameters without any Call Server involvement.

For further information about the SRTP media encryption feature, ["Media security" \(page 447\)](#).

- 42** Use the **Right** navigation key to scroll and highlight **Ignore GARP** check box. Press the **Enter** key to switch this item on and off.

The GARP feature protects the IP Phone from a Gratuitous ARP Spoof attack from the network.

For more information about GARP, see ["Gratuitous Address Resolution Protocol Protection " \(page 427\)](#).

- 43** If an External Application Server (XAS) is available in the network, use the **Right** navigation key to scroll and highlight the **XAS IP** list. Use the dialpad to enter the XAS IP address.

The XAS delivers business applications to the IP Phone. For more information about XAS, see Nortel Application Gateway 1000 documentation.

- 44** If the XAS supports graphical displays, use the **Right** navigation key to scroll and highlight **Graphical XAS** check box. Press the **Enter** key to switch this item on and off.

- 45** Use the **Right** navigation key to scroll and highlight **Port** list. Press the **Enter** key to start the edit mode. Use the dialpad to fill in the information.

- 46** Use the **Right** navigation key to scroll and highlight **Enable Bluetooth** list. Press the **Enter** key. Press the **Down** navigation key to open the list box.

Only the Agent port supports Bluetooth wireless technology.

- 47** Use the **Up/Down** navigation keys to scroll and highlight one of the following options

- Auto—(default) Bluetooth wireless technology setting received through TFTP configuration
- Yes—Bluetooth wireless technology is enabled on the IP Phone
- No—Bluetooth wireless technology is disabled on the IP Phone

For further information about Bluetooth wireless technology, [Appendix "Bluetooth wireless technology" \(page 531\)](#).

- 48** Upgrade the IP Phone 1150E firmware.

Use the **Right** navigation key to scroll and highlight **TFTP IP** list. The IP Phone 1150E supports remote firmware upgrades through a TFTP process and an automated UFTP process.

The method to upgrade the firmware depends on the following Call Server software

- For Succession Release 3.0 or CS 1000 Release 4.0, the TFTP Server is required to download the current firmware. Enter the TFTP Server IP address at the prompt.
- For CS 1000 Release 4.5, use either a TFTP Server to upgrade the firmware (at the prompt accept the default entry of 0.0.0.0) or UFTP to download the current firmware.
- For CS 1000 Release 5.0, a Signaling Server provides the firmware for the IP Phones. Check the Nortel Web site at www.nortel.com for updated firmware files.

For Succession Release 3.0 and CS 1000 Release 4.0, the IP Phone 1150E searches for the TFTP Server for firmware upgrade. If the file name specified in 1150e.cfg is not the same as the current firmware, the IP Phone downloads the file and upgrades the firmware. This takes several minutes. When the upgrade is complete, the IP Phone 1150E reboots.

For further information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

The Enhanced UNISlim firmware download is supported on CS 1000 Release 4.5 or later. The Enhanced UNISlim firmware download feature for IP Phones improves the delivery of new firmware to IP Phones. For further information about Enhanced UNISlim Firmware Download, see *IP Line Fundamentals (NN43100-500)*.

For information about the IP Phone firmware upgrade using Element Manager, see *Element Manager System Reference—Administration (NN43001-632)*.

The IP Phone 1150E searches for the connect server.

- 49** The IP Phone 1150E registers with the Terminal Proxy Server (TPS) and, if needed, begins the firmware download. This takes several minutes. When download is complete, the IP Phone 1150E resets .

The current system date and time appear on the top line of the display when the configuration is complete. Self-labeling keys also appear.

- 50** Check for a dial tone and the correct DN on the display.

- 51** (Optional) Customize the feature keys as required. For more information, see *Software Input Output Administration (NN43001-611)* and the *IP Phone 1150E User Guide (NN43114-100)*.

—End—

Full Duplex mode

In the Configuration menu, autonegotiate mode is the default setting for initial startup. Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results. No intervention is required under normal operation.

Changing the speed and changing duplex mode on the phone changes both the LAN Ethernet port and PC Ethernet Port interfaces.

ATTENTION

Nortel recommends that autonegotiate mode is used on the network and the IP Phone. Use Full Duplex mode only when the network is forced Full Duplex for 100BT Full Duplex mode; otherwise, a duplex mismatch results.

If the IP Phone connects to a network configured for Full Duplex mode only, the IP Phone cannot automatically negotiate the proper configuration. Therefore, in this instance, to allow the IP Phone to work at the optimum speed and duplex mode, Full Duplex mode must be enabled.

Use [Procedure 82 "Enabling Full Duplex mode" \(page 425\)](#) to enable Full Duplex mode.

Procedure 82 Enabling Full Duplex mode

Step	Action
1	Double-press the Services key to open the Local Tools menu.
2	Press 3 on the dialpad to access the Network Configuration menu or use the Up/Down navigation keys to scroll and highlight the Network Configuration option.
3	Use the Right navigation key to scroll and highlight the Duplex list.
4	Press Enter to start the edit mode.
5	Press the Down navigation key to open list box.
6	Use the Up/Down navigation keys to scroll and highlight one of the following options <ul style="list-style-type: none"> • 10BT Full—10 BT Full Duplex mode • 100BT Full—100 BT Full Duplex mode

- 7 Press **Enter** to exit the edit mode.
- 8 Press the **Apply&Reset** soft key to save the changes and to restart the IP Phone 1150E. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

—End—

When the IP Phone restarts, the firmware reads the setting for Full Duplex mode and sets the LAN Ethernet port, PC Ethernet port, duplex, and speed accordingly.

Use the following procedure to confirm activation of Full Duplex mode.

Procedure 83
Checking Ethernet Statistics

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

- | | |
|---|--|
| 1 | Double-press the Services key to open the Local Tools menu. |
| 2 | Press 2 to select Local Diagnostics , then press 3 to open the Ethernet Statistics menu. |

If Full Duplex mode is active, the following is displayed

- Link Status: UP
- Duplex Mode: Full
- Network Speed: 10 MB, 100 MB, or 1 G
- Auto Sense/Negotiate
 - Auto-Negotiate Capability: No
 - Auto-Negotiate Completed: No

—End—

TFTP firmware upgrade

When you enter the IP address of the TFTP Server, the IP Phone searches for an upgrade file on the TFTP Server.

Users of CS 1000 Release 4.5 or later do not need to enter a TFTP IP address.

For further information about TFTP firmware upgrade, see [Appendix "TFTP Server" \(page 547\)](#).

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection protects the IP Phone 1150E from GARP Spoof attacks on the network. In a GARP Spoof attack, a malicious device on the network takes over an IP address (usually the default gateway) by sending unsolicited (or Gratuitous) ARP messages, thus manipulating the ARP table of the victim machine. The malicious device launches a variety of attacks on the network, that results in undesired traffic routing. For example, a GARP attack can convince the victim machine that the malicious device is the default gateway. In this scenario, all traffic from the victim machine flows through the malicious device.

To enable GARP Protection during configuration, see [Procedure 81 "Installing the IP Phone 1150E "](#) (page 416).

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) is a general protocol that fulfills the protocol requirements defined by 802.1x. For further information about 802.1x, see [Appendix "802.1x Port-based network access control"](#) (page 469).

Bluetooth wireless technology

The IP Phone 1150E supports Bluetooth wireless technology . For information about configuring Bluetooth wireless technology on the IP Phone 1150E, see [Appendix "Bluetooth wireless technology"](#) (page 531).

Redeploying an IP Phone 1150E

You can redeploy an existing previously configured IP Phone 1150E on the same system. For example, the IP Phone 1150E can be assigned to a new user (new TN) or to an existing user who moved to a new subnet by changing the TN of the IP Phone 1150E. For further information, see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

Procedure 84

Changing the TN of an existing IP Phone 1150E

Step	Action
1	Repower the IP Phone 1150E. During the reboot sequence of a previously configured IP Phone, the IP Phone 1150E displays the existing node number for approximately five seconds.
2	If the node password is enabled and NULL, choose one of the following <ol style="list-style-type: none"> Disable the password.

- b. Set the password as non-NULL.
- 3** Press **OK** when the node number displays.
- | If | Then |
|--|--|
| the node password is enabled and is not NULL | a password screen displays. Go to Step 4 . |
| the node password is disabled | a TN screen displays. Go to Step 5 . |
- 4** Enter the password at the password screen, and press **OK**.
A TN screen displays.
To obtain the password, enter the nodePwdShow command in Element Manager. For further information, see *Element Manager System Reference—Administration (NN43001-632)*.
- 5** Select the Clear soft key to clear the existing TN.
- 6** Enter the new TN.

—End—

Replacing an IP Phone 1150E

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1150E that currently uses the TN.

Procedure 85 Replacing an IP Phone 1150E

- | Step | Action |
|-------------|--|
| 1 | Obtain the node and TN information of the phone you want to replace. |
| 2 | Disconnect the IP Phone 1150E that you want to replace. |
| 3 | Follow Procedure 80 "Configuring an IP Phone 1150E" (page 409) to install and configure the IP Phone 1150E. |
| 4 | Enter the same TN and Node Number as the IP Phone 1150E you replaced. The system associates the new IP Phone 1150E with the existing TN. |

—End—

Removing an IP Phone 1150E from service

Procedure 86

Removing an IP Phone 1150E from service

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

- | | |
|---|---|
| 1 | Disconnect the IP Phone 1150E from the network or turn the power off. |
|---|---|

The service to the PC is disconnected as well if the PC connects to the IP Phone 1150E.

If the IP Phone 1150E was automatically configured, the DHCP lease expires and the IP address returns to the available pool.

- | | |
|---|---------------------------------------|
| 2 | In LD 11, enter OUT at the TN prompt. |
|---|---------------------------------------|
-

—End—

Expansion Module for IP Phone 1100 Series

Contents

This section contains the following topics:

- "Description" (page 431)
- "Features" (page 432)
- "Display characteristics" (page 433)
- "Package components" (page 433)
- "Configuration" (page 433)
- "Installation" (page 434)
- "Expansion Module startup initialization" (page 438)
- "Operating parameters" (page 439)
- "Services key operation" (page 440)
- "Firmware" (page 442)

Description

The Expansion Module for IP Phone 1100 Series (Expansion Module) is supported on the following IP Phones

- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

The Expansion Module is a hardware component that connects to the IP Phones and provides additional line appearances and feature keys.

Up to three Expansion Modules are supported on the IP Phones. With three Expansion Modules, the IP Phones provide up to 54 additional line/feature keys.

The IP Phone 1140E and IP Phone 1150E can also provide up to 36 additional line/feature keys using the Shift key functionality and one Expansion Module. With more than one Expansion Module connected, the Shift key functionality does not affect the Expansion Module since the maximum number of line/feature keys is already available.

The IP Phone 1120E does not support Shift key functionality.

Figure 50 "IP Phone 1140E with Expansion Module for IP Phone 1100 Series" (page 432) shows an IP Phone 1140E with the Expansion Module attached.

Figure 50
IP Phone 1140E with Expansion Module for IP Phone 1100 Series



Features

The Expansion Module provides the following features

- 18 self-labeled line/programmable feature keys provide up to 36 additional self-labeled line/programmable feature keys. Using the Shift key functionality, an IP Phone 1140E, for example, can have up to 66 additional logical self-labeled line/programmable feature keys.
- Upgradeable firmware using a TFTP or UFTP Server.
- A desk-mount bracket and structural baseplate connect the Expansion Module to an IP Phone or to another Expansion Module.

- IP Phone and Expansion Module combination can be wall-mounted using the wall mount template provided.

Display characteristics

The Expansion Module has the following display characteristics

- LCD display area—Each of the 18 physical keys on the Expansion Module has a 10-character display label beside the 18 self-labeled line/programmable feature keys (see [Figure 50 "IP Phone 1140E with Expansion Module for IP Phone 1100 Series" \(page 432\)](#)). This label is set automatically; however, the user can edit the label using the controls on the IP Phone.
- adjustable display and contrast settings—Use the Contrast Adjustment option in the Telephone Options menu on the IP Phone to adjust the display and contrast settings. Any contrast changes you make on the IP Phone affect the Expansion Module. The Expansion Module and IP Phone do not have separate contrast adjustments.
- backlight—The local 48 V power supply is required to operate the backlight on the Expansion Module; however, you can use either the local 48 V power supply or Power over Ethernet (PoE) to operate all other Expansion Module functionality.

Package components

[Table 59 "Expansion Module components list" \(page 433\)](#) lists the Expansion Module package components.

Table 59
Expansion Module components list

Expansion Module for IP Phone 1100 Series	NTYS08AAE6
---	------------

Configuration

Use LD 11 to configure the Expansion Module.

LD 11 - Configure the Expansion Module

Prompt	Response	Description
REQ:	NEW/CHG	Add new or change existing data.
TYPE	1120/1140/1150	For IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E
...
KEM	(0) - 3/<CR>	Number of attached Expansion Modules (0). Up to three Expansion Modules are supported.
...

Prompt	Response	Description										
CLS	KEM3	KEM3 CLS must be defined										
KEY	0 - <see text>/<CR>	<p>Key number range expanded to support number of Expansion Modules specified by KEM prompt. The range on the IP Phone is as follows:</p> <table> <tr> <td>KEM value:</td> <td>KEY range:</td> </tr> <tr> <td>0</td> <td>0 to 31</td> </tr> <tr> <td>1</td> <td>32 to 49</td> </tr> <tr> <td>2</td> <td>50 to 67</td> </tr> <tr> <td>3</td> <td>68 to 85</td> </tr> </table>	KEM value:	KEY range:	0	0 to 31	1	32 to 49	2	50 to 67	3	68 to 85
KEM value:	KEY range:											
0	0 to 31											
1	32 to 49											
2	50 to 67											
3	68 to 85											
PAGEOFST	<Page> <KeyOffset> / <CR>	PAGEOFST is prompted if one Expansion Modules is specified at the KEM prompt and <CR> is entered at the KEY prompt. This prompt enables you to enter a Page number of 0, or 1, and a Key Offset number from 0 to 17. Once entered, the KEY is prompted with the appropriate KEY value filled in. <CR> ends the input.										
KEY <key>	<keys conf data>/<CR>	<key> is the key number for the Page + Key Offset entered at PAGEOFST. Enter the key configuration <CR> or just <CR>.										
KEMOFST	<KEM> <Key-Offset> / <CR>	<p>KEMOFST is prompted if two or three Expansion Modules are specified at the KEM prompt and <CR> is entered for KEY prompt.</p> <p>This prompt enables you to enter a KEM number of 1, 2, or 3 and a KEY Offset number from 0 to 17. Once entered, the KEY prompt is prompted with the appropriate KEY value filled in. <CR> ends the input.</p>										
KEY <key>	<keys conf data>/<CR>	<key> is the key number for the KEM + Key Offset entered at KEYOFST. Enter the key configuration <CR> or just <CR>.										

Installation

The Expansion Module mounts on the right side of the IP Phone. The Expansion Module snaps into the receptacle on the back of the IP Phone using the desk-mount bracket and structural baseplate supplied with the Expansion Module.

The Expansion Module connects to the IP Phone using the Accessory Expansion Module (AEM) port on the IP Phone.

Use [Procedure 87 "Connecting the Expansion Module to the IP Phone" \(page 435\)](#) to connect the Expansion Module for IP Phone 1100 Series to the IP Phone.

**CAUTION****Damage to Equipment**

To avoid damaging the equipment, remove the power (PoE cable, or local power) from the IP Phone before connecting the Expansion Module.

**CAUTION**

The Expansion Module is shipped with the base locked in position. To avoid damaging the Expansion Module, press the wall-mount lever, located on the base at the front of the Expansion Module.

Procedure 87**Connecting the Expansion Module to the IP Phone****Step Action**

- 1 Press the tilt lever to adjust the stand angle on the IP Phone. See [Figure 51 "Wall-mount lever" \(page 435\)](#). You can adjust the stand angle to maximum, instead of removing the stand. See [Figure 52 "Adjusting the stand angle on the IP Phone" \(page 436\)](#).

Figure 51
Wall-mount lever

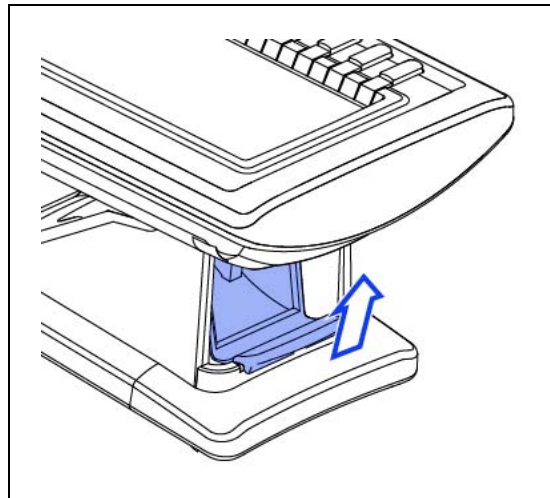
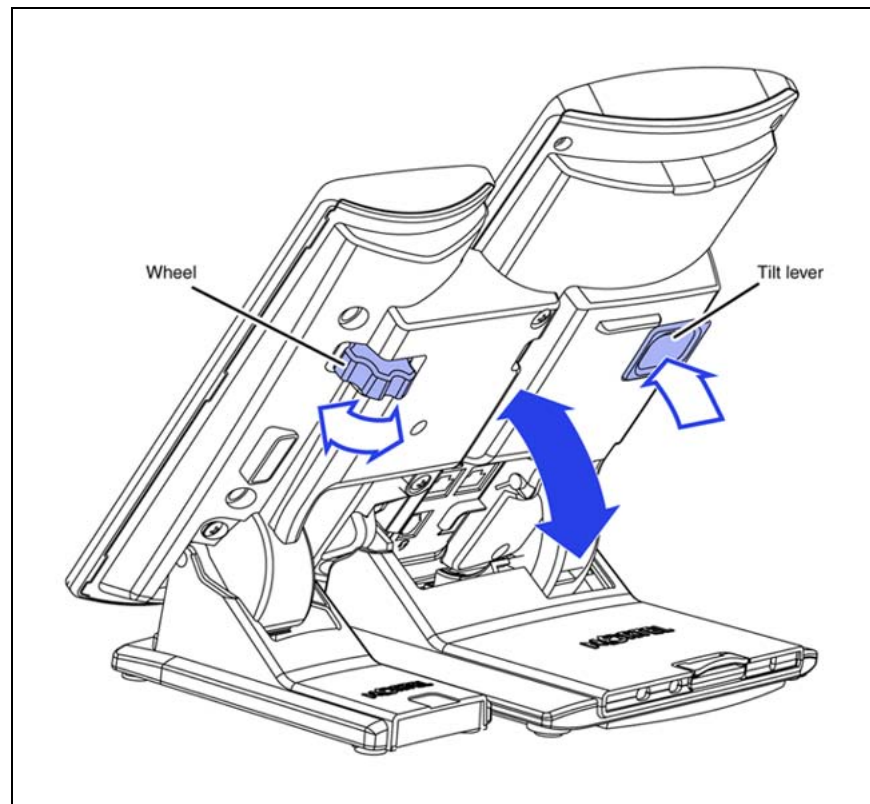
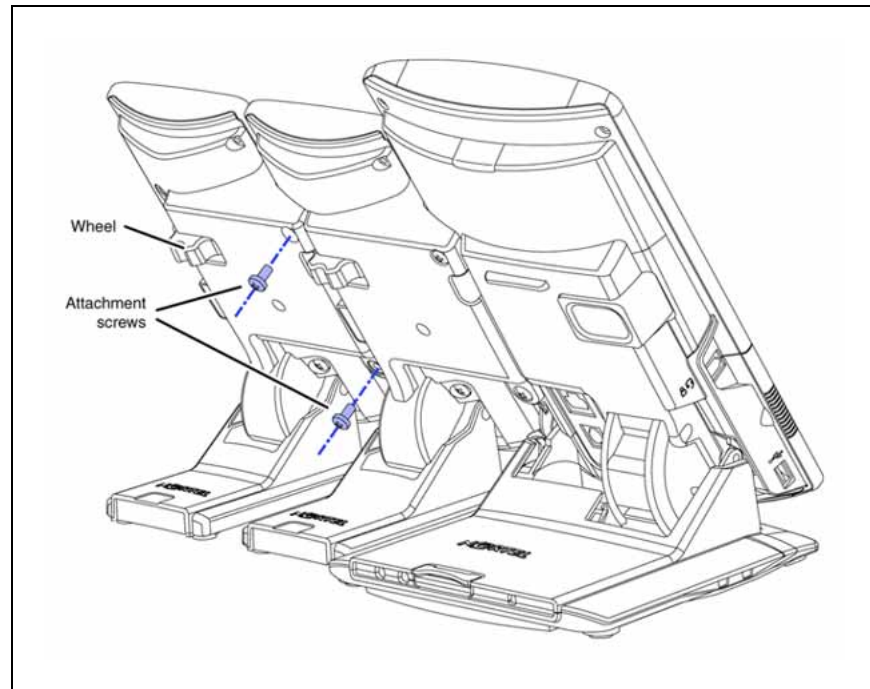


Figure 52
Adjusting the stand angle on the IP Phone



- 2 At the back of the IP Phone, remove the rubber plug from the Accessory Expansion Module (AEM) port. Place the connecting arm of the Expansion Module behind the IP Phone and align the Expansion Module connection plug to the AEM port on the back of the IP Phone.
- 3 Insert the screws in to the top and bottom holes of the connecting arm of the Expansion Module and tighten until snug. See [Figure 53 "Connecting the Expansion Module"](#) (page 437).

Figure 53
Connecting the Expansion Module



- 4** If connecting a second, or a third Expansion Module, repeat steps 2 to 4.

The second Expansion Module is attached to the right side of the first Expansion Module. The third Expansion Module is attached to the right side of the second Expansion Module.

- 5** Adjust the height of the IP Phone tilt adjustment to a comfortable viewing angle. Then adjust each of the Expansion Module footstands so they are flush to the desk surface. Turn the wheel on the back right side of the Expansion Module to the right (if viewed from the front) to tighten the Expansion Module.



CAUTION

Do not over tighten the wheel on the Expansion Module.

- 6** Connect power to the IP Phone. The Expansion Module powers up. The Expansion Module uses the electrical connection of the IP Phone for power. It does not have its own power source.

—End—

Expansion Module startup initialization

Once the Expansion Module has been installed and powered up on the IP Phone, the Expansion Module initializes.

Table 60 "Startup initialization process for the Expansion Module" (page 438) lists the initialization process for the Expansion Module.

Table 60
Startup initialization process for the Expansion Module

Phase	Description
1 Expansion Module performs self-test	<p>The self-test confirms the operation of the Expansion Modules local memory, CPU, and other circuitry. While undergoing this self-test, the Expansion Modules display lights up.</p> <p>If the Expansion Modules display does not light up, or lights up and then goes blank, or fails to begin flashing, check that the Expansion Modules is correctly installed and configured.</p>
2 Expansion Module establishes communication with the IP Phone	<p>The Expansion Modules display flashes until it establishes communication with the IP Phone.</p> <p>If the Expansion Modules display does not stop flashing, communication is not established with the IP Phone. Check that the Expansion Modules is correctly installed and configured.</p>
3 Expansion Module downloads key maps	<p>The key labels download to the Expansion Modules. During the download, the display is blank.</p>

When the three phases complete successfully, you are ready to use the additional self-labeled line/programmable feature keys on the Expansion Module.

If you have a second or a third Expansion Module installed on your IP Phone, the one to the immediate right of the IP Phone must be functional so that subsequent Expansion Module to work. This is necessary because the second Expansion Module receives its power, and communicates with the IP Phone, through the first Expansion Module; and the third Expansion Module receives its power, and communicates with the IP Phone, through the second Expansion Module.

Operating parameters

If the Expansion Module does not respond, and lines or features are configured on keys 32 to 85, calls can be directed to those keys which the user cannot access. This means that the IP Phone rings, but the call cannot be answered. In such cases, the incoming call receives Call Forward No Answer (CFNA) treatment.

IP Phone 1120E

The IP Phone 1120E does not support Shift key functionality.

If only one Expansion Module is configured in LD 11, but two or three Expansion Modules are detected on an IP Phone 1120E, the second and third Expansion Modules are ignored. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

If two Expansion Modules are configured in LD 11, but only one Expansion Module responds, the keys on the second Expansion Module are available for call processing but are not accessible to the user. This means that lines and features on keys 32 to 67 can cause the IP Phone 1120E to ring, but there is no way to answer it. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

If three Expansion Modules are configured in LD 11, but only one or two Expansion Modules respond, the keys on the third Expansion Module are available for call processing but are not accessible to the user. This means that lines and features on keys 68 to 85 can cause the IP Phone 1120E to ring, but there is no way to answer it. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

IP Phone 1140E and IP Phone 1150E

If only one Expansion Module is configured in LD 11, but two or three Expansion Modules are detected on the IP Phone, the Terminal Proxy Server (TPS) assigns keys 50 to 67 to the second Expansion Module. The third Expansion Module does not have keys assigned until it is configured in LD 11.

An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

If two Expansion Modules are configured in LD 11 but only one Expansion Module responds, the TPS assigns keys 32 to 67 to the single Expansion Module (using the Shift key functionality). An error message displays to alert the administrator that the hardware configuration does not match the

administered configuration. When a second Expansion Module is detected, the TPS changes the key assignments to display across both Expansion Modules.

If two Expansion Modules are configured in LD 11 but three Expansion Module respond, the TPS assigns the keys 32 to 67 to the first two Expansion Modules. The third Expansion Module does not have keys assigned until it is configured in LD 11. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration.

If three Expansion Modules are configured but only one Expansion Module responds, the TPS assigns the keys 32 to 67 to the single Expansion Module (using the Shift key functionality). When a second Expansion Module is detected, the TPS changes the key assignments to display across both Expansion Modules. Keys on the third Expansion Module are inaccessible.

If three Expansion Modules are configured in LD 11 but two Expansion Modules respond, the TPS assigns keys 32 to 85 to the first two Expansion Modules. An error message displays to alert the administrator that the hardware configuration does not match the administered configuration. When a third Expansion Module is detected, the TPS changes the key assignments to display across all three Expansion Modules.

Services key operation

The Services key is used to access user settings and certain features on the IP Phone. When one or more Expansion Modules are attached to the IP Phone, the actions of the display diagnostics for the IP Phones DN/feature key display area are duplicated for the Expansion Modules.

If an incoming call occurs when in the diagnostic mode, the call is answered by pressing the DN/feature key, handsfree, or headset key, or by picking up the handset. The display area remains in diagnostic mode until either the user exits the diagnostic more, or the idle timeout clears the mode. Once cleared, the normal display for the current state of the IP Phone is displayed.

Press the Services key to access the following menu items

- Display diagnostics
- Set Info

Display diagnostics

Use the Up/Down navigation keys to scroll the Display diagnostics menu to access the following screens/diagnostic operations

- ["Initial screen" \(page 441\)](#)
- ["Full Contrast" \(page 441\)](#)

- "LED Test" (page 441)
- "Character Test" (page 441)

Initial screen

Instructions are displayed on the display area of the IP Phone and the Expansion Module. The DN/feature key display areas are blank.

Full Contrast

The IP Phone and the Expansion Module display areas are set to maximum (dark) contrast, including the DN/feature key areas. All LEDs are off.

LED Test

The IP Phone and the Expansion Module LEDs are set to on. The display area is cleared, including the DN/feature key display areas.

Character Test

The IP Phone and the Expansion Module LEDs are set to off. The available character set is displayed across all writable areas of the display, including the DN/feature key display areas. The telephone on-hook icon is displayed for all DN/feature keys.

Table 61 "Display diagnostic operation on the IP Phone and the Expansion Module for IP Phone 1100 Series" (page 441) shows the display diagnostic operation on the IP Phones and the Expansion Module.

Table 61
Display diagnostic operation on the IP Phone and the Expansion Module for IP Phone 1100 Series

Diagnostic step	IP Phone DN/feature key display area	Expansion Module display area
initial screen	blank	blank
Full Contrast	set to highest contrast	set to highest contrast
LED Test	blank	blank
Character Test	Characters display across the display areas, the telephone on-hook icon is displayed.	Characters display across the display areas, the telephone on-hook icon is displayed.

Set Info

The Set Info menu displays the firmware version for the IP Phone and any attached Expansion Modules. The attached Expansion Modules are identified as KEM1, KEM2, and KEM3. KEM1 is the closest to the IP Phone. The Expansion Module identifies the firmware as a three character string; the TPS displays the firmware in an n.nn format.

Use the Up/Down navigation keys to scroll the list to display the firmware for each attached Expansion Module. The firmware version is displayed even if the Expansion Module is not configured in LD 11. In this case, the Expansion Module is identified in the display area by an asterisk (*) after the Expansion Module number (for example, KEM1*).

If an Expansion Module is configured but does not respond, the firmware version displays as <unknown>.

Firmware

The Expansion Module uses a TFTP or UFTP Server to upgrade the firmware. The firmware is downloaded to the IP Phone, which is then distributed to the each attached Expansion Module, one at a time. After the Expansion Module confirms to the IP Phone that the firmware file is downloaded and saved successfully, the IP Phone starts the download to the next attached Expansion Module.

If any error causes the firmware download to fail, or if the saved firmware file is corrupted, the Expansion Module reverts to the factory installed firmware. The factory installed firmware file is always available to facilitate firmware download in case the downloaded firmware is unusable.

For more information about TFTP Server firmware upgrade, see [Appendix "TFTP Server" \(page 547\)](#).

For more information about Expansion Module, see the *Expansion Module for IP Phones 1100 Series User Guide (NN43130-101)*.

Features overview

Contents

This section contains the following topics:

- "Introduction" (page 443)
- "Corporate Directory" (page 444)
- "Personal Directory" (page 444)
- "Redial List" (page 444)
- "Callers List" (page 445)
- "Password Administration" (page 445)
- "IP Call Recording" (page 445)
- "Virtual Office" (page 445)
- "Emergency Services for Virtual Office" (page 446)
- "Active Call Failover" (page 446)
- "Enhanced UNiStim Firmware download" (page 446)
- "Media security" (page 447)
- "Live Dialpad" (page 451)

Introduction

This chapter provides an overview of the following software features available for IP Phones

- Corporate Directory
- Personal Directory
- Redial List
- Callers List
- Password Administration
- IP Call Recording
- Virtual Office

- Emergency Services for Virtual Office
- Active Call Failover
- Enhanced UNISlim Firmware download
- SRTP media encryption
- Live Dialpad

Personal Directory, Redial List, Callers List, Application Server Administration, Password Administration are software on the Signaling Server. An IP Phone must be registered to a Signaling Server to access these features.

Corporate Directory

The Corporate Directory feature extends the use of a system database, created from Telephony Manager 3.3 information, to the IP Phones. This database is downloaded and stored on the system CPU platform. For information about using Corporate Directory from IP Phones, see the appropriate user guide. For details about Corporate Directory, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

Corporate Directory is not supported on the IP Phone 2001, IP Audio Conference Phone 2033, or IP Phone 1110.

Personal Directory

Personal Directory allows an end user to create and control a personal directory. Up to 100 Personal Directory entries can be created, edited, copied from other sources, or deleted. (For information about using Personal Directory on IP Phones, see the appropriate user guide. For more information about the Personal Directory feature, see *Features and Services Fundamentals—Book 5 of 6 (NN43001-106)* . Personal Directory uses a separate central database, called the Application Server, to store directory data and end-user profile options.

Personal Directory is not supported on the IP Phone 2001, IP Audio Conference Phone 2033, or IP Phone 1110.

Redial List

Redial List is a call log feature whose content is generated by the system during call processing. The list resides on the Application Server. An end user can scroll through a list of up to 20 entries of the most recent calls dialed from the IP Phone and redial a selected telephone number. For more information about using Redial List with IP Phones, see the appropriate user guide. For more information about the Redial List feature, see *Features and Services Fundamentals—Book 5 of 6 (NN43001-106)*.

Redial List is not supported on the IP Phone 2001, IP Audio Conference Phone 2033, or IP Phone 1110.

Callers List

Callers List is a call log feature whose content is generated by the system during call processing. The list resides in the Application Server. An end user can scroll through a list of up to 100 entries of the most recent calls received by the IP Phone and call a selected telephone number. For more information about using Callers List with IP Phones, see the appropriate user guide. For more information about the Callers List feature, see *Features and Services Fundamentals—Book 5 of 6 (NN43001-106)*.

Callers List is not supported on the IP Phone 2001, IP Audio Conference Phone 2033, or IP Phone 1110.

Password Administration

Once the Station Control password (SCPW) has been set by the system administrator on the Call Server, end users can operate this feature from IP Phones to protect private directory information stored on the Application Server. For more information about using Password Administration from IP Phones, see the appropriate user guide. For information about the Password Administration feature, see *IP Line Fundamentals (NN43100-500)*.

IP Call Recording

IP Call Recording enables an IP Call Recording Server to monitor the media stream for the active call and record it by that provide the IP address and port information for an IP Phone on an active call. The following recording models are supported

- bulk call recording — records all calls on an IP Phone
- quality monitor recording — records individual calls on an IP Phone

If the network connection between the IP Call Recording Server and the IP Phone is lost, active calls cannot be recorded.

For more information about the IP Call Recording feature, see *IP Line Fundamentals (NN43100-500)* and *Automatic Call Distribution Fundamentals (NN43001-551)*.

Virtual Office

The Virtual Office feature enables end users to log into any IP Phone using their own user ID and password This redirects the telephone calls and other features to the Virtual Office logged-in IP Phone. For information about using Virtual Office on an IP Phone, see the appropriate user guide. For

more information about the Virtual Office feature, see *IP Line Fundamentals (NN43100-500)* and *Features and Services Fundamentals—Book 4 of 6 (NN43001-106)*.

Emergency Services for Virtual Office

The E911 for Virtual Office feature allows Virtual Office users to place an emergency call to the correct Public Safety Answering Point (PSAP) for their geographic location. For more information about the E911 for Virtual Office feature, see *Emergency Service Access Fundamentals (NN43001-613)*.

Active Call Failover

The Active Call Failover (ACF) feature enables an IP Phone to reregister in the ACF mode during a Signaling Server failure.

The ACF mode preserves the following

- active media stream
- LED status of the Mute, Handsfree, and Headset keys
- DRAM content

All other elements (feature keys, soft keys and text areas) are retained until the user presses a key or the connection with the Signaling Server is resumed. If the user presses a key during the failover, the display is cleared and a localized "Server Unreachable" message is displayed.

The IP Phone uses this new mode of reregistration only when the Signaling Server explicitly tells the IP Phone to do so. IP Phones clear all call information if they register to a Signaling Server or Line Terminal Proxy Server (LTPS) that does not support the ACF feature.

For more information about Active Call Failover, see *IP Line Fundamentals (NN43100-500)*.

Enhanced UNISlim Firmware download

Enhanced UNISlim firmware download feature provides the following functionality for IP Phones

- Enhanced firmware file header that includes the IT_TYPE and name string for each IP Phone type.
- Revised definition of the IP Phone identification of the IP Phone Client.
- Maintenance Mode for the Signaling Server that allows more simultaneous firmware downloads.

Maintenance Mode is not applicable to Voice Media Gateway Cards.

- Identification of the registered IP Phones using string names and detailed identification of IP Phones that register as emulations of the base IP Phone 2001, IP Phone 2002, and IP Phone 2004.
- UNISlim IP Phones are able to register with older versions of firmware when the UFTP servers are busy, and are periodically offered the option start the firmware upgrade to the IP Phone.

Enhanced UNISlim Firmware download feature requires a Signaling Server to be present on the node. Without a Signaling Server, the only firmware files available for downloading are the three available in CS Release 4.0 for the Phase 0/1/2 IP Phone 2001, IP Phone 2002, and IP Phone 2004.

For further information about Enhanced UNISlim Firmware download and IP Phone firmware upgrade using Element Manager, see *IP Line Fundamentals (NN43100-500)*.

Media security

Media security normally shares keys using a secure UNISlim channel. In situations where CS 1000 Release 5.0 or later is not available, you can use Pre-Shared keys (PSK).

For CS 1000 Release 5.0 and later, the controlling Call Server provides all of the keying material and control of the SRTP operation.

For CS 1000 Release 4.5 or earlier, the key is protected by a preshared secret embedded in the IP Phone to generate and exchange encryption parameters.

For more information about the Media Security feature, see *Security Management Fundamentals (NN43001-604)*.

The Media Security feature is supported on the following IP Phones:

- Phase II IP Phone 2001
- Phase II IP Phone 2002
- Phase II IP Phone 2004
- IP Phone 2007
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E
- IP Softphone 2050

ATTENTION

Phase I IP Phones do not support SRTP.

ATTENTION

The IP Softphone 2050 supports media security for CS 1000 Release 5.0 and later. The IP Softphone 2050 supports UNISim key (USK) SRTP media encryption only.

Operating parameters

The Media Security feature has the following operating parameters

- During a firmware upgrade, the Media security is automatically disabled.
- Media security does not support duplicate media streams encryption, such as IP Call Recording.
- Pre-Shared key (PSK) SRTP media encryption negotiates after the call is setup. The first few seconds of the call can sometimes be unsecured; after the lock icon displays the call is secure. UNISim key (USK) SRTP media encryption is negotiated before the call is setup so no delays occur. In both versions of SRTP the call is secure when the lock displays.

When USK SRTP negotiates, an outlined lock icon and Encrypted appears on the display. When PSK SRTP negotiates, a solid lock icon displays but Encrypted does not display.

- SRTP PSK does not negotiate if you use 10ms G.729, due to the small payload size. The call remains in RTP. All other payloads are supported for PSK SRTP. USK SRTP supports all payloads.

Configuration

For CS 1000 Release 5.0 or later, you can configure a system-wide configuration setting (USK SRTP), which controls whether or not the CS 1000 system is capable of providing Media Security.

It is possible to enable both PSK SRTP on the IP Phone and configure USK SRTP at the Call Server. If USK SRTP does not negotiate for a call, PSK SRTP attempts to negotiate during a call. If the two endpoints for the call have PSK SRTP enabled, the call is encrypted using PSK SRTP.

By default, Media Security is enabled on the system. To configure USK SRTP, see "[USK SRTP configuration](#)" (page 449). To configure PSK SRTP on the IP Phone, see "[PSK SRTP configuration](#)" (page 449).

USK SRTP configuration

Use LD 17 to configure a system-wide Class of Service parameter for IP Phones called Media Security System Default (MSSD). The system default value is one of the following:

- Always Secure IP (MSAW)
- Best Effort (MSBT)
- Never (MSNV)

When you change the MSSD parameter, the system updates any IP Phones that have a Class of Service value of MSSD to use the new MSSD parameter.

Use LD 11 to configure the Media Security Class of Service on each IP Phone. The IP Phone can have any of the following values:

- MSSD
- Best Effort
- Always
- Never

For more information about configuring system-wide Media Security and configuring Class of Service, see *Security Management Fundamentals (NN43001-604)*.

PSK SRTP configuration

The SRTP PSK (Pre-Shared Key) media encryption feature provides encrypted media. A preshared secret is embedded in the Nortel IP Phone to generate and to exchange encryption parameters without any Call Server involvement. This feature provides SRTP capabilities to IP Phones managed by call servers, which do not support SRTP USK (UNIStim Key). The SRTP PSK feature must not be used in networks where phone-to-phone one-way delay is greater than 200mSec.

For CS 1000 Release 4.5 or earlier, you must configure PSK SRTP on each IP Phone. See "[PSK SRTP configuration](#)" (page 449).

To configure PSK SRTP on IP Phones, see the following procedures:

- Phase II IP Phone 2001, Phase II IP Phone 2002, Phase II IP Phone 2004, and IP Phone 1110—[Procedure 88 "Enabling SRTP media encryption on a Phase II IP Phone and IP Phone 1110"](#) (page 450)
- IP Phone 2007—[Procedure 89 "Enabling SRTP media encryption on an IP Phone 2007"](#) (page 450)

- IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E—[Procedure 90 "Enabling SRTP media encryption on an IP Phone 1120E, IP Phone 1140E, or IP Phone 1150E" \(page 451\)](#)

Procedure 88**Enabling SRTP media encryption on a Phase II IP Phone and IP Phone 1110****Step Action**

-
- | | |
|---|--|
| 1 | Disconnect then reconnect the power on the IP Phone to reset it. |
| 2 | When the Nortel logo appears, press each of the four soft keys at the bottom of the display in sequence from left to right, one at a time. |
| 3 | If no other configuration changes are required, press OK repeatedly until PSK SRTP (0-No, 1-Yes) option appears. |
| 4 | Press 1 to enable PSK SRTP. |
| 5 | Press OK . |
| 6 | Restart the IP Phone. |
-

—End—

For more information about configuring an IP Phone, see the applicable section in this document.

Procedure 89**Enabling SRTP media encryption on an IP Phone 2007****Step Action**

-
- | | |
|---|--|
| 1 | Tap the Tools icon. |
| 2 | Select Network Configuration . |
| 3 | Use the Right navigation key to scroll to Enable PSK SRTP . The current setting displays. |
| 4 | Select the check box to enable SRTP media encryption. |
| 5 | Tap the Apply&Reset soft key to apply the current configuration and reset the phone. |
-

—End—

Procedure 90**Enabling SRTP media encryption on an IP Phone 1120E, IP Phone 1140E, or IP Phone 1150E**

Step	Action
1	Double-press the Services key.
2	Press 3 on the dialpad to access the Network Configuration menu or use the Up/Down navigation keys to scroll and highlight the Network Configuration option.
3	Press Enter to start the edit mode.
4	Use the Right navigation key to navigate to Enable PSK SRTP . The current setting displays.
5	Press Enter to switch this item on and off.
6	Press the Apply&Reset soft key to apply the current configuration and reset the phone.

—End—

Media Security information

Use the Encryption Info menu to view Media security information for the IP Phone. Select Telephone Options > Set Info > Encryption Info. The Encryption Info submenu offers the following choices:

- Encryption Capability—set to Available or Not Available depending on the IP Phone type and the firmware version
- Encryption Policy—set to Never, Best Effort, or Always, depending on configuration in LD 11

Live Dialpad

The primary Directory Number (DN) key is activated when the user makes a call by dialing a DN on the dialpad without picking up the handset or pressing the Handsfree key. To set the Live Dialpad feature to On or Off, select Telephone Options > Live Dialpad. By default, Live Dialpad is set to Off.

For more information about configuring Live Dialpad, see the applicable IP Phone User Guide.

Regulatory and safety information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver connects.
- Consult the dealer or an experienced radio/TV technician for help.

The user should not make changes or modifications not expressly approved by Nortel Networks. Any such changes could void the user authority to operate the equipment.

This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Warnings:

- This is a Class B product. In a domestic environment this product can cause radio interference in which case the user must take adequate measures.
- Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device."

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Table 62 "EMC compliance" (page 454) lists EMC compliance for various jurisdictions.

Table 62
EMC compliance

Jurisdiction	Standard	Description
United States	FCC CFR 47 Part 15	Class B Emissions: FCC Rules for Radio Frequency Devices (see Notes 1 and 2)
Canada	ICES-003	Class B Emissions: Interference-Causing Equipment Standard: Digital Apparatus
Australia/New Zealand	AS/NZS 3548 CISPR 22	Class B Emissions: Information technology equipment - Radio disturbance
European Community	EN55022	Class B Emissions: Information technology equipment - Radio disturbance
	EN 55024	Information technology equipment - Immunity characteristics Limits and methods of measurement
	EN 61000-3-2	Limits for harmonic current emissions (equipment input current \leq 16 A per phase)
	EN 61000-3-3	Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current \leq 16 A
Japan	VCCI	Regulations for voluntary control measures.

Table 63 "Safety compliance" (page 454) lists safety compliance for various jurisdictions.

Table 63
Safety compliance

Jurisdiction	Standard	Description
United States	UL 60950-1	Safety of Information Technology Equipment
Canada	CSA 60950-1-03	Safety of Information Technology Equipment

Jurisdiction	Standard	Description
European Community	EN 60950-1	ITE equipment - Safety - Part 1: General requirements
Australia/New Zealand	AS/NZS 60950.1:2003	Safety of Information Technology Equipment

Other Safety Approvals : IEC 60950-1: ITE equipment - Safety - Part 1: General requirements.

Other compliancies

US/Canada—Hearing Aid Compatibility (HAC) as per FCC Part 68 This equipment complies with the CE Marking requirements.



EU Countries—This device complies with the essential requirements and other relevant provisions of Directive 1999/5/EC. A copy of the Declaration may be obtained from www.nortel.com or from the Nortel Networks GmbH address: Ingolstaedter Strasse 14-18, 80807 Munich Germany.

Australia: AS/ACIF S004—Voice Frequency Performance Requirements for Customer Equipment

For those devices equipped with Bluetooth wireless technology

This portable device with its antenna complies with FCC RF radiation exposure limits for an uncontrolled environment. To maintain compliance, this transmitter must not be colocated or operated in conjunction with any other antenna or transmitter.

DenAn regulatory notice for Japan

Warning

Please be careful of the following while installing the equipment:

- Please only use the Connecting cables, power cord, AC adaptors shipped with the equipment or specified by Nortel to be used with the equipment. If you use any other equipment, it may cause “failures, malfunctioning or fire”.
- Power cords shipped with this equipment must not be used with any other equipment. In case the above guidelines are not followed, it may lead to death or severe injury

警告

本製品を安全にご使用頂くため、以下のことにご注意ください。

- 接続ケーブル、電源コード、ACアダプタなどの部品は、必ず製品に同梱されております。添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となることがあります。
- 同梱されております付属の電源コードを他の機器には使用しないでください。上記注意事項を守らないと、死亡や大怪我など人身事故の原因となることがあります。

Appendix A

Specifications

Contents

This section contains the following topics:

- "IP Phone power requirements" (page 457)
- "Environmental specifications" (page 459)

IP Phone power requirements

Phase II IP Phones have integrated hardware to support power over Ethernet for 802.3af standard power. Nortel recommends Power over Ethernet deployment since it allows for power backup in case of power failures. With Phase II IP Phones, power splitters are no longer needed to support Power over Ethernet.

Phase II IP Phones, IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E also support connection to AC local power using the appropriate adapter. If local power using the AC adapter is required, the AC adapter must be ordered separately. If the network LAN infrastructure supports Power over Ethernet, an AC adapter may not be required.

You must order a country-specific power adapter. See the IP Phone components list table in the applicable IP Phone chapter for AC adapter descriptions and product codes.

If you are using local power with the IP Phone 1110, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, you must use the AC adapter (model number N0089601) *only*.

Nortel does not advise connecting a local power adapter in addition to Power over Ethernet.

Table 64 "Power requirements (US, CA, CALA, AP, GC) " (page 458) shows the power requirements for the IP Audio Conference Phone 2033 (US, CA, CALA, AP, GC) using Power over Ethernet Classification 0.

Table 65 "Power requirements (EMEA) " (page 458) shows the power requirements for the IP Audio Conference Phone 2033 (EMEA), which uses Power over Ethernet Classification 0.

In the following tables, heavy load is defined as all LEDs on and 1 kHz tone on the speaker and Normal load is defined as set powered up.

Table 64
Power requirements (US, CA, CALA, AP, GC)

IP Phone	Product Code	Maximum Load	Normal Load
2033	NTEX11BA70 NTEX11EA70	10.5 W	8.5 W

Table 65
Power requirements (EMEA)

IP Phone	Product Code	Maximum Load	Normal Load
2033	NTEX11AA70E6 NTEX11BA70E6 NTEX11EA70E6 NTEX11FA70E6	10.5 W	8.5 W

Table 66 "Power requirements for IP Phones using Power over Ethernet Classification 2" (page 458) provides power requirements for IP Phones, which use Power over Ethernet Classification 2.

Table 66
Power requirements for IP Phones using Power over Ethernet Classification 2

IP Phone	Product Code	Maximum Load	Normal Load
2001 (Phase II)	NTDU90BA	4.8 W	3.0 W
2002 (Phase II)	NTDU91BA	5.4 W	3.0 W
2004 (Phase II)	NTDU92BA	5.4 W	3.4 W
1110	NTYS02AAE6 TYS02BAE6	6.0 W	3.4 W

Table 67 "Power requirements for IP Phones using Power over Ethernet Classification 3" (page 459) provides power requirements for IP Phones, which use Power over Ethernet Classification 3.

Table 67
Power requirements for IP Phones using Power over Ethernet Classification 3

IP Phone	Product Code	Maximum Load	Normal Load
2007	NTDU96AB	12.0 W	7.0 W
1120E	NTYS03AA NTYS03BA	9.6 W	6.0 W
1140E	NTYS05AA NTYS05BA	9.6 W	6.0 W
1150E	NTYS06AA NTYS06BA NTYS15AAE6	9.1 W	6.0 W

Environmental specifications

Table 68 "Environmental specifications" (page 459) shows the environmental specifications of IP Phones.

Table 68
Environmental specifications

Parameter	Specifications
Operating temperature	+5° to +40°C, ambient
Operating humidity	+5% to 95% RH (29 g/m3 mean absolute humidity)
Storage temperature	-40° to +70° C

Appendix B

802.1Q VLAN description

Contents

This section contains the following topics:

- "Introduction" (page 461)
- "Description" (page 462)
- "IP Phone support" (page 462)
- "IP Softphone 2050 support" (page 463)
- "Three-port switch support" (page 463)
- "VLAN IDs" (page 464)
- "Enhanced DATA VLAN" (page 466)

Introduction

The 802.1Q support is available for the following IP Phones

- IP Phone 2001
- IP Phone 2002
- IP Phone 2004
- IP Phone 2007
- IP Audio Conference Phone 2033
- IP Softphone 2050 (through the PC operating system)
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

The 802.1Q support is configured from the user display interface of the IP Phone. Configure 802.1Q VLAN support when you initially configure an IP Phone. The switch ports for Voice Gateway Media Card TLAN network interfaces must be configured as untagged ports so the header is removed. While the IP Phone 2001 and the IP Audio Conference Phone 2033 provide VLAN support, they do not provide a port for a PC.

The 802.1Q IEEE protocol standard allows virtual LANs (VLANs) to be defined within a single LAN. This improves bandwidth management and limits the impact of broadcast and multicast messages. A higher level of security between segments in a network can also be achieved.

802.1Q functionality is supported only on the IP Phone. The IP Line application IP stack does not provide 802.1Q support for the Voice Gateway Media Card.

Description

The p bits within the 802.1Q standard allow packet prioritization at Layer 2 improving network throughput for VoIP data.

The 802.1Q standard specifies a new format of Ethernet frame. A standard Ethernet frame contains

- a header consisting of a six-byte destination MAC address (following the header is a data area)
- a six-byte source MAC address
- a two-byte protocol identifier

The 802.1Q formatted frame is identical to a standard Ethernet frame, with the exception of the 4-byte 802.1Q tag that is inserted between the source MAC address and the protocol identifier. The first 16 bits of the 802.1Q tag field is the Tag Protocol Identifier containing 8100 (hex), allowing the Ethernet interface to distinguish it from standard Ethernet frames. The last 16 bits of the 802.1Q tag contain the following information

- a 3-bit Priority field (the 802.1p defined bits)
- a 1-bit Canonical Field Identifier (CFI)
- a 12-bit VLAN ID field

IP Phone support

The IP Phones support 802.1Q as follows

- 802.1Q can be enabled or disabled at boot time using manual configuration or control downloaded from the TPS.
- If 802.1Q is disabled, standard Ethernet frames are transmitted.

- If 802.1Q is enabled, all frames transmitted by the Ethernet driver have the 802.1Q tag bytes inserted between the source MAC address and the protocol type field. The tag protocol identifier field contains 8100 (hex) and the CFI bit is set to 0.
- When 802.1Q is enabled, the configuration of separate voice and data VLANs is possible. Each VLAN has its own ID and priority on the IP Phone. Voice messages have the priority bits of all frames set to 6 (octal) and the VOICE VLAN ID is set to 000 (hex) by default. Data messages have the priority bits of all frames set to 0 and the DATA VLAN ID is set to 000 (hex) by default. The GUI and TPS configured values override these values.
- The IP Phone Ethernet driver receives any Ethernet frame destined for it, regardless of whether 802.1Q is enabled or whether the received frame is an 802.1Q tagged frame.

The only exception is any 802.1Q tagged frame with the CFI = 1. In this case the frame is discarded.
- The IP Phone Ethernet driver strips the 802.1Q tag information from the frame prior to passing it on to the IP stack.
- The IP Phone Ethernet driver filters packets by the VLAN tag and MAC address. Tagged traffic is prioritized and routed based on the priority bits.

IP Softphone 2050 support

The IP Softphone 2050 supports 802.1Q with Windows 2000. By default, when 802.1Q is enabled, the priority bits of all frames are set to 6 and the VLAN ID is set to 0 (a restriction of Windows 2000).

Three-port switch support

The section refers to the following IP Phones

- IP Phone 2002
- IP Phone 2004
- IP Phone 2007
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

The three-port switch does not interpret the 802.1Q header, but rather, allows the packets to pass through unmodified. Priority is achieved on a per port basis. The phone "port" traffic has higher priority over the Ethernet port to which the PC connects.

An IP Phone can receive Broadcast frames from a PC data VLAN. Any data network broadcast storm packets from the network are seen by the IP Phone. Significant broadcast storms occurring on the DATA VLAN can impact IP Phone performance. See "[Enhanced VLAN Tagging](#)" (page 465) for configuration information to filter network activity from impacting IP Phone performance.

Enhanced 802.1P and 802.1Q support on the IP Phones improves voice quality by taking advantage of the VLAN filtering available on the three-port switch on the BCM 1100/1101/1103.

The following functions are available on the three-port switch

- hardware VLAN filter
- two TX (out) queues on each port —High Priority Queue (HPQ) and Low Priority Queue (LPQ)

Therefore, traffic other than Voice VLAN can be filtered by enabling the VLAN filtering feature and taking advantage of the hardware VLAN filter. Voice traffic is always queued to the HPQ thereby that provide a higher quality of service.

VLAN IDs

The VOICE and DATA VLAN ID fields can be specified on a *per interface* basis. There is only one network interface on the IP Phone; however, the IP Phone has two internal IDs, one for voice and one for data traffic. The IP Phone firmware can detect and route the voice and data traffic.

The VLAN ID fields are *global* settings. That is, all voice packets transmitted by the IP Phone have the same VOICE VLAN ID. If DATA VLAN is enabled, the IP Phone adds the DATA VLAN ID to untagged traffic. However, if the traffic arriving on the PC port is already tagged, the frame passes through unchanged.

Each VLAN ID is specified as follows

- The default VLAN ID is 000 (hex).
- The VOICE and DATA VLAN IDs can be specified in the manual configuration user interface.
- Or, in the case of the VOICE VLAN ID, the VOICE VLAN ID can also be configured by the DHCP parameter when using the Automatic VLAN discovery using DHCP approach.

Automatic VOICE VLAN ID configuration

As part of the 802.1Q feature, there is an option to automatically discover the VOICE VLAN ID using DHCP. This process reduces the configuration steps since entering data manually (the VOICE VLAN ID) is not required.

When the Automatic VOICE VLAN Discovery using DHCP approach is used, and the IP Phone has been configured as such, the following steps are automatically taken to obtain the VOICE VLAN ID

1. The IP Phones perform an initial DHCP Discovery Request in the default VLAN.
2. The DHCP server returns a DHCP Ack message with an IP address in the data VLAN and one or more voice VLAN IDs in the vendor-specific field.
3. The IP Phone reads and saves the VOICE VLAN IDs.
4. The IP Phone rejects the DHCP offer (accepts it but immediately gives up the lease).
5. The IP Phone reboots and sends a DHCP Discovery Request with the first VLAN ID from the saved list. This is repeated for each VLAN ID in the list until a response is received.

This works because the Layer 2 switch discards every DHCP Discovery Request it receives from the IP Phone if the VLAN ID does not match the VLAN IDs configured on the port. When the IP Phone sends a DHCP Discovery Request with the port configured VLAN ID, the packet passes into the network and the DHCP server Ack message is passed back.

When a DHCP Ack message is received, the IP Phone accepts the offer and saves the IP address and Node IP address.

Enhanced VLAN Tagging

Enhanced VLAN has two main functions

- Enhance the current Voice VLAN by implementing the hardware VLAN filter on the IP Phone port (SMP).
- Use TX High Priority Queue (HPQ) and 802.1P VLAN priority to enhance the traffic control on the IP Phone and PC network interface.

ATTENTION

VLAN filtering on the telephony port is disabled by default. If tagging is enabled on the telephony port, you can enable VLAN filtering on the telephony port. When VLAN filtering is enabled, packets destined for the IP Phone port are filtered based on the MAC address and the VLAN tag.

If VLAN filtering is not enabled on the telephony port, packets destined for the IP Phone port are filtered only on the MAC address. Filtering based on the VLAN tag does not occur. This makes the telephony port susceptible to broadcast storms and a Denial of Service (DOS) attack.

Enhanced DATA VLAN

Enhancements for DATA (PC Port) VLAN for the IP Phone include the following

- DATA (PC Port) VLAN packet handling
 - PC Port (Ingress direction)
 - PC Port (Egress direction)
- DATA (PC Port) VLAN Tag Stripping

DATA (PC Port) VLAN packet handling

Packets processed to and from the PC port operate as follows

PC Port (Ingress direction)

- DATA VLAN disabled—all traffic received on the PC port is switched based on MAC address. The packets are not modified in any way.
- DATA VLAN enabled—all untagged packets received on the PC port have the 802.1Q header appended and the VLAN ID is set to the value that was manually configured in the Data VLAN field. Any packet arriving on the PC port that is already tagged is dropped.

PC Port (Egress direction)

- DATA VLAN disabled—all traffic received on the PC port has the 802.1Q header appended and the VLAN ID is set to the value which was manually configured in the DATA VLAN field. Any packet arriving on the PC port which is already tagged is dropped.
- DATA VLAN enabled—all traffic is forwarded to the PC port based on a review of the MAC address and the 802.1Q value that was manually configured in the DATA VLAN field. Traffic is forwarded out the PC port only if the packets contain the DATA VLAN tag. Untagged traffic and traffic without the DATA VLAN tag is dropped.

DATA (PC Port) VLAN Tag Stripping

DATA VLAN Tag Stripping can be configured in the Network Configuration menu. To enable DATA VLAN Tag Stripping, select the PC-Port Untag All check box, DATA VLAN Tag Stripping can be enabled or disabled independent of enabling VLAN support on the PC Port.

If the DATA VLAN Tag Stripping is disabled, the packet is sent to the PC Port unmodified. If the DATA VLAN Tag Stripping is enabled, the 802.1Q header if one exists, is removed from the packet before the packet is forwarded to the PC port.

During manual configuration, if DATA VLAN is enabled by configuring a VLAN ID, the PC-Port Untag All check box is selected and is enabled by default. By default, the egress tag is stripped. To manually override this setting and disable egress stripping, clear the PC-Port Untag All check box.

If DATA VLAN is not enabled during manual configuration, the PC-Port Untag All check box is not selected. By default, the ingress tag is not stripped. To manually override this setting and enable ingress stripping, select the PC-Port Untag All check box.

Appendix C

802.1x Port-based network access control

Contents

This section contains the following topics:

- "Introduction" (page 469)
- "Extensible Authentication Protocol" (page 469)

Introduction

The 802.1x support is available for the following IP Phones

- IP Phone 2001
- IP Phone 2002
- IP Phone 2004
- IP Phone 2007
- IP Audio Conference Phone 2033
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) supports multiple authentication methods, such as MD5, PEAP, TLS, and TTLS, and represents a technology framework that facilitates the adoption of Authentication, Authorization, and Accounting (AAA) schemes, such as Remote Authentication Dial In User Service (RADIUS). RADIUS is defined in RFC 2865.

802.1x defines the following three roles

- Supplicant—an IP Phone which requires access to the network to use network services.
- Authenticator—the network entry point to which the supplicant physically connects (typically a Layer 2/3 switch). The authenticator acts as the proxy between the supplicant and the authentication server. The authenticator controls access to the network based on the authentication status of the supplicant.
- Authentication server—performs authentication of the supplicant.

Authorization

If 802.1x is configured and the IP Phone is physically connected to the network, the IP Phone (supplicant) initiates 802.1x authentication by contacting the Layer 2/3 switch (authenticator). The IP Phone also initiates 802.1x authentication after the Ethernet connection (network interface only) is restored following a network link failure. However, if the phone resets, the IP Phone assumes the Layer 2 link has remained in service and is authenticated. The IP Phone fails to authorize if the DeviceID and the IP Phone passwords do not match the DeviceID and IP Phone password provisioned on the RADIUS Server. The Layer 2 switch (authenticator) locks out the IP Phone and network access is denied. If this happens during reauthorization, all IP Phone services are lost. The connected PC operates as normal.

For information about configuring EAP, see the applicable IP Phone section in this document.

Appendix D

802.1ab Link Layer Discovery Protocol

Contents

This section contains the following topics:

- "Introduction" (page 471)
- "Description" (page 471)

Introduction

802.1ab Link Layer Discovery Protocol is available for the following IP Phones

- IP Phone 2001
- IP Phone 2002
- IP Phone 2004
- IP Phone 2007
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

Description

The IEEE 802.1ab Link Layer Discovery Protocol (LLDP) defines a standard method for Ethernet network devices, such as IP Phones, switches, and routers to exchange information about their capabilities with other devices and to store this information in a Management Information Base (MIB).

LLDP also enables the system administrator to view the entire network infrastructure.

The Telecommunications Industry Association (TIA) developed the Link Layer Discovery Protocol (LLDP)-Media Endpoint Discovery (LLDP-MED) extension of 802.1ab LLDP for VoIP networks, as defined by ANSI/TIA-1057.

This extension enables media devices such as IP Phones, IP media gateways, IP media servers, and IP media controllers to transmit and receive media related information.

LLDP provides the following functionality

- periodic transmission of advertisements containing device information
- device capabilities and media specific configuration information to neighbors in the same network
- implementation of behavioral requirements specified by LLDP-MED

The 802.1ab feature provides automatic configuration of the IP Phone network policy parameters, such as VLAN ID, as well as, automatic detection of misconfigurations, such as Duplex discrepancies.

The 802.1ab feature is enabled by default. However, you can disable the feature during manual configuration.

For information about 802.1ab configuration, see the applicable IP Phone section in this document.

Appendix E

Configuring the Local Tools menu

Contents

This section contains the following topics:

- "Introduction" (page 473)
- "Configuring the Local Tools options" (page 473)

Introduction

This section describes the Local Tools menu for the IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and the IP Phone 1150E.

For information about the IP Phone 2007 Local Tools menu, see [Figure 16 "IP Phone 2007" \(page 166\)](#).

Configuring the Local Tools options

Double press the **Services** key to access the Local Tools menu. To make a menu selection, you can press the number associated with the menu item (for example, press 2 1 to show the IP Set&DHCP Information menu) or you can use the navigation keys to scroll through the list of menu items.

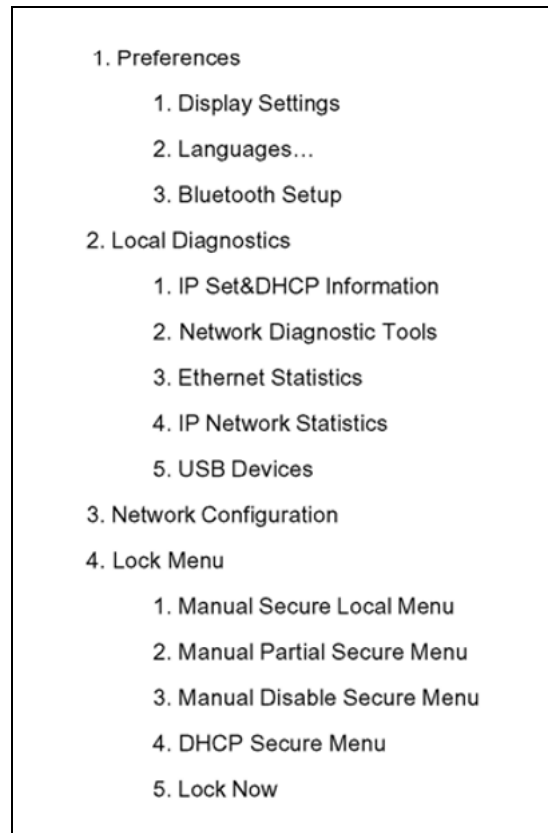
For information about the Local Tools menu for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E, see [Figure 54 "Local Tools menu options" \(page 474\)](#).

For information about the Local Tools menu for the IP Phone 1110, see [Figure 55 "IP Phone 1110 Local Tools menu" \(page 478\)](#).

Local Tools menu

[Figure 54 "Local Tools menu options" \(page 474\)](#) shows the options in the Local Tools menu for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E.

Figure 54
Local Tools menu options



Bluetooth wireless technology (IP Phone 1140E and IP Phone 1150E) is optional and appears dimmed if it is not enabled.

Preferences

The Preferences submenu offers the following choices

- 1. Display Settings
- 2. Languages
- 3. Bluetooth Setup (IP Phone 1140E, and IP Phone 1150E)

1. Display Settings

The Display Settings menu provides access to the Contrast and Screen Saver tools. Contrast adjusts the viewing angle of the display. Screen Saver controls how long the display remains lit if the phone is inactive.

Nortel recommends you use the Telephone Options menu to adjust the contrast.

2. Languages

Use this item to select the language of the IP Phone.

Bluetooth Setup

You can access the Bluetooth Setup options using either of the following two methods

- Double press the **Headset** key to open the 3. Bluetooth Setup dialog box.
- Double press the **Services** key to open the Local Tools menu, press 1 on the dialpad to select **1. Preferences** and press 3 on the dialpad to open the **Bluetooth Setup** dialog box.

The **Bluetooth Setup** item is not available on all phones. If the Bluetooth Setup menu item appears dimmed, or fails to open when you double press the Headset key, Bluetooth wireless technology is not enabled on your phone. To configure the administration setting for Bluetooth wireless technology, see "[Bluetooth wireless technology](#)" (page 386).

Local Diagnostics

For information about Local Diagnostics, see [Appendix "IP Phone diagnostic utilities"](#) (page 483).

Network Configuration

Use the Network Configuration menu item to configure the IP Phone 1120E, IP Phone 1140E, and the IP Phone 1150E, and to display information, which was configured during installation. You can access the Network Configuration menu using one of the following methods

- Reboot the IP Phone and press the four soft keys at the bottom of the display in sequence from left to right.
- Select 3. Network Configuration from the Local Tools menu.

For more information, see [Appendix "IP Phone diagnostic utilities"](#) (page 483).

Lock Menu

You must enter the fixed password whenever the Lock Menu sub menu is accessed. Use the dialpad and enter the fixed password 26567*738 (color*set).

The settings configured in the Lock Menu sub menu override the settings received from the DHCP string.

The Lock Menu offers the following choices

- 1. Manual Secure Lock Menu

- 2. Manual Partial Secure Menu
- 3. Manual Disable Secure Menu
- 4. DHCP Secure Menu
- 5. LockNow

1. Manual Secure Local Menu

When this option is selected, you are prompted to enter the fixed password whenever the **Services** key is double-pressed.

2. Manual Partial Secure Menu

When this option is selected, you are prompted to enter the fixed password whenever you access the Local Diagnostics and the Network Configuration sub menus.

3. Manual Disable Secure Menu

When this option is selected, the Lock Menu is disabled.

4. DHCP Secure Mode

The IP Phone follows the menu lock configuration received from the Full DHCP string

- if SECUREMENU is present, you are prompted to enter a password after you double-press the Services key
- if PARTSECURE is present, you are prompted to enter a password whenever you select Local Diagnostics and Network Configuration
- if neither SECUREMENU nor PARTSECURE is present, then the menu is not locked

For information about Password Protection of the Local Tools menu in the applicable IP Phone section in this document.

5. Lock Now

The Lock Now item immediately exits the Tools menu, closes any open Tools menu pages, and locks the **Tools** menu.

Procedure 91

Locking the Tools menu

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

- | | |
|---|-------------------------------|
| 1 | Press the Services key twice. |
|---|-------------------------------|

- 2 Press 4 on the dialpad to access the Lock Menu item or use the Up/Down navigation keys to scroll and highlight the Lock Menu options.
- 3 Press the Select soft key.

—End—

Procedure 92**Unlocking the Tools menu**

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

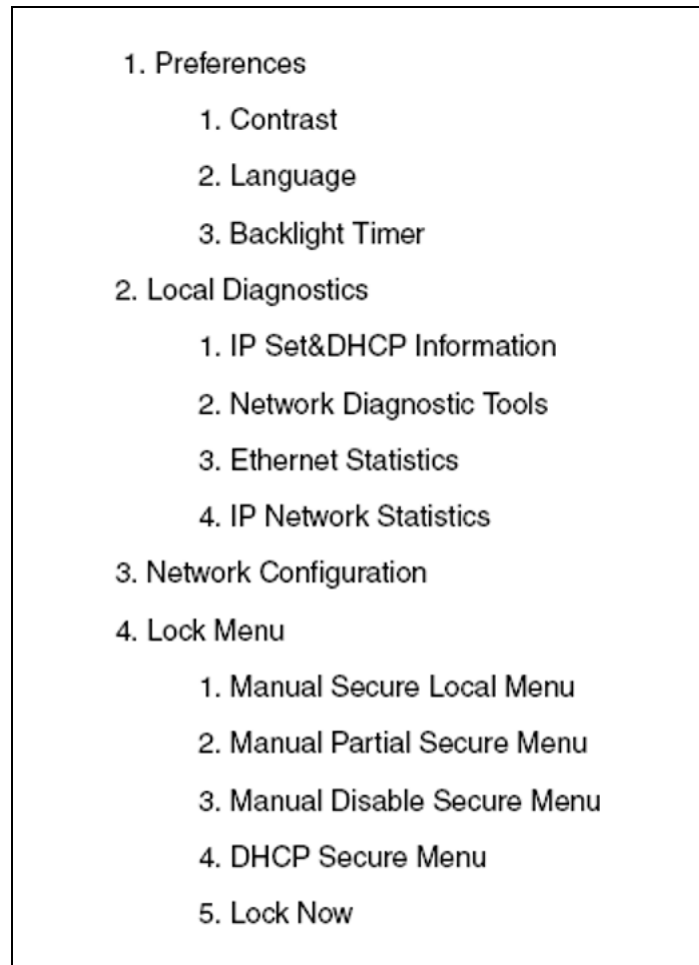
- | | |
|---|--|
| 1 | Press the Services key twice. |
| 2 | Enter the password 26567*738 (color*set) in the prompt window.
The Tools menu is unlocked, and remains active for five minutes. |
-

—End—

Local Tools menu

This section describes the Local Tools menu options for the IP Phone 1110. [Figure 55 "IP Phone 1110 Local Tools menu" \(page 478\)](#) shows the Local Tools menu for the IP Phone 1110.

Figure 55
IP Phone 1110 Local Tools menu



Preferences

The Preferences submenu offers the following choices

- 1. Contrast
- 2. Language
- 3. Backlight Timer

1. Contrast

The Contrast tool adjusts the contrast of the LCD display screen on the IP Phone.

The initial Contrast level for the LCD display screen is downloaded when the IP Phone is configured. Selecting the Contrast tool automatically sets the LCD display screen contrast to the IP Phone local contrast setting.

2. Language

Use this item to select the language in the local menus of the IP Phone. To access the language used by the server-based features, press Services > Telephone Options > Languages.

To access the local language tool, double-press the Services key, select the Preferences menu, or press 1 on the dialpad to open the Preferences menu, then press 2 to select the Language tool.

3. Backlight Timer

Use this item to adjust how long the LCD display screen remains lit when the IP Phone is inactive.

The backlight time is displayed in the format xxx, where xxx is the time in minutes or hours.

Local Diagnostics

For information about Local Diagnostics, see [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

Network Configuration

Use the Network Configuration menu item to configure the IP Phone and to display information, which you configured during installation. You can access the Network Configuration menu using one of the following methods

- Reboot the IP Phone and press the four soft keys at the bottom of the display in sequence from left to right.
- Select 3. Network Configuration from the Local Tools menu.

For information about Network Configuration, see [Appendix "IP Phone diagnostic utilities" \(page 483\)](#).

Lock Menu

You must enter the fixed password whenever the Lock Menu sub menu is accessed. Use the dialpad and enter the fixed password 26567*738 (color*set).

The settings configured in the Lock Menu sub menu override the settings received from the DHCP string.

The Lock Menu offers the following choices

- 1. Manual Secure Lock Menu
- 2. Manual Partial Secure Menu
- 3. Manual Disable Secure Menu

- 4. DHCP Secure Menu
- 5. LockNow

When options are inactive, a black box appears at the beginning of the menu item, and replaces the menu option number.

1. Manual Secure Local Menu

When this option is selected, you are prompted to enter the fixed password whenever the Services key is double-pressed.

2. Manual Partial Secure Menu

When this option is selected, you are prompted to enter the fixed password whenever you access the Local Diagnostics and the Network Configuration sub menus.

3. Manual Disable Secure Menu

When this option is selected, the Lock Menu is disabled.

4. DHCP Secure Mode

The IP Phone follows the menu lock configuration received from the Full DHCP string

- if SECUREMENU is present, you are prompted to enter a password after you double-press the Services key
- if PARTSECURE is present, you are prompted to enter a password whenever you select Local Diagnostics and Network Configuration
- if neither SECUREMENU nor PARTSECURE is present, then the menu is not locked

For information about Password Protection of the Local Tools menu in the applicable IP Phone section in this document.

5. Lock Now

The Lock Now item immediately exits the Tools menu, closes any open Tools menu pages, and locks the Tools menu.

Procedure 93

Locking the Tools menu

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

- | | |
|----------|-------------------------------|
| 1 | Press the Services key twice. |
|----------|-------------------------------|

- 2 Press 4 on the dialpad to access the Lock Menu item or use the Up/Down navigation keys to scroll and highlight the Lock Menu options.
- 3 Press the Select soft key.

—End—

Procedure 94
Unlocking the Tools menu

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

- 1 Press the Services key twice.
- 2 Enter the password 26567*738 (color*set) in the prompt window.
- 3 The Tools menu is unlocked, and remains active for five minutes.

—End—

Appendix F

IP Phone diagnostic utilities

Contents

This section contains the following topics:

- ["Introduction" \(page 483\)](#)
- ["Text-based diagnostic utilities" \(page 483\)](#)
- ["Graphic-based diagnostics utilities" \(page 513\)](#)

Introduction

Two methods of accessing IP Phone diagnostic utilities are text-based and graphic-based. The IP Phone 2001, IP Phone 2002, IP Phone 2004, IP Audio Conference Phone 2033, and IP Phone 1110 use a text-based method to access diagnostic utilities. For information about diagnostic utilities for the IP Phone 2001, IP Phone 2002, IP Phone 2004, and IP Audio Conference Phone 2033, see ["Network diagnostic utilities" \(page 484\)](#).

The IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and the IP Phone 1150E use a graphic-based method to access Local Diagnostics through the Local Tools menu. For information about Local Diagnostics for the IP Phone 2007, see ["Local Diagnostics for the IP Phone 2007" \(page 514\)](#). For information about Local Diagnostics for the IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, see ["Local Diagnostics for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E" \(page 519\)](#).

Text-based diagnostic utilities

Network diagnostic utilities are accessible on IP Phone 2001, IP Phone 2002, IP Phone 2004, and IP Audio Conference Phone 2033 to isolate voice quality and network performance problems.

Network diagnostic utilities

Network diagnostic utilities are available on the IP Phone itself (set-based), or from the Command Line Interface (CLI) (server-based). Diagnostic utilities provide testing and verification of end-to-end connectivity, verification of statistics and settings, and retrieval of set information. For further information about CLI, see ["Using CLI Commands" \(page 511\)](#).

Network diagnostic utilities include Network Diagnostic Tools (Ping and traceRoute), Ethernet Statistics, IP Networking Statistics, DHCP Information Process, RUDP Statistics, and Network QoS Process.

See [Table 69 "Network Diagnostic Utilities availability" \(page 484\)](#) for a description of diagnostic utilities available for each IP Phone state.

Network diagnostic utilities are available on the IP Audio Conference Phone 2033 in Remote Mode only.

For detailed information about Quality of Service (QoS) and Proactive Voice Quality Management (PVQM), see *Converging the Data Network with VoIP Fundamentals (NN43001-260)*.

[Table 69 "Network Diagnostic Utilities availability" \(page 484\)](#) lists the Network Diagnostic Utilities available on the IP Phone in different states.

Table 69
Network Diagnostic Utilities availability

Function module	Before IP Address assignment	After IP Address assignment, unregistered - Local Mode	Registered (TPS) - Remote Mode	Call in progress (TPS)
Local diagnostic tools (Ping & TraceRoute)	N/A	Yes	Yes	Yes
Ethernet statistics	Yes	Yes	Yes	Yes
IP Networking statistics	N/A	Yes	Yes	Yes
DHCP information process	N/A	Yes, part of information	Yes	Yes
UNISim/RUDP statistics	N/A	N/A	Yes	Yes
RTP/RTCP statistics	N/A	N/A	Yes	Yes
Network QoS process	N/A	N/A	Yes, last call	Yes, renew

Function module	Before IP Address assignment	After IP Address assignment, unregistered - Local Mode	Registered (TPS) - Remote Mode	Call in progress (TPS)
Supplicant Status	N/A	N/A	Yes	Yes
Supplicant Authentication Status	N/A	N/A	Yes	Yes
Supplicant Device ID	N/A	N/A	Yes	Yes
Supplicant Authentication or ID	N/A	N/A	Yes	Yes

Ping and TraceRoute

The system administrator can use the local diagnostic tools, Ping or Traceroute command, from a specific endpoint with any arbitrary destination, typically another endpoint or Signaling Server. Ping and TraceRoute are available in Local or Remote mode.

Ethernet statistics

In Local or Remote Mode, the system administrator can view ethernet statistics (for example, number of collisions, VLAN ID, speed and duplex) for the IP Phone on a particular endpoint. The exact statistics depends on what is available from the IP Phone for the specific endpoint. The user may select either the Network Port (NIport) or PC port (PCport).

IP Networking statistics

In Local or Remote Mode, the system administrator can view information about the packets sent, packets received, broadcast packets received, multicast packets received, incoming packets discarded, and outgoing packets discarded.

DHCP information process

In Remote Mode, the system administrator can view DHCP settings (for example, IP address, S1, S2, and S4 addresses) for each IP Phone. In Local Mode partial information is available.

UNISlim/RUDP statistics

In Remote Mode, the system administrator can view RUDP statistics (for example, number of messages sent, received, retries, resets, and uptime) for the IP Phones.

RTP/RTCP statistics

In Remote Mode, the system administrator can view RTP/RTCP QoS metrics (for example, packet loss and jitter) while a call is in progress.

Network QoS Process

In Remote Mode, the system administrator can view QoS statistics (for example, packets sent, packets received, packet loss, jitter average and jitter maximum, and round trip delay).

Supplicant Status

The system administrator uses this option to determine whether 802.1x is enabled or disabled 802.1x.

Authentication State

The system administrator uses this option to determine whether the IP Phone is currently authenticated with the 802.1x system. The following are valid state values

- LogOff
- Disconnected
- Connected
- Acquired
- Authorizing
- Held
- Authorized
- Dbl Authd

DeviceID

The system administrator uses this option to check the user name configured for the device that is sent to the switch for authentication. This should match the corresponding entry in the RADIUS Server.

Authenticator ID

The system administrator uses this option to check the MAC address of the Authenticator (switch).

Accessing Network Diagnostic utilities from the IP Phone

Local diagnostics are available from the IP Phone for either Local or Remote mode.

Diagnostics prompts are presented in English.

Local Mode

When the IP Phone is not registered with the signaling server, the **Network Diagnostic Tools** menu is available from the IP Phone in Local Mode (see [Table 69 "Network Diagnostic Utilities availability" \(page 484\)](#)). This menu is controlled by the firmware on the IP phone.

Use [Procedure 95 "Accessing the Network Diagnostic Tools menu in Local mode" \(page 487\)](#) to access the Network Diagnostic Tools in Local mode.

Procedure 95

Accessing the Network Diagnostic Tools menu in Local mode

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

- | | |
|---|---|
| 1 | Double-press the Services key. The Local Main Menu, Network Diagnostic Tools, appears. |
| 2 | Press Cancel to quit, or use the Navigation keys to scroll through the menu and select one of the following <ul style="list-style-type: none"> • Ping • TraceRoute • Ethernet Statistics • IP Network Statistics • IP Set & DHCP Information |
-

—End—

Procedure 96

Executing Ping

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

- | | |
|---|---|
| 1 | Select Ping from the Network Diagnostic Tools submenu. |
| 2 | Press the IP soft key and enter the IP address to Ping.
Tip: Use the dialpad to enter the IP address. The * key is used for dots and the # key produces a space. |
| 3 | Press the Ping soft key. The results of the Ping appear on the display. |
| 4 | Use the Navigation keys to browse the data. See Figure 56 "PING data display page" (page 499) .
Tip: Press the Ping soft key again to stop the pinging. |
| 5 | Press one of the following soft keys <ul style="list-style-type: none"> • Reset — to clear the data • Exit — to return to the Network Diagnostic Tools menu. |

—End—

Procedure 97
Executing TraceRoute

Step Action

- 1 Select **TraceRoute** from the **Network Diagnostic Tools** submenu.
- 2 Press the **IP** soft key and enter the IP address to trace.
- 3 Press the **Tracert** soft key. The results of the TraceRoute appear on the display.
- 4 Use the **Navigation** keys to browse the data. See [Figure 57 "TraceRoute data display screen"](#) (page 499).
Tip: Press the **Tracert** soft key again to stop the route tracing.
- 5 Press one of the following soft keys
 - **Reset** — to clear the data
 - **Exit** — to return to the **Network Diagnostic Tools** menu

—End—

Procedure 98
Accessing Ethernet Statistics

Step Action

- 1 Select **Ethernet Statistics** from the **Network Diagnostic Tools** menu. The Ethernet statistics appear on the display.
- 2 Use the **Navigation** keys to browse the data. See [Figure 58 "Ethernet Statistics data display page"](#) (page 500).
- 3 Press one of the following soft keys
 - **Reset**— to clear the data and reset the statistic counter
 - **Exit** — to return to the **Network Diagnostic Tools** menu

—End—

Procedure 99
Accessing IP Network Statistics

Step	Action
1	Select IP Network Statistics from the Network Diagnostic Tools menu. The IP Network Statistics appear on the display.
2	Use the Navigation keys to browse the data. See Figure 59 "IP Networking Statistics data display screen" (page 501) .
3	Press one of the following soft keys <ul style="list-style-type: none"> • Reset — to clear the data and reset the statistic counter • Exit — to return to the Network Diagnostic Tools menu

—End—

Procedure 100
Accessing IP Set and DHCP Information

Step	Action
1	Select IP Set & DHCP Information from the Network Diagnostic Tools menu. The IP Set and DHCP information appears on the display.
2	Use the Navigation keys to browse the data. See Figure 60 "DHCP information data display page" (page 502) . In Local Mode, Exit is the only soft-key available in this submenu.

—End—

Remote Mode

When the IP Phone is registered to the signaling server, diagnostics are available through the Telephone Options menu in Remote Mode. This menu is controlled by the TPS.

Diagnostics are available on the IP Audio Conference Phone 2033 in Remote Mode only.

When the user selects **Diagnostics** from the **Telephone Options** menu, if an IP Phone Installer Password is enabled in the Signaling Server, the **Diagnostics** menu is locked and the message "Access denied" displays on the IP Phone display.

Use Procedure 101 "Accessing the Diagnostics submenu in Remote Mode" (page 490) to access the **Diagnostics** submenu in Remote Mode:

Procedure 101**Accessing the Diagnostics submenu in Remote Mode**

Step Action

- 1 Press the **Services** key.
- 2 Select **Telephone Options**.
- 3 Select **Diagnostics**.
- 4 Do one of the following:
 - Press the **Cancel** soft key to quit the **Diagnostics** submenu and return to the **Telephone Options** menu.
 - Use the **Navigation** keys to scroll through the **Diagnostics** submenu.
 - Press **Select** to select one of the diagnostics.

The following items are available on the **Diagnostics** submenu

- Diag Tools (Diagnostic Tools: Ping and TraceRoute)
- EtherStats (Ethernet Statistics)
- IP Stats (IP Statistics)
- RUDP Stats (RUDP Statistics)
- QoS Stats (Quality of Service Statistics)

—End—

Procedure 102**Accessing Diagnostic Tools in Remote mode**

Step Action

- 1 Select **Diagnostic Tools** from the **Diagnostics** submenu.
- 2 Do one of the following
 - Press the **Cancel** soft key to return to the **Diagnostics** submenu.
 - Use the **Navigation** keys to scroll to the Diagnostic Tools selection.
- 3 Press the **Select** soft key to choose one of the following

- Ping (see Figure 63 "Ping data display page" (page 505))
- TraceRoute (see Figure 64 "Tracert data display screen" (page 505))

—End—

Ping The following items are available on the **Ping** submenu in Remote mode

- IP Addr
- Nr of Pings
- Ping!
- Last ping

Procedure 103

Entering an IP address

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

- | | |
|---|---|
| 1 | Scroll through the Ping submenu to the IP Addr menu item. An IP address appears if previously entered. Example 47.249.48.20. |
| 2 | Press the Select soft key. |
| 3 | Use the Navigation keys to scroll to the destination IP address. <ul style="list-style-type: none"> • If the destination IP address is in the list, press the Select soft key to select the IP address. Press the Select soft key again to return to the Ping submenu. • If the destination IP address is not in the list, continue scrolling through the available IP address list until the IP address 0.0.0.0 appears. Press the Select soft key. <p>Tip: To edit the IP address, use the dialpad and the Delete soft key and the Cancel soft key. Use the * key for dots.</p> |
| 4 | Press the Select soft key to save the new IP address or press the Cancel soft key to return to the Ping submenu. |

—End—

Procedure 104**Changing the number of Pings**

Step Action

- 1 From the **Ping** submenu, use the **Navigation** keys to scroll to the **Nr of Pings** submenu item.
- 2 Press the **Select** soft key.
Tip: Use the **Delete** and **Clear** soft keys to enter the number of pings.
- 3 Do one of the following
 - Press the **Select** soft key to accept the change and return to the **Ping** submenu.
 - Press the **Cancel** soft key to return to the **Ping** submenu.

—End—

Procedure 105**Pinging an IP address**

Step Action

- 1 From the **Ping** submenu, use the **Navigation** keys to scroll to the **Ping!** submenu item.
- 2 Press the **Select** soft key. Pinging starts.
Tip: Press the **Stop** soft key to stop pinging.
- 3 Press the **OK** soft key to return to the **Ping** submenu.

—End—

Procedure 106**Reviewing the results of the Ping**

Step Action

- 1 Use the **Navigation** keys to scroll to the **Last Ping** submenu item.
- 2 Press the **Select** soft key.
- 3 Use the **Navigation** keys to scroll through the results.
- 4 Press the **Cancel** soft key to return to the **Ping** submenu.

—End—

TraceRoute The following items are available on the **TraceRoute** submenu in Remote mode

- IP Addr
- Max Nr of Hops
- TraceRt!
- Last TraceRt

Procedure 107

Entering an IP address

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

- | | |
|---|---|
| 1 | Scroll through the TraceRoute submenu to the IP Addr menu item. An IP address appears if previously entered. Example 47.249.48.20. |
| 2 | Press the Select soft key. |
| 3 | Use the Navigation keys to scroll to the destination IP address. <ul style="list-style-type: none"> • If the destination IP address is in the list, press the Select soft key to select the IP address. Press the Select soft key again to return to the TraceRoute submenu. • If the destination IP address is not in the list, continue scrolling through the available IP address list until the IP address 0.0.0.0 appears. Press the Select soft key. |

Tip: To edit the IP address, use the **Delete** soft key and the **Cancel** soft key. Use the * key for dots.

- | | |
|---|--|
| 4 | Press the Select soft key to save the new IP address, or press the Cancel soft key to return to the TraceRoute submenu. |
|---|--|

—End—

Procedure 108

Changing the number of Hops

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

- | | |
|---|---|
| 1 | From the TraceRoute submenu, use the Navigation keys to scroll to the Max Nr of Hops submenu item. |
|---|---|

- 2 Press the **Select** soft key.
Tip: Use the dialpad and the **Delete** and **Clear** soft keys to enter the number of Hops.
- 3 Do one of the following
 - Press the **Select** soft key to accept the change and return to the **TraceRoute** submenu.
 - Press the **Cancel** soft key to return to the **TraceRoute** submenu.

—End—

Procedure 109
Tracing a route

Step Action

- 1 From the **TraceRoute** submenu, use the **Navigation** keys to scroll to the **TraceRoute!** submenu item.
- 2 Press the **Select** soft key. Route tracing starts.
Tip: Press the **Stop** soft key to stop the trace.
- 3 Press the **OK** soft key to return to the **TraceRoute** submenu.

—End—

Procedure 110
Reviewing the results of the trace

Step Action

- 1 From the **TraceRoute** submenu, use the **Navigation** keys to scroll to the **Last TraceRt** submenu item.
- 2 Press the **Select** soft key.
- 3 Use the **Navigation** keys to scroll through the results.
- 4 Press the **Cancel** soft key to return to the **TraceRoute** submenu.

—End—

Ethernet Statistics Use [Procedure 111 "Browsing Ethernet Statistics" \(page 495\)](#) to access the **EtherStats** submenu item in Remote mode.

Procedure 111
Browsing Ethernet Statistics

Step	Action
1	Select EtherStats from the Diagnostics submenu. The Ethernet statistics appear on the display.
2	Do one of the following <ul style="list-style-type: none"> • Press the OK soft key to return to the Diagnostics submenu. • Use the Navigation keys to browse the data. See Figure 65 "Ethernet statistics data display screen" (page 506). • Press the Cancel soft key to return to the Diagnostics submenu.

—End—

Procedure 112
Checking 802.1x Supplicant status

Step	Action
1	Select EtherStats from the Diagnostics submenu.
2	Scroll through the EtherStats menu and select Supplicant Status .
3	Press the Select soft key.
4	Do one of the following <ul style="list-style-type: none"> • Press the OK soft key to return to the EtherStats submenu. • Use the Navigation keys to browse the data.
5	Press the Cancel soft key to return to the EtherStats submenu.

—End—

Procedure 113
Checking 802.1x Supplicant Authentication state

Step	Action
1	Select EtherStats from the Diagnostics submenu.
2	Scroll through the EtherStats menu and select Authentication State .

- 3 Press the **Select** soft key.
- 4 Do one of the following
- 5 Press the **OK** soft key to return to the **EtherStats** submenu.
 - Use the **Navigation** keys to browse the data.
- 6 Press the **Cancel** soft key to return to the **EtherStats** submenu.

—End—

Procedure 114
Checking Device ID

Step Action

- 1 Select **EtherStats** from the **Diagnostics** submenu.
- 2 Scroll through the **EtherStats** menu and select **Device ID**.
- 3 Press the **Select** soft key.
- 4 Do one of the following
 - Press the **OK** soft key to return to the **EtherStats** submenu.
 - Use the **Navigation** keys to browse the data.
- 5 Press the **Cancel** soft key to return to the **EtherStats** submenu.

—End—

Procedure 115
Checking Authenticator ID

Step Action

- 1 Select **EtherStats** from the **Diagnostics** submenu.
- 2 Scroll through the **EtherStats** menu and select **Authenticator ID**.
- 3 Press the **Select** soft key.
- 4 Do one of the following
- 5 Press the **OK** soft key to return to the **EtherStats** submenu.
 - Use the **Navigation** keys to browse the data.

- 6 Press the **Cancel** soft key to return to the **EtherStats** submenu.

—End—

IP Statistics Use [Procedure 116 "Browsing IP Statistics" \(page 497\)](#) to access the **IP Stats** submenu item in Remote mode.

Procedure 116
Browsing IP Statistics

Step Action

- 1 Select **IP Stats** from the **Diagnostics** submenu. The IP Statistics appear on the display.
- 2 Do one of the following
 - Press the **OK** soft key to return to the **Diagnostics** submenu.
 - Use the **Navigation** keys to scroll through the data display results. See [Figure 66 "IP Networking statistics data display screen" \(page 507\)](#).
 - Press the **Cancel** soft key to return to the **Diagnostics** submenu.

—End—

RUDP Statistics Use [Procedure 117 "Browsing RUDP Statistics" \(page 497\)](#) to access the **RUDP Stats** submenu item in Remote mode.

Procedure 117
Browsing RUDP Statistics

Step Action

- 1 Select **RUDP Stats** from the **Diagnostics** submenu. The RUDP statistics appear on the display.
- 2 Do one of the following
 - Press the **OK** soft key to return to the **Diagnostics** submenu.
 - Use the **Navigation** keys to scroll through the data display results. See [Figure 67 "RUDP statistics data display page" \(page 507\)](#).
 - Press the **Cancel** soft key to return to the **Diagnostics** submenu.

—End—

QoS Statistics Use [Procedure 118 "Browsing Quality of Service Statistics" \(page 498\)](#) to access the **QoS Stats** submenu item in Remote mode.

Procedure 118

Browsing Quality of Service Statistics

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

- | | |
|---|--|
| 1 | Select QoS Stats from the Diagnostics submenu. The Quality of Service statistics appear on the display. |
| 2 | Do one of the following <ul style="list-style-type: none"> • Press the OK soft key to return to the Diagnostics submenu. • Use the Navigation keys to scroll through the results. See Figure 68 "QoS statistics data display page" (page 508). • Press the Cancel soft key to return to the Diagnostics submenu. |

The IP Phone display returns to an idle state after 5 minutes if the user does not interact with menu items.

—End—

Network Diagnostic Utilities data display pages

Data from the diagnostic utilities is displayed on the IP Phone display. One line of data at a time is displayed on IP Phone 2001, IP Phone 2002, IP Audio Conference Phone 2033 and 3 lines of data are displayed at a time on IP Phone 2004. Each line of data is up to 24 characters in length. Use the **Navigation** keys to scroll through the lines of data.

Local Mode data display pages

The following figures illustrate the Network Diagnostic Utilities data display pages in Local Mode.

Ping [Figure 56 "PING data display page" \(page 499\)](#) illustrates the data displayed from the **Ping** diagnostic tool.

Figure 56
PING data display page

```
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
```

In Figure 56 "PING data display page" (page 499),

- PacketTx = packets sent
- PacketRx = packets received

TraceRoute Figure 57 "TraceRoute data display screen" (page 499) illustrates the data displayed from the **TraceRoute** diagnostic tool. Browse through the last 30 items by pressing the **Navigation** keys.

Figure 57
TraceRoute data display screen

```
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
XXX: XXXXX XXXXX XXXXX
IP: XXX.XXX.XXX.XXX
```

In [Figure 57 "TraceRoute data display screen" \(page 499\)](#),

- xxx: = Time To Live (TTL):Round Trip Time1, Round Trip Time2, Round Trip Time3
- IP: = IP address

Ethernet Statistics [Figure 58 "Ethernet Statistics data display page" \(page 500\)](#) illustrates the data displayed from the **Ethernet Statistics** submenu item.

Figure 58
Ethernet Statistics data display page

```
1.Link: UP/Down
2.Duplex:Full/Half
3.Speed: xxx (MB)
4.Auto Sense/Negotiate
Auto-Nego Capability:Y/N
Auto-Nego Completed:Y/N
5.VLANPriority:xxx
6.VLANID:xxxx
7.PktColl:xxxxxxxxxxx
8.CRCErrors:xxxxxxxxxxx
9.FrameErrors:xxxxxxxxxxx
```

In [Figure 58 "Ethernet Statistics data display page" \(page 500\)](#),

- Duplex = duplex mode
- Speed = network speed 10MB/100MB
- Auto Sense/Negotiate = Auto Negotiate Protocol Received or Not (Y – Yes, N – No)

In the **IP Phone Configuration** menu, Auto Negotiate mode is the default setting for initial startup. If the telephone connects to a network that supports Auto Negotiate, it selects the best speed and duplex mode available. For more information, the applicable IP Phone section in this document.

- VLANPriority = IP Phone VLAN priority
- VLANID = IP Phone VLAN ID
- PCollision = network packet collision peg counts
- CRCErrors = network CRC errors peg counts

- FrameErrors = network Framing errors peg counts

IP Networking Statistics Figure 59 "IP Networking Statistics data display screen" (page 501) illustrates the data displayed from the **IP Networking Statistics** submenu item.

Figure 59
IP Networking Statistics data display screen

```
1. Packet Tx: xxxxxxxxxxxx
2. PacketRx: xxxxxxxxxxxx
3. BcastPktRx: xxxxxxxxxxxx
4. McastPktRx: xxxxxxxxxxxx
5. InPktDisc: xxxxxxxxxxxx
6. OutPktDisc: xxxxxxxxxxxx
7. UnknownPkts: xxxxxxxxxxxx
8. ICMPType—Code: xxx—xxx
```

In Figure 59 "IP Networking Statistics data display screen" (page 501),

- PacketTx = IP Phone packets sent
- PacketRx = IP Phone packets received
- BcastPktRx = broadcast packets received
- McastPktRx = multicast packets received
- InPktDisc = incoming packets discarded
- OutPktDisc = outgoing packets discarded
- UnknownPkts = unknown protocol packets discarded
- ICMPType-Code = the last ICMP message: XXX-XXX

DHCP Statistics Figure 60 "DHCP information data display page" (page 502) illustrates the data displayed from the **DHCP Statistics** submenu item.

Figure 60
DHCP information data display page

```
1.Configuration:
NetworkDataValided:Yes/No
MACAddressStored:Yes/No
PerformDHCP:Full/Partial
VLANEnable:Yes/No
VLANConfig:Manual/Auto
VLANIDsDiscovered:Yes/No
PrimaryServer:S1/S2
2.FWVersion:xxxxxxx
3.HWIDxxxxxxxxxxxxxxxxxxxxx
4.SetIP:xxx.xxx.xxx.xxx
5.SbMask:xxx.xxx.xxx.xxx
6.GtWay:xxx.xxx.xxx.xxx
7.PROMS1:xxx.xxx.xxx.xxx
  Port:xxxx Act:xxx
  Retries:xxx
8.PROMS2:xxx.xxx.xxx.xxx
  Port:xxxx Act:xxx
  Retries:xxx
9.VLANPriority:xxx
10.VLANID:xxxx
11.DHCPRespondString:
xxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxx.....
12.Servers'Information:
  SN:xxx.xxx.xxx.xxx
  Port:xxxx Act:xxx
  Retries:xxx FailOver:xxx
```

In Figure 60 "DHCP information data display page" (page 502),

- NetworkDataValided = is EEPROM Network Data validated?
- MACAddressStored = is MAC Address stored in EEPROM?
- FWVersion = IP Phone firmware version
- HWID = IP Phone hardware ID

- SbMask = subnet mask
- GtWay = Gateway
- PROMS1 = EEPROM Server1 information
- PROMS2 = EEPROM Server2 information
- Sn = S: Server n is from 1 to 16

UNIStim/RUDP statistics Figure 61 "UNIStim/RUDP statistics data display screen (TPS)" (page 503) shows the data displayed from the **UNIStim/RUDP statistics** submenu item.

Figure 61
UNIStim/RUDP statistics data display screen (TPS)

```
1.MessageTx:xxxxxxxxxxxxx
2.MessageRX:xxxxxxxxxxxxx
3.Retries:xxxxxxxxxxxxx
4.UpTime:xxx/xx/xx/xx
```

In Figure 61 "UNIStim/RUDP statistics data display screen (TPS)" (page 503),

- MessageTx = messages sent
- MessageRx = messages received
- Retries = number of retries
- UpTime = up-time of current TPS registration (days/hours/minutes/seconds)

RTP/RTCP statistics Figure 62 "RTP/RTCP statistics data display page" (page 504) shows the data displayed from the **RTP/RTCP statistics** submenu item.

Figure 62
RTP/RTCP statistics data display page

```
1.EndIP:xxx.xxx.xxx.xxx
2.PortID:xxxx
3.PacketTX:xxxxxxxxxxx
4.PacketRx:xxxxxxxxxxx
5.DiscPktRx:xxxxxxxxxxx
6.PacketLossRx:xxx%
7.JittAveRx:xxxxxxxxxxx
8.JittMaxRx:xxxxxxxxxxx
9.RdTripDelay:xxxxx ms
```

In [Figure 62 "RTP/RTCP statistics data display page"](#) (page 504),

- EndIP = endpoint IP address
- PortID = port ID
- PacketTx = RTP packets sent
- PacketRx = RTP packets received
- DPacketRx = BTR Disorder packets received
- PacketLossRx = packet loss received xxx%
- JittAveRx = jitter average received xxxxxx
- JittMaxRx = jitter maximum received xxxxxx
- RdTripDelay = round trip delay

Each new call resets the counters.

Remote Mode data display pages

The following figures illustrate the **Network Diagnostic Utilities** data display pages in Remote Mode.

PING [Figure 63 "Ping data display page"](#) (page 505) shows the data displayed from the **Ping** Diagnostic Tool.

Figure 63
Ping data display page

```

Rx 64 bytes time xx ms
Rx 64 bytes time xx ms
Rx 64 bytes time xx ms
For xxx.xxx.xxx.xxx
PacketTx:xxx
Packet Loss = xx%
Min RTT: xxx ms
Avg RTT: xxx ms
Max RTT: xxx ms

```

In Figure 63 "Ping data display page" (page 505),

- Packet TX = packets sent
- Packet Rx = packets received
- RTT - Round Trip Time (for Min RTT, Avg RTT, and Max RTT)

TraceRoute Figure 64 "Tracert data display screen" (page 505) shows the data displayed from the **Tracert** Diagnostic tool.

Figure 64
Tracert data display screen

```

Hopxxx: RTT = xxx xxx xxx
IP: xxx.xxx.xxx.xxx
Hopxxx: RTT = xxx xxx xxx
IP: xx.xxx.xxx.xxx
Hopxxx: RTT = xxx xxx xxx
IP: xxx.xxx.xxx.xxx
Hopxxx: RTT = xxx xxx xxx
IP: xxx.xxx.xxx.xxx
Hopxxx: RTT = xxx xxx xxx
IP: xxx.xxx.xxx.xxx

```

In Figure 64 "Tracert data display screen" (page 505),

- Hopxxx = the Hop number
- xxx = Round Trip Time1, Round Trip Time2, Round Trip Time3
- IP: = IP address

Ethernet Statistics Figure 65 "Ethernet statistics data display screen" (page 506) shows the data displayed from the **EtherStats** submenu item.

Figure 65
Ethernet statistics data display screen

```
1.Link: UP/Down
2.Duplex:Full/Half
3.Speed: xxx (MB)
4.Auto Sense/Negotiate
Auto-Nego Capability: Y/N
Auto-Nego Completed: Y/N
5.VLANPriority:xxx
6.VLANID:xxxx
7.PktColl:xxxxxxxxxxx
8.CRCErrors:xxxxxxxxxxx
9.FrameErrors:xxxxxxxxxxx
```

In Figure 65 "Ethernet statistics data display screen" (page 506),

- Duplex - duplex mode
- Speed - network speed 10MB/100MB
- Auto Sense/Negotiate = Auto Negotiate Protocol Received or Not (Y - Yes, N - No)
- VLANPriority = IP Phone VLAN priority
- VLANID = IP Phone VLAN ID
- PCollision = network packet collision peg counts
- CRCErrors = network CRC errors peg counts
- FrameErrors = network Framing errors peg counts

In the **IP Phone Configuration** menu, Auto Negotiate mode is the default setting for initial startup. If the telephone connects to a network that supports Auto Negotiate, it selects the best speed and duplex mode available. For more information, see the applicable IP Phone section in this document.

IP Networking Statistics Figure 66 "IP Networking statistics data display screen" (page 507) shows the data displayed from the **IP Stats** submenu item.

Figure 66
IP Networking statistics data display screen

```

1. Packet TX: xxxxxxxxxxxx
2. Packet Rx: xxxxxxxxxxxx
3. BcastPktRx: xxxxxxxxxxxx
4. McastPktRx: xxxxxxxxxxxx
5. InPktDisc: xxxxxxxxxxxx
6. OutPktDisc: xxxxxxxxxxxx
7. UnknownPkts: xxxxxxxxxxxx
8. ICMPTypeCode: xxx-xxx

```

In Figure 66 "IP Networking statistics data display screen" (page 507),

- PacketTx = IP Phone packets sent
- PacketRX = IP Phone packets received
- BcastPktRx = broadcast packets received
- McastPkeRx = multicast packets received
- InPktDisc = incoming packets discarded
- OutPktDisc = outgoing packets discarded
- UnknownPkts = unknown protocol packets discarded
- ICMPTypeCode = the last ICMP message: xxx-xxx

RUDP statistics data display screen (TPS) Figure 67 "RUDP statistics data display page" (page 507) shows the data displayed from the **RUDP Stats** submenu item.

Figure 67
RUDP statistics data display page

```

1.MessageTx:xxxxxxxxxxxxx
2.MessageRx:xxxxxxxxxxxxx
3.Retries:xxxxxxxxxxxxx
4.UpTime:xxx/xx/xx/xx

```

In Figure 67 "RUDP statistics data display page" (page 507),

- MessageTx = messages sent
- MessageRx = messages received
- Retries = number of retries

- UpTime = up-time of current TPS registration (days/hours/minutes/seconds)

Quality of Service statistics Figure 68 "QoS statistics data display page" (page 508) shows the data displayed from the **QoS Stats** menu item.

Figure 68
QoS statistics data display page

```
FarEndIP:xxx.xxx.xxx.xxx
PortEndPortID:xxxx
LocPktLossRx:xxxxxxxxxxxx
LocJittAvgRx:xxx
LocLatAvg:xxx
LocPktTx:xxx
LocPktRx:xxx
LocOutOrdRx:xxx
LocListR:xxx
RmtPktLossRx:xxx
RmtJittAvgRx:xxx
RmtLatAvg>xxx
RmtListR:xxx
```

In Figure 68 "QoS statistics data display page" (page 508),

- EndIP = endpoint IP address
- PortID = port ID
- PacketTx = RTP packets sent
- Packet Rx = RTP packets received
- DPacketRx = BTR Disorder packets received
- PacketLossRx = packet loss received xxx%
- JittAveRx = jitter average received xxxxxx
- JittMaxRx = jitter maximum received xxxxxx
- RdTripDelay = round trip delay

Each new call resets the counters.

Network Address Translation Traversal

This section describes the Network Address Translation (NAT) Traversal feature as it effects IP Phones. NAT Traversal is required to permit IP Phones working behind a NAT box to connect and maintain signaling and media paths.

NAT Traversal is applicable to all UNiStim IP Phone clients and is one-ended. That is, it does not require the other end of a call to support any special protocol, and it is interoperable with any other media termination.

In this document NAT refers to both IP port address mapping and IP address mapping (also known as NAPT). A NAT is used with or without a Virtual Private Network (VPN).

The NAT Traversal feature supports only IP clients behind cone NAT types. Three types of cone NAT are: full cone, restricted cone, and port restricted cone. NAT traversal is not compatible with symmetric NATs. If the IP Phone is behind a Symmetric NAT, the LTPS unregisters the phone from the call server (while remaining registered on the LTPS), and displays the following message on the IP Phone display: *Error! Symmetric NAT.*

For detailed information about the NAT Traversal feature, see *IP Line Fundamentals (NN43100-500)*.

For information about accessing NAT information from an IP Phone, see "[Set IP Information](#)" (page 510).

ATTENTION

Nortel recommends partial DHCP configuration for IP Phones residing behind a NAT router unless the NAT router supports special configuration of the DHCP server. For more information, see *IP Line Fundamentals (NN43100-500)*.

General Information

The General Information menu displays information about the IP Phone. To access the General Information menu, press **Services > Telephone Options > Set Information > General Information**.

The General Information menu displays the following information about the IP Phone

- Hardware ID
- Terminal Type
- Release Number
- Manufacturer Code
- Color Code
- Set TN
- Registered TN
- EEPROM Data Validity
- Set IP Information

For further information about the Set IP Information menu option, see ["Set IP Information" \(page 510\)](#).

- Ethernet Information

For further information about the Ethernet Information menu option, see ["Ethernet Information" \(page 511\)](#)

- Server Information

For further information about the Server Information menu option, see ["Server Information" \(page 511\)](#)

Set IP Information

IP Phones which do not reside behind a NAT device display the following information

Set IP:
SIG:
x.x.x.x:yyyy
GW:
x.x.x.x
Mask:
xxx.xxx.xxx.xxx

IP Phones which reside behind a NAT device display the following information

Public Set IP
SIG:
x.x.x.x:yyyy
Public Set IP
RTP:
x.x.x.x:yyyy
Private Set IP
SIG:
x.x.x.x:yyyy
Private Set IP
RTP:
x.x.x.x:yyyy
GW:
x.x.x.x
Mask:
xxx.xxx.xxx.xxx
Type of NAT:
Cone

Ethernet Information

The following information is accessed through the Ethernet Information menu

- MAC Address Stored
- VLAN Enabled
- VLAN Configuration
- VLAN Discovered
- VLAN Priority
- VLAN ID

Server Information

The following information is accessed through the Server Information menu

- Node IP
- Node ID
- ITG IP Address
- Perform DHCP
- Primary Server
- S1, S2 IP Address
- S1, S2 Port
- S1, S2 Action
- S1, S2 Retry Count
- DHCP Server IP Address

Using CLI Commands**IDU commands**

The system-based IDU command in LD 32 is used to test the end-to-end IP connectivity of the IP Phone from the call server console instead of using set-based diagnostics.

The IDU command provides the following information

- TN
- TN ID
- MAC address
- IP address
- LTPS IP address
- Manufacturer code

- Model
- NT code
- Color code
- Release code
- Serial number
- Firmware/Software version

For an IP Phone behind a NAT, the IP address is composed of the public address followed by the private address in parentheses (see [Table 70 "IDU command printout in LD 32 for IP Phone with a NAT" \(page 512\)](#)). For an IP Phone without a NAT, the IP address is the signaling IP address of the IP Phone as seen by the LTPS (see [Table 71 "IDU command printout in LD 32 for IP Phone without a NAT" \(page 513\)](#)).

For detailed information, see *Software Input Output Reference—Maintenance (NN43001-711)*.

[Table 70 "IDU command printout in LD 32 for IP Phone with a NAT" \(page 512\)](#) and [Table 71 "IDU command printout in LD 32 for IP Phone without a NAT" \(page 513\)](#) provide the output format of the IDU commands in LD 32.

[Table 70 "IDU command printout in LD 32 for IP Phone with a NAT" \(page 512\)](#) provides the output format of the IDU commands in LD 32 for an IP Phone with a NAT.

Table 70
IDU command printout in LD 32 for IP Phone with a NAT

Item	Description
ISET TN:	l s c u
TN ID CODE:	2001P2, 2002P1, 2002P2, 2004P1, 2004P2, 2050PC
ISET MAC ADR	xx.xx.xx.xx.xx.xx
ISET IP ADR	xx.x.x.xxx:xxxx(xxx.xxx.x.xx)
LTPS IP ADR	xx.xx.xxx.xx
MANUFACTURER CODE	[NAME]
MODEL	
NT CODE:	xxxxxxxx
COLOR CODE:	xx
RLS CODE:	x
SER NUM:	xxxxxx
FW/SW VERSION	xxxxxxx

Table 71 "IDU command printout in LD 32 for IP Phone without a NAT" (page 513) provides the output format of the IDU commands in LD 32 for an IP Phone without a NAT.

Table 71
IDU command printout in LD 32 for IP Phone without a NAT

Item	Description
ISET TN:	l s c u
TN ID CODE:	2001P2, 2002P1, 2002P2, 2004P1, 2004P2, 2050PC
ISET MAC ADR	xx.xx.xx.xx.xx .xx
ISET IP ADR	xx.x.x.xxx:xxxx
LTPS IP ADR	xx.xx.xxx.xx
MANUFACTURER CODE	[NAME]
MODEL	
NT CODE:	xxxxxxxx
COLOR CODE:	xx
RLS CODE:	x
SER NUM:	xxxxxx
FW/SW VERSION	xxxxxxxx

If the IDU command cannot retrieve the information shown in Table 70 "IDU command printout in LD 32 for IP Phone with a NAT" (page 512) or Table 71 "IDU command printout in LD 32 for IP Phone without a NAT" (page 513), it responds with one of the following

- prints the IP Phone IP address and the Voice Gateway Media Card address, and generates an NPR0503 message
- the IP Phone is not registered with the Call Server and generates an NPR0048 message
- the IP Phone is registered, but the Call Server is not responding, and generates an NPR0503 message

Graphic-based diagnostics utilities

Graphic diagnostic utilities are available on the IP Phone 2007, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E.

For information about diagnostic utilities for the IP Phone 2007, see "[Local Diagnostics for the IP Phone 2007](#)" (page 514). For information about diagnostic utilities for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E, see "[Local Diagnostics for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E](#)" (page 519).

Local Diagnostics for the IP Phone 2007

To access the Local Diagnostics menu on the IP Phone 2007, tap the **Tools** icon then tap the **Local Diagnostics** menu entry. The Local Diagnostics menu displays the following items

- Network Diagnostic Tools
- Ethernet Statistics
- IP Network Statistics
- IP Set&DHCP Information

You can press the **Return** soft key in any submenu item screen to return to the Local Diagnostics submenu. Therefore, you can gather information and run tests without exiting and reentering the Local Diagnostics menu.

Use [Procedure 119 "Using Network Diagnostic Tools"](#) (page 514) to access Network Diagnostic Tools.

Procedure 119 Using Network Diagnostic Tools

Step	Action
1	Tap the Tools icon.
2	Tap the Local Diagnostics menu entry.
3	Tap the Network Diagnostic Tools soft key. The screen displays Ping , Tracert , and EXIT soft keys, presents a pull-down list for IP addresses, and displays the Ping and Hop parameters.
4	Scroll down through the IP addresses and tap an address.
5	The number of repetitions of the Ping command are shown in the top bar of the screen. The default is 4. To change the number of repetitions, tap on the number and enter a new value using the USB keyboard.
6	The number of hops for the Tracert command are shown in the top bar of the screen. The default is 30.

To change the number of hops, tap on the number and enter a new value using the USB keyboard.

- 7 Tap the **Ping** soft key to have the telephone attempt to access the IP address up to the number of times shown on the top of the screen.

The IP Phone displays the following

```
Pinging x.x.x.x with 64 bytes
(where x.x.x.x is the IP address chosen in step 4)
```

The **Exit** soft key changes to **Stop** and the other soft keys become blank.

The IP Phone attempts to contact (ping) the address the number of configured times, displaying the results of each attempt.

- 8 To stop the ping before completing, tap the **Stop** soft key.

The **Stop** key becomes the **Exit** soft key. The results of ping are displayed as follows

- Packets transmitted (Tx)
- Packets received (Rx)
- Packets lost (Lost)
- Minimum round trip time (Min)
- Maximum round trip time (Max)
- Average round trip time (Avg)

- 9 Tap the **Tracert** soft key to request the IP Phone to trace the route to the entered IP address, up to MaxHop nodes.

The IP Phone displays the following

```
Tracing route to: (x.x.x.x) over a maximum of
y hops
(where x.x.x.x is the IP address chosen in step 4 and y is the
number of hops displayed at the top of the screen)
```

The **Exit** soft key changes to **Stop** and the other soft keys become blank.

The IP Phone traces the route to the address for the configured number of server hops, displaying the hop number (starting at 0), the time in milliseconds, and the IP address.

When the trace is complete, the screen displays the following
Trace complete.

- 10 To stop Tracert before it completes, tap the **Stop** soft key.

The **Stop** soft key becomes the **Exit** soft key when Tracert stops.

- 11 Tap the **Exit** soft key to return to the Local Diagnostics menu.

—End—

Procedure 120

Using Ethernet Statistics tool

Step	Action
1	Tap the Tools icon.
2	Tap the Local Diagnostics menu entry.
3	Tap the Ethernet Statistics soft key. The tool displays Reset , NIPort , and EXIT soft keys, and the statistics for the Network Interface Port (NIPort). The following statistics are displayed <ul style="list-style-type: none"> • Link Status • Duplex Mode • Network Speed • AutoSense/Negotiate Capability • AutoSense/Negotiate Completed • Port VLAN Priority • Port VLAN ID • Packet Collision • CRC Error count • Frame Error count
4	To reset the NIPort counters to 0, tap the Reset soft key.
5	Tap the NIPort soft key. The NIPort soft key changes to the PCPort soft key and the tool displays the statistics for the Personal Computer port (PCPort). The following statistics are displayed <ul style="list-style-type: none"> • Link Status • Duplex Mode • Network Speed

- 1 Tap the **Tools** icon.

- 2 Tap the **Local Diagnostics** menu entry.

- 3 Tap the **Ethernet Statistics** soft key.

The tool displays **Reset**, **NIPort**, and **EXIT** soft keys, and the statistics for the Network Interface Port (NIPort).

The following statistics are displayed

- Link Status
- Duplex Mode
- Network Speed
- AutoSense/Negotiate Capability
- AutoSense/Negotiate Completed
- Port VLAN Priority
- Port VLAN ID
- Packet Collision
- CRC Error count
- Frame Error count

- 4 To reset the NIPort counters to 0, tap the **Reset** soft key.

- 5 Tap the **NIPort** soft key.

The **NIPort** soft key changes to the **PCPort** soft key and the tool displays the statistics for the Personal Computer port (PCPort). The following statistics are displayed

- Link Status
- Duplex Mode
- Network Speed

- AutoSense/Negotiate Capability
- AutoSense/Negotiate Completed
- Port VLAN Priority
- Port VLAN ID
- Packet Collision
- CRC Error count
- Frame Error count

6 To reset the PCPort statistics to 0, tap the **Reset** soft key.

—End—

Procedure 121

Using the IP Network Statistics tool

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

1	Tap the Tools icon.
---	---------------------

2	Tap the Local Diagnostics soft key.
---	-------------------------------------

3	Tap the IP Network Statistics soft key.
---	---

The tool displays the Reset, NIPort, and Exit soft keys, and the statistics for the Network Interface Port (NIPort).

The following statistics are displayed

- Packets sent
- Packets received
- Broadcast Packets received (Rx)
- Multicast Packets received (Rx)
- Incoming Packets discarded
- Outgoing Packets discarded
- Unknown protocols (Unknown protos)
- Last Internet Control Message Protocol (ICMP) message type and code (ICMP Type/Code)

4	To reset the NIPort counters to 0, tap the Reset soft key.
---	---

5	Tap the NIPort soft key.
---	---------------------------------

The **NIPort** soft key becomes the **PCPort** soft key, and the statistics for the Personal Computer Port (PCPort) are displayed.

The following statistics are displayed

- Packets sent
- Packets received
- Broadcast Packets received (Rx)
- Multicast Packets received (Rx)
- Incoming Packets discarded
- Outgoing Packets discarded
- Unknown protocols (Unknown protos)
- Last Internet Control Message Protocol (ICMP) message type and code (ICMP Type/Code)

- 6 To reset the PCPort counters to 0, tap the **Reset** soft key.
- 7 Tap the **Exit** soft key to return to the Local Diagnostics menu.

—End—

Procedure 122

Using the IPSet and DHCP Information tool

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

- | | |
|---|---|
| 1 | Tap the Tools icon. |
| 2 | Tap the Local Diagnostics soft key. |
| 3 | Tap the IPSet&DHCP Information soft key. |

The tool displays the **Exit** soft key at the bottom of the display and the following information

- Configuration
 - Network data validated, MAC address stored, DHCP setting
 - Voice VLAN status, type of configuration and discovery status
 - Primary Server identification
- Firmware version and Hardware Identification number
- Telephone Set IP address
- Network subnet mask

- Gateway IP address
 - EPROM Server S1 and S2 IP addresses, ports, actions, and number of retries
 - Voice VLAN priority and VLAN ID
 - DHCP Respond String
 - Server Information for S01, S02, S03, and S04, including IP addresses, ports, actions, number of retries, and failover values
- 4 Use the scroll bar to display all the information.
 - 5 Tap the **Exit** soft key to return to the Local Diagnostics menu.

—End—

Local Diagnostics for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E

This section describes the Local Diagnostics for the IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, and IP Phone 1110. [Figure 69 "Local Diagnostics menu" \(page 520\)](#) shows the Local Diagnostic menu for the IP Phone 1140E.

The Local Diagnostics submenu offers the following choices

- 1. IP Set&DHCP Information
- 2. Network Diagnostic Tools
- 3. Ethernet Statistics
- 4. IP Network Statistics
- 5. USB Devices

Figure 69
Local Diagnostics menu



1. IP Set and DHCP Information

Use [Procedure 123 "Using the IP Set and DHCP Information tool"](#) (page 520) to use the IP Set&DHCP Information tool.

Procedure 123

Using the IP Set and DHCP Information tool

Step	Action
1	Press the Services key twice.
2	Press 2 1 on the dialpad to access the IP Set&DHCP Information menu or use the Up/Down navigation keys to scroll and highlight the IP Set & DHCP Information option.
3	Press the Select soft key. You can press the Return soft key to exit the menu and return to Local Diagnostics submenu. The tool displays the following information <ul style="list-style-type: none"> • Configuration <ul style="list-style-type: none"> — Network data validated, MAC address stored, DHCP setting

- Voice VLAN status, type of configuration and discovery status
- Primary Server identification, PC Port enabled status
- Firmware version and Hardware Identification number
- Telephone Set IP address
- Network subnet mask
- Gateway IP address
- EPROM Server S1 and S2 IP addresses, ports, actions, and number of retries
- Voice VLAN priority and VLAN ID
- DHCP Response String
- Server information for S01, S02, S03, and S04, including IP addresses, ports, actions, number of retries, and failover values
- TFTP Server IP address

Figure 70 "IP Set and Information screen" (page 521) shows IP Set & DHCP Information screen.

Figure 70
IP Set and Information screen



- 4 Use the scroll bar to display all the information.

- 5 Press the **Return** soft key to return to the **Local Tools** menu or the **Stop** key to exit the menu and return to the IP Phone display.

—End—

2. Network Diagnostic Tools

The Network Diagnostic Tools menu contains the following menu items

- IP/MaxPing/MaxHop
- Ping
- Tracert
- Exit

Use [Procedure 124 "Using Network Diagnostic Tools" \(page 522\)](#) to access Network Diagnostic Tools.

Procedure 124

Using Network Diagnostic Tools

Step	Action
1	Press the Services key twice.
2	Press 2 2 on the dialpad to access the Network Diagnostic Tools menu or use the Up/Down navigation keys to scroll and highlight the IP Set & DHCP Information option.
3	Press the Select soft key. You can press the Return soft key exit the menu to return to the Local Diagnostics submenu. The screen displays IP/MaxPing/MaxHop , Ping , Tracert , and Return soft keys. Figure 71 "Network Diagnostic Tools screen" (page 523) shows the Network Diagnostic Tools screen.

Figure 71
Network Diagnostic Tools screen



- 4 Enter an IP address or use the Up/Down navigation keys to scroll down through the IP addresses.
- 5 The number of repetitions of the **Ping** command is shown in the top bar of the screen. The default is 4.
 To change the number of repetitions, use the arrow keys to select the number and enter a new value using the dialpad.
- 6 The number of hops for the **Tracert** command is shown in the top bar of the screen. The default is 30.
 To change the number of hops, use the arrow keys to select the number and enter a new value using the dialpad.
- 7 Press the **Ping** soft key to have the IP Phone attempt to access the IP address, up to the number of times shown on the top of the screen.

The IP Phone displays the following

```
Pinging x.x.x.x with 64 bytes
(where x.x.x.x is the entered IP address)
```

The **Return** soft key changes to **Stop** and the other soft keys become blank.

The IP Phone attempts to contact (ping) the address the number of configured times, and displays the results of each attempt.

- 8 To stop the ping before completing, tap the **Stop** soft key.

The **Stop** soft key becomes the **Return** soft key. The results of ping are displayed as follows

- Packets transmitted (Tx)
- Packets received (Rx)
- Percentage of Packets Lost (Lost)
- Minimum round trip time (Min)
- Maximum round trip time (Max)
- Average round trip time (Avg)

- 9 Press the **Tracert** soft key to request the IP Phone to trace the route to the entered IP address, up to MaxHop nodes.

The IP Phone displays the following

```
Tracing route to: (x.x.x.x) over a maximum of y
hops
(where x.x.x.x is the entered IP address and y is the number of hops
displayed at the top of the screen)
```

The **Return** soft key changes to **Stop** and the other soft keys become blank.

The IP Phone traces the route to the address for the configured number of server hops, displaying the hop number (starting at 0), the time in milliseconds, and the IP address.

When the trace is complete, the screen displays the following
Trace complete.

- 10 To stop Tracert before it completes, tap the **Stop** soft key.

The **Stop** soft key becomes the **Return** soft key when Tracert stops.

- 11 Tap the **Return** soft key to return to **Local Tools** menu or the **Stop** key to exit the menu and return to the IP Phone display.

—End—

3. Ethernet Statistics

Use [Procedure 125 "Using Ethernet Statistics tool" \(page 525\)](#) to use the Ethernet Statistics menu.

Procedure 125
Using Ethernet Statistics tool

Step Action

- 1 Press the **Services** key twice.
- 2 Press 2 3 on the dialpad to access the **Ethernet Statistics** menu or use the Up/Down navigation keys to scroll and highlight the **Ethernet Statistics** option.
- 3 Press the **Select** soft key.

You can press the **Return** soft key exit the menu to return to the **Local Diagnostics** submenu.

The screen displays **Reset**, **Nlport/PCport**, and **Return** soft keys. The **Nlport/PCport** soft key is used to select the Network (NI) Port or the PC (PC) Port. The soft key label indicates the current display page. For example, when NIport appears on the soft key label, the information showing on the display is for the network interface port.

When NIport appears on the second soft key label, the following statistics are displayed

- Link Status
- Duplex Mode
- Network Speed (10 Mb, 100 Mb, or 1 G)
- AutoSense/Negotiate
 - AutoSense/Negotiate Capability
 - AutoSense/Negotiate Completed
- Port VLAN Priority
- Port VLAN ID
- Packet Collision
- CRC Error count
- Frame Error count
- Unicast Packets Sent
- Unicast Packets Received
- Broadcast Packets Received
- Multicast Packets Received
- 802.1x Status (EAP Status)

4 To reset the NIPort counters to 0, press the **Reset** soft key.

5 Press the **NIPort** soft key.

The **NIPort** soft key changes to the **PCPort** soft key and the tool displays the statistics for the Personal Computer port (PCPort). The following PCPort statistics are displayed

- Link Status
- Duplex Mode
- Network Speed
- AutoSense/Negotiate Capability
- AutoSense/Negotiate Completed
- Port VLAN Priority
- Port VLAN ID
- Packet Collision
- CRC Error count
- Frame Error count
- Unicast Packets Sent
- Unicast Packets Received
- Broadcast Packets Received
- Multicast Packets Received

Figure 72 "Ethernet Statistics display screen" (page 527) shows Ethernet Statistics display screen.

Figure 72
Ethernet Statistics display screen



- 6 To reset the PCPort statistics to 0, tap the **Reset** soft key.

—End—

4. IP Network Statistics

Use [Procedure 126 "Using the IP Network Statistics tool"](#) (page 527) to use the Network Statistics tool.

Procedure 126

Using the IP Network Statistics tool

Step	Action
1	Press the Services key twice.
2	Press 2 4 on the dialpad to access the IP Network Statistics menu or use the Up/Down navigation keys to scroll and highlight the IP Network Statistics option.
3	Press the Select soft key. You can press the Return soft key exit the menu to return to the Local Diagnostics submenu.

- 4 The screen displays **Reset**, **Refresh**, and **Return** soft keys. The Refresh soft key (second soft key on the display) refreshes the counts on the display. This display shows the Network statistics for the IP Phone port of the 3 port switch.

The following statistics are displayed

- Packets sent
- Packets received
- Incoming Packet errors
- Outgoing Packet errors
- Incoming Packets discarded
- Outgoing Packets discarded
- Unknown protocols (Unknown protos)
- Last Internet Control Message Protocol (ICMP) message type and code (The Last ICMP Type/Code)

Figure 73 "IP Networks Statistics screen" (page 528) shows IP Networks Statistics screen.

Figure 73
IP Networks Statistics screen



- 5 To reset the NIPort counters to 0, press the **Reset** soft key.

- 6 The display counter values are a snapshot and the displayed counter values do not change while the display is shown. To refresh them as you view the counter display, press the **Refresh** soft key.
- 7 You can press the **Return** soft key exit the menu to return to the **Local Diagnostics** submenu, or you can press the **Stop** key to close the menu and return to the IP Phone display.

—End—

5. USB Devices

The USB Devices tool provides information about an Universal Serial Bus (USB) devices that connect to your IP Phone. The IP Phone automatically detects USB devices when they are connected to the USB port in the back of the IP Phone. The IP Phone enumerates and lists any USB device , but only USB mice and USB keyboards are used. The display shows the descriptive text string received from the USB device.

Procedure 127

Using the USB Devices tool

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

- | | |
|---|--|
| 1 | Press the Services key twice. |
| 2 | Press 2 5 on the dialpad to access the USB Devices menu or use the Up/Down navigation keys to scroll and highlight the USB Devices option. |
| 3 | Press the Select soft key.

You can press the Return soft key exit the menu to return to the Local Diagnostics submenu. |

—End—

Appendix G

Bluetooth wireless technology

Contents

This section contains the following topics:

- "Introduction" (page 531)
- "Description" (page 531)

Introduction

Bluetooth wireless technology is supported on the IP Phone 1140E and the IP Phone 1150E. The IP Phone 1120E does not support Bluetooth wireless technology.

On the IP Phone 1150E, only the Agent port supports Bluetooth wireless technology.

Description

The IP Phone 1140E and the IP Phone 1150E contain both hardware and software support for Bluetooth wireless technology enabled headsets. When the IP Phone powers up, Bluetooth wireless technology is disabled and must be explicitly re-enabled.

Supported Bluetooth wireless technology headsets

The following Bluetooth wireless technology headsets are supported

- Plantronics P251N, P261N, CS55, Voyager 510S (IP Phone 1140E, and IP Phone 1150E)
- GNNetcom GN 2120 NCD, GN 9120 Flex (IP Phone 1150E *only*)
- GNNetcom Liberation (IP Phone 1150E *only*)

To select a Bluetooth wireless technology headset type for the IP Phone 1150E, select Headset Type from the Telephone Options menu.

Enabling Bluetooth wireless technology

The following methods are available to enable Bluetooth wireless technology on the IP Phone

- Manual configuration— is used to set the Bluetooth wireless technology mode on the IP Phone on a phone-by-phone basis. If manual configuration is used exclusively, a TFTP server is not required to configure Bluetooth wireless technology. For further information about manual configuration, see "[Manual configuration](#)" (page 532).

Use [Procedure 128 "Configure the Bluetooth wireless technology administration setting"](#) (page 533) to configure the Bluetooth wireless technology through the **Local Tools > Network Configuration** submenu.

- TFTP configuration—is used to initially set the Bluetooth wireless technology mode then the TFTP Server can be removed. The IP Phone now retains the value and uses the last value received if no new value is received.

Use [Procedure 129 "Enabling Bluetooth wireless technology on the IP Phone 1140E"](#) (page 534) to enable Bluetooth wireless technology on the IP Phone 1140E using the TFTP configuration file (1140e.cfg) retrieved during bootup.

If Bluetooth wireless technology is enabled on your phone, and password-protection for the Local Tools menu has been enabled, you can still double-press the **Headset** key to access the menu.

Manual configuration

You can enable or disable Bluetooth wireless technology through the Network Configuration menu. The **Enable Bluetooth** option provides administration control over Bluetooth wireless technology. The following values are available

- Auto—(default) Bluetooth wireless technology setting received through TFTP configuration
- Yes—Bluetooth wireless technology is enabled on the IP Phone
- No—Bluetooth wireless technology is disabled on the IP Phone

When the IP Phone 1140E firmware is upgraded, or when the IP Phone is received from the manufacturer with the latest firmware, the default power up setting is Auto. When the setting is Auto, the setting received from the TFTP Device Config file controls whether Bluetooth wireless technology is enabled.

When the Bluetooth wireless technology setting is Yes or No, the value received from the TFTP Device Config file is saved but is not used. The Bluetooth wireless technology administration setting is forced enabled, or

disabled respectively regardless of the value received in the TFTP Device Config file. If the setting is then changed back to Auto, the saved value takes effect if no further setting is received through the TFTP server.

Procedure 128

Configure the Bluetooth wireless technology administration setting

Step	Action
1	Double-press the Services key.
2	Press 3 on the dialpad to access the Network Configuration menu or use the Up/Down navigation keys to scroll and highlight the Network Configuration option.
3	Use the Right navigation key to navigate to the Enable Bluetooth box. The current setting is displayed.
4	Press Enter to start the edit mode.
5	Use the Down navigation key to open the list.
6	Use the Up/Down navigation keys to scroll and highlight the desired Bluetooth wireless technology mode.
7	Press Enter to select the mode and to close the list.
8	Press Enter to exit the edit mode.
9	Press the Apply&Reset soft key to save the change and to restart the phone.

—End—

The new mode takes affect when the IP Phone restarts. If the administrative control enabled Bluetooth wireless technology on the phone, the item appears in **1. Preferences** submenu.

After setting administrative control, it is recommended that the Partial Menu Lock feature be activated to prevent users from changing the administration setting. For further information about the Partial Menu Lock feature, see [Appendix "Configuring the Local Tools menu" \(page 473\)](#).

TFTP configuration

Use [Procedure 129 "Enabling Bluetooth wireless technology on the IP Phone 1140E" \(page 534\)](#) to enable Bluetooth wireless technology on the IP Phone. The IP Phone 1140E is used as an example.

Procedure 129**Enabling Bluetooth wireless technology on the IP Phone 1140E****Step Action****ATTENTION**

If the TFTP server is configured and running, skip to [step 5](#) to configure the IP Phone 1140E with the TFTP Server IP address.

- 1 Add the [DEVICE_CONFIG] section to the 1140e.cfg file.
- 2 Create the device configuration file. This file must have the same name as that specified for the FILENAME parameter in the [DEVICE_CONFIG] section of the 1140e.cfg file. See [Figure 74 "Sample of the 1140eDEV.cfg file"](#) (page 534).

Figure 74
Sample of the 1140eDEV.cfg file

```
ENABLE_BT 1
```

- 3 The device configuration file (1140eDEV.cfg) enables Bluetooth wireless technology if ENABLE_BT 1 is present. If ENABLE_BT 0 is present, Bluetooth wireless technology is disabled. [Figure 75 "Sample of the 1140E.cfg file"](#) (page 535) shows an example of the 1140e.cfg file with the FW and the ENABLE_BT line.

It is also possible to use the 1140e.cfg file with only the [DEVICE_CONFIG] section for the control of Bluetooth wireless technology. [Figure 76 "Sample of the DEVICE_CONFIG file with only the \[DEVICE_CONFIG\] section"](#) (page 535) shows an example of the 1140e.cfg file with only the [DEVICE_CONFIG] section.

If only the [DEVICE_CONFIG] version is used, you must add the [FW] section before the BootC FW recovery is used. Otherwise, the BootC FW download fails and the IP Phone reverts to the BootC TPS download screen.

Figure 75
Sample of the 1140E.cfg file

```
[FW]
DOWNLOAD_MODE AUTO
VERSION 0625Cxx
FILENAME 0625Cxx.bin
PROTOCOL TFTP
SERVER_IP 192.168.1.100
SECURITY_MODE 0

[DEVICE_CONFIG]
DOWNLOAD_MODE FORCED
VERSION 000001
FILENAME 1140eDEV.cfg
SERVER_IP 192.168.1.100
```

Figure 76
Sample of the DEVICE_CONFIG file with only the [DEVICE_CONFIG] section

```
[DEVICE_CONFIG]
DOWNLOAD_MODE FORCED
VERSION 000001
FILENAME 1140eDEV.cfg
SERVER_IP 192.168.1.100
```

- 4 Start the TFTP Server. The TFTP Server must be running on the network when the IP Phone 1140E powers up to retrieve the Bluetooth wireless technology administrative control. After you put the 1140e.cfg and the device config file in the TFTP Server directory, ensure the TFTP Server is running then reboot the IP Phone 1140E. For information about TFTP Server configuration, see [Appendix "TFTP Server" \(page 547\)](#).

Once the IP Phone 1140E retrieves the setting when the IP Phone 1140E restarts, it is saved in persistent memory. If the Enable BT setting is set to Auto, then the received value is acted on and Bluetooth wireless technology is either enabled or disabled on the IP Phone 1140E. If the Device Config file with the Enable BT setting is not received for any reason and the Enable Bluetooth mode is set to Auto, then the phone uses the last value received (retrieved from persistent memory).

If administrative control is not retrieved, the previously received value is used. If no value has ever been retrieved, then Bluetooth wireless technology is disabled by default.

If the IP Phone 1140E successfully retrieves the administrative control and enables Bluetooth wireless technology, 3. *Bluetooth Setup* appears in the Preferences menu.

- 5 Configure the IP Phone 1140E with a TFTP Server IP address so the IP Phone can access the TFTP Server.
- 6 Press the **Services** key twice.
- 7 Press **3** on the dialpad to access the **Network Configuration** menu or use the Up/Down navigation keys to scroll and highlight the **Network Configuration** option. Press **Enter**.
- 8 Enter the TFTP IP address in the **TFTP IP** field.
- 9 Press the **Apply&Reset** soft key.

—End—

[Table 72 "1140e.cfg field name definitions" \(page 536\)](#) lists the 1140e.cfg field names and definitions.

Table 72
1140e.cfg field name definitions

Field name	Field value	Definition
[FW]		Section header for firmware download information
DOWNLOAD_MODE	AUTO	Recommended setting. FW is downloaded when the IP Phone FW version is older than the value in the 1140e.cfg file VERSION field.
VERSION	0625Cxx	FW version
FILENAME	0625Cxx.bin	image file name, must match the file name of the FW file
PROTOCOL	TFTP	Download protocol must be TFTP
SERVER_IP	xxx.xxx.xxx.xxx	IP address of the TFTP server that downloads the FILENAME file.
SECURITY_MODE	0	For future use.

Possible reasons Bluetooth wireless technology remains disabled on the IP Phone after bootup

The following are possible reasons Bluetooth wireless technology remains disabled on the IP Phone 1140E after bootup

- The TFTP Server is down or is no longer present on the network.

- Network failure.
- The DEVICE_CONFIG section is missing from the 1140e.cfg file or is present but the specified device config file cannot be accessed, or it can be accessed but the ENABLE_BT line is either missing, or is present but the value of 1 is missing.

Create the DEVICE_CONFIG section and file

The file pointed to by the [DEVICE_CONFIG] section contains the parameter, ENABLE_BT. The parameter value is set to 1, which enables Bluetooth wireless technology.

The [DEVICE_CONFIG] section can point to a single file that enables or disables the Bluetooth wireless technology on all phones, or it can point to a device configuration file for specific phones using a wildcard file name to enable the Bluetooth wireless technology for select phones. The configuration files for the specific phones use the IP Phone MAC address as the file name with the .cfg file extension.

Table 73 "[DEVICE_CONFIG] field name definitions" (page 537) lists the [DEVICE_CONFIG] section field names and definitions.

Table 73
[DEVICE_CONFIG] field name definitions

Field name	Field value	Definition
[DEVICE_CONFIG]		Section header for device configuration file information
DOWNLOAD_MODE	FORCED	Recommended setting. The version is ignored and the DEVICE_CONFIG file is always read.
	or	
VERSION	000001	The version of the device config file
FILENAME	1140eDEV.cfg	Device config filename. The file name can be anything. If a file name is specified, the file name is loaded to every IP Phone 1140e.
	or	
	*.cfg	A wildcard file name enables a different setting to be configured for every IP Phone. The IP Phone checks for a file with the MAC address as the file name (for example, 001365FEF1C6.cfg).
SERVER_IP	xxx.xxx.xxx.xxx	The IP address of the TFTP Server that downloads the FILENAME file.

Pairing your headset

Use [Procedure 130 "Pairing the Bluetooth wireless technology headset with your IP Phone"](#) (page 538) to pair the Bluetooth wireless technology headset with your IP Phone.

Procedure 130

Pairing the Bluetooth wireless technology headset with your IP Phone

Step	Action
1	Restart your IP Phone using one of the following methods <ul style="list-style-type: none"> If you are using an AC power adapter, unplug it, wait 10 seconds, and reinsert it. If you are using POE, unplug the LAN Ethernet cable, wait 10 seconds, and reinsert it.
2	Double-press the Headset key to open the dialog box. The Enable Bluetooth check box is highlighted. If the menu fails to open when you double press the Headset key, Bluetooth wireless technology is not enabled on your phone.
3	Press the Enter key to activate Bluetooth wireless technology. A check mark is displayed to indicate that Bluetooth wireless technology is activated. The message <i>BT Enabled</i> appears at the bottom of the display.
4	Put your Bluetooth wireless technology headset in its pairing or search mode. The procedure for doing this can be different for each wireless headset. See the documentation that accompanies your headset.
5	Search for the headset. <ol style="list-style-type: none"> Press the Right navigation key twice to highlight the Search button, displayed next to the Search Devices item. Press the Enter key. The message <i>Searching...</i> is displayed. If the search is successful, a list of Bluetooth wireless technology headsets appears in the Found: box. Choose one of the following <ul style="list-style-type: none"> If the search is successful, proceed to step 6. If the search is not successful, the message <i>Search completed. No device found</i> is displayed. Power off the wireless technology, and repeat step 4 and step 5.

- 6 Wait for the search to finish or press the **Stop** soft key to end the search.
- 7 Choose one of the following
 - If your headset is displayed as the first item in the Found box, proceed to step 8.
 - If your headset is not displayed as the first item in the Found box, select your headset from the list, as follows
 - a. Press the **Right** navigation key one or more times to highlight the Found: box. Press the **Enter** key to start the edit mode.
 - b. Press the **Down** navigation key to open the list. Press the **Up/Down** navigation keys to scroll and highlight your headset.
 - c. Press the **Enter** key to select the headset and close the list. Press the **Enter** key to exit edit mode.
- 8 Press the **Right** navigation key one or more times to highlight the **Pair** button (next to the Pair Device item) and press the **Enter** key.
 - a. A dialog box appears, with the prompt *Enter PIN#*.
 - b. Use the IP Phone dialpad to enter the Bluetooth wireless technology headset PIN and press the **Enter** key.

Check your headset documentation to find its PIN (sometimes called a passkey). Typically this value is 0000.
- 9 Choose one of the following
 - If the headset is successfully paired with your phone, proceed to step 10. To verify that the pairing was successful, ensure that the headset appears in the list next to the Paired: item. If pairing is successful, the message *Pair completed* also appears at the bottom of the screen.
 - If the headset is not successfully paired with your phone, an error message appears at the bottom of the screen. If an error message appears
 - Confirm that the wireless headset is still in search/pair mode. For example, on the GN Netcom GN 6210 headset the blue LED should still be lighted when the pairing operation starts.
 - If the headset timed out and exited search/pairing mode, put the headset in pairing mode, as discussed in step 4, and repeat step 8.
 - Check that you are using the correct PIN and repeat step 8.
- 10 Choose one of the following

- If your headset is displayed as the first item in the Paired box, proceed to step 11.
- If more than one device is paired, you may need to navigate to the one you want, as follows
 - Press the **Right** navigation key one or more times to highlight the item in the Paired box. Press the **Enter** key to start the edit mode.
 - Press the **Up/Down** navigation keys to open the list. Press the **Up/Down** navigations key to scroll in the list and highlight your headset.
 - Press the **Enter** key to select the headset and close the list. Press the **Enter** key to exit edit mode.

11 Choose one of the following

- If only one headset is paired, proceed to [step 12](#).
- If more than one wireless headset is paired, the first headset paired is automatically made the active device.

To make a different headset active, press the **Right** navigation key one or more times to highlight the Set button (next to the Set Active Device item). Press the **Enter** key.

The message *Set active: <device name>* appears. This means the headset named is now the active wireless headset and is used when you press the headset key.

12 Press the **Exit** soft key to exit to the main display. Changes are saved automatically.

Paired headset information is saved and restored when a reboot of the IP Phone occurs; therefore, the active wireless headset remains paired and active.

It is not recommended to pair more than one headset of the same model because identical names will appear in the Paired list.

—End—

Dual Pairing Headsets

Take special care when you use a dual pairing type of Bluetooth wireless technology headset. This headset can be paired to its base as well as to the IP Phone 1140E and IP Phone 1150E.

If the headset is paired to both, the IP Phone is the second device. When you press the headset telephone key and you hear a single tone, the headset is active for a call from the desktop IP Phone base.

To use the headset with the IP Phone, press and hold the headset telephone key for 1 second. You hear a double beep. The headset is active with the IP Phone.

If the base is powered off, the headset is only paired to the IP Phone. Press the headset telephone key to connect to the IP Phone.

Unless a need exists to dual-pair a headset, the operation of the headset with the IP Phone is simpler if the headset is only used with its charging-only base. The desktop IP Phone base should be powered off if it is not in use.

Interaction with wired headsets

If you connect a Bluetooth wireless technology headset and a wired handset to the same IP Phone, the two interact as follows

- If no wireless headset is paired, the wired headset works as normal. Likewise, if a wireless headset is paired with an IP Phone but is not in range, the wired headset works as normal.
- If the Use BT Headset check box is selected, the Bluetooth wireless technology headset is used as the phone headset.

The Bluetooth wireless technology headset can work only within range of the IP Phone; as a wireless headset approaches the edge of its radio range, the audio quality degrades and radio interference noise increases. When the wireless headset is in connecting range, the Headset key controls the headset, even if a wired headset is attached. If a Bluetooth wireless technology headset moves out of connecting range, a special beep sounds in the headset to indicate that the connection is lost.

When you do not want to use Bluetooth wireless technology

If a Bluetooth wireless technology headset is connected, and you want to use the wired headset, you can switch between the wireless headset and the wired headset. It is not necessary to unpair or disable Bluetooth wireless technology. You can switch between a wired headset and back again when the phone is idle or during an active call.

Use [Procedure 131 "Switching between a wired headset and wireless headset" \(page 542\)](#) to switch between a wired headset and a wireless headset.

Procedure 131**Switching between a wired headset and wireless headset**

Step	Action
1	Double-press the Headset key to open the dialog box.
2	Press the Left/Right navigation key to select the Use BT headset item. A check mark indicates that the wireless headset is used. This option is on by default.
3	To switch between a wired headset and a wireless headset, do one of the following <ul style="list-style-type: none"> • Press the Enter key to clear the check box and to use the wired headset. • Press the Enter key to select the check box and to use the wireless headset.
4	Press the Exit soft key to exit to the main display.

—End—

Use [Procedure 132 "Unpairing a wireless headset" \(page 542\)](#) to unpair the Bluetooth wireless technology headset.

Procedure 132**Unpairing a wireless headset**

Step	Action
1	Double-press the Headset key to open the dialog box.
2	Press the Right navigation key to select the Paired: item.
3	Choose one of the following <ul style="list-style-type: none"> • If your headset is displayed in the Paired box, proceed to step 5. • If more than one device is paired, and your headset is not already displayed in the Paired box, do the following <ul style="list-style-type: none"> — Press the Right navigation key one or more times to highlight the Paired: box. Press the Enter key to open edit mode. — Press the Up/Down navigation keys to open the list. Press the Up/Down navigations key to scroll in the list and highlight your headset.

- Press the **Enter** key to select the headset and close the box.
Press the **Enter** key to exit edit mode.

- 4** Press the **Right** navigation key one or more times to highlight the UnPair button (next to the UnPair Device item).

- 5** Press the **Enter** key.
Your Bluetooth wireless technology headset is unpaired and removed from the Paired: item list.

- 6** Press the **Exit** soft key to exit to the main display.
Your Bluetooth wireless technology headset is no longer paired with your phone, and the wired headset is used. To use the Bluetooth wireless technology headset again, you must perform the pairing and activation procedure.

—End—

Appendix H

Language enhancement

Contents

This section contains the following topics:

- "Description" (page 545)
- "Expansion Module for IP Phone 1100 Series font support" (page 546)

Description

To support new languages with complex fonts, CS 1000 Release 5.0 introduces the following language enhancements for the IP Phone 2007, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E

- UNISim font messages interpreted as UTF-8— enables the Call Server to easily display complex fonts, such as Arabic, Simplified Chinese, Traditional Chinese, Greek, Hebrew, Japanese, and Korean on an IP Phone.
- Support for TFTP Server—an extension of the existing configuration file is used to download fonts as needed into the IP Phone.
- Synchronization of the display language between the Call Server and the IP Phone—local prompts on the IP Phone and text from the Call Server are displayed in the same language.

UTF-8 character encoding

UTF-8 is used as character encoding between the Call Server and the IP Phone. This must be enabled on the Call Server in order for the fonts to be downloaded. After the Call Server has downloaded the appropriate fonts, the IP Phone can display all languages for which it has appropriate character sets. Although the IP Phone supports the languages for which it has appropriate character sets, only one language can be displayed at a time.

TFTP Server support

A configuration file is used to download font files, as needed, to the IP Phone using a TFTP Server. After the font files are downloaded to the IP Phone, the configuration file creates a mapping, so the IP Phone knows how and when to use the font.

Synchronizing the language

If the Call Server initiates a language change, the IP Phone changes its local prompts to match the specified language on the Call Server. If the IP Phone user initiates a language change using the Local Tools menu, the Call Server changes its local prompts to match the specified language on the IP Phone. If the Call Server selects a language which the IP Phone does not support, the local prompts default to English.

For information about downloading and configuring fonts see [Appendix "TFTP Server" \(page 547\)](#).

Expansion Module for IP Phone 1100 Series font support

The Expansion Module for IP Phone 1100 Series (Expansion Module) text is rendered by the IP Phone; therefore, the selected language and font mappings on the Expansion Module mirror the selected language and font mappings on the IP Phone.

Appendix I

TFTP Server

Contents

This section contains the following topics:

- "Introduction" (page 547)
- "TFTP Server planning" (page 547)
- "Updating IP Phones firmware" (page 549)
- "Downloading and configuring fonts" (page 556)

Introduction

A Trivial File Transfer Protocol (TFTP) Server may be required in an IP Telephony system to distribute firmware to IP Phones. The TFTP Server can reside on a subnet other than the Call Server and can be located on either side of the firewall.

TFTP Server planning



CAUTION

TFTP firmware download does not work when the IP Audio Conference Phone 2033 is behind a NAT Server.

The TFTP Server holds the firmware for updating the IP Phones. Assuming the IP address for the TFTP Server has been configured on the IP Phone, each time the IP Phone is powered on, rebooted, or is manually reset, the IP Phone checks the version of firmware against the version of firmware on the TFTP Server. If the versions are different, the IP Phone downloads the new firmware from the TFTP Server.

The following information must be considered when planning for a TFTP Server:

- The process for the IP Phone to check the version of firmware against the firmware on the TFTP Server takes a few seconds for a quiet network.
- The IP Phone attempts to connect to the TFTP Server. If the TFTP Server is offline, unreachable, or no connection is made, the IP Phone uses its existing version.
- The firmware downloading process takes about 30 seconds.
- The TFTP Server must be capable of supporting multiple TFTP sessions.
- When the IP Phone makes a TFTP request, it uses filenames without a full path name. Therefore, firmware updates for the IP Phones must be installed on the root directory of the TFTP Server.

When the firmware is uploaded to the TFTP Server, the files must be unzipped. Allow time for the TFTP Server to refresh. Monitor the TFTP Server for any errors. The TFTP Server can be located anywhere on the network if the IP Phones have the subnet mask and default IP gateway configured correctly. However, the IP Phone expects a response within two seconds to any TFTP Server request. Therefore, the TFTP Server should not be located, for example, at the other end of a slow WAN link.

If too many IP Phones attempt to download new software simultaneously, it can cause the downloads to slow down or return error messages. To reduce the number of retries and error messages, manage the download process by staggering the times the IP Phones download the firmware.

Nortel has tested the following TFTP Servers. They are listed in order of preference:

- Nortel TFTP Server (ONMS application)
- 3COM TFTP Server
- Pumpkin TFTP Server

Pre-download checklist

Ensure the following requirements are met before downloading firmware:

- A LAN must be properly configured and operational.
- The Nortel Telephony system must be connected to the network and completely operational.
- A TFTP Server must be available on the network in order to load the appropriate firmware in the IP Phones.

Updating IP Phones firmware

The latest IP Phone firmware files are found on the Nortel Web site. When the firmware is uploaded to the TFTP Server, the files must be unzipped. The zip file contains the .bin file. It can also contain other supporting notes and configuration files.

For future firmware upgrades, update the firmware file which is stored on the TFTP Server. Each time the IP Phone is powered on, it checks with the TFTP Server to ensure it has the proper firmware version, and it downloads the new software, if necessary.

Use [Procedure 133 "Updating the IP Phones firmware" \(page 549\)](#) to update the IP Phone firmware for IP Phone 2001, IP Phone 2002, IP Phone 2004, and IP Audio Conference Phone 2033.

For information about updating the firmware for the IP Phone 2007, see ["Updating the IP Phone 2007 firmware" \(page 550\)](#). For information about updating the firmware for the IP Phone 1110, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, see [Procedure 135 "Updating the firmware" \(page 553\)](#).

ATTENTION

Nortel recommends that the user ends an active call before performing firmware upgrade. Otherwise results may be unpredictable.

Procedure 133

Updating the IP Phones firmware

Step	Action
1	Download the latest IP Phones firmware from the Nortel Web site.
2	Load the latest version of the IP Phones firmware, place it on the TFTP Server, and unzip the files. Ensure the TFTP Server is started. The files required are: <ul style="list-style-type: none"> • configuration file (i2033.cfg, for example) • firmware binary file (2310S10.bin, for example)
3	If you statically assign IP addresses, ensure that the IP address, TFTP Server IP Address, Subnet Mask, and Default Gateway information are accurate. If you are using a DHCP Server, ensure the DHCP options are configured.
4	Enter the TFTP Server IP address in the configuration menu, and reboot the IP Phone.

—End—

Updating the IP Phone 2007 firmware

The IP Phone 2007 can perform TFTP firmware upgrade from within the **Tools** menu. This method requires the TFTP Server to store the following files in the root directory:

- i2007.cfg – downloading script file
- 0625Cxx.bin – firmware image file

i2007.img is the name of the firmware file by default, but the location and the name of the firmware image file being downloaded is specified in the i2007.cfg file and can be any name. The name of the firmware image file can be specified in relative path name notation (for example, /subfolder/name.ext or name.ext).

Table 74 "Fields in the TFTP configuration file" (page 550) describes the fields in the configuration file on the TFTP Server. The download mode can be set to AUTO or FORCED. It is recommended that you set DOWNLOAD_MODE to AUTO.

Table 74
Fields in the TFTP configuration file

Field Name	Field Value	Descriptions
DOWNLOAD_MODE	AUTO	Recommended setting. The application looks at the version and downloads the FW if it is a newer version than what is on the phone.
	FORCED	The version of firmware is ignored. The firmware is always downloaded.
VERSION	0625Cxx	The version string compared to what is on the phone.
FILENAME	0625Cxx.bin	Image file name. Must match the file name of the actual IP Phone FW file.
PROTOCOL	TFTP	Download protocol. Must be TFTP.
SERVER_IP	xxx.xxx.xxx.xxx	IP Address of the TFTP server in decimal.
SECURITY_MODE	0	For future use.

Use Procedure 134 "Downloading the firmware for the IP Phone 2007" (page 551) to upgrade the firmware for the IP Phone 2007.

Procedure 134**Downloading the firmware for the IP Phone 2007****Step Action****ATTENTION**

Nortel recommends that the user ends an active call before performing firmware upgrade otherwise results can be unpredictable.

- 1 Download the latest IP Phones firmware from the Nortel Web site.
- 2 Load the latest version of the IP Phones firmware and place it on the TFTP Server. Ensure the TFTP Server is started.
- 3 Tap the **Tools** icon to access the Local Tools menu.
- 4 Tap **3. Network Configuration**.
- 5 Use the **Up** and **Down** navigation keys to scroll and highlight the TFTP IP field.
- 6 Enter the IP address for the TFTP Server in the **TFTP IP** field.
- 7 Tap **Apply/Reset**.

The IP Phone 2007 goes blank briefly, then "Nortel" appears on the bottom left of the screen. The phone restarts and "Nortel" appears in the middle of the screen. Then the firmware version appears on the middle of the screen "F/W Version xxxxxx". After an 8-second count down the screen displays "Attempting TFTP...". Then "Downloading updates" appears.

—End—

Updating the firmware

This section describes the firmware upgrade process for the following IP Phones:

- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

Automatic TFTP download at bootup

If a TFTP IP address has been configured and a firmware upgrade is available on the server when the phone restarts, the phone executes the automatic TFTP download. This method requires the TFTP Server to store the .cfg and 0625Cxx.bin files for the IP Phone in the root directory.

For example, the IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E require the following files:

- 1110.cfg
0625Cxx.bin
- 1120e.cfg
0625Cxx.bin
- 1140e.cfg
0625Cxx.bin
- 1150e.cfg
0625Cxx.bin

0625Cxx.bin is the name of the firmware file by default, but the location and the name of the firmware image file being downloaded is specified in .cfg and can be any name. The name of the firmware image file can be specified in relative path name notation (for example, /subfolder/name.ext or name.ext).

[Table 75 "Fields in the TFTP configuration file" \(page 552\)](#) describes the fields in the configuration file on the TFTP Server. The download mode can be set to AUTO or FORCED. It is recommended that you set DOWNLOAD_MODE to AUTO.

Table 75
Fields in the TFTP configuration file

Field Name	Field Value	Descriptions
[FW]		Section header for firmware download info
DOWNLOAD_MODE	AUTO	Recommended setting. The application looks at the version and downloads the FW if it is a newer version than what is on the phone.
	FORCED	The version of firmware is ignored. The firmware is always downloaded.
VERSION	0625Cxx	The version string compared to what is on the phone.
FILENAME	0625Cxx.bin	Image file name. Must match the file name of the actual IP Phone FW file.
PROTOCOL	TFTP	Download protocol. Must be TFTP.

Field Name	Field Value	Descriptions
SERVER_IP	xxx.xxx.xxx.xxx	IP Address of the TFTP server in decimal.
SECURITY_MODE	0	For future use.

Use [Procedure 135 "Updating the firmware" \(page 553\)](#) to upgrade the firmware for the IP Phone 1110, IP Phone 1120E, IP 1140E, and IP Phone 1150E, using automatic TFTP download during bootup.

Procedure 135

Updating the firmware

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

1	Use one of the three methods to configure the TFTP Server address:
---	--

- Access the Network Configuration menu. Enter the address at the TFTP IP prompt. Press the **ApplyandReset** soft key to save the change.
- Enter the address in the BootC menu. See "[Manual TFTP Download from BootC Procedure](#)" (page 553).

BootC idz_8958 is not available for Expansion Modules for IP Phones 1100 Series.

- Enter the IP address in the TFTP IP address field retrieved by the DHCP Server.

2	Restart the phone.
---	--------------------

After the IP Phone starts and begins to run the latest version of firmware, the 1110.cfg, 1120e.cfg, 1140e.cfg, 1150e.cfg, files are downloaded from the TFTP Server. After the .cfg file is retrieved, the DOWNLOAD_MODE and VERSION fields are checked. If necessary, the firmware file is transferred to the phone using TFTP. The display shows the message *[FW] reading...* If successful, the display shows *[FW] writing...* and the blue LED starts to flash. After the FW image is written to the phone, the message *[FW] finished* displays, the blue LED stops flashing, and the phone resets. The phone registers to the TPS with the new FW version.

—End—

Manual TFTP Download from BootC Procedure

This method of upgrading the firmware is normally used only when you need to force the phone to restore an older firmware version. To use this method, the firmware must be placed on the TFTP Server, and you must

manually configure the phone to point to that TFTP Server. The BootC firmware carries out the upgrade. To initiate the firmware download task, BootC must be triggered to run.

You can create the configuration file with a default file name, such as 1140E.img so you do not have to change the file name each time a new IP Phone 1140E firmware load is released. However, if you take this approach, be sure to rename the released firmware file (for example, 0625Cxx.bin) to the default file name when the new firmware file is copied into the TFTP Server root directory and to update the VERSION string in the configuration file.

After the configuration file and the image file are in the TFTP Server root directory, use [Procedure 136 "Upgrading the firmware using BootC"](#) (page 554) to upgrade the firmware using BootC.

Procedure 136 Upgrading the firmware using BootC

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

- | | |
|---|---|
| 1 | Hold down the [Up] and [2] keys, and while doing so, repower the phone. When the phone restarts, it loads and runs BootC instead of the application. When the Msg Waiting LEDs go off, you can release the [Up] and [2] keys. |
| 2 | The following text menu on a white background appears: |

11x0 IP Phone Manual Configuration Nortel

If you do not see this message, you are in the wrong menu. Repeat step 1. If BootC is damaged from a power reset, hold down the [Up] and [3] keys to use the backup BootC.

- | | |
|---|---|
| 3 | When Nortel appears on the screen, press the soft keys 1,2,3,4 in sequence (left to right). BootC goes to manual configuration. If you miss this step, and the phone begins to register to the TPS, repeat step 1. |
| 4 | Follow the prompts to configure DHCP and other IP parameters or, if DHCP and other parameters are already configured, just continue pressing the 1 soft key or OK. The soft keys functions are listed below: <ul style="list-style-type: none"> • soft key 1 (below the LCD) is OK • soft key 2 is BackSpace • soft key 3 is Clear |

- soft key 4 is Cancel
- 5 When prompted: *TFTP Dwnld? (0-No, 1-Yes):0*,
- Press soft key 2 (BKSpace) to clear the 0 (No).
 - Press 1 on the dialpad, then press soft key 1 (OK).
- 6 When prompted: *TFTP IP xxx.xxx.xxx.xxx*,
- If the IP address is correct for the TFTP server, press soft key 1 (OK). After the TFTP address is entered the first time, it is presented the next time you enter the menu.
 - If the IP address is incorrect, press soft key 2 (Clear) to erase the address shown and enter a new address. Press the asterisk (*) key to enter a period (.) in the IP address. You can also use backspace key to erase part of the address or correct errors by pressing soft key 1 (BKSpace). When the address is correct, press soft key 1 (OK).
- 7 The phone reads the configuration file from the TFTP server, extracts the Server_IP and Filename fields, and attempts to download the file. The display shows the message *[FW] reading...*
- 8 The display shows *[FW] writing...* and the blue LED starts to flash.
- 9 After the FW image is written to the phone, the message *[FW] finished* is displayed, the blue LED stops flashing, and the phone resets.
- The phone registers to the TPS with the new FW version.
- If the TFTP Server, specified by the TFTP IP address entered during configuration, is unreachable or down, the IP Phone attempts to register to the TPS to perform a firmware download. If the IP Phone does not register to the TPS, the IP Phone does not work. Check the TFTP IP address and the state of the TFTP Server, then reboot the IP Phone.
- 10 If the IP Phone remains in this condition because no TPS FW download occurs, check the TFTP IP address and the state of the TFTP Server, then restart the IP Phone.

—End—

Expansion Module for IP Phones

The Expansion Module for IP Phone 1100 Series (Expansion Module) uses the same TFTP Server configuration file method as the IP Phone 1120E, IP Phone 1140E, and the IP Phone 1150E.

Table 76 "Fields in the TFTP configuration file for the Expansion Module" (page 556) describes the fields in the configuration file on the TFTP Server. The section [GEM FW] indicates the firmware is for the Expansion Module. Set the download mode to AUTO or FORCED. It is recommended that you set DOWNLOAD_MODE to AUTO.

Table 76
Fields in the TFTP configuration file for the Expansion Module

Field Name	Field Value	Descriptions
[GEM FW]		Section header for the Expansion Module firmware download information.
DOWNLOAD_MODE	AUTO	Recommended setting. The application looks at the version and downloads the FW if it is a newer version than the one on the phone.
	FORCED	The version of firmware is ignored. The firmware is always downloaded.
VERSION		The version string compared to the one on the phone.
FILENAME		Image file name. This name must match the file name of the actual IP Phone FW file.
PROTOCOL	TFTP	Download protocol. This must be TFTP.
SERVER_IP	xxx.xxx.xxx.xxx	IP Address of the TFTP server in decimal.
SECURITY_MODE	0	For future use.

After the IP Phone downloads the firmware from the TFTP Server, the firmware is upgraded for any attached Expansion Modules, one at a time. The Expansion Module verifies that the firmware was downloaded and saved successfully before the IP Phone initiates the firmware download to the next attached Expansion Module. If any errors occur, which prevent the firmware from downloading or saving properly, the Expansion Module reverts to the factory installed firmware. This version of firmware is always available in case the downloaded firmware is unusable.

Downloading and configuring fonts

The font files are downloaded as needed using the same TFTP Server configuration file method as IP Phone 2007, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E.

The IP Phone downloads the required files specified in the configuration file, as necessary. [Table 77 "Fields in the TFTP configuration file for downloadable fonts" \(page 557\)](#) describes the fields in the configuration file on the TFTP Server for downloadable fonts. The section [FONTxx] indicates the font file. Set the download mode to AUTO or FORCED. Nortel recommends that you set DOWNLOAD_MODE to AUTO.

Table 77
Fields in the TFTP configuration file for downloadable fonts

Field Name	Field Value	Description
[FONTxx]		Section header for the font file, which contains font information, including the optional download parameters, versions, and how to use the font after it is downloaded. Only [FONT01] to [FONT10] are supported.
DOWNLOAD_MODE	AUTO	Recommended setting. The application looks at the version and downloads the font if it is a newer version than the one on the phone.
	FORCED	The version of the font is ignored. The configuration file is always downloaded.
PROTOCOL	TFTP	Download protocol. Must be TFTP.
SERVER_IP	xxx.xxx.xxx.xxx	IP Address of the TFTP server in decimal.
SECURITY_MODE	0	For future use.
FILENAME		Image file name. Must match the file name of the actual IP Phone FW file.
ALIAS		Enables the font to have a different name in the IP Phone file system than the one on the Call Server.
VERSION		The version string compared to what is on the phone.
FONTLANG		Configuration command that defines the language codes for which a font is used. FONTLANG = languagelist Where: languagelist is a comma separated list of ISO 639-2/RFC 3066 codes. See the Display Manager Assign IT Language UNISim message for details on language codes.
MAP		Configuration command that defines how the font is mapped in the Unicode character set. MAP xx xx xx xx xx xx xx xx xx xx Where:

Field Name	Field Value	Description
		xx...xx = 10 hex bytes defining the Unicode ranges for a font in the same format as the IT Character Set Report.

Figure 77
Sample of the font configuration file

```
[FONT01]
DOWNLOAD_MODE AUTO
PROTOCOL TFTP
SERVER_IP 47.65.100.100
SERVER_PORT 7500
SECURITY MODE 0
FILENAME san_950.ccc
ALIAS chinese.ccc
VERSION 00010001
FONTMAPPING ulUnicodeRange=00 00 00 00 00 40- EF 28 32 00 00
00 00 00 00 00; LanguageCode=zu-Hant

[LANGUAGE]
DOWNLOAD_MODE AUTO
PROTOCOL TFTP
SERVER_IP 47.65.100.100
SERVER_PORT 7500
SECURITY MODE 0
VERSION 00010001
FILENAME zu_Hant.lgn
FILENAME jap.lgn
```

For information about downloading the font file from the Nortel Web site, see *IP Line Fundamentals (NN43100-500)*.

Procedure 137
Downloading a font file

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

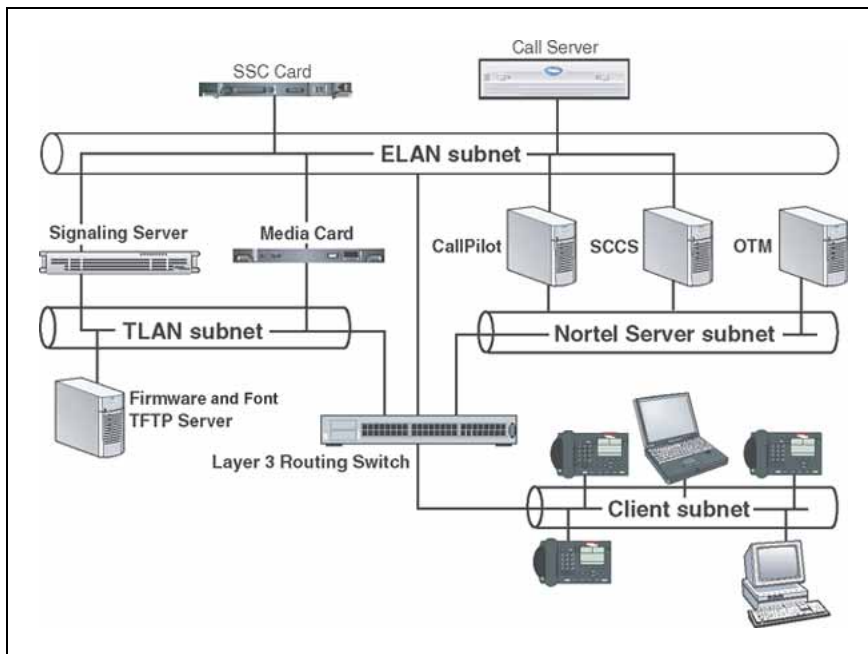
- | | |
|---|---|
| 1 | The version number is compared to the version number of the file (for example, chinese.ccc) in the file system, if it exists. See Figure 77 "Sample of the font configuration file" (page 558). |
| 2 | If the file does not exist in the file system, or if the version is older than the VERSION specified (for example, 1.1), then the IP Phone downloads the font from the TFTP Server. |

As the [FONTxx] sections are processed, the FONTLANG configuration command is also processed. This command defines the language codes for which a font is used. The MAP configuration command defines how the font is mapped in the Unicode character set. This command maps the font (for example, chinese.ccc) to the UNICODE pages (for example, 0x3000-0xE000 and 0xF100) and associates the font to the Traditional Chinese language code (for example, zu-Hant). The [LANGUAGE] section specifies the prompt files for the IP Phone. The prompt file is only downloaded to the file system if the version is higher than the existing prompt version, or if DOWNLOAD_MODE is set to FORCED. The IP Phone firmware includes the base set of prompt files so downloads are not necessary for languages natively supported by the firmware.

- 3 After the required fonts are downloaded from the TFTP Server, the IP Phone resets and registers to the TPS.

—End—

Figure 78
TFTP Server on a network



Appendix J

IP Phone context-sensitive soft keys

Table 78 "IP Phone context-sensitive soft keys" (page 561) describes the IP Phone feature assignment for each of the dedicated keys. Use LD 11 to program keys 16 to 26 on the IP Phones.

If you attempt to configure anything other than the permitted response, the Call Server generates an error code.

For more information about context-sensitive soft keys, see *Features and Services Fundamentals—Book 2 of 6 (NN43001-106)*.

Table 78
IP Phone context-sensitive soft keys

Key number	Response	Description
Key 16	MWK	Message Waiting key
Key 17	NUL	Removes function or feature from key
	TRN	Call Transfer key
Key 18	NUL	Removes function or feature from key
	A03	Three-party conference key
	A06	Six-party conference key
Key 19	NUL	Removes function or feature from key
	CFW	Call Forward key
Key 20	NUL	Removes function or feature from key
	RGA	Ring Again key
	NUL	Removes function or feature from key

Key number	Response	Description
Key 21	PRK	Call Park key
Key 22	NUL	Removes function or feature from key
	RNP	Ringling Number Pickup key
Key 23	NUL	Removes function or feature from key
	SCU	Speed Call User
	SSU	System Speed Call User
	SCC	Speed Call Controller
Key 24	SSC	System Speed Call Controller
	NUL	Removes function or feature from key
	PRS	Privacy Release key
Key 25	NUL	Removes function or feature from key
	CHG	Charge Account key
Key 26	NUL	Removes function or feature from key
	CPN	Calling Party Number key
	NUL	Removes function or feature from key

Appendix K

Call features

Table 79 "IP Phone supported call features" (page 563) shows a list of supported call features for the IP Phones.

Table 79
IP Phone supported call features

Feature	Description
AAG	ACD Answer Agent
ACNT	ACD Account
ADL	Autodial
AGT	ACD Agent
AMG	ACD Answer Emergency
A03	Three party conference
A06	Six party conference
ARC	Attendant recall
ASP	ACD Call Supervisor
AWT	ACD Call Waiting Time
AWC	ACD Calls Waiting
BFS	Busy Forward Status
CA	No hold conference - autodial
CCOS	Controlled Class of Service
CFW	Call Forward
CHG	Charge Account
CLID	Caller ID and called ID
CPN	Calling Party Number
CS	No hold conference - speed call
CSD	Conferee Selectable Display

Feature	Description
CWT	Call Waiting
DAG	ACD Display Agents
DSP	Display
DIG	Display Intercom Group
DPU	Directed Call Pickup
DRC	DID Route Control
DWC	ACD Display Call Waiting Calls
EOV	Enhanced Override
EMG	ACD Emergency
ENI	ACD Enable Inflow
FLH	BCS Flash
FOV	Flash Override
GHD	Group Hunt Deactivate
GRC	Group Call
GPU	Group Pickup
HOT	Hotline
ICF	Internal Call Forward
IMM	BCS Immediate
LNR	Last Number Redial
MCK	Message Cancellation Key
MIK	Message Indication Key
MRK	Message Registration Key
MSB	Make Set Busy
MWK	Message Waiting Key
NHC	No Hold Conference
NKL	Notification Key Lamp
NRD	Not Ready
NSVC	ACD Night Service
OBV	ACD Observe Agent
OSN	Onsite Notification
OVB	Overflow position Busy
OVR	Override
PRK	Call Park
PRS	Privacy Release

Feature	Description
PRY	Priority
RAG	ACD Agent Call
RCK	Ringing Change Key
RD	Redial Stored Number
RGA	Ring Again
RLS	Release
RANK	Room Status Key
REMARK	Remote Message Waiting Key
RNP	Ringing Number Pickup
RPAG	Radio Page
SCC	Speed Call Controller
SCU	Speed Call User
SIG	Signal
SSC	Speed System Call Controller
SSU	System Speed call User
THF	Centrex Switch Hook Flash
TRC	Malicious Call Trace
TRN	Call Transfer
USR	User Selectable Call Redirection
UST	User Status
VCC	Voice Call
WUK	Wake Up Key
XMWK	Multiple DN Message Waiting

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