



NORTEL

Nortel Communication Server 1000

IP Phones Fundamentals

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New in this release

The following sections detail what's new in *IP Phones Fundamentals* (NN43001-368) for Nortel Communication Server 1000 (CS 1000) Release 6.0.

Features

Communication Server Release 6.0 includes the following additions:

- Two-line mode for IP Phones 1110 and 1210
- Dynamic IP Line localization with support of 25 languages. Dynamic localization means that prompt translations can be easily updated and new translations can be added. New translations are regionally controlled.
- New telephony features: Caller ID display order and Normal Mode Indication (with configurable Normal Mode Display)

Other

Revision history

May 2009	Standard 05.02. This document is up-issued to support CS 1000 Release 6.0.
May 2009	Standard 05.01. This document is up-issued to support CS 1000 Release 6.0.
August 2008	Standard 04.03. This document is up-issued to support UNISTim Release 3.0 for CS 1000 Release 5.5.
August 2008	Standard 04.02. This document is up-issued to support an update to technical content for the IP Softphone 2050.
July 2008	Standard 04.01. This document is up-issued to support IP Softphone 2050 Release 3.1 for Communication Server 1000 Release 5.5. This document also contains updates to technical content for UNISTim 3.0.

May 2008	Standard 03.07. This document is up-issued to support Communication Server 1000 Release 5.5. This document contains an update to technical content within the IP Phone 1200 Series sections.
April 2008	Standard 03.06. This document is up-issued to support Communication Server 1000 Release 5.5. This document contains support for UNISim 3.0.
April 2008	Standard 03.05. This document is up-issued to support Communication Server 1000 Release 5.5. This document contains an update to technical content.
March 2008	Standard 03.04. This document is up-issued to support Communication Server 1000 Release 5.5. This document contains an update to technical content for IP Softphone 2050 Release 3 and an update to technical content for TFTP server firmware download.
February 2008	Standard 03.03. This document is up-issued to support Communication Server 1000 Release 5.5. This document contains updates to technical content.
December 2007	Standard 03.02. This document is up-issued to support Communication Server 1000 Release 5.5. This document contains updates to technical content.
December 2007	Standard 03.01. This document is up-issued to support Communication Server 1000 Release 5.5.
December 2007	Standard 02.01. This document is up-issued to support Communication Server 1000 Release 5.0. This document contains support for IP Softphone 2050 Release 3.
June 2007	Standard 01.02. This document is up-issued to support Communication Server 1000 Release 5.0.
May 2007	Standard 01.01. This document is up-issued to support Communication Server 1000 Release 5.0. This document is renamed <i>IP Phones Fundamentals</i> (NN43001-368) and contains information previously contained in the following legacy document, now retired: (553-3001-368).
March 2007	Standard 23.00. This document is up-issued to support Communication Server 1000 Release 4.5. This document is up-issued to include updated information for Mobile Voice Client (MVC) 2050.
March 2007	Standard 22.00. This document is up-issued to support Communication Server 1000 Release 4.5. This document is up-issued to support the addition of the IP Phone 1110.
January 2007	Standard 21.00. Not issued.

November 2006	Standard 20.00. This document is up-issued to support CS 1000 Release 4.5. This document is up-issued to support the addition of the Expansion Module for IP Phone 1100 Series.
October 2006	Standard 19.00. This document is up-issued to support Communication Server 1000 Release 4.5.
October 2006	Standard 18.00. This document is up-issued to support CS 1000 Release 4.5. This document is up-issued to support the addition of the IP Phone 1150E.
August 2006	Standard 17.00. This document is up-issued to support CS 1000 Release 4.5.
July 2006	Standard 16.00. This document is up-issued to support CS 1000 Release 4.5.
June 2006	Standard 15.00. This document is up-issued to include UNISlim firmware up-version.
April 2006	Standard 14.00. This document is up-issued to support CS 1000 Release 4.5. This document is up-issued to include content for the IP Audio Conference Phone 2033 Release 2.
April 2006	Standard 13.00. Not issued.
March 2006	Standard 12.00. This document is up-issued to support CS 1000 Release 4.5. This document is up-issued to include updated content for the IP Softphone 2050 V2.
January 2006	Standard 11.00. This document is up-issued to support CS 1000 Release 4.5. This document is up-issued to include updated content for the IP Phone 1120E and IP Phone 1140E.
January 2006	Standard 10.00. This document is up-issued to support CS 1000 Release 4.5. This document is up-issued to include updated content for the IP Phone 1140E.
January 2006	Standard 9.00. This document is up-issued to support CS 1000 Release 4.5.
November 2005	Standard 8.00. This document is up-issued to support the addition of IP Phone 1140E.
August 2005	Standard 7.00. This document is up-issued to support CS 1000 Release 4.5.
April 2005	Standard 6.00. This document is up-issued to support the addition of the IP Phone 2007.
April 2005	Standard 5.00. This document is up-issued to support the addition of the IP Audio Conference Phone 2033.

February 2005	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).

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
- Nortel IP Phone 1210
- Nortel IP Phone 1220
- Nortel IP Phone 1230
- Nortel IP Phone 1200 Series Expansion Module (EM)

Note on legacy products and releases

This NTP contains information about systems, components, and features that are compatible with Nortel Communication Server 1000 Release 6.0 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* (NN43119-102)
- *Expansion Module for IP Phones 1100 Series User Guide* (NN43130-101)
- *IP Phone 1210 User Guide* (NN43140-101)
- *IP Phone 1220 User Guide* (NN43141-101)
- *IP Phone 1230 User Guide* (NN43142-101)
- *WLAN IP Telephony Installation and Commissioning* (NN43001-504)
- *Converging the Data Network with VoIP Fundamentals* (NN43001-260)
- *Signaling Server IP Line Applications Fundamentals* (NN43001-125)
- *IP Peer Networking Installation and Commissioning* (NN43001-313)
- *Security Management Fundamentals* (NN43001-604)
- *Features and Services Fundamentals* (NN43001-106)
- *Central Answering Position Implementation Guide* (NN43011-501)

- *Software Input Output Reference - Administration* (NN43001-611)
- *Secure Multimedia Controller Implementation Guide* (NN43001-325)
- *Element Manager System Reference - Administration* (NN43001-632)
- *Nortel Application Gateway 1000/2000 Administration Guide* (NN42360-600)
- *IP Phone 1110 Getting Started Card* (NN43100-300)
- *IP Phone 1120E Getting Started Card* (NN43112-100)
- *IP Phone 1140E Getting Started Card* (NN43113-103)
- *IP Phone 1150E Getting Started Card* (NN43114-103)
- *Automatic Call Distribution Fundamentals* (NN43001-551)
- *Emergency Service Access Fundamentals* (NN43001-613)
- *Software Input Output Reference - Maintenance* (NN43001-711)

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

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- “Introduction” (page 27)
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- “Components and functions” (page 28)
- “Features” (page 30)
- “Display characteristics” (page 31)
- “Package components” (page 32)
- “Installation and configuration” (page 33)
- “Redeploying an IP Phone 2001” (page 37)
- “Replacing an IP Phone 2001” (page 38)
- “Removing an IP Phone 2001 from service” (page 38)

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 34)
- Procedure 2 “Connecting the components” (page 35)
- Procedure 3 “Changing the TN of an existing IP Phone 2001” (page 37)
- Procedure 4 “Replacing an IP Phone 2001” (page 38)
- Procedure 5 “Removing an IP Phone 2001 from service” (page 38)

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” \(page 28\)](#)
- [“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" \(page 29\)](#) 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
- Normal Mode indication
- Caller ID display order
- 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 Branch Office is configured)

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

You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone 2001 User Guide* (NN43115-102).

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [“IP Phone diagnostic utilities” \(page 531\)](#).

If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.

While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.

Features

The IP Phone 2001 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* (NN43001-106).
- volume control bar to adjust ringer, speaker, handset volume
- two specialized feature keys
 - Message/Inbox
 - Services
- two call-processing keys
 - Goodbye
 - Hold

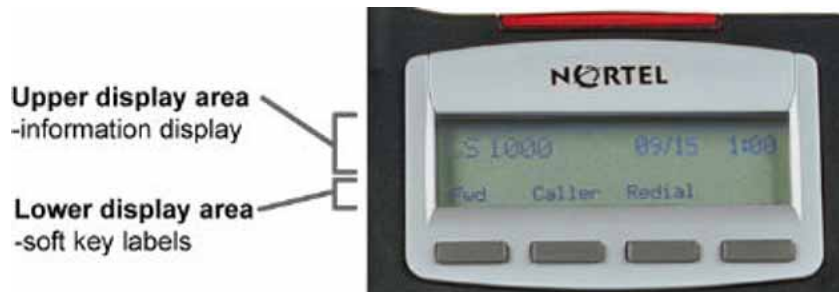
Display characteristics

An IP Phone 2001 has two display areas:

- “Information line display” (page 31)
- “Soft key label display” (page 32)

Figure 2 "IP Phone 2001 display areas" (page 31) 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

Do not use 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.

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 "Package components" \(page 32\)](#) lists the IP Phone 2001 package components.

Table 3
Package components

- | |
|---|
| <ul style="list-style-type: none">• IP Phone 2001• handset• handset cord• 2.1 m (7-ft) e Ethernet cable• Getting Started Card |
|---|

[Table 4 "IP Phone 2001 components list" \(page 33\)](#) lists the IP Phone 2001 components and product codes.

Table 4
IP Phone 2001 components list

Component	Product code
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. Cat5e Ethernet Cable	N0177422
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 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” \(page 34\)](#)
- [“First-time installation” \(page 34\)](#)
- [“Configuring the IP Phone 2001” \(page 34\)](#)

- [“Connecting the components” \(page 35\)](#)
- [“Startup sequence” \(page 37\)](#)

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. For a list of IP Phone 2001 package components, see [Table 3 "Package components" \(page 32\)](#).
- 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 4 "IP Phone 2001 components list" \(page 33\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



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” \(page 34\)](#) 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 <i>Signaling</i>

- Server IP Line Applications Fundamentals* (NN43001-125) and *Software Input Output Reference-Administration* (NN43001-611).
- 2 Configure the IP Phone 2001 on the Call Server using LD 11. At the prompt, enter the following:


```
REQ:new
TYPE:2001P2
```

For more information about configuring the IP Phone 2001 using LD 11, see *Software Input Output Reference-Administration* (NN43001-611).
 - 3 Configure the IP Phone 2001 in Element Manager. IP Phones are configured using the **Phones** section in the Element Manager navigation tree. For more information about configuring the IP Phone 2001 using Element Manager, see *Element Manager System Reference - Administration* (NN43001-632).

--End--

Connecting the components

Use ["Connecting the components" \(page 35\)](#) to connect the IP Phone 2001 components.

Procedure 2 Connecting the components

Step	Action
1	Connect one end of the handset cord to the handset jack on the back of the IP Phone identified with a handset icon. See Figure 3 "IP Phone 2001 Ethernet network interface connections" (page 36) .
2	Connect the other end of the handset cord to the handset.
3	Connect one end of the CAT5e 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 36)). The other end of the CAT5e Ethernet cable plugs into the IP network. The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation.
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.

- 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.

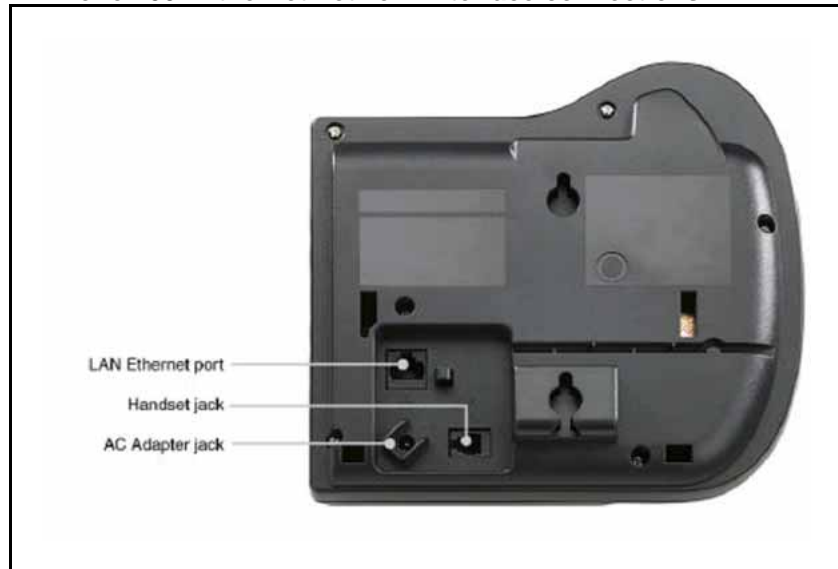


CAUTION

Damage to Equipment

Do not plug any device into your IP Phone 2001 Ethernet port other than an IEEE 802.3 Ethernet network connection.

Figure 3
IP Phone 2001 Ethernet network interface connections



- 6 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 4 "IP Phone 2001 components list" \(page 33\)](#).

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 CAT5e 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.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See ["Dynamic Host Configuration Protocol" \(page 405\)](#).

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

For information about provisioning the IP Phone, see [“Manual provisioning of IP Phone 2000 Series” \(page 495\)](#).

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 3

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> <ul style="list-style-type: none"> a Disable the password. b Set the password as non-NULL. 						
3	<p>Press OK when the node number displays.</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left; width: 50%;">If</th> <th style="text-align: left; width: 50%;">Then</th> </tr> </thead> <tbody> <tr> <td style="border: none;">the node password is enabled and is not NULL</td> <td style="border: none;">a password screen displays. Go to Step 4.</td> </tr> <tr> <td style="border: none;">the node password is disabled</td> <td style="border: none;">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 4 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 to install the IP Phone 2001. To configure the IP Phone, "Manual provisioning of IP Phone 2000 Series" (page 495).
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 5 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 the following: REQ: OUT

TYPE: 2001P2
TN: LLL S CC UU

--End--

Nortel IP Phone 2002

Contents

This section contains the following topics:

- “Introduction” (page 41)
- “Description” (page 42)
- “Components and functions” (page 42)
- “Features” (page 45)
- “Display characteristics” (page 46)
- “Package components” (page 47)
- “Installation and configuration” (page 49)
- “Redeploying an IP Phone 2002” (page 53)
- “Replacing an IP Phone 2002” (page 54)
- “Removing an IP Phone 2002 from service” (page 54)

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 6 “Configuring the IP Phone 2002” (page 50)
- Procedure 7 “Connecting the components” (page 51)
- Procedure 8 “Changing the TN of an existing IP Phone 2002” (page 53).
- Procedure 9 “Replacing an IP Phone 2002” (page 54).
- Procedure 10 “Removing an IP Phone 2002 from service” (page 54).

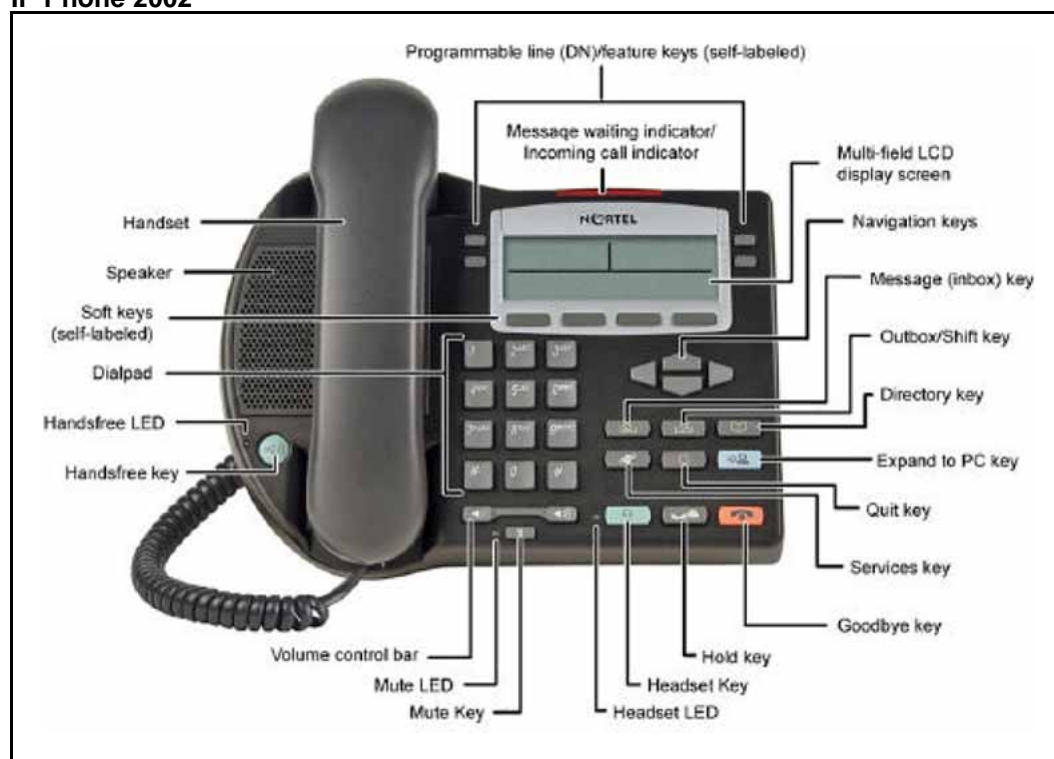
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

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 42) 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" \(page 43\)](#)
- ["Services menu" \(page 44\)](#)

Keys and functions

Table 5 "IP Phone 2002 keys and functions" (page 43) 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.
Programmable line (DN)/feature keys (self-labeled)	Programmable line (DN)/feature keys (self-labeled) are configured for various features on the IP Phone. One must be the prime DN key. 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.
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)	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.
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	Press the Outbox/Shift key to switch between two feature key pages and access an additional six lines/features.
Directory	Press the Directory key to access Directory services.
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.
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.

Table 5
IP Phone 2002 keys and functions (cont'd.)

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

Services menu

Table 6 "Services menu" (page 44) 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
--------------	---

- Normal Mode indication
 - Caller ID display order
 - 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)
- You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone 2002 User Guide* (NN43116-104).

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see ["IP Phone diagnostic utilities" \(page 531\)](#).

If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.

While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.

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)
 - 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* (NN43001-106).
- volume control bar to adjust ringer, speaker, handset, handsfree, and headset volume
- ability to change the programmable line (DN)/feature key labels
- 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

For more information about IP Phone features, see “Features” (page 369).

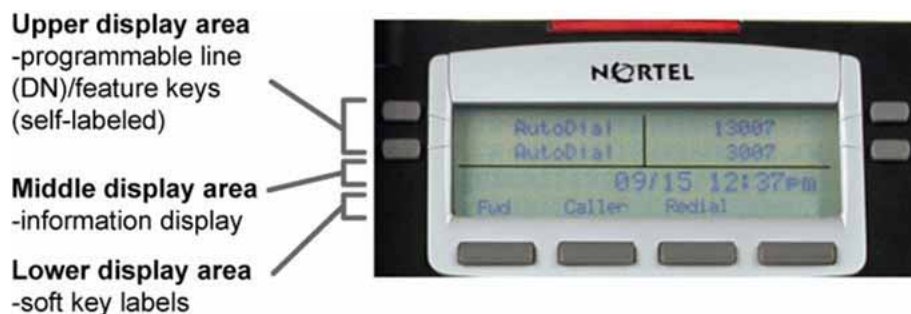
Display characteristics

An IP Phone 2002 has three major display areas:

- “Programmable line (DN)/feature key label display” (page 47)
- “Information line display” (page 47)
- “Soft key label display” (page 47)

Figure 5 “IP Phone 2002 display areas” (page 46) 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

Do not use 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.

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.

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 "Package components" \(page 48\)](#) lists the IP Phone 2002 package components.

Table 7
Package components

[Table 8 "IP Phone 2002 components list" \(page 48\)](#) lists the IP Phone 2002 components and product codes.

Table 8
IP Phone 2002 components list

Component	Product code
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 Cat5e Ethernet cable	N0177422
Handset, Ethergray	A0788874
Handset, Charcoal	A0758634
Handset cord, Ethergray	A0897725

Table 8
IP Phone 2002 components list (cont'd.)

Component	Product code	
Handset cord, Charcoal	N0000763	
Footstand, Charcoal (used for Ethergray and Charcoal models)	A0891619	
Power Adapters		
Global power supply (for local power)		
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

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” \(page 50\)](#)
- [“First-time installation” \(page 50\)](#)
- [“Configuring the IP Phone 2002” \(page 50\)](#)

- [“Connecting the components” \(page 51\)](#)
- [“Startup sequence” \(page 53\)](#)

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. For a list of IP Phone 2002 package components, see [Table 7 "Package components" \(page 48\)](#).
- 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 8 "IP Phone 2002 components list" \(page 48\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

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

Configuring the IP Phone 2002

Use [Procedure 6 “Configuring the IP Phone 2002” \(page 50\)](#) to configure the IP Phone 2002.

Procedure 6 Configuring the IP Phone 2002

Step	Action
1	Configure a virtual loop on the Call Server using LD 97.

For more information about configuring a virtual loop, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125) and *Software Input Output Reference-Administration* (NN43001-611).

- 2 Configure the IP Phone 2002 on the Call Server using LD 11. At the prompt, enter the following:

```
REQ:new
TYPE:2002P1,2002P2
```

For more information about configuring the IP Phone 2002 using LD 11, see *Software Input Output Reference-Administration* (NN43001-611).

- 3 Configure the IP Phone 2002 in Element Manager. IP Phones are configured using the **Phones** section in the Element Manager navigation tree. For more information about configuring the IP Phone 2002 using Element Manager, see *Element Manager System Reference - Administration* (NN43001-632).

--End--

Connecting the components

Use [Procedure 7 "Connecting the components" \(page 51\)](#) to connect the components for the IP Phone.

Procedure 7 Connecting the components

Step	Action
1	Connect one end of the handset cord to the handset jack on the back of the IP Phone (identified with a handset icon). See Figure 6 "IP Phone 2002 Ethernet network interface connections" (page 52)
2	Connect the other end of the handset cord to the handset.
3	Choose one of the following connections: <ul style="list-style-type: none"> • For an IP Phone not sharing LAN access with a PC: Connect one end of the CAT5e Ethernet cable to the network interface located on the back of the IP Phone (identified with a LAN icon). The other end of the CAT5e Ethernet cable plugs into the IP network. • For an IP Phone sharing LAN access with a PC: Connect one end of the CAT5e Ethernet cable to the network interface located on the back of the IP Phone (identified with a LAN icon) and the other end to the IP network. Insert on end of a second CAT5e Ethernet cable into the PC network

interface located on the back of the IP Phone (identified with a PC icon) and the other end into the computer.
See [Figure 6 "IP Phone 2002 Ethernet network interface connections"](#) (page 52).

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.

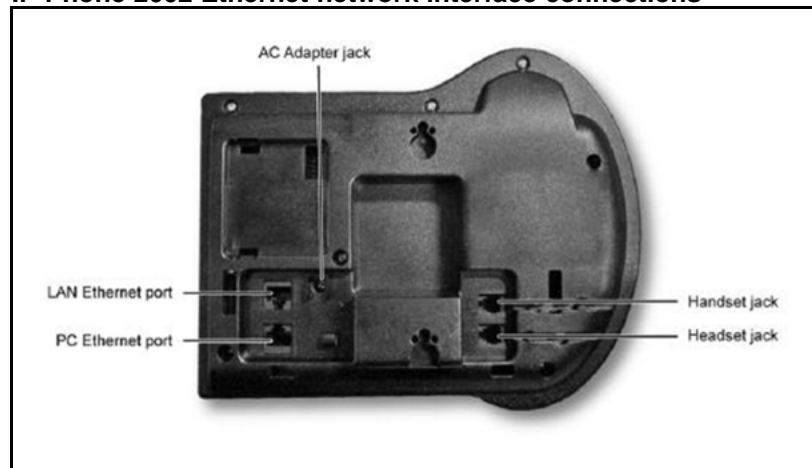


CAUTION

Damage to Equipment

Do not plug any device into your IP Phone 2002 Ethernet port other than an IEEE 802.3 Ethernet network connection. The IP Phone 2002 does not support multiple devices connected through the PC Ethernet port.

Figure 6
IP Phone 2002 Ethernet network interface connections



- 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.
- 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.
- 6 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 8 "IP Phone 2002 components list"](#) (page 48).

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 CAT5e 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.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol”](#) (page 405).

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

For information about provisioning the IP Phone, see [“Manual provisioning of IP Phone 2000 Series”](#) (page 495).

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 8 Changing the TN of an existing IP Phone 2002

Step	Action
1	<p>Repower the IP Phone 2002.</p> <p>During the reboot sequence of a previously configured IP Phone, the IP Phone 2002 displays the existing node number for approximately 5 seconds.</p>
2	<p>If the node password is enabled and NULL, choose one of the following:</p> <ul 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 **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 9 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 to install the IP Phone 2002. To configure the IP Phone, see “Manual provisioning of IP Phone 2000 Series” (page 495).
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 10 Removing an IP Phone 2002 from service

Step	Action
1	<p>Disconnect the IP Phone 2002 from the network or turn off the power.</p> <p>The service to the PC is disconnected as well if the PC connects to the IP Phone 2002.</p> <p>If the IP Phone 2002 was automatically configured, the DHCP lease expires and the IP address returns to the available pool.</p>
2	<p>In LD 11, enter the following:</p> <p>REQ: OUT</p> <p>TYPE: 2002P1, 2002P2</p> <p>TN: LLL S CC UU</p>
<hr/> --End-- <hr/>	

Nortel IP Phone 2004

Contents

This section contains the following topics:

- “Introduction” (page 57)
- “Description” (page 58)
- “Components and functions” (page 58)
- “Features” (page 61)
- “Package components” (page 64)
- “Installation and configuration” (page 66)
- “Redeploying an IP Phone 2004” (page 70)
- “Replacing an IP Phone 2004” (page 71)
- “Removing an IP Phone 2004 from service” (page 71)

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 11 “Configuring the IP Phone 2004” (page 67)
- Procedure 12 “Connecting the components” (page 68)
- Procedure 13 “Changing the TN of an existing IP Phone 2004” (page 70).
- Procedure 14 “Replacing an IP Phone 2004” (page 71).
- Procedure 15 “Removing an IP Phone 2004 from service” (page 71).

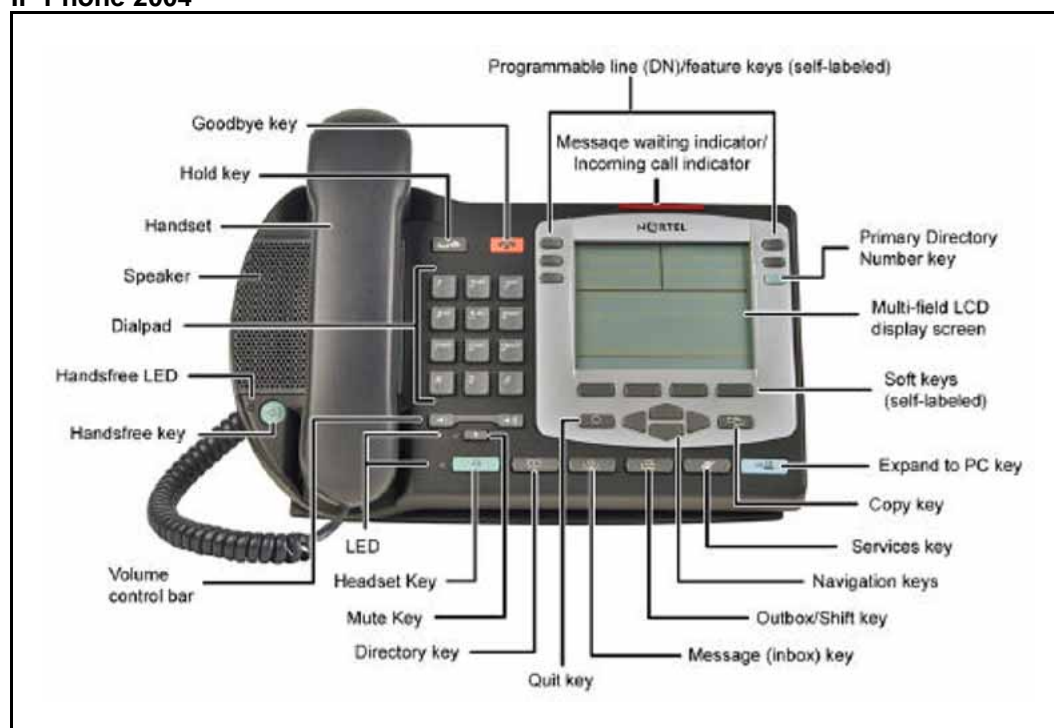
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

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 58) 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" \(page 58\)](#)
- ["Services menu" \(page 60\)](#)

Keys and functions

[Table 9 "IP Phone 2004 keys and functions" \(page 59\)](#) 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)	<p>Programmable line (DN)/feature keys (self-labeled) 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 (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>
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.
Outbox/Shift	Press the Outbox/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.
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>
Directory	Press the Directory key to access Directory services.
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>

Table 9
IP Phone 2004 keys and functions (cont'd.)

Key	Function
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" \(page 60\)](#) shows the Services menu.

Table 10
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 — 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)
--------------	--

You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone 2004 User Guide* (NN43117-102).

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [“IP Phone diagnostic utilities” \(page 531\)](#).

If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.

While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.

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.

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)
 - 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* (NN43001-106).
- volume control bar to adjust ringer, speaker, handset, handsfree, and headset volume
- ability to change the programmable line (DN)/feature key labels
- 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

For more information about IP Phone features, see [“Features”](#) (page 369)

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).

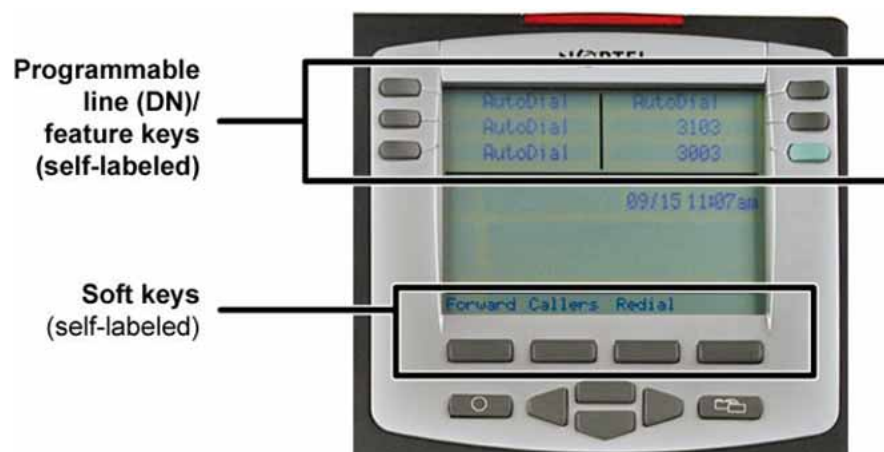
Display characteristics

An IP Phone 2004 has three major display areas:

- [“Programmable line \(DN\)/feature key label display”](#) (page 63)
- [“Information line display”](#) (page 63)
- [“Soft key label display”](#) (page 63)

[Figure 8 “IP Phone 2004 display areas”](#) (page 62) 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

Do not use 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 seven 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.

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 "Package components" \(page 64\)](#) lists the IP Phone 2004 package components.

Table 11
Package components

[Table 12 "IP Phone 2004 component list" \(page 64\)](#) lists the IP Phone 2004 components and product codes.

Table 12
IP Phone 2004 component list

Component	Product code
IP Phone 2004 (Ethergray) with Icon keycaps	NTDU92AA16/A0533408
IP Phone 2004 (Ethergray) with English text label keycaps	NTDU92BA16/A0533409
IP Phone 2004 (Charcoal) with Icon keycaps	NTDU92AA70/A0533410
IP Phone 2004 (Charcoal) with English text label keycaps	NTDU92BA70/A0533411
IP Phone 2004 (Charcoal with Bezel) with Icon keycaps	NTDU92AB70

Table 12
IP Phone 2004 component list (cont'd.)

Component	Product code
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/A0503076
Replacement parts	
7 ft Ethernet Cat5e cable	N0177422
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 2002/2004 Power Adapters		
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

IP Phone 2002/2004 Power Adapters		
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

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” \(page 66\)](#)
- [“First-time installation” \(page 67\)](#)
- [“Configuring the IP Phone 2004” \(page 67\)](#)
- [“Connecting the components” \(page 67\)](#)
- [“Startup sequence” \(page 70\)](#)

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. For a list of IP Phone 2004 package components, see [Table 11 "Package components" \(page 64\)](#).
- 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 12 "IP Phone 2004 component list" \(page 64\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

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

Configuring the IP Phone 2004

Use [Procedure 11 “Configuring the IP Phone 2004”](#) (page 67) to configure the IP Phone 2004 for the first time.

Procedure 11 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>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Phone 2004 on the Call Server using LD 11. At the prompt, enter the following:</p> <pre>REQ:new TYPE:2004P1,2004P2</pre> <p>For more information about configuring the IP Phone 2004 using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
3	<p>Configure the IP Phone 2004 in Element Manager. IP Phones are configured using the Phones section in the Element Manager navigation tree. For more information about configuring the IP Phone 2004 using Element Manager, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>
--End--	

Connecting the components

Use [Procedure 12 “Connecting the components”](#) (page 68) to connect the components for the IP Phone.

Procedure 12
Connecting the components

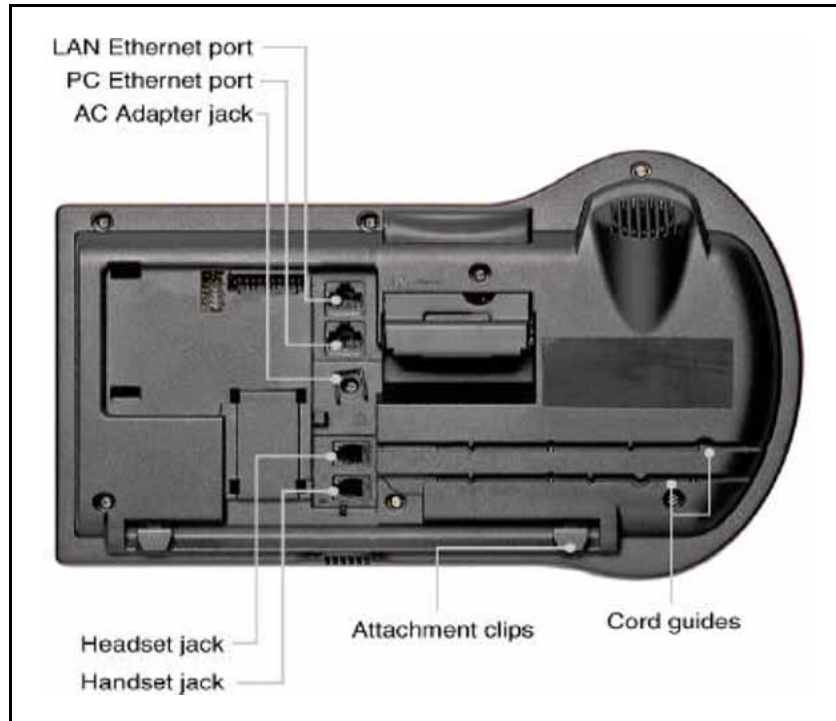
Step	Action
1	Connect one end of the handset cord to the handset jack on the back of the IP Phone (identified with a handset icon). See Figure 9 "IP Phone 2004 Ethernet network connections" (page 69).
2	Connect the other end of the handset cord to the handset.
3	Choose one of the following connections: <ul style="list-style-type: none">• For an IP Phone not sharing a LAN access with a PC: Connect one end of the CAT5e 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 CAT5e Ethernet cable plugs into the IP network.• For an IP Phone sharing a LAN access with a PC: Connect one end of the CAT5e Ethernet cable to the LAN Ethernet port located on the back of the IP Phone (identified with a LAN icon) and the other end to the IP network. Insert one end of a second CAT5e Ethernet cable into the PC Ethernet port located on the back of the IP Phone (identified with a PC icon) and the other end into the computer. See Figure 9 "IP Phone 2004 Ethernet network connections" (page 69).

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.

**CAUTION**
Damage to Equipment

Do not plug any device into your IP Phone 2004 Ethernet port other than an IEEE 802.3 Ethernet network connection. The IP Phone 2004 does not support multiple devices connected through the PC Ethernet port.

Figure 9
IP Phone 2004 Ethernet network connections



- 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.
- 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.
- 6 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 12 "IP Phone 2004 component list" \(page 64\)](#).

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 CAT5e 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.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol” \(page 405\)](#).

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

For information about provisioning the IP Phone, see [“Manual provisioning of IP Phone 2000 Series” \(page 495\)](#).

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 13 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. <table><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 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 14 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 to install the IP Phone 2004. To configure the IP Phone, see "Manual provisioning of IP Phone 2000 Series" (page 495).
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 15 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 the following:
REQ: OUT
TYPE: 2004P1, 2004P2
TN: LLL S CC UU

--End--

IP Phone Key Expansion Module (KEM)

Contents

This section contains the following topics

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- “Key number assignments” (page 75)
- “Package components” (page 75)
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- “IP Phone KEM startup initialization” (page 79)
- “Operating parameters” (page 80)

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 10 "IP Phone 2002 with one IP Phone KEM attached"](#) (page 74)).

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 10
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 10 "IP Phone 2002 with one IP Phone KEM attached" \(page 74\)](#)). 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.

For more information about key number assignments, see [“IP Phone context-sensitive soft keys” \(page 605\)](#).

Package components

[Table 13 "IP Phone KEM components list" \(page 75\)](#) lists the IP Phone KEM package components.

Table 13
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 14
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

Table 14
LD 11: Configure the IP Phone KEM (cont'd.)

Prompt	Response	Description
KEM	(0) – 2	Number of attached IP Phone KEMs Up to two IP Phone KEMs can be attached to an IP Phone. Pressing <CR> without entering a number leaves the value unchanged.
.... KEY	xx aaa yyyy (cccc or D) zz..z	Telephone function key assignments 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. Where: xx = key number aaa = key name or function yyy = additional information required for the key zz.z = additional information required for the key aaa. The cccc or D entry deals specifically with the Calling Line Identification feature, where: cccc = CLID table entry of (0)-N, where N = the value entered at the SIZE prompt in LD 15 minus 1. 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. The position of the (cccc or D) field varies depending on the key name or function. You may enter a CLID table entry if aaa = ACD, HOT d, HOT L, MCN, MCR, PVN, PVR, SCN, or SCR. Type xx NUL to remove a key function or feature.

Table 14
LD 11: Configure the IP Phone KEM (cont'd.)

Prompt	Response	Description
PAGEOFST	<Page> <KeyOffset>	<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> <p>Enter <CR> to keep the current setting.</p>
KEMOFST	<KEM> <KeyOffset>	<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>

Table 14
LD 11: Configure the IP Phone KEM (cont'd.)

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 11 "IP Phone KEM attached to an IP Phone 2002"](#) (page 78)).

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 11
IP Phone KEM attached to an IP Phone 2002



Procedure 16
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	<p>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.</p> <p>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.</p>
3	<p>Press the IP Phone KEM and IP Phone firmly together until the IP Phone KEM locks into place.</p>
4	<p>If connecting a second IP Phone KEM, repeat steps 1 to 3.</p> <p>The second IP Phone KEM is attached to the right side of the first IP Phone KEM.</p>
5	<p>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.</p> <p>The IP Phone KEM powers up.</p> <p>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.</p>
--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 15 "Startup initialization process for the IP Phone KEM" \(page 80\)](#)).

Table 15
Startup initialization process for the IP Phone KEM

Phase	Description
1. IP Phone KEM performs self-test	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. 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.
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 Audio Conference Phone 2033

Contents

- “Introduction” (page 83)
- “Description” (page 84)
- “Extension microphones” (page 85)
- “Components and functions” (page 86)
- “Features” (page 88)
- “Display characteristics” (page 89)
- “Package components” (page 91)
- “Installation and configuration” (page 93)
- “Redeploying an IP Audio Conference Phone 2033” (page 97)
- “Replacing an IP Audio Conference Phone 2033” (page 98)
- “Removing an IP Audio Conference Phone 2033 from service” (page 99)
- “Connecting an extension microphone” (page 99)

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 17 “Configuring the IP Audio Conference Phone 2033” (page 94)
- Procedure 18 “Connecting the components” (page 95)

- [Procedure 19 "Changing the TN of an existing IP Audio Conference Phone 2033" \(page 98\)](#)
- [Procedure 20 "Replacing an IP Audio Conference Phone 2033" \(page 98\)](#)
- [Procedure 21 "Removing an IP Audio Conference Phone 2033 from service" \(page 99\)](#)

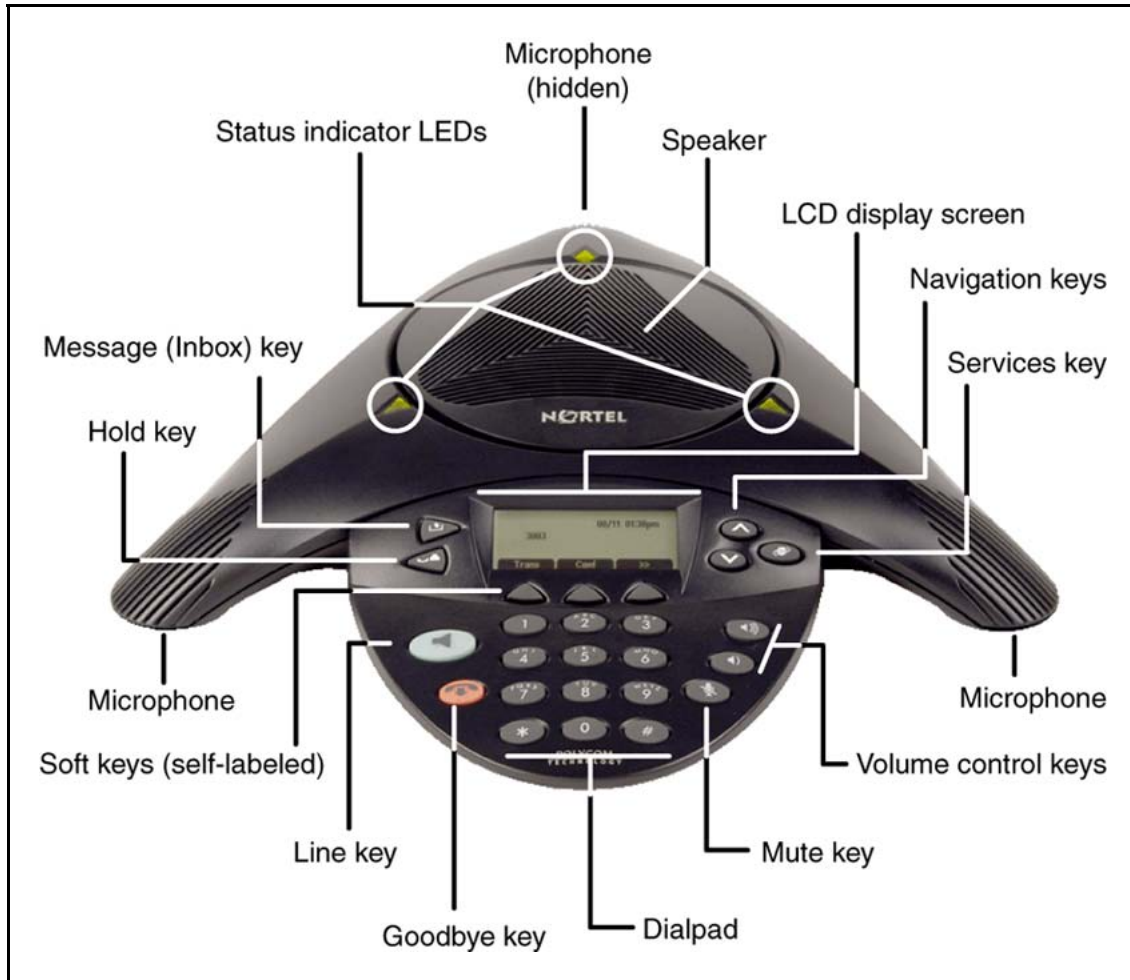
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

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 12 "IP Audio Conference Phone 2033" \(page 85\)](#) shows the IP Audio Conference Phone 2033.

Figure 12
IP Audio Conference Phone 2033

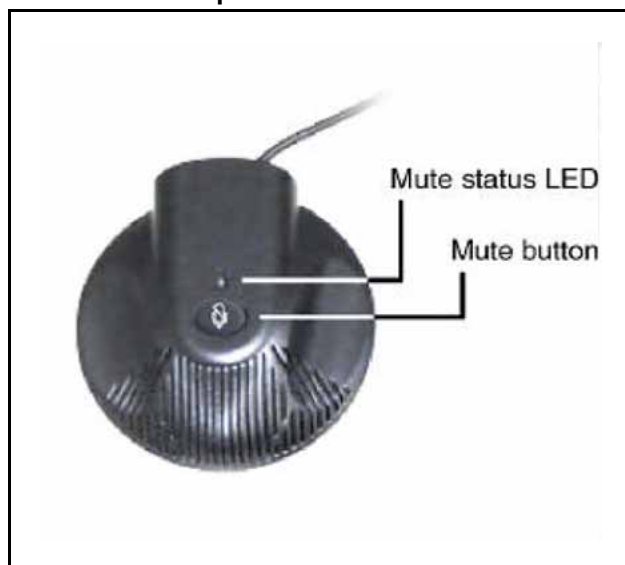


Extension microphones

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 13 "Extension microphone" \(page 86\)](#) shows an extension microphone.

Figure 13
Extension microphone



Components and functions

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

- [“Keys and functions”](#) (page 86)
- [“Services menu”](#) (page 87)

Keys and functions

[Table 16 "IP Audio Conference Phone 2033 keys and functions" \(page 86\)](#) describes the IP Audio Conference Phone 2033 keys and functions.

Table 16
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.

Table 16
IP Audio Conference Phone 2033 keys and functions (cont'd.)

Key	Function
Goodbye key	Use the Goodbye key to terminate an active call.
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.
	Arrows appear on the left side of display screen to indicate there is more information to be displayed.
Context-sensitive soft keys	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 90) 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 17 "Services menu" \(page 87\)](#) shows the Services menu.

Table 17
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.

You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone Audio Conference Phone 2033 User Guide* (NN43111-100).

Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [“IP Phone diagnostic utilities” \(page 531\)](#).

Network diagnostic utilities is available in Remote Mode only.

If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.

While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.

Features

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

- three 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* (NN43001-106).

- volume control keys to adjust ringer, speaker volume
- two specialized feature keys
 - Message/Inbox
 - Services
- three call processing keys

- Mute
- Goodbye
- Hold

For more information about IP Phone features, see “Features” (page 369).

Display characteristics

The IP Audio Conference Phone 2033 has two display areas:

- “Information line display” (page 90)
- “Soft key label display” (page 90)

Figure 14 “IP Audio Conference Phone 2033 display areas” (page 89) shows the two display areas.

Figure 14
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

Do not use 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 15 "Soft keys" \(page 90\)](#) shows the soft keys on the display area.

Figure 15
Soft keys



Package components

Table 18 "Components list for US, CA, CALA, AP, and GC" (page 91) lists the components for the IP Audio Conference Phone 2033 for the Americas, Asia Pacific, and Greater China region.

Table 18
Components list for US, CA, CALA, AP, and GC

Component	Product code
IP Audio Conference Phone 2033 package contents include <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7 ft Cat5e Ethernet cable • Power Interface Module (PIM) with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card Universal power supply	NTEX11AA70
IP Audio Conference Phone 2033 package contents include <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7ft Cat5e Ethernet cable • Power over Ethernet (PoE) Module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card • 2 Extension microphones (charcoal) Universal power supply	NTEX11BA70
IP Audio Conference Phone 2033 package contents include <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7 ft Cat5e Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card Universal power supply	NTEX11EA70
Accessories	
Power accessory kit (PIM, Universal power supply, cabling)	NTEX11CA
Power over Ethernet module	NTEX11GAE6
Extension microphone with 7-ft. cable	NTEX11DA70

Table 19 "Components list for EMEA" (page 92) lists the components for Europe, Middle East and Africa (EMEA) regions.

Table 19
Components list for EMEA

Component	Product code
IP Audio Conference Phone 2033 package contents include <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7 ft Cat5e Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable IP Audio Conference Phone 2033 Quick Reference Card	NTEX11AA70E6
IP Audio Conference Phone 2033 package contents include <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7-ft. CAT5e Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card • 2 Extension microphones (charcoal) 	NTEX11BA70E6
IP Audio Conference Phone 2033 package contents include <ul style="list-style-type: none"> • IP Audio Conference Phone 2033 (charcoal) • 7 ft Cat5e Ethernet cable • Power over Ethernet (PoE) module with 25 ft. console cable • IP Audio Conference Phone 2033 Quick Reference Card • Universal Power Supply 	NTEX11EA70E6
IP Audio Conference Phone 2033 package contents include IP Audio Conference Phone 2033 (charcoal) <ul style="list-style-type: none"> • 7 ft Cat5e 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	
<ul style="list-style-type: none"> • Universal Power Supply (order power cord separately) 	NTEX11CAE6
<ul style="list-style-type: none"> • Power over Ethernet module 	NTEX11GAE6
<ul style="list-style-type: none"> • Extension microphones (charcoal) with cables 	NTEX11DA70E6

Table 19
Components list for EMEA (cont'd.)

[Table 20 "Power cords" \(page 93\)](#) lists the IP Audio Conference Phone 2033 power cords.

Table 20
Power cords

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" \(page 93\)](#)
- ["First-time installation" \(page 94\)](#)
- ["Configuring the IP Audio Conference Phone 2033" \(page 94\)](#)
- ["Connecting the components" \(page 95\)](#)
- ["Startup sequence" \(page 97\)](#)

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 18 "Components list for US, CA, CALA, AP, and GC" \(page 91\)](#) or [Table 19 "Components list for EMEA" \(page 92\)](#) 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 18 "Components list for US, CA, CALA, AP, and GC" \(page 91\)](#) or [Table 19 "Components list for EMEA" \(page 92\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



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 17 "Configuring the IP Audio Conference Phone 2033" \(page 94\)](#) to configure the IP Audio Conference Phone 2033 for the first time.

Procedure 17

Configuring the IP Audio Conference Phone 2033

Step	Action
1	<p>Configure a virtual loop on the system using LD 97.</p> <p>For more information about configuring a virtual loop, see <i>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Audio Conference Phone 2033 on the system using LD 11. At the prompts, enter the following:</p> <pre>REQ:new TYPE:2033 TN 111 s cc uu ECHG yes ITEM cls ITEM</pre> <p>For more information about configuring the IP Audio Conference Phone 2033 using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>

- 3 Configure the IP Audio Conference Phone 2033 in Element Manager. IP Phones are configured using the **Phones** section in the Element Manager navigation tree. For more information about configuring the IP Audio Conference Phone 2033 using Element Manager, see *Element Manager System Reference - Administration* (NN43001-632).

--End--

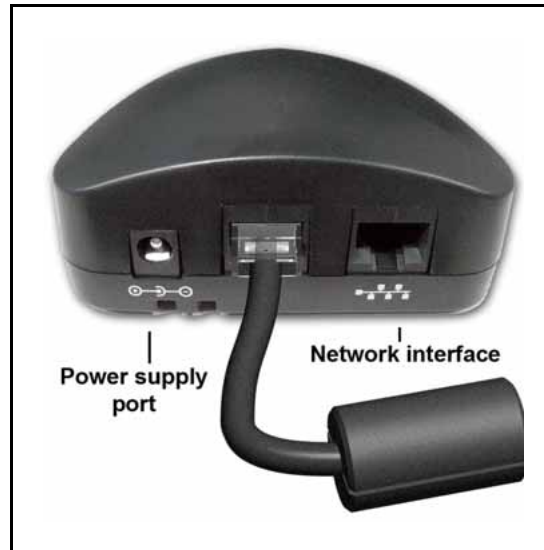
Connecting the components

Use [Procedure 18 "Connecting the components" \(page 95\)](#) to connect the components for the IP Phone.

Procedure 18 Connecting the components

Step	Action
1	Connect one end of the CAT5d Ethernet cable to the network interface located on the back of the Power over Ethernet (PoE) module. See Figure 16 "POE module" (page 96) . Plug the other end of the CAT5e Ethernet cable into your IP network interface.
2	Connect the CAT5e Ethernet cable attached to the PoE module to the IP Phone. Thread the CAT5e Ethernet cable through the channel on the bottom of the IP Phone and plug it into the PoE module port on the IP Phone. The PoE module port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation.
3	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 18 "Components list for US, CA, CALA, AP, and GC" (page 91) or Table 19 "Components list for EMEA" (page 92) . Figure 16 "POE module" (page 96) shows the Power over Ethernet (PoE) module.

Figure 16
POE module

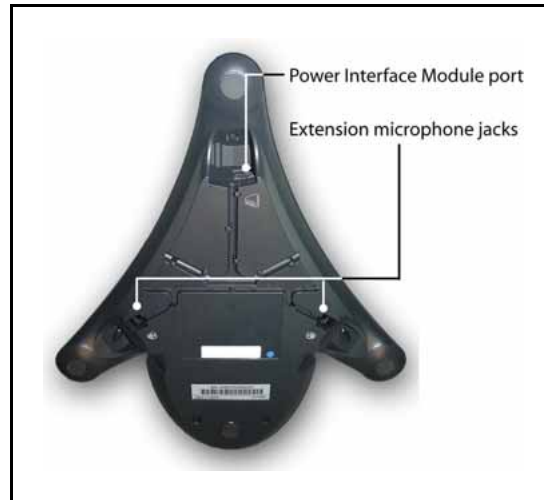


Red LEDs on the IP Audio Conference Phone 2033 indicate power. Messages indicating system start up, such as Loading, Initializing network, and Loading boot parameters appear after a short delay.

[Figure 17 "Bottom view of IP Audio Conference Phone 2033" \(page 97\)](#) 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 CAT5e 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 17
Bottom view of IP Audio Conference Phone 2033



--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol”](#) (page 405).

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

For information about provisioning the IP Phone, see [“Manual provisioning of IP Phone 2000 Series”](#) (page 495).

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 19
Changing the TN of an existing IP Audio Conference Phone 2033

Step	Action						
1	<p>Repower the IP Audio Conference Phone 2033.</p> <p>During the reboot sequence of a previously configured the IP Audio Conference Phone 2033 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> <p>a Disable the password.</p> <p>b Set the password as non-NULL.</p>						
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 nodePwdShow command in Element Manager. For further information, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>						
5	<p>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.</p>						
6	<p>Enter the new TN.</p>						
--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 20
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 to install the IP Audio Conference Phone 2033. To configure the IP Phone, see “Manual provisioning of IP Phone 2000 Series” (page 495) .
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 21

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 the following: REQ: OUT TYPE: 2033 TN: LLL S CC UU
--End--	

Connecting an extension microphone

Procedure 22

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 101)
- “Description” (page 102)
- “Components and functions” (page 102)
- “Features” (page 106)
- “Touch panel” (page 107)
- “Dialpad entry” (page 108)
- “Cleaning the IP Phone display screen” (page 109)
- “Display characteristics” (page 109)
- “Package components” (page 112)
- “Installation and configuration” (page 114)
- “Redeploying an IP Phone 2007” (page 118)
- “Replacing an IP Phone 2007” (page 119)
- “Removing an IP Phone 2007 from service” (page 119)

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 24 “Configuring the IP Phone 2007” (page 115)
- Procedure 25 “Connecting the components” (page 115)
- Procedure 26 “Changing the TN of an existing IP Phone 2007” (page 118).

- [Procedure 27 “Replacing an IP Phone 2007” \(page 119\).](#)
- [Procedure 28 “Removing an IP Phone 2007 from service” \(page 119\).](#)

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 18 "IP Phone 2007" \(page 102\)](#) shows the IP Phone 2007.

Figure 18
IP Phone 2007



Components and functions

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

- [“Keys and functions” \(page 103\)](#)
- [“Services menu” \(page 104\)](#)
- [“Local Tools menu” \(page 105\)](#)

Keys and functions

Table 21 "IP Phone 2007 keys and functions" (page 103) lists the keys and functions for the IP Phone 2007.

Table 21
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.
Programmable line (DN)/feature keys (self-labeled)	Programmable line (DN)/feature keys (self-labeled) are located on the touch panel display and are configured for various features on the IP Phones.
	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.
Context-sensitive soft keys (self-labeled)	Context-sensitive soft keys (self-labeled) are located on the touch panel display. The soft key label changes, based on the active feature.
	Tap the More soft key to access the next layer of soft key functions.

Table 21
IP Phone 2007 keys and functions (cont'd.)

Key	Function
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 22 "Services menu" \(page 104\)](#) shows the Services menu.

Table 22
Services menu

Services key	Tap the Services key to access the following items: <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)
--------------	--

You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone 2007 User Guide* (NN43118-100).
 Double-press the Services key to access Network diagnostic utilities. For more information about Network diagnostic utilities, see [“IP Phone diagnostic utilities” \(page 531\)](#).

Local Tools menu

Tap the Tools icon to access the Local Tools menu. [Table 23 "Local Tools menu" \(page 105\)](#) 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” \(page 521\)](#).

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

Table 23
Local Tools menu

Network Configuration	Use this menu to configure or to display configuration information. This menu contains the following items: <ul style="list-style-type: none"> • 802.1x/EAP • 802.1ab (LLDP) • 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, priority, and filtering • PC port disable, speed, and duplex setting • Data VLAN, priority, and filtering • Network interface speed and duplex setting • Ignore GARP protection • Pre-Shared Key SRTP • XAS IP address, graphical, port
Local Diagnostics	Displays the Local Diagnostics menu containing the following items: <ul style="list-style-type: none"> • Network Diagnostic Tools • Ethernet Statistics • IP Network Statistics • IP Set&DHCP Information

	<ul style="list-style-type: none">• USB Devices• Advanced Diag Tools <p>For more information about the IP Phone 2007 Local Diagnostics menu, see “IP Phone diagnostic utilities” (page 531).</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.
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.

Features

The IP Phone 2007 supports the following features

- 12 programmable line (DN)/feature soft keys
- four context-sensitive soft keys (self-labeled)
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* (NN43001-106).
- large, color touch panel display screen
- volume control bar to adjust ringer, speaker, handset, handsfree, and headset volume
- speaker for on-hook dialing or on-hook listening
- four call-processing fixed keys:
 - Hold
 - Goodbye
 - Handsfree
 - Mute
- ability to change the programmable line (DN)/feature key labels
Feature keys support English characters only.

For more information about IP Phone features, see [“Features” \(page 369\)](#).

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 23 "Calibrating the touch panel and stylus" \(page 107\)](#).

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.

Procedure 23 Calibrating the touch panel and stylus

Step	Action
1	Tap the Tools icon to calibrate the touch panel and stylus.
2	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.
3	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. <ul style="list-style-type: none"> 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--

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 24 "Character key mappings" \(page 108\)](#) for character key mappings.

- The insertion point remains in 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 24
Character key mappings

Key	Generates
1	_ - . ! @ \$ % & + 1

Table 24
Character key mappings (cont'd.)

Key	Generates
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

Do not use 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.

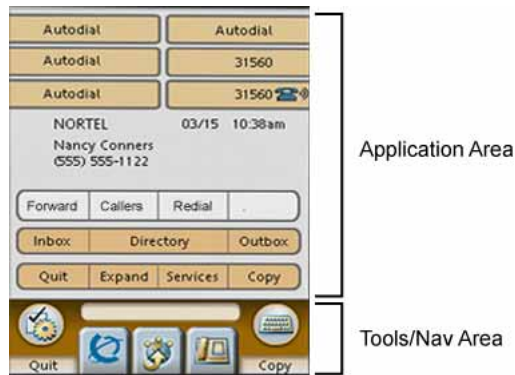
Display characteristics

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

- [“Application area” \(page 110\)](#)
- [“Tools/Navigation area” \(page 112\)](#)

[Figure 19 "IP Phone 2007 display areas" \(page 110\)](#) shows these two display areas.

Figure 19
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).

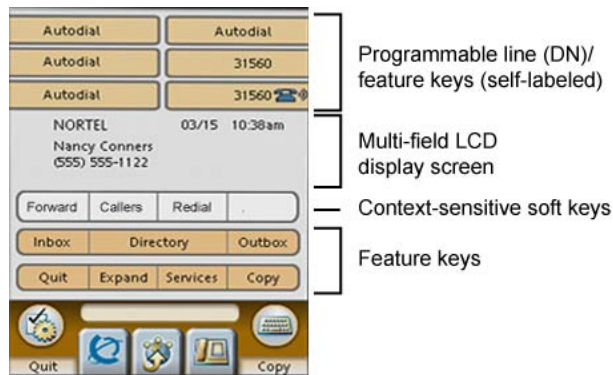
Application area

The Application area provides:

- “Programmable line (DN)/feature key label display” (page 111)
- “Information line display ” (page 111)
- “Soft key label display” (page 111)
- “Feature key label display” (page 111)

Figure 20 "IP Phone 2007 Application area" (page 110) shows the Application area.

Figure 20
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

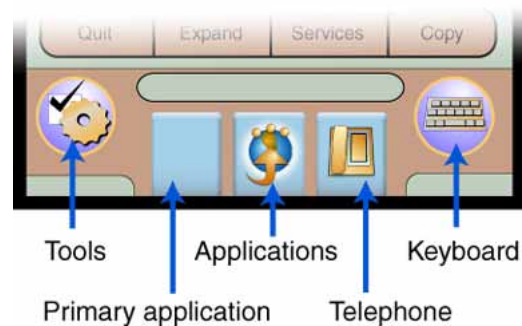
The Tools/Navigation area provides controls for navigating between features and selecting tools.

The following five main elements are presented as touchable keys:

- Tools
- Primary application
- Applications
- Telephone
- Keyboard

[Figure 21 "IP Phone 2007 Tools/Navigation area" \(page 112\)](#) shows the Tools/Navigation area.

Figure 21
IP Phone 2007 Tools/Navigation area



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 25 "Package components" \(page 113\)](#) lists the IP Phone 2007 package components.

Table 25
Package components

- IP Phone 2007
- Handset
- Handset cord
- Footstand
- 2.1 m (7-ft) CAT5e Ethernet cable
- Getting Started card

Table 26 "IP Phone 2007 component list" (page 113) lists the IP Phone 2007 components and product codes. Contact Nortel for further information.

Table 26
IP Phone 2007 component list

Component	Product code
IP Phone 2007 (charcoal with metallic bezel)	NTDU96AB70
Replacement parts	
7-ft. CAT5e Ethernet cable	N0177422
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” \(page 114\)](#)
- [“First-time installation” \(page 114\)](#)
- [“Configuring the IP Phone 2007” \(page 114\)](#)
- [“Connecting the components” \(page 115\)](#)
- [“Startup sequence” \(page 117\)](#)

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. For a list of IP Phone 2007 package components, see [Table 25 "Package components" \(page 113\)](#).
- 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 26 "IP Phone 2007 component list" \(page 113\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Damage to Equipment

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

Configuring the IP Phone 2007

Use [Procedure 24 “Configuring the IP Phone 2007” \(page 115\)](#) to configure the IP Phone 2007.

Procedure 24 Configuring the IP Phone 2007

Step	Action
1	<p>Configure a virtual loop on the system using LD 97.</p> <p>For more information about configuring a virtual loop, see <i>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Phone 2007 on the system using LD 11. At the prompt, enter the following:</p> <pre>REQ: new TYPE: 2007</pre> <p>To configure the IP Phone 2007 using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
3	<p>Configure the IP Phone 2007 in Element Manager. IP Phones are configured using the Phones section in the Element Manager navigation tree. For more information about configuring the IP Phone 2007 using Element Manager, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>
--End--	

Connecting the components

Use [Procedure 24 "Configuring the IP Phone 2007"](#) (page 115) to connect the components for the IP Phone.

Procedure 25 Connecting the components

Step	Action
1	Connect one end of the handset cord to the handset jack on the back of the IP Phone (identified with a handset icon).
2	Connect the other end of the handset cord to the handset.
3	<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: Connect one end of the CAT5e 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 CAT5e 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 CAT5e 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 CAT5e Ethernet cable into the PC Ethernet port located on the back of the IP Phone and the other end into the computer Ethernet port.

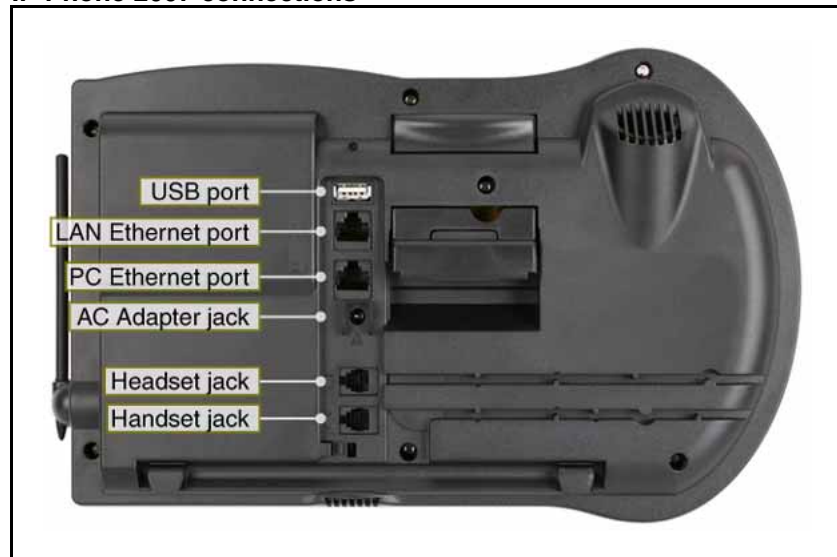
The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.

- 4 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 an IEEE 802.3 Ethernet network connection. The IP Phone 2007 does not support multiple devices connected through the PC Ethernet port.

Figure 22
IP Phone 2007 connections



- 5 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 26 "IP Phone 2007 component list" \(page 113\)](#).
 - b Connect the power jack as shown in [Figure 22 "IP Phone 2007 connections" \(page 116\)](#).

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 CAT5e 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.

- 6 Tap the Tools icon to access the Network Configuration menu. To manually provision your IP Phone, see [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#)
- 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--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol” \(page 405\)](#).

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 network access (if supported by the network infrastructure)
- obtaining VLAN ID (if supported by the network infrastructure)
- obtaining the IP parameters
- obtaining the automatic provisioning parameters
- connecting to the Call Server

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones” \(page 447\)](#).

You can manually configure all or some parameters. For information about provisioning the IP Phone manually, see [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#).

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 26 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> <ul style="list-style-type: none"> a Disable the password. b 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 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</i> (NN43001-632).</p>						
5	<p>Select the Clear soft key to clear the existing TN.</p>						

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 27 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 to install the IP Phone 2007. To configure the IP Phone, see "Manual provisioning of IP Phone 2007 and 1100 Series" (page 487) . 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 28 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 the following: REQ: OUT

TYPE: 2007
TN: LLL S CC UU

--End--

Nortel IP Phone 1210

Contents

This section contains the following topics:

- “Introduction” (page 121)
- “Description” (page 122)
- “Components and functions” (page 123)
- “Features” (page 126)
- “Display characteristics” (page 126)
- “Package components” (page 128)
- “Installation and configuration” (page 129)
- “Redeploying an IP Phone 1210” (page 134)
- “Replacing an IP Phone 1210” (page 135)
- “Removing an IP Phone 1210 from service” (page 135)

Introduction

This section explains how to install and maintain the IP Phone 1210. For information about using the IP Phone 1210, see the *IP Phone 1210 User Guide* (NN43140-101).

This section contains the following procedures:

- Procedure 29 “Configuring the IP Phone 1210” (page 130)
- Procedure 30 “Connecting the components” (page 131)
- Procedure 31 “Redeploying the TN of an existing IP Phone 1210” (page 134)
- Procedure 32 “Replacing an IP Phone 1210” (page 135)
- Procedure 33 “Removing an IP Phone 1210 from service” (page 135)

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 1210 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 1210 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 1210 network and CS 1000 connections.

Figure 23 "IP Phone 1210" (page 122) shows the IP Phone 1210.

Figure 23
IP Phone 1210



Components and functions

This section describes the following components and functions of the IP Phone 1210:

- [“Keys and functions” \(page 123\)](#)
- [“Services menu” \(page 124\)](#)
- [“Local Tools menu” \(page 125\)](#)

Keys and functions

[Table 27 "IP Phone 1210 keys and functions" \(page 123\)](#) describes the IP Phone 1210 keys and functions.

Table 27
IP Phone 1210 keys and functions

Key	Function
Handsfree	Press the Handsfree key to activate handsfree mode. The Handsfree light emitting diode (LED) indicator, located on the Handsfree key, lights to indicate that the headset is in use.
Visual Alerter/Message Waiting indicator	If a message is waiting, the red Visual Alerter/Message Waiting indicator LED at the top center of the phone flashes. The indicator also flashes to indicate an incoming call. The flash cadences for both alerts are different.
Volume control buttons	Use the Volume control buttons to adjust the volume of the ringer, handset, headset, speaker, and Handsfree features. Press the upper button to increase the volume, and press the lower button to decrease the volume.
Hold key	Press the Hold key to place an active call on hold. Press the Hold key again to return to the caller on hold.
Conference key	Press the Conference key (programmable memory button) to initiate conference.
Applications key	Press the Applications key 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 screen. The Navigation keys to move up, down, left, and right. 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.

Table 27
IP Phone 1210 keys and functions (cont'd.)

Key	Function
Enter key	Press the Enter key, at the center of the Navigation key cluster, to confirm menu selections. You can also use the Enter key instead of the Select soft key.
Context-sensitive soft keys (self-labeled)	Context-sensitive soft keys are below the LCD. The soft key label is dynamic and depends on the active feature. The label length is a maximum of six characters. A triangle before a key label indicates that the key is active.
Goodbye key	Press the Goodbye key to terminate an active call.
Mute key	Press the Mute key to listen to the calling party without transmitting voice from your phone. Press the Mute key again to return to a two-way conversation. Mute key functionality applies to handsfree, handset, and headset modes. After you mute the transmission path, the Mute indicator LED, embedded in the Mute key, flashes.
Headset key	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 indicator, located on the Headset key, lights to indicate that the headset is in use.

Services menu

Table 28 "Services menu" (page 124) shows the Services menu.

Table 28
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
--------------	---

- On-hook Default Path
- Live Dial Pad
- Normal Mode Indication
- Caller ID display order
- Password Administration
 - 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)

You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone 1210 User Guide* (NN43140-101).

To access network diagnostic utilities, double-press the Services key. Press 2 2 on the dialpad to access the Network Diagnostic Tools menu or use the Up or Down navigation keys to scroll and highlight Network Diagnostic Tools option. For more information about network diagnostic utilities, see [“IP Phone diagnostic utilities” \(page 531\)](#).

If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.

While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.

Local Tools menu

[Table 29 “Local Tools menu” \(page 125\)](#) shows the Local Tools menu. For more information about the Local Tools menu, see [“Local Tools menu” \(page 521\)](#).

Table 29
Local Tools menu

Services key	<p>Press the Services key twice to access the Local Tools menu. The following items appear in the Local Tools menu:</p> <ul style="list-style-type: none"> • 1. Preferences • 2. Local Diagnostics • 3. Network Configuration • 4. Lock Menu <p>If you are prompted to enter a password when you double-press the Services key, password protection initiates. For more information about password protection, see “Local Tools menu” (page 521).</p>
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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 Cancel key to exit from a menu or menu item.

Features

The IP Phone 1210 supports the following telephony features:

- four context-sensitive soft keys
Functions for the context-sensitive soft keys are configured in LD 11.
- volume control buttons to adjust ringer, speaker, handset, and headset volume
- three specialized feature keys
 - Conference
 - Services
 - Applications
- five call-processing keys
 - Goodbye
 - Hold
 - Handsfree
 - Mute
 - Headset

For more information about IP Phone features, see [“Features” \(page 369\)](#).

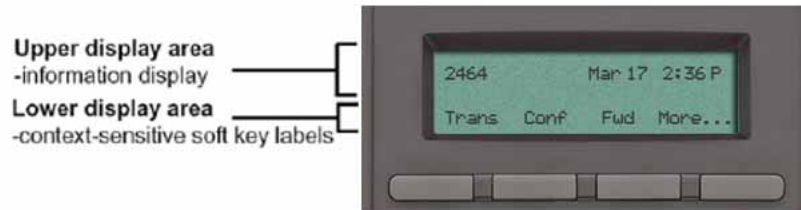
Display characteristics

An IP Phone 1210 has two display areas:

- [“Information line display” \(page 127\)](#)
- [“Soft key label display” \(page 127\)](#)

[Figure 24 “IP Phone 1210 display areas” \(page 127\)](#) shows these two display areas.

Figure 24
IP Phone 1210 display areas



Cleaning the IP Phone display screen

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



CAUTION

Do not use any liquids or powders on the IP Phone 1210. If you use anything other than a soft, dry cloth, you can contaminate IP Phone components and cause premature failure.

Information line display

An IP Phone 1210 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)
- IP Phone 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 of 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 you initiate a feature, the icon

state turns on. The icon remains in the on state until you press this feature key again. This action 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 you assign only four functions to the soft keys, the More key does not appear, and all four functions display.

Package components

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

[Table 30 "Package components" \(page 128\)](#) lists the package components for the IP Phone 1210.

Table 30
Package components

- | |
|---|
| <ul style="list-style-type: none"> • IP Phone 1210 • handset • handset cord • footstand • 2.1 m (7-ft) CAT5e Ethernet cable • number plate and lens |
|---|

[Table 31 "IP Phone 1210 components list" \(page 128\)](#) lists the IP Phone 1210 components and product codes.

Table 31
IP Phone 1210 components list

Component		Product code
IP Phone 1210 (Charcoal) with icon keys		NTYS18AA70E6
IP Phone 1210 (Charcoal) with English text keys		NTYS18BA70E6
Power adapter		
Global Power Supply		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

Table 31
IP Phone 1210 components list (cont'd.)

Component		Product code
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

For more 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 1210:


- [“Before you begin” \(page 129\)](#)
- [“First-time installation” \(page 130\)](#)
- [“Configuring the IP Phone 1210” \(page 130\)](#)
- [“Connecting the components” \(page 131\)](#)
- [“Startup sequence” \(page 133\)](#)

Before you begin

Before installing the IP Phone 1210, complete the following preinstallation checklist:


- Ensure one IP Phone 1210 boxed package exists for each IP Phone 1210 you install. For a list of IP Phone 1210 package components, see [Table 30 "Package components" \(page 128\)](#).
- Ensure one software license exists for each IP Phone 1210 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 approved Nortel global power supply (model number N0089601).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

	<p>CAUTION</p> <p>Ensure that the protective rubber cap on the Accessory Expansion Module (AEM) port is in place when the port is not in use. An improper connector can cause damage to the IP Phone.</p>
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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 IP Line Applications Fundamentals* (NN43001-125).

	<p>CAUTION</p> <p>Do not plug your IP Phone 1210 into an ISDN connection. Severe damage can result.</p>
---	--

Configuring the IP Phone 1210

Use [Procedure 29 “Configuring the IP Phone 1210” \(page 130\)](#) to configure the IP Phone 1210 for the first time.

Procedure 29 Configuring the IP Phone 1210

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>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Phone 1210 on the Call Server using LD 11. At the prompt, enter the following command:</p> <pre>REQ:new TYPE:1210</pre> <p>For more information about configuring the IP Phone 1210 using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
3	<p>Configure the IP Phone 1210 in Element Manager. IP Phones are configured using the Phones section in the Element</p>

Manager navigation tree. For more information about configuring the IP Phone 1210 using Element Manager, see *Element Manager System Reference - Administration* (NN43001-632).

--End--

Connecting the components

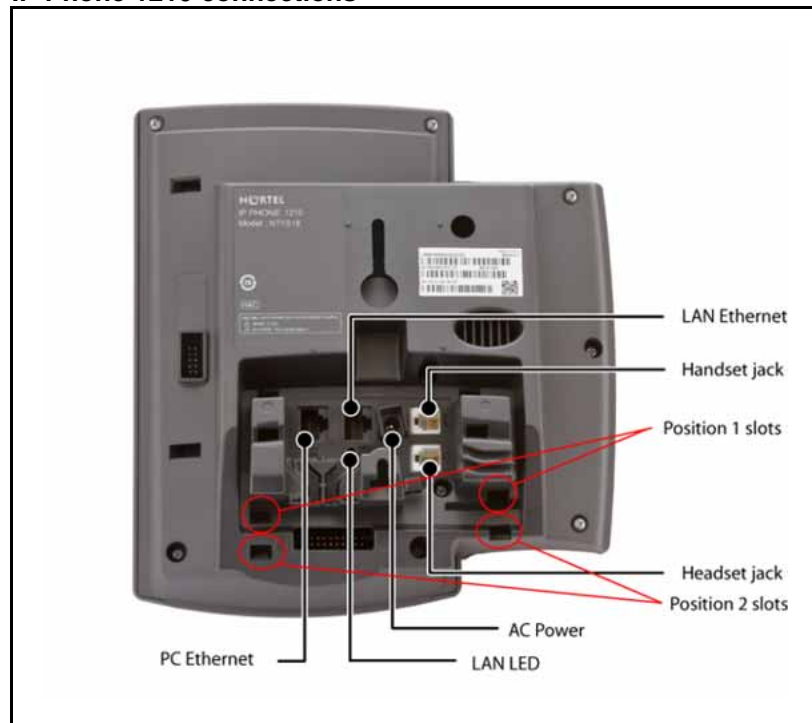
Use [Procedure 30 "Connecting the components"](#) (page 131) to connect the components for the IP Phone. See [Figure 25 "IP Phone 1210 connections"](#) (page 131).

Procedure 30 Connecting the components

Step	Action
1	<p>Attach the footstand (optional). Attach the foot stand in the appropriate slots depending on the desired angle for your IP Phone. If you insert the foot stand into the upper slots, your IP Phone sits at a 25-degree angle. If you insert the foot stand into the lower slots, your IP Phone sits at a 55-degree angle.</p> <p>If you install the IP Phone on the wall, do not attach the footstand.</p>

[Figure 25 "IP Phone 1210 connections"](#) (page 131) shows the back of the IP Phone.

Figure 25
IP Phone 1210 connections



- a Align the bottom tabs on the foot stand with the position 1 slots or the position 2 slots on the back of your IP Phone. In position 1 the IP Phone sits at a 25-degree angle. In position 2 the IP Phone sits at a 55-degree angle.
 - b Press the footstand into the slots until it snaps into place.
 - 2 Connect the handset:
 - a Plug the end of the handset cord with the short straight section into the handset.
 - b Plug the other end of the handset cord with the long straight section into the handset jack marked with the handset symbol on the back of the IP Phone.
 - c Thread the cord through the channel in the footstand (if installed) so that it exits on the side of the foot stand (optional).
 - 3 Connect the headset (optional):
 - a Plug the headset cord into the headset jack on the back of the IP Phone marked with the headset symbol.
 - b Thread the cord through the channel in the side of the foot stand.
 - c Set up the headset according to the instructions included with the headset.
 - 4 Connect the AC power adapter (optional).

The IP Phone 1210 supports both AC power and Power over Ethernet (PoE) options, including IEEE 802.3af Power Classification 2. To use PoE, where power is delivered over the CAT5e cable, the LAN must support PoE, and an AC adapter is not required. To use local AC power, you can order the optional AC adapter separately.

**WARNING**

Use your IP Phone 1210 with the approved Nortel global power supply (model number N0089601).

The IP Phone 1210 supports both AC power and PoL options, including IEEE 802.3af Power Classification 2.

- a Connect the Direct Current (DC) barrel connector to the power jack on the back of the IP Phone.
 - b Thread the cable through the channel in the foot stand to secure the cable.
 - c Plug the country-specific IEC cable into the Global Power Supply, and then plug the Global Power Supply into the nearest AC power outlet.

- 5 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5e connector (LAN Ethernet port), and thread the network cable through the channel in the footstand.
- 6 Connect the other end of the cable to your LAN Ethernet connection. The LAN LED on the back of the IP Phone lights when a LAN connection is established.
- 7 If you connect your PC through the phone, a second CAT5e cable is required. Only one cable is included with the IP Phone 1210 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 CAT5e connector (PC Ethernet port), and thread it through channel in the footstand. Connect the other end to the LAN connector on the back of your PC.

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.
- 8 Wall mount the IP Phone 1210 (optional):
 - a Remove the footstand.
 - b Ensure all cables are properly routed and the IP Phone is functioning.
 - c Make small marks on the wall where you want to align each of the two keyhole slots.
 - d Insert the screws (not provided), so that they protrude slightly from the wall.
 - e Align the keyholes on the back of the IP Phone with the screws in the wall.
 - f Slide the IP Phone down on the screws to secure the IP Phone in position.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol”](#) (page 405).

Startup sequence

When you connect an IP Phone 1210 to the network, it must perform a startup sequence. The elements of the startup sequence include

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

- obtaining the provisioning parameters
- connecting to the Call Server

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones” \(page 447\)](#).

You can manually configure all or some parameters. For information about manually provisioning the IP Phone, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).

Redeploying an IP Phone 1210

You can redeploy an existing previously-configured IP Phone 1210 on the same system. For example, you can assign the IP Phone 1210 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 1210. For further information, see *Converging the Data Network with VoIP Fundamentals* (NN43001-260).

Procedure 31 Redeploying the TN of an existing IP Phone 1210

Step	Action						
1	Repower the IP Phone 1210. During the reboot sequence of a previously configured IP Phone, the IP Phone 1210 displays the existing node number for approximately 5 seconds.						
2	If you configure the node password to NULL, choose one of the following: a Disable the password. b Set the password as nonNULL.						
3	Press OK when the node number displays. <table border="0"><thead><tr><th>If</th><th>Then</th></tr></thead><tbody><tr><td>you configure the node password to 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	you configure the node password to NULL	a password screen displays. Go to Step 4 .	the node password is disabled	a TN screen displays. Go to Step 5 .
If	Then						
you configure the node password to NULL	a password screen displays. Go to Step 4 .						
the node password is disabled	a TN screen displays. Go to Step 5 .						
4	Enter password at the password screen, and press OK . A TN screen displays. To obtain the password, enter the nodePwdShow command in Element Manager. For more information, see <i>Element Manager System Reference - Administration</i> (NN43001-632).						

- 5 Select the **Clear** soft key to clear the existing TN.
- 6 Enter the new TN.
- 7 Click **OK** to save and accept changes.

--End--

Replacing an IP Phone 1210

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1210 that currently uses the TN.

Procedure 32 Replacing an IP Phone 1210

Step	Action
1	Obtain the node and TN information of the phone you want to replace.
2	Disconnect the IP Phone 1210 that you want to replace.
3	Follow to install the IP Phone 1210. To configure the IP Phone, see "Manual provisioning of IP Phone 1110 and 1200 Series" (page 479) .
4	Enter the same TN and node number as the IP Phone 1210 you replaced. The system associates the new IP Phone 1210 with the existing TN.

--End--

Removing an IP Phone 1210 from service

Procedure 33 Removing an IP Phone 1210 from service

Step	Action
1	Disconnect the IP Phone 1210 from the network or turn off the power. If the IP Phone 1210 was automatically configured, the DHCP lease expires and the IP address returns to the available pool.
2	In LD 11, enter the following: REQ: OUT

TYPE: 1210
TN: LLL S CC UU

--End--

Nortel IP Phone 1220

Contents

This section contains the following topics:

- “Introduction” (page 137)
- “Description” (page 138)
- “Components and functions” (page 139)
- “Features” (page 143)
- “Display characteristics” (page 143)
- “Package components” (page 145)
- “Installation and configuration” (page 147)
- “Redeploying an IP Phone 1220” (page 151)
- “Replacing an IP Phone 1220” (page 152)
- “Removing an IP Phone 1220 from service” (page 153)

Introduction

This section explains how to install and maintain the IP Phone 1220. For information about using the IP Phone 1220, see the *IP Phone 1220 User Guide* (NN43141-101).

This section contains the following procedures:

- Procedure 34 “Configuring the IP Phone” (page 148)
- Procedure 35 “Connecting the components” (page 148)
- Procedure 36 “Redeploying the TN of an existing IP Phone 1220” (page 151).
- Procedure 37 “Replacing an IP Phone 1220” (page 152).
- Procedure 38 “Removing an IP Phone 1220 from service” (page 153).

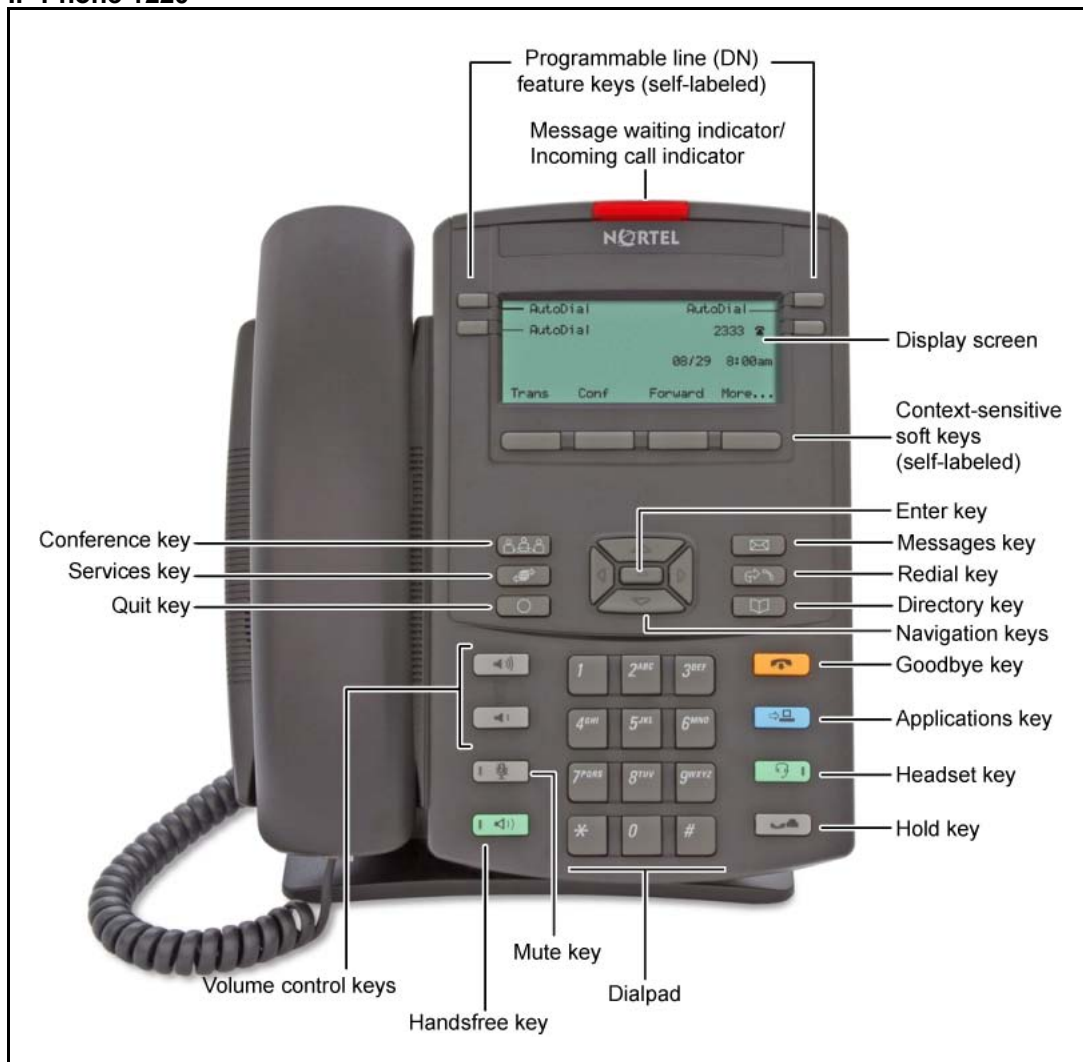
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 1220 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 1220 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 1220 network and CS 1000 connections.

Figure 26 "IP Phone 1220" (page 138) shows the IP Phone 1220.

Figure 26
IP Phone 1220



Components and functions

This section describes the following components and functions of the IP Phone 1220:

- “Keys and functions” (page 139)
- “Services menu” (page 141)
- “Local Tools menu” (page 142)

Keys and functions

Table 32 "IP Phone 1220 keys and functions" (page 139) describes the IP Phone 1220 keys and functions.

Table 32
IP Phone 1220 keys and functions

Key	Function
Handsfree	<p>Press the Handsfree key to activate handsfree mode.</p> <p>The Handsfree light emitting diode (LED) indicator, located on the Handsfree key, lights to indicate that the headset is in use.</p>
Programmable line (DN)/feature keys (self-labeled)	<p>Programmable line (Directory Number [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 icon beside a line (DN) key indicates the line is active. A flashing icon indicates the line is on hold. After a call arrives on a DN key, which is not on the currently displayed page of keys, the IP Phone automatically moves to the page with the active key.</p> <p>A steady icon beside a feature key indicates the feature is active. A flashing icon indicates the feature is being programmed. After a call arrives on a feature key, which is not on the currently displayed page of keys, the IP Phone automatically moves to the page with the active key.</p> <p>These keys also function as line (DN) keys. Press the Left or Right arrow keys to access the second page of feature keys. This feature is called Second Page functionality.</p>
Visual Alerter/Message Waiting indicator	<p>If a message is waiting, the red Visual Alerter/Message Waiting indicator LED at the top center of the phone flashes. The indicator also flashes to indicate an incoming call. The flash cadences for both alerts are different.</p>

Table 32
IP Phone 1220 keys and functions (cont'd.)

Key	Function
Context-sensitive soft keys (self-labeled)	Context-sensitive soft keys are below the LCD. The soft key label is dynamic and depends on the active feature. The label length is a maximum of six characters.
Navigation keys	<p>A triangle before a key label indicates that the key is active.</p> <p>Use the Navigation keys to scroll through menus and lists that appear on the LCD screen. The Navigation keys to move up, down, left, and right.</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	Press the Enter key, at the center of the Navigation key cluster, to confirm menu selections. You can also use the Enter key instead of the Select soft key.
Messages (Inbox)	Press the Messages (Inbox) key to access your voice mailbox when the message waiting indicator flashes.
Redial (Outbox)	Press the Redial (Outbox) key to access your Redial list.
Directory	Press the Directory key to access Directory services.
Quit	Press the Quit key to end an active application.
Conference	Pressing the Quit key does not affect the status of the calls currently on your IP Phone.
Applications	Press the Conference key to initiate conference.
Goodbye	Press the Applications key to access external server applications, such as Nortel Application Server.
Hold	Press the Goodbye key to terminate an active call.
Headset	Press the Hold key to place an active call on hold. Press the flashing line (DN) key to return to the caller on hold.
	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 indicator, located on the Headset key, lights to indicate that the headset is in use.

Table 32
IP Phone 1220 keys and functions (cont'd.)

Key	Function
Mute	Press the Mute key to listen to the calling party without transmitting voice from your phone. Press the Mute key again to return to a two-way conversation. Mute key functionality applies to handsfree, handset, and headset modes. After you mute the transmission path, the Mute indicator LED, embedded in the Mute key, flashes.
Volume control buttons	Use the Volume control buttons to adjust the volume of the ringer, handset, headset, speaker, and Handsfree features. Press the upper button to increase the volume, and press the lower button to decrease the volume.

Services menu

Table 33 "Services menu" (page 141) shows the Services menu.

Table 33
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 — Change Feature key label — Call Timer — On-hook Default Path — Live Dial Pad — Normal Mode Indication — Caller ID display order • 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)
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	You can customize the IP Phone features to meet user requirements. For more information, see the <i>IP Phone 1220 User Guide</i> (NN43141-101).
<p>To access network diagnostic utilities, double-press the Services key. Press 2 2 on the dialpad to access the Network Diagnostic Tools menu or use the Up or Down navigation keys to scroll and highlight Network Diagnostic Tools option. For more information about network diagnostic utilities, see “IP Phone diagnostic utilities” (page 531).</p> <p>If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.</p> <p>While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.</p>	

Local Tools menu

[Table 34 “Local Tools menu”](#) (page 142) shows the Local Tools menu.

Table 34
Local Tools menu

<p>Services key</p>	<p>Press the Services key twice to access the Local Tools menu. The following items appear in the Local Tools menu:</p> <ul style="list-style-type: none"> • 1. Preferences • 2. Local Diagnostics • 3. Network Configuration • 4. Lock Menu <p>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 and the Local Tools menu, see “Local Tools menu” (page 521).</p> <p>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.</p> <p>Press the Cancel key to exit from any menu or menu item.</p>
---------------------	---

For information about configuring the Local Tools menu, see [“Local Tools menu”](#) (page 521).

Features

The IP Phone 1220 supports the following telephony features:

- four programmable line (DN)/ feature keys (self-labeled)
- four context-sensitive soft keys (self-labeled)
Functions for the context-sensitive soft keys are configured in LD 11.
- volume control bar to adjust ringer, speaker, handset, and headset volume
- ability to change the programmable line (DN)/feature key labels
- six specialized feature keys
 - Quit
 - Directory
 - Message/Inbox
 - Redial (Outbox)
 - Services
 - Conference
- six call-processing fixed keys:
 - Mute
 - Handsfree
 - Goodbye
 - Applications
 - Headset
 - Hold

For more information about IP Phone features, see [“Features” \(page 369\)](#).

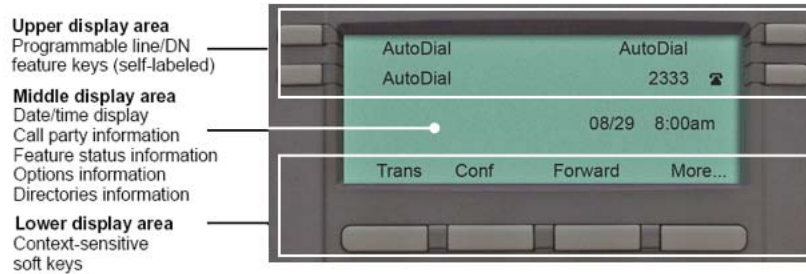
Display characteristics

An IP Phone 1220 has three major display areas:

- [“Programmable line \(DN\)/feature key label display” \(page 144\)](#)
- [“Information line display” \(page 144\)](#)
- [“Soft key label display” \(page 145\)](#)

[Figure 27 "IP Phone 1220 display areas" \(page 144\)](#) shows these three display areas.

Figure 27
IP Phone 1220 display areas



Cleaning the IP Phone display screen

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



CAUTION

Do not use any liquids or powders on the IP Phone 1220. If you use anything other than a soft, dry cloth, you can contaminate IP Phone components and cause premature failure.

Programmable line (DN)/feature key label display

The feature key label area displays a 9-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 9 characters, the last 9 characters are displayed and the excess characters are deleted from the beginning of the string when the string is a DN, otherwise excess characters are deleted from end of the string.

You can use the Programmable line (DN)/feature key label feature to add a text label on the Auto Dial keys that have a 10 digit number.

Information line display

An IP Phone 1220 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 1220 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 9 characters. Press the flashing arrow to display the caller name.

Soft key label display

The soft key label has a maximum of 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 you initiate a feature, the icon state turns on. The icon remains in the on state until you press this feature key again. This action 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 you assign only four functions to the soft keys, the More key does not appear, and all four functions display.

Package components

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

[Table 35 "Package components" \(page 146\)](#) lists the IP Phone 1220 package components.

Table 35
Package components

- IP Phone 1220
- handset
- handset cord
- footstand
- 2.1 m (7-ft) CAT5e Ethernet cable
- number plate and lens

Table 36 "IP Phone 1220 components list" (page 146) lists the IP Phone 1220 package components and product codes.

Table 36
IP Phone 1220 components list

Component		Product code
IP Phone 1220 (Charcoal with icon keys)		NTYS19AA70E6
IP Phone 1220 (Charcoal with English text keys)		NTYS19BA70E6
Power adapter		
Global Power Supply		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

For more 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 1220:

- “Before you begin” (page 147)
- “First-time installation” (page 147)
- “Configuring the IP Phone 1220” (page 148)
- “Connecting the components” (page 148)
- “Startup sequence” (page 151)

Before you begin

Before installing the IP Phone 1220, complete the following pre-installation checklist:

- Ensure one IP Phone 1220 boxed package exists for each IP Phone 1220 you install. For a list of IP Phone 1220 package components, see [Table 35 "Package components" \(page 146\)](#).
- Ensure one software license exists for each IP Phone 1220 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 approved Nortel global power supply (model number N0089601).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Ensure that the protective rubber cap on the Accessory Expansion Module (AEM) port is in place when the port is not in use. An improper connector can cause damage to the IP Phone.

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Do not plug your IP Phone 1220 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1220

Use [Procedure 34 "Configuring the IP Phone" \(page 148\)](#) to configure the IP Phone 1220 for the first time.

Procedure 34 Configuring the IP Phone

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>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Phone 1220 on the Call Server using LD 11. At the prompt, enter the following command:</p> <pre>REQ:new TYPE:1220</pre> <p>For more information about configuring the IP Phone 1220 using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
3	<p>Configure the IP Phone 1220 in Element Manager. IP Phones are configured using the Phones section in the Element Manager navigation tree. For more information about configuring the IP Phone 1220 using Element Manager, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>
--End--	

Connecting the components

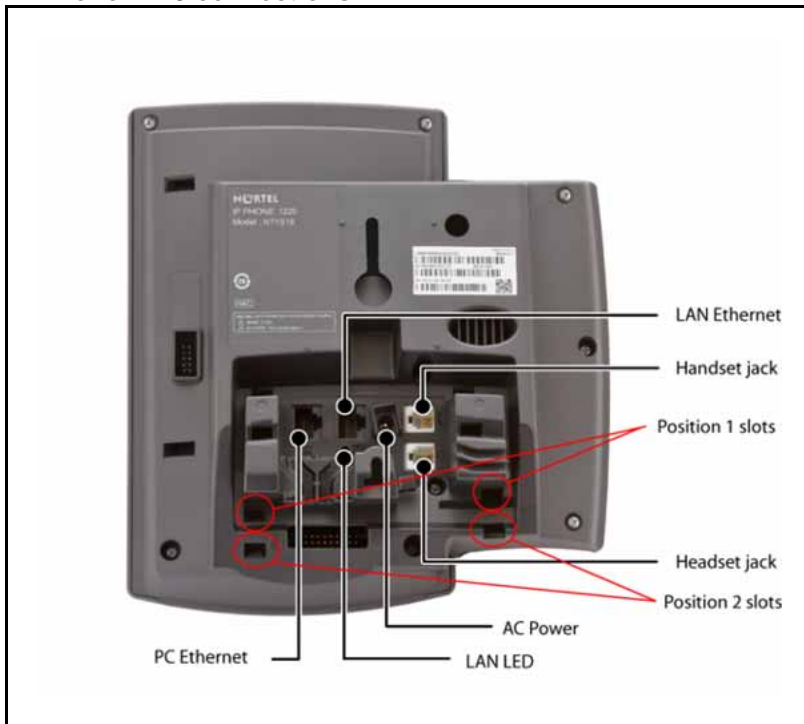
Use [Procedure 35 "Connecting the components" \(page 148\)](#) to connect the components for the IP Phone. See [Figure 28 "IP Phone 1220 connections" \(page 149\)](#).

Procedure 35 Connecting the components

Step	Action
1	<p>Attach the footstand (optional). Attach the foot stand in the appropriate slots depending on the desired angle for your IP Phone. If you insert the foot stand into the upper slots, your IP Phone sits at a 25-degree angle. If you insert the foot stand into the lower slots, your IP Phone sits at a 55-degree angle.</p> <p>If you install the IP Phone on the wall, do not attach the footstand.</p>

Figure 28 "IP Phone 1220 connections" (page 149) shows the IP Phone 1220 connections.

Figure 28
IP Phone 1220 connections



- a Align the bottom tabs on the foot stand with the position 1 slots or the position 2 slots on the back of your IP Phone. In position 1 the IP Phone sits at a 25-degree angle. In position 2 the IP Phone sits at a 55-degree angle.
 - b Press the footstand into the slots until it snaps into place.
- 2** Connect the handset:
- a Plug the end of the handset cord with the short straight section into the handset.
 - b Plug the other end of the handset cord with the long straight section into the handset jack marked with the handset symbol on the back of the IP Phone.
 - c Thread the cord through the channel in the footstand (if installed) so that it exits on the side of the foot stand (optional).
- 3** Connect the headset (optional):
- a Plug the headset cord into the headset jack on the back of the IP Phone marked with the headset symbol.
 - b Thread the cord through the channel in the side of the foot stand.

- c Set up the headset according to the instructions included with the headset.

4 Connect the AC power adapter (optional).

The IP Phone 1220 supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 2. To use PoE, where power is delivered over the CAT5e cable, the LAN must support PoE, and an AC adapter is not required. To use local AC power, you can order the optional AC adapter separately.



WARNING

Use your IP Phone 1220 with the approved Nortel global power supply (model number N0089601).

The IP Phone 1220 supports both AC power and PoL options, including IEEE 802.3af Power Classification 2.

- a Connect the Direct Current (DC) barrel connector to the power jack on the back of the IP Phone.
 - b Thread the cable through the channel in the foot stand to secure the cable.
 - c Plug the country-specific IEC cable into the Global Power Supply, and then plug the Global Power Supply into the nearest AC power outlet.
- 5** Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5e connector (LAN Ethernet port), and thread the network cable through the channel in the footstand.
- 6** Connect the other end of the cable to your LAN Ethernet connection. The LAN LED on the back of the IP Phone lights when a LAN connection is established.
- 7** If you connect your PC through the phone, a second CAT5e cable is required. Only one cable is included with the IP Phone 1220 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 CAT5e connector (PC Ethernet port), and thread it through channel in the footstand. Connect the other end to the LAN connector on the back of your PC.
- The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.
- 8** Wall mount the IP Phone 1220 (optional):
- a Remove the footstand.

- b** Ensure all cables are properly routed and the IP Phone is functioning.
- c** Make small marks on the wall where you want to align each of the two keyhole slots.
- d** Insert the screws (not provided), so that they protrude slightly from the wall.
- e** Align the keyholes on the back of the IP Phone with the screws in the wall.
- f** Slide the IP Phone down on the screws to secure the IP Phone in position.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol” \(page 405\)](#).

Startup sequence

When you connect an IP Phone 1220 to the network, it must perform a startup sequence. The elements of the startup sequence include

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

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones” \(page 447\)](#).

You can manually configure all or some parameters. For information about manually provisioning the IP Phone, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).

Redeploying an IP Phone 1220

You can redeploy a previously-configured IP Phone 1220 on the same Call Server. For example, the IP Phone 1220 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 1220. For more information, see *Converging the Data Network with VoIP Fundamentals* (NN43001-260).

Procedure 36 Redeploying the TN of an existing IP Phone 1220

Step	Action						
1	Repower the IP Phone 1220. During the reboot sequence of a previously-configured IP Phone, the IP Phone 1220 displays the existing node number for approximately 5 seconds.						
2	If you configure the node password to NULL,, choose one of the following: <ul style="list-style-type: none"> a Disable the password. b Set the password as nonNULL. 						
3	Press OK when the node number displays. <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">If</th> <th style="text-align: left;">Then</th> </tr> </thead> <tbody> <tr> <td>you configure the node password to 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	you configure the node password to NULL	a password screen displays. Go to Step 4 .	the node password is disabled	a TN screen displays. Go to Step 5 .
If	Then						
you configure the node password to 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 more information, see <i>Element Manager System Reference - Administration</i> (NN43001-632).						
5	Select the Clear soft key to clear the existing TN.						
6	Enter the new TN.						
7	Click OK to save and accept changes.						
--End--							

Replacing an IP Phone 1220

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1220 that currently uses the TN.

Procedure 37 Replacing an IP Phone 1220

Step	Action
1	Obtain the node and TN information of the phone you want to replace.
2	Disconnect the IP Phone 1220 that you want to replace.

- 3 Follow to install the IP Phone 1220. To configure the IP Phone, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).
- 4 Enter the same TN and node number as the IP Phone 1220 you replaced. The Call Server associates the new IP Phone 1220 with the existing TN.

--End--

Removing an IP Phone 1220 from service

Procedure 38

Removing an IP Phone 1220 from service

Step	Action
1	<p>Disconnect the IP Phone 1220 from the network or turn off the power.</p> <p>The service to the PC is disconnected as well if the PC connects to the IP Phone 1220.</p> <p>If the IP Phone 1220 was automatically configured, the DHCP lease expires and the IP address returns to the available pool.</p>
2	<p>In LD 11, enter the following:</p> <p>REQ: OUT TYPE: 1220 TN: LLL S CC UU</p>

--End--

Nortel IP Phone 1230

Contents

This section contains the following topics:

- “Introduction” (page 155)
- “Description” (page 156)
- “Components and functions” (page 157)
- “Features” (page 161)
- “Display characteristics” (page 161)
- “Package components” (page 163)
- “Installation and configuration” (page 165)
- “Redeploying an IP Phone 1230” (page 169)
- “Replacing an IP Phone 1230” (page 170)
- “Removing an IP Phone 1230 from service” (page 171)

Introduction

This section explains how to install and maintain the IP Phone 1230. For information about using the IP Phone 1230, see the *IP Phone 1230 User Guide* (NN43142-101).

This section contains the following procedures:

- Procedure 39 “Configuring the IP Phone 1230” (page 166)
- Procedure 40 “Connecting the components” (page 166)
- Procedure 41 “Redeploying the TN of an existing IP Phone 1230” (page 169).
- Procedure 42 “Replacing an IP Phone 1230” (page 170).
- Procedure 43 “Removing an IP Phone 1230 from service” (page 171).

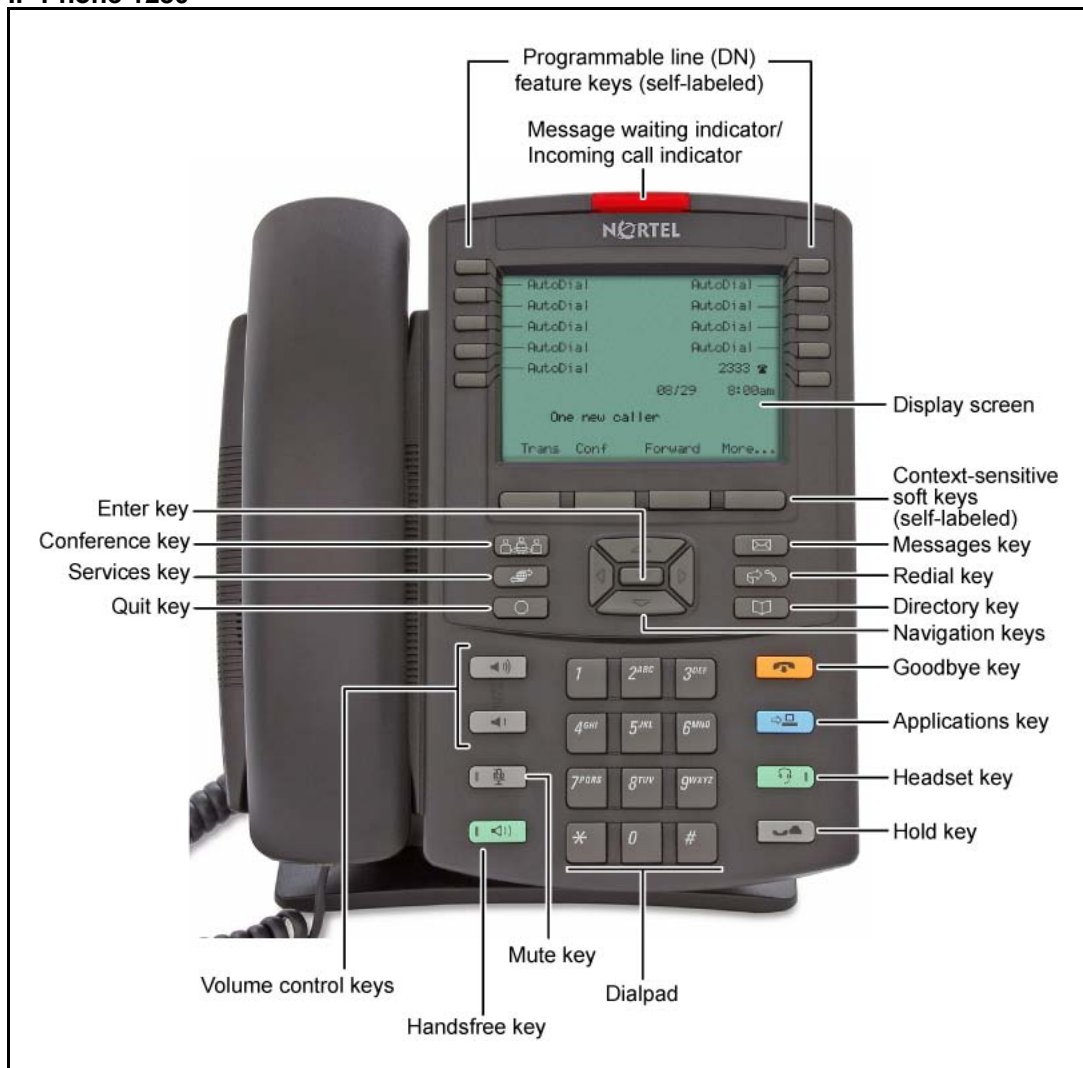
After you install and configure an IP Phone, if power to the phone is interrupted, you need not re-enter the IP parameters, node number, Terminal Number (TN), or reacquisition of firmware.

Description

The IP Phone 1230 uses the customer IP data network to communicate with the Communication Server 1000 (CS 1000). The IP Phone 1230 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 1230 network and CS 1000 connections.

Figure 29 "IP Phone 1230" (page 156) shows the IP Phone 1230.

Figure 29
IP Phone 1230



Components and functions

This section describes the following components and functions of the IP Phone 1230:

- [“Keys and functions” \(page 157\)](#)
- [“Services menu” \(page 159\)](#)
- [“Local Tools menu” \(page 160\)](#)

Keys and functions

[Table 37 "IP Phone 1230 keys and functions" \(page 157\)](#) describes the IP Phone 1230 keys and functions.

Table 37
IP Phone 1230 keys and functions

Key	Function
Handsfree	Press the Handsfree key to activate handsfree mode. The Handsfree light emitting diode (LED) indicator, located on the Handsfree key, lights to indicate that the headset is in use.
Programmable line (DN)/feature keys (self-labeled)	<p>Programmable line (Directory Number [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 icon beside a line (DN) key indicates the line is active. A flashing icon indicates the line is on hold. After a call arrives on a DN key, which is not on the currently displayed page of keys, the IP Phone automatically moves to the page with the active key.</p> <p>A steady icon beside a feature key indicates the feature is active. A flashing icon indicates the feature is being programmed. After a call arrives on a feature key, which is not on the currently displayed page of keys, the IP Phone automatically moves to the page with the active key.</p> <p>These keys also function as line (DN) keys. Press the Left or Right arrow keys to access the second page of feature keys. This feature is called Second Page functionality.</p>
Visual Alerter/Message Waiting indicator	If a message is waiting, the red Visual Alerter/Message Waiting indicator LED at the top center of the phone flashes. The indicator also flashes to indicate an incoming call. The flash cadences for both alerts are different.

Table 37
IP Phone 1230 keys and functions (cont'd.)

Key	Function
Context-sensitive soft keys (self-labeled)	Context-sensitive soft keys are below the LCD. The soft key label is dynamic and depends on the active feature. The label length is a maximum of six characters.
Navigation keys	<p>A triangle before a key label indicates that the key is active.</p> <p>Use the Navigation keys to scroll through menus and lists that appear on the LCD screen. The Navigation keys to move up, down, left, and right.</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	Press the Enter key, at the center of the Navigation key cluster, to confirm menu selections. You can also use the Enter key instead of the Select soft key.
Message (Inbox)	Press the Message (Inbox) key to access your voice mailbox when the message waiting indicator flashes.
Redial (Outbox)	Press the Redial (Outbox) key to access the Redial list.
Conference	Press the Conference key to initiate conference.
Directory	Press the Directory key to access Directory services.
Quit	Press the Quit key to end an active application.
Applications	Pressing the Quit key does not affect the status of the calls currently on your IP Phone.
Goodbye	Press the Applications key to access external server applications, such as Nortel Application Server.
Hold	Press the Goodbye key to terminate an active call.
Headset	Press the Hold key to place an active call on hold. Tap the flashing line (DN) key to return to the caller on hold.
	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 indicator, located on the Headset key, lights to indicate that the headset is in use.

Table 37
IP Phone 1230 keys and functions (cont'd.)

Key	Function
Mute	<p>Press the Mute key to listen to the calling party without transmitting voice from your phone. Press the Mute key again to return to a two-way conversation. Mute key functionality applies to handsfree, handset, and headset modes.</p> <p>After you mute the transmission path, the Mute indicator LED, embedded in the Mute key, flashes.</p>
Volume control buttons	<p>Use the Volume control buttons to adjust the volume of the ringer, handset, headset, speaker, and Handsfree features. Press the upper button to increase the volume, and press the lower button to decrease the volume.</p>
Handsfree key	<p>Press the Handsfree key to activate the Handsfree feature.</p> <p>The LED lights to indicate when handsfree is active.</p>

Services menu

Table 38 "Services menu" (page 159) shows the Services menu.

Table 38
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 — Change Feature key label — Call Timer — On-hook Default Path — Live Dial Pad
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	<ul style="list-style-type: none"> — Normal Mode Indication — Caller ID display order • 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) <p>You can customize the IP Phone features to meet user requirements. For more information, see the <i>IP Phone 1230 User Guide</i> (NN43142-101).</p>
<p>To access network diagnostic utilities, double-press the Services key. Press 2 2 on the dialpad to access the Network Diagnostic Tools menu or use the Up or Down navigation keys to scroll and highlight Network Diagnostic Tools option. For more information about network diagnostic utilities, see "IP Phone diagnostic utilities" (page 531).</p> <p>If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.</p> <p>While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.</p>	

Local Tools menu

[Table 39 "Local Tools menu"](#) (page 160) shows the Local Tools menu.

Table 39
Local Tools menu

<p>Services key</p>	<p>Press the Services key twice to access the Local Tools menu. The following items appear in the Local Tools menu:</p> <ul style="list-style-type: none"> • 1. Preferences • 2. Local Diagnostics • 3. Network Configuration • 4. Lock Menu <p>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 and the Local Tools menu, see "Local Tools menu" (page 521).</p> <p>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.</p> <p>Press the Cancel key to exit from any menu or menu item.</p>
---------------------	---

Features

The IP Phone 1230 supports the following telephony features:

- 20 programmable line (DN)/ feature keys (self-labeled) on two pages
Use the Left or Right key to access the second page of DNs or features.
- four context-sensitive soft keys (self-labeled)
Functions for the context-sensitive soft keys are configured in LD 11.
- volume control bar to adjust ringer, speaker, handset, and headset volume
- Call Duration Timer
- ability to change the programmable line (DN)/feature key labels
- six specialized feature keys
 - Quit
 - Directory
 - Message/Inbox
 - Redial (Outbox)
 - Services
 - Conference
- six call-processing fixed keys:
 - Mute
 - Handsfree
 - Goodbye
 - Expand
 - Headset
 - Hold

For more information about IP Phone features, see [“Features” \(page 369\)](#).

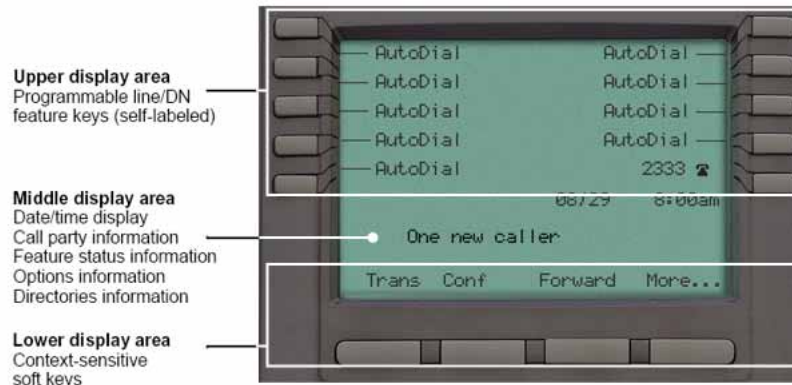
Display characteristics

An IP Phone 1230 has three major display areas:

- [“Programmable line \(DN\)/feature key label display” \(page 162\)](#)
- [“Information line display” \(page 162\)](#)
- [“Soft key label display” \(page 163\)](#)

[Figure 30 "IP Phone 1230 display areas" \(page 162\)](#) shows these three display areas.

Figure 30
IP Phone 1230 display areas



Cleaning the IP Phone display screen

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



CAUTION

Do not use any liquids or powders on the IP Phone 1230. If you use anything other than a soft, dry cloth, you can contaminate IP Phone components and cause premature failure.

Programmable line (DN)/feature key label display

The feature key label area displays a 9-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 9 characters, the last 9 characters are displayed and the excess characters are deleted from the beginning of the string when the string is a DN, otherwise excess characters are deleted from end of the string.

You can use the Programmable line (DN)/feature key label feature to add a text label on the Auto Dial keys that have a 10 digit number.

Information line display

An IP Phone 1230 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.

Because the IP Phone 1230 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 9 characters. Press the flashing arrow to display the caller name.

Soft key label display

The soft key label has a maximum of 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 you initiate a feature, the icon state turns on. The icon remains in the on state until you press this feature key again. This action 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 you assign only four functions to the soft keys, the More key does not appear, and all four functions display.

Package components

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

[Table 40 "Package components" \(page 164\)](#) lists the IP Phone 1230 package components.

Table 40
Package components

- IP Phone 1230
- handset
- handset cord
- footstand
- 2.1 m (7-ft) CAT5e Ethernet cable
- number plate and lens

Table 41 "IP Phone 1230 components list" (page 164) lists the IP Phone 1230 components and product codes.

Table 41
IP Phone 1230 components list

Component		Product code
IP Phone 1230 (Charcoal with icon keys)		NTYS20AA70E6
IP Phone 1230 (Charcoal with English text keys)		NTYS20BA70E6
Power adapter		
Global Power Supply		N0146475
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

For more 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 1230:

- [“Before you begin” \(page 165\)](#)
- [“First-time installation” \(page 165\)](#)
- [“Configuring the IP Phone 1230” \(page 166\)](#)
- [“Connecting the components” \(page 166\)](#)
- [“Startup sequence” \(page 169\)](#)

Before you begin

Before installing the IP Phone 1230, complete the following pre-installation checklist:

- Ensure one IP Phone 1230 boxed package exists for each IP Phone 1230 you install. For a list of IP Phone 1230 package components, see [Table 40 "Package components" \(page 164\)](#).
- Ensure one software license exists for each IP Phone 1230 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 approved Nortel global power supply (model number N0089601).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Ensure that the protective rubber cap on the Accessory Expansion Module (AEM) port is in place when the port is not in use. An improper connector can cause damage to the IP Phone.

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Do not plug your IP Phone 1230 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1230

Use [Procedure 39 "Configuring the IP Phone 1230" \(page 166\)](#) to configure the IP Phone 1230 for the first time.

Procedure 39 Configuring the IP Phone 1230

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>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Phone 1230 on the Call Server using LD 11. At the prompt, enter the following commands:</p> <pre>REQ:new TYPE:1230</pre> <p>For more information about configuring the IP Phone 1230 using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
3	<p>Configure the IP Phone 1230 in Element Manager. IP Phones are configured using the Phones section in the Element Manager navigation tree. For more information about configuring the IP Phone 1230 using Element Manager, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>
--End--	

Connecting the components

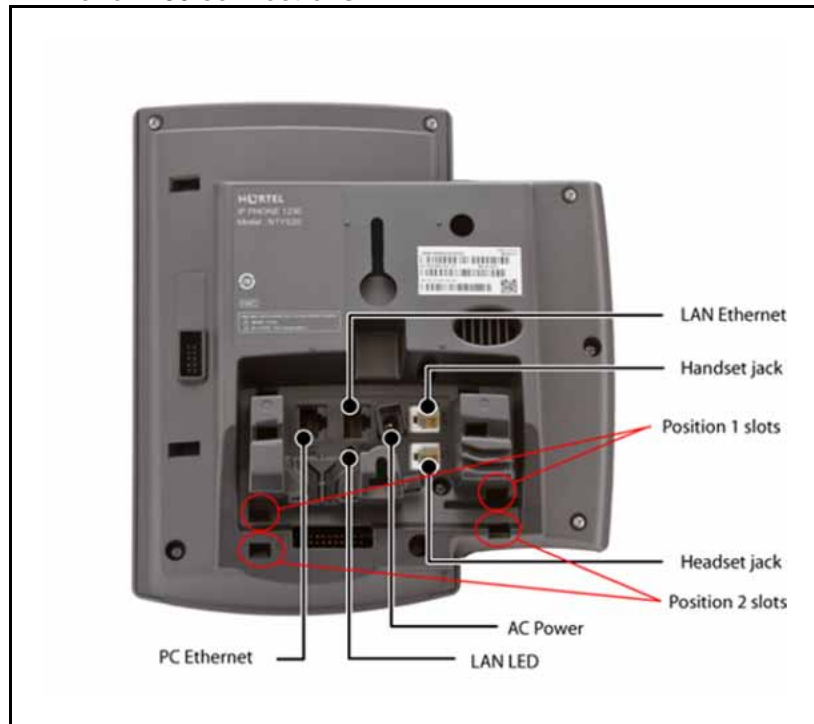
Use [Procedure 40 "Connecting the components" \(page 166\)](#) to connect the components for the IP Phone. See [Figure 31 "IP Phone 1230 connections" \(page 167\)](#).

Procedure 40 Connecting the components

Step	Action
1	<p>Attach the footstand (optional). Attach the foot stand in the appropriate slots depending on the desired angle for your IP Phone. If you insert the foot stand into the upper slots, your IP Phone sits at a 25-degree angle. If you insert the foot stand into the lower slots, your IP Phone sits at a 55-degree angle.</p> <p>If you install the IP Phone on the wall, do not attach the footstand.</p>

Figure 31 "IP Phone 1230 connections" (page 167) shows the IP Phone 1230 connections.

Figure 31
IP Phone 1230 connections



- a Align the bottom tabs on the foot stand with the position 1 slots or the position 2 slots on the back of your IP Phone. In position 1 the IP Phone sits at a 25-degree angle. In position 2 the IP Phone sits at a 55-degree angle.
 - b Press the footstand into the slots until it snaps into place.
- 2** Connect the handset:
- a Plug the end of the handset cord with the short straight section into the handset.
 - b Plug the other end of the handset cord with the long straight section into the handset jack marked with the handset symbol on the back of the IP Phone.
 - c Thread the cord through the channel in the footstand (if installed) so that it exits on the side of the foot stand (optional).
- 3** Connect the headset (optional):
- a Plug the headset cord into the headset jack on the back of the IP Phone marked with the headset symbol.
 - b Thread the cord through the channel in the side of the foot stand.

- c Set up the headset according to the instructions included with the headset.

4 Connect the AC power adapter (optional).

The IP Phone 1230 supports both AC power and Power over Ethernet (PoE) options, including IEEE 802.3af Power Classification 2. To use PoE, where power is delivered over the CAT5e cable, the LAN must support PoE, and an AC adapter is not required. To use local AC power, you can order the optional AC adapter separately.



WARNING

Use your IP Phone 1230 with the approved Nortel global power supply (model number N0089601).

The IP Phone 1230 supports both AC power and PoE options, including IEEE 802.3af Power Classification 2 .

- a Connect the Direct Current (DC) barrel connector to the power jack on the back of the IP Phone.
- b Thread the cable through the channel in the footstand to secure the cable.
- c Plug the country-specific IEC cable into the Global Power Supply, and then plug the Global Power Supply into the nearest AC power outlet.

5 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5e connector (LAN Ethernet port), and thread the network cable through the channel in the footstand.

6 Connect the other end of the cable to your LAN Ethernet connection. The LAN LED on the back of the IP Phone lights when a LAN connection is established.

7 If you connect your PC through the phone, a second CAT5e cable is required. Only one cable is included with the IP Phone 1230 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 CAT5e connector (PC Ethernet port), and thread it through channel in the footstand. Connect the other end to the LAN connector on the back of your PC.

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.

8 Wall mount the IP Phone 1230 (optional):

- a Remove the footstand.

- b Ensure all cables are properly routed and the IP Phone is functioning.
- c Make small marks on the wall where you want to align each of the two keyhole slots.
- d Insert the screws (not provided), so that they protrude slightly from the wall.
- e Align the keyholes on the back of the IP Phone with the screws in the wall.
- f Slide the IP Phone down on the screws to secure the IP Phone in position.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol” \(page 405\)](#).

Startup sequence

When you connect an IP Phone 1230 to the network, it must perform a startup sequence. The elements of the startup sequence include

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

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones” \(page 447\)](#).

You can manually configure all or some parameters. For information about manually provisioning the IP Phone, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).

Redeploying an IP Phone 1230

You can redeploy a previously-configured IP Phone 1230 on the same Call Server. For example, you can assign the IP Phone 1230 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 1230. For more information, see *Converging the Data Network with VoIP Fundamentals* (NN43001-260).

Procedure 41 Redeploying the TN of an existing IP Phone 1230

Step	Action						
1	Repower the IP Phone 1230. During the reboot sequence of a previously-configured IP Phone, the IP Phone 1230 displays the existing node number for approximately 5 seconds.						
2	If you configure the node password to NULL, choose one of the following: <ul style="list-style-type: none"> a Disable the password. b Set the password as nonNULL. 						
3	Press OK when the node number displays. <table border="0" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">If</th> <th style="text-align: left;">Then</th> </tr> </thead> <tbody> <tr> <td>you configure the node password to 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	you configure the node password to NULL	a password screen displays. Go to Step 4 .	the node password is disabled	a TN screen displays. Go to Step 5 .
If	Then						
you configure the node password to 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 more information, see <i>Element Manager System Reference - Administration</i> (NN43001-632).						
5	Select the Clear soft key to clear the existing TN.						
6	Enter the new TN.						
7	Click OK to save and accept changes.						
--End--							

Replacing an IP Phone 1230

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1230 that currently uses the TN.

Procedure 42 Replacing an IP Phone 1230

Step	Action
1	Obtain the node and TN information of the phone you want to replace.
2	Disconnect the IP Phone 1230 that you want to replace.

- 3 Follow to install the IP Phone 1230. To configure the IP Phone, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).
- 4 Enter the same TN and node number as the IP Phone 1230 you replaced. The Call Server associates the new IP Phone 1230 with the existing TN.

--End--

Removing an IP Phone 1230 from service

Procedure 43

Removing an IP Phone 1230 from service

Step	Action
1	<p>Disconnect the IP Phone 1230 from the network or turn off the power.</p> <p>The service to the PC is disconnected as well if the PC connects to the IP Phone 1230.</p> <p>If the IP Phone 1230 was automatically configured, the DHCP lease expires and the IP address returns to the available pool.</p>
2	<p>In LD 11, enter the following:</p> <p>REQ: OUT TYPE: 1230 TN: LLL S CC UU</p>

--End--

Nortel IP Phone 1200 Series LCD Expansion Module

Contents

This section contains the following topics:

- “Description” (page 173)
- “Features” (page 177)
- “Display characteristics” (page 178)
- “Package components” (page 178)
- “Configuration” (page 178)
- “Installation” (page 180)
- “IP Phone 1200 Series LCD Expansion Module startup initialization” (page 181)
- “Operating parameters” (page 182)
- “Services key operation” (page 185)
- “Firmware” (page 187)

Description

The IP Phone 1200 Series LCD Expansion Module (12-key self-labeling) is supported on the following IP Phones

- IP Phone 1220
- IP Phone 1230

CS 1000 does not support the IP Phone 1200 Series LCD Expansion Module on the IP Phone 1210.

The LCD Expansion Module is classified as KEM 4 in the class of service.

The LCD Expansion Module is a hardware component that connects to the IP Phones and provides additional line appearances and feature keys.

The IP Phones support up to four LCD Expansion Modules. With four LCD Expansion Modules, the IP Phones provide up to 48 additional line feature keys.

The IP Phone 1230 can also support up to 48 additional line/feature keys using the Second Page functionality with one or more LCD Expansion Modules attached. The Second Page functionality works across both the IP Phone and the LCD Expansion Module. Press the Left or Right arrow keys to view the second page of feature keys to appear both on the IP Phone feature keys and the LCD Expansion Module keys. You cannot switch the pages on the IP Phone and on the LCD Expansion Module separately.

The IP Phone 1220 does not support Second Page functionality.

Table 42
Number of keys provided by IP Phone 1200 Series LCD Expansion Module

Number of LCD Expansion Modules	IP Phone 1220	IP Phone 1230
1	12 keys	2 pages x 12 keys = 24 keys (paged)
2	24 keys	2 pages x 24 keys = 48 keys (paged)
3	36 keys	1 page x 12 keys = 36 keys (non-paged)
4	48 keys	1 page x 12 keys = 48 keys (non-paged)

Key numbers for the LCD Expansion Module are consecutive starting from 32 up to 79, depending on the number of LCD Expansion Modules configured. The key numbers are grouped in four logical pages of 12 keys.

[Table 43 "Key and page numbering " \(page 174\)](#) shows the key and page number for various LCD Expansion Module configurations.

Table 43
Key and page numbering

Configured LCD Expansion Module	Keys	Attached LCD Expansion Modules	Description
1	12*1*2=24, 2 ranges	1	The first range (32 to 43) of keys displays on the first page of the LCD Expansion Module and the second range of keys (44 to 55) displays on the second page.
		2	The first range (32 to 43) displays on the first LCD Expansion Module. The second

Configured LCD Expansion Module	Keys	Attached LCD Expansion Modules	Description
			range (44 to 55) displays on the second LCD Expansion Module. The second page of each LCD Expansion Module is empty. The pressing of left or right keys is ignored if keys 10 to 15 and 27 to 30 are not configured on IP Phone (for example, no keys are configured on the second page of the IP Phone).
		3	The first range (32 to 43) displays on the first LCD Expansion Module. The second range (44 to 55) displays on the second LCD Expansion Module. Third LCD Expansion Module is empty. LCD Expansion Module pages do not switch.
		4	The first range (32 to 43) appears on the first LCD Expansion Module. The second range (44 to 55) appears on the second LCD Expansion Module. Third (56 to 67) and fourth (68 to 79) LCD Expansion Modules are empty. LCD Expansion Module pages do not switch.
2	12*1*2=48, 4 ranges	1	The first range (32 to 43) appears on the first page of the LCD Expansion Module and the second range (44 to 55) appears on the second page. Third and fourth ranges do not appear.
		2	The first range (32 to 43) appears on the first page of the first LCD Expansion Module, the second range (44 to 55) appears on the first page of the second LCD Expansion Module. Third (56 to 67) and fourth (68 to 79) ranges appear on the second pages of the first and second LCD Expansion Modules correspondingly.

Configured LCD Expansion Module	Keys	Attached LCD Expansion Modules	Description
		3	The fourth range does not appear. LCD Expansion Module pages do not switch, for example, the first range (32 to 43) appears on the first LCD Expansion Module, the second range (44 to 55) appears on the second LCD Expansion Module and third range (56 to 67) appears on the third LCD Expansion Module.
		4	All ranges appear on corresponding LCD Expansion Modules. LCD Expansion Module pages do not switch.
3	12*3*1=36 3 ranges	1	The first range (32 to 43) appears on the first page of the LCD Expansion Module and the second range (44 to 55) appears on the second page. Third range does not appear.
		2	The first range (32 to 43) appears on the first page of the first LCD Expansion Module. The second range (44 to 55) appears on the first page of the second LCD Expansion Module. The third range (56 to 67) appears on the second page of the first LCD Expansion Module. The second page of the second LCD Expansion Module is empty.
		3	All ranges appear on corresponding LCD Expansion Modules. LCD Expansion Modules pages do not switch.
		4	All ranges appear on corresponding LCD Expansion Modules. The fourth LCD Expansion Module is empty. LCD Expansion Module pages do not switch.

Configured LCD Expansion Module	Keys	Attached LCD Expansion Modules	Description
4	12*4*1=48, 4 ranges	1	The first range (32 to 43) appears on the first page of LCD Expansion Module and the second range (44 to 55) appears on the second page. Third and fourth ranges do not appear.
		2	The first range (32 to 43) appears on the first page of the first LCD Expansion Module, the second range (44 to 55) appears on the first page of second LCD Expansion Module. Third (56 to 67) and fourth (68 to 79) ranges appear on the second pages of the first and second LCD Expansion Modules correspondingly.
		3	The fourth range does not appear. LCD Expansion Module pages do not switch, for example, the first range (32 to 43) appears on the first LCD Expansion Module, the second range (44 to 55) appears on the second LCD Expansion Module and third range (56 to 67) appears on the third LCD Expansion Module.
		4	All ranges appear on corresponding LCD Expansion Modules. LCD Expansion Module pages do not switch.

Features

The LCD Expansion Module provides the following features

- 12 self-labeled line programmable feature keys provide up to 48 additional self-labeled line programmable feature keys.
- Second Page functionality for one or two LCD Expansion Modules on an IP Phone 1230

- A desk-mount bracket and structural base plate connects the LCD Expansion Module to an IP Phone or to another LCD Expansion Module.
- IP Phone and LCD Expansion Module combinations can be wall-mounted using the wall mount template provided.

Display characteristics

The LCD Expansion Module has the following display characteristics

- LCD display area—Each of the 12 physical keys on the LCD Expansion Module provides a 9-character display label beside the 12 self-labeled line/programmable feature keys. This label is configured automatically. You 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 affects the LCD Expansion Module. The LCD 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 LCD Expansion Module. You can use either the local 48 V power supply or Power over Ethernet (PoE) to operate all other LCD Expansion Module functionality.

Package components

[Table 44 "IP Phone 1200 Series LCD Expansion Module components list" \(page 178\)](#) lists the package components.

Table 44
IP Phone 1200 Series LCD Expansion Module components list

Component	Product code
IP Phone 1200 Series LCD Expansion Module	NTYS22AA70E6

Configuration

Use LD 11 to configure the IP Phone 1200 Series LCD Expansion Module.

Table 45
LD 11—Configure the IP Phone 1200 Series LCD Expansion Module

Prompt	Response	Description
REQ:	NEW/CHG	Add new or change existing data.
TYPE	1220/1230	For IP Phone 1220, IP Phone 1230

Table 45
LD 11—Configure the IP Phone 1200 Series LCD Expansion Module (cont'd.)

Prompt	Response	Description												
TN	l s c u	Where l = loop, s = shelf, c = card, u = unit. Enter loop (virtual loop), shelf, card, and unit (terminal number), where unit = 0 to 31.												
KEM	(0) - 4/<CR>	Number of attached KEM (0). Up to four LCD Expansion Modules are supported.												
...												
CLS	KEM4	KEM4 CLS must be defined												
KEY	0 - <see text>/<CR>	Key number range expanded to support number of LCD Expansion Modules specified by KEM prompt. The range on the IP Phone is as follows: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">KEM value:</td> <td style="width: 50%;">KEY range:</td> </tr> <tr> <td>0</td> <td>0 to 31</td> </tr> <tr> <td>1</td> <td>32 to 43</td> </tr> <tr> <td>2</td> <td>44 to 55</td> </tr> <tr> <td>3</td> <td>56 to 67</td> </tr> <tr> <td>4</td> <td>68 to 79</td> </tr> </table>	KEM value:	KEY range:	0	0 to 31	1	32 to 43	2	44 to 55	3	56 to 67	4	68 to 79
KEM value:	KEY range:													
0	0 to 31													
1	32 to 43													
2	44 to 55													
3	56 to 67													
4	68 to 79													
PAGEOFST	<Page> <KeyOffset> / <CR>	PAGEOFST is prompted if one or two LCD Expansion Module are specified at the KEM prompt for the IP Phone 1230 and <CR> is entered at the KEY prompt. The PAGEOFST is not supported on the IP Phone 1220. Page number (0 to 3) 0 - first page on KEM 1 1 - second page on KEM 1 2 - first page on KEM 2 3 - second page on KEM 2 Key offset number (0 to 11). After you enter the offset number, 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 Page + Key Offset entered at PAGEOFST. Enter the key configuration <CR> or just <CR>.												

Table 45
LD 11—Configure the IP Phone 1200 Series LCD Expansion Module (cont'd.)

Prompt	Response	Description
KEMOFST	<KEM> <Key-Offset> / <CR>	<p>KEMOFST is prompted if three or four LCD Expansion Modules are specified at the KEM prompt and <CR> is entered for KEY prompt.</p> <p><KEM> - KEM number (1 to 4) 1 - for KEM 1 (32 to 43) 2 - for KEM 2 (44 to 55) 3 - for KEM 3 (56 to 67) 4 - for KEM 4 (68 to 79)</p> <p><Key Offset> - key offset number (0 to 11). After you enter the offset number, 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 LCD Expansion Module mounts on the right side of the IP Phone. The LCD Expansion Module snaps into the receptacle on the back of the IP Phone using the desk-mount bracket and structural base plate supplied with the LCD Expansion Module.

The LCD Expansion Module connects to the IP Phone using the Accessory Expansion Module (AEM) port on the IP Phone.

Use [Procedure 44 "Connecting the IP Phone 1200 Series LCD Expansion Module to the IP Phone"](#) (page 180) to connect the LCD Expansion Module.



CAUTION

Damage to Equipment

To avoid damaging the equipment, remove the power (PoE cable, or local power) from the IP Phone before connecting the LCD Expansion Module.

Procedure 44
Connecting the IP Phone 1200 Series LCD Expansion Module to the IP Phone

Step	Action
1	Remove the IP Phone from the stand by pulling the IP Phone away from the stand.
2	Remove the rubber cap from the AEM port.
3	Attach the ribbon cable from the LCD Expansion Module to the IP Phone and the AEM port.
4	If connecting a second, third, or fourth LCD Expansion Module, repeat steps 2 to 4. The second LCD Expansion Module is attached to the right side of the first LCD Expansion Module. The third LCD Expansion Module is attached to the right side of the second LCD Expansion Module. The fourth LCD Expansion Module is attached to the right side of the third LCD Expansion Module.
5	Attach the IP Phone stand and the LCD Expansion Module stand, if removed. Adjust each LCD Expansion Module stand to the same angle as the IP Phone.
6	Reconnect the local power or PoE cable to the IP 1200 Series phone. The LCD Expansion Module powers up. The LCD Expansion Module uses the electrical connection of the IP Phone 1220 or IP Phone 1230 for power. It does not have its own power source.
--End--	

IP Phone 1200 Series LCD Expansion Module startup initialization

After you install and power up the LCD Expansion Module on the IP Phone, the LCD Expansion Module initializes.

Table 46 "Startup initialization process " (page 181) lists the initialization process for the LCD Expansion Module.

Table 46
Startup initialization process

Phase	Description
1 LCD Expansion Module performs self-test	The self-test confirms the operation of the LCD Expansion Module local memory, CPU, and other circuitry. While undergoing this self-test, the LCD Expansion Module display lights up.

Phase	Description
	If the LCD Expansion Module display does not light up, or lights up and then goes blank, or fails to begin flashing, check that the LCD Expansion Module is correctly installed and configured.
2 LCD Expansion Module establishes communication with the IP Phone	<p>The LCD Expansion Module display flashes until it establishes communication with the IP Phone.</p> <p>If the LCD Expansion Module display does not stop flashing, communication is not established with the IP Phone. Check that the LCD Expansion Module is correctly installed and configured.</p> <p>The LCD Expansion Module contains pre-installed firmware and cannot be upgraded from the phone or from the CS 1000.</p>
3 LCD Expansion Module downloads key maps	The key labels download to the LCD Expansion Module. During the download, the display is blank.

After the three phases complete successfully, you are ready to use the additional self-labeled line programmable feature keys on the LCD Expansion Module.

If you have a second, third, or fourth LCD Expansion Module installed on your IP Phone, the one to the immediate right of the IP Phone must be functional so that subsequent LCD Expansion Module to work. This is necessary because the second LCD Expansion Module receives its power and communicates with the IP Phone through the first LCD Expansion Module; and the third LCD Expansion Module receives its power and communicates with the IP Phone through the second LCD Expansion Module; and the fourth LCD Expansion Module receives its power and communicates with the IP Phone through the third LCD Expansion Module.

Operating parameters

If the LCD Expansion Module does not respond, and you configure lines or features on keys 32 to 79, calls can be directed to those keys which you cannot access. In this case, the IP Phone rings, but the call cannot be answered. The incoming call receives Call Forward No Answer (CFNA) treatment.

IP Phone 1220

The IP Phone 1220 does not support Second Page functionality.

If you configure only one LCD Expansion Module in LD 11, but two, three, or four LCD Expansion Modules are detected on an IP Phone 1220, the second, third, and fourth LCD Expansion Modules are ignored. An error message alerts the administrator that the hardware configuration does not match the administered configuration.

If you configure two LCD Expansion Modules in LD 11, but only one LCD Expansion Module responds, the keys on the second LCD Expansion Module are available for call processing but you cannot answer them. The lines and features on keys 44 to 55 can cause the IP Phone 1220 to ring, but there is no way to answer it. An error message alerts the administrator that the hardware configuration does not match the administered configuration.

If you configure three LCD Expansion Modules in LD 11, but only one or two LCD Expansion Modules respond, the keys on the third LCD Expansion Module are available for call processing but you cannot access them. The lines and features on keys 56 to 67 can cause the IP Phone 1220 to ring, but there is no way to answer it. An error message alerts the administrator that the hardware configuration does not match the administered configuration.

If you configure four LCD Expansion Modules in LD 11, but only one, two, or three LCD Expansion Modules respond, the keys on the fourth LCD Expansion Module are available for call processing but you cannot access them. The lines and features on keys 68 to 79 can cause the IP Phone 1220 to ring, but there is no way to answer it. An error message alerts the administrator that the hardware configuration does not match the administered configuration.

IP Phone 1230

The IP Phone 1230 supports Second Page functionality.

If you configure only one LCD Expansion Module in LD 11, but two, three, or four LCD Expansion Modules are detected on the IP Phone, the Terminal Proxy Server (TPS) assigns keys 44 to 55 to the second page. The third and fourth LCD Expansion Modules do not have keys assigned until they are configured in LD 11.

An error message alerts the administrator that the hardware configuration does not match the administered configuration.

If you configure two LCD Expansion Modules in LD 11 but only one LCD Expansion Module responds, the TPS assigns keys 32 to 55 to the single LCD Expansion Module (using the Second Page functionality). An error message alerts the administrator that the hardware configuration does not

match the administered configuration. When a second LCD Expansion Module is detected, the TPS changes the key assignments to display across both LCD Expansion Modules.

If you configure two LCD Expansion Modules in LD 11 but three LCD Expansion Modules respond, the TPS assigns the keys 32 to 55 to the first two LCD Expansion Modules. The third LCD Expansion Module does not have keys assigned until it is configured in LD 11. An error message alerts the administrator that the hardware configuration does not match the administered configuration.

If you configure two LCD Expansion Modules in LD 11 but four LCD Expansion Modules respond, the TPS assigns the keys 32 to 55 to the first two LCD Expansion Modules. The fourth LCD Expansion Module does not have keys assigned until it is configured in LD 11. An error message alerts the administrator that the hardware configuration does not match the administered configuration.

If you configure three LCD Expansion Modules but only one LCD Expansion Module responds, the TPS assigns the keys 32 to 55 to the single LCD Expansion Module (using the Second Page functionality). When a second then the third LCD Expansion Module is detected, the TPS changes the key assignments to display across all three LCD Expansion Modules.

If you configure three vExpansion Modules in LD 11 but two LCD Expansion Modules respond, the TPS assigns keys 32 to 67 to the first two LCD Expansion Modules. An error message alerts the administrator that the hardware configuration does not match the administered configuration. When a third LCD Expansion Module is detected, the TPS changes the key assignments to display across all three LCD Expansion Modules.

If you configure three LCD Expansion Modules in LD 11 but four LCD Expansion Modules respond, the TPS assigns keys 32 to 67 to the first three LCD Expansion Modules. The fourth LCD Expansion Module does not have keys assigned until it is configured in LD 11. An error message alerts the administrator that the hardware configuration does not match the administered configuration.

If you configure four LCD Expansion Modules but only one LCD Expansion Module responds, the TPS assigns the keys 32 to 55 to the single LCD Expansion Module (using the Second Page functionality). When a second, third, and fourth LCD Expansion Modules are detected, the TPS changes the key assignments to display across all four LCD Expansion Modules.

If you configure four LCD Expansion Modules in LD 11 but two LCD Expansion Modules respond, the TPS assigns keys 32 to 79 to the first two LCD Expansion Modules. An error message alerts the administrator that the hardware configuration does not match the administered configuration. When a third LCD Expansion Module is detected, the TPS changes the key assignments to display across all three LCD Expansion Modules.

Services key operation

Use the Services key to access user settings and certain features on the IP Phone. When one or more LCD 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 LCD Expansion Module.

If an incoming call occurs when in the diagnostic mode, answer the call 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 you exit the diagnostic mode, or the idle timeout clears the mode. Once cleared, the normal display for the current state of the IP Phone is displayed.

For information about the Services menu, see [“Services menu” \(page 141\)](#) for the IP Phone 1220 or [“Services menu” \(page 159\)](#) for the IP Phone 1230.

Display diagnostics

Use the Up or Down navigation keys to scroll the Display diagnostics menu to access the following diagnostic operations

- [“Initial screen” \(page 185\)](#)
- [“Full contrast” \(page 185\)](#)
- [“LED test” \(page 186\)](#)
- [“Character test” \(page 186\)](#)

Initial screen

Instructions appear on the display area of the IP Phone and the LCD Expansion Module. The DN feature key display areas are blank.

Full contrast

The IP Phone and the LCD 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 LCD Expansion Module LEDs are configured to on. The display area is clear, including the DN feature key display areas. The context label displays "Display diag".

Character test

The IP Phone and the LCD Expansion Module LEDs are configured to off. The Latin characters display across all writable areas of the display, including the DN feature key display areas. The telephone on-hook icon displays for all DN feature keys.

Table 47 "Display diagnostic operation" (page 186) shows the display diagnostic operation on the IP Phones and the LCD Expansion Module.

Table 47
Display diagnostic operation

Diagnostic step	IP Phone DN feature key display area	LCD 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 LCD Expansion Module. The attached LCD Expansion Modules are identified as KEM1, KEM2, KEM3, and KEM4. KEM1 is the closest to the IP Phone. The KEM identifies the firmware as a three character string; the TPS displays the firmware in an n.nn format.

Use the Up or Down navigation keys to scroll the list to display the firmware for each attached LCD Expansion Module. The firmware version appears even if the LCD Expansion Module is not configured in LD 11. In this case, the LCD Expansion Module is identified in the display area by an asterisk (*) after the KEM number (for example, KEM1*).

If a LCD Expansion Module is configured but does not respond, the firmware version displays as <unavailable>.

Firmware

The LCD Expansion Module firmware is not downloadable. If the LCD Expansion Module firmware must be upgraded or changed, the LCD Expansion Module must be replaced with a new LCD Expansion Module containing the updated firmware.

Nortel IP Softphone 2050

Contents

This section contains the following topics:

- “Introduction” (page 189)
- “Description” (page 190)
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- “Display characteristics” (page 196)
- “Licenses” (page 203)
- “Key number assignments” (page 221)
- “Minimum system requirements” (page 222)
- “System components” (page 223)
- “Before you begin” (page 224)
- “First-time installation” (page 225)
- “Installing or upgrading the IP Softphone 2050” (page 226)
- “Running the IP Softphone 2050 for the first time” (page 236)
- “Redeploying the IP Softphone 2050” (page 236)
- “Removing an IP Softphone 2050 from service” (page 237)
- “Maintenance” (page 237)

Introduction

This section explains how to install and maintain the IP Softphone 2050. For information about using the IP Softphone 2050, see *IP Softphone 2050 User Guide* (NN43119-101).

This section contains the following procedures:

- [Procedure 58 “Configuring an IP Softphone 2050 ” \(page 225\).](#)
- [Procedure 65 “Upgrading the IP Softphone 2050 on your PC” \(page 233\).](#)
- [Procedure 66 “Removing IP Softphone 2050 \(Version 1\)” \(page 234\).](#)
- [Procedure 67 “Removing IP Softphone 2050 \(Version 2 or Release 3\)” \(page 234\).](#)
- [Procedure 68 “Installing the Accessibility Interface” \(page 234\)](#)
- [Procedure 69 “Installing the Windows QoS Packet Scheduler” \(page 235\)](#)
- [Procedure 70 “Redeploying the TN of an existing IP Softphone 2050” \(page 237\).](#)
- [Procedure 71 “Removing an IP Softphone 2050 from service” \(page 237\).](#)

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* (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 68 “Installing the Accessibility Interface” \(page 234\)](#) 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” \(page 369\)](#).
- UNISlim 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 Kanji, Japanese Katakana, Korean, Arabic, Greek, Hebrew, Portuguese, Czech, Finnish, Hungarian, Italian, Polish, Spanish, Russian, Latvian, and Turkish
 - Graphical External Application Server (GXAS)
 - 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 Notification pop up screen for incoming calls feature requires MPLR25221 for CS 1000 Release 4.50.88, MPLR24100 for CS 1000 Release 4.5 and CS 1000 Release 5.0, MPLR24248 for CS 1000 Release 5.00.31, and CNDA and DNDA defined as CLS in LD 11. MPLR222796 is required to support UBS call pickup.
 - 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 32 "1140 Call Control window" \(page 194\)](#)) to make and manage IP Phone calls.

Figure 32
1140 Call Control window

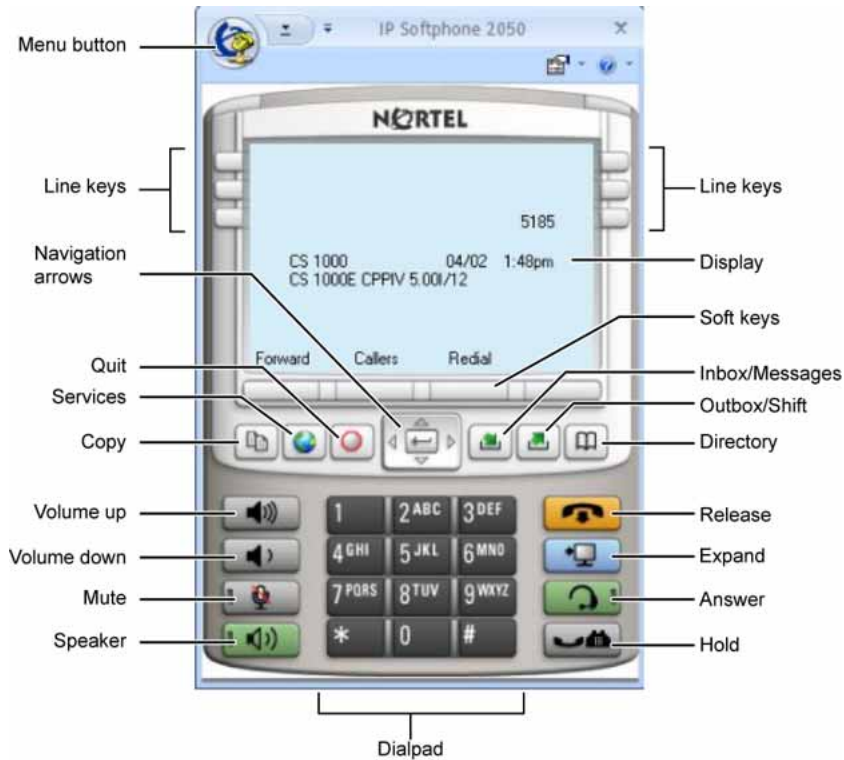


Table 48 "Call Control window elements and functions" (page 194) lists the elements and functions of the Call Control window.

Table 48
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.
	

Table 48
Call Control window elements and functions (cont'd.)















Element		Function
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		Click 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.

Table 48
Call Control window elements and functions (cont'd.)

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	 <p>Press the Speaker key to answer and make calls using the handsfree speaker.</p>
Expand	 <p>Click the Expand key to launch the GXAS applications window.</p>
Services	 <p>Press the Services key to 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 <p>— Station Control Password</p>

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” \(page 235\)](#).

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
Value 1—enable QoS
```

Trace utilities can be used to verify QoS settings. See [“Ethereal traces” \(page 203\)](#).

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.

802.1 p 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
VLAN ID**

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 LAN.

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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

802.1p

For information about configuring 802.1p values, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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.

GXAS

The IP Softphone 2050 Release 3.1 supports GXAS, which enables the user to start applications that are available on the GXAS server. You must manually configure the CSV file on the GXAS server to support the IP Softphone 2050. For more information, see *Nortel Application Gateway 1000/2000 Administration Guide* (NN42360-600).

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 204)
- “Cached license” (page 204)
- “Evaluation period ” (page 204)

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 207). 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.
- 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 [“Server Redundancy”](#) (page 210).

License types

The following two types of licenses exist:

- [“Upgrade licenses”](#) (page 205)
- [“Normal R3 licenses”](#) (page 205)
- [“Post-R3 licenses”](#) (page 205)

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.

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 (Imgrd) in the Server line. For information about modifying the Server line, see [“License file” \(page 210\)](#).

How to configure ports for licensing

The following are the steps to configure ports for licensing:

1. The 2050 starts to send the TCP packets to the license server. The IP address and port are retrieved from the 2050 settings (License Servers prop page). If no port information is typed, the default range (27000 - 27009) is used. If you need to change this port range, you need to make changes on both sides: 2050 settings and license file (SERVER line). Make sure that this port is opened and listened on by server.

Settings

The settings -> License Servers prop page: 172.2.2.2:27001

the counted.lic file: SERVER this_host HOSTNAME=host-1.corp.nortel.com PORT=27001

2. The vendor daemon starts to work and uses the random port for server (it is not random always). The vendor information is transmitted to 2050 client by the Server Manager and the 2050 starts to send the TCP packets to this port.

To control the port for vendor daemon you need to change the VENDOR line in counted.lic file.

VENDOR line in counted.lic file

VENDOR nortelip PORT=1052

2050 client side changes are no longer required

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 (Imgrd.exe)
- FLEXnet Licensing Administration Tools
 - command line tools available with the installer
 - Imtools.exe—graphical user interface (GUI) for license server management

For FLEXnet Licensing and license management 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 207)
- “Obtaining a valid license” (page 208)
- “Starting the License Server Manager” (page 209)

Installing the License Server

Use the following procedure to install the License Server components.

Procedure 45 Installing the License Server

Step	Action
1	Obtain the IP Softphone 2050 License Server Installer from the IP Softphone 2050 CD-ROM or download it from www.nortel.com .
2	On your license server, execute the file setup_server.exe .
3	Click Next on the Welcome window.
4	If you agree with the terms of the License Agreement, select the appropriate button and click Next . The Welcome to the InstallShield Wizard opens.
5	Click Next .
6	Choose the Installation Path of the target directory for the License Server component files. A Confirmation window appears.

- 7 Click **Next**.
A progress bar appears to show the progress of the installation.
- 8 To install the License Server as a Windows Service, select the "Install as a service" checkbox.
- 9 Click **Finish**.
The window closes.

--End--

Obtaining a valid license

The Nortel Keycode Retrieval System (KRS) generates the keycode license file. You must register for access to KRS. Go to www.nortel.com/support/tools/krs to register to KRS.

ATTENTION

Before you can obtain a license, you must possess a valid Fully Qualified Domain Name (FQDN), for example, `yourlicenseserver1.yourcompany.com`.

Use the following procedure to obtain a valid license. In this procedure, `yourlicenseserver1.yourcompany.com` is used as the FQDN.

Procedure 46 Obtaining a valid license

Step	Action
1	To view your FQDN, select Start > All Programs > Nortel > IP Softphone 2050 Licensing Server > GetHostID .
2	Go to www.nortel.com/support/tools/krs .
3	Login to Keycode Retrieval System (KRS). For information about creating key codes, see the KRS User Guide at www.nortel.com/support/tools/krs . Select Product family, Documentation, Forms and User Guides.
4	On the Retrieve Keycode page, enter your FQDN (for example, <code>yourlicenseserver1.yourcompany.com</code>) in the System ID (site ID) field.
5	Select the product keycode from the list, then save file, for example, <code>yourlicenseserver1.yourcompany.com.lic</code> to a directory on your PC . Before you continue with the following steps, Nortel recommends that you shut down your license server.
6	To shut down your license server, go to Start > All Programs > Nortel > IP Softphone 2050 License Server > Manual Server > Shut Down License Server .

- 7 Go to the directory on your PC where the License server software is located, for example, C:\Program Files\Nortel\IPSoftphone2050. Rename the file **counted.lic** to **counted_old.lic**.
- 8 Go to the directory where **yourlicenseserver1.yourcompany.com.lic** is located. Move **yourlicenseserver1.yourcompany.com.lic** to the directory where the License Server software is located, for example, C:\Program Files\Nortel\IPSoftphone2050.
- 9 Rename **yourlicenseserver1.yourcompany.com.lic** to **counted.lic**.
- 10 Restart the License Server. Go to **Start > All Programs > Nortel > IP Softphone 2050 License Server > Manual Server > Restart License Server**.

--End--

Procedure 47
Verifying user licenses

Step	Action
1	Go to Start > All Programs > Accessories > Command Prompt to open the Command Prompt window.
2	From the Command Prompt window, go to the directory on your PC where the License server software is located, for example, C:\Program Files\Nortel\IPSoftphone2050.
3	At the prompt, enter lmstat -A . The number of user licenses and the number of licenses in use display.

--End--

Starting the License Server Manager

Use one of the following options to start the License Server Manager:

- [“Manual server ” \(page 209\)](#)
- [“Configure as a service” \(page 210\)](#)

Manual server

If the server is run as "manual server" a console window appears on the desktop, which displays the output of both the lmgrd.exe and nortelip.exe processes.

You can select one of the following options from **Start > All Programs > Nortel > IP Softphone 2050 License Server > Manual Server**.

- Restart Licensing Server
- Shut Down Licensing Server
- Start Up 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 **Start > All Programs > Nortel > IP Softphone 2050 License Server > Server Service**.

- Install Licensing Server as a Service
- Uninstall Licensing Server Service
- Restart Licensing Server Service

Server Redundancy

Select a stable machine for server redundancy. When a server is no longer available (for example, failure), the Site Administrator can rename the new server with the existing host domain name and can then reinstall the licensing server software and the associated `counted.lic` file. For information about installing the licensing server software, see [“Installing the License Server” \(page 207\)](#).

License file

You can modify the following elements in the license file

- Host name on the SERVER line
- TCP/IP port number 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 format of the SERVER line is:

SERVER host hostid [port]

For more information, see [Table 49 "License file" \(page 211\)](#).

Table 49
License file

Field	Description
host	The system host name or IP address. On NT/2000/XP, ipconfig / all; on Windows 95/98/ME, winipcfg/all return the host name.
hostid	The hostid generated by the Get Host ID command. KRS requires the host ID in order to provision the server system with valid licenses.
port	TCP/IP port number to use. A valid number is any used port number between 0 and 64000. If you do not specify a TCP/IP port number, one of the default ports in the range of 27000 to 27009 is used.

Port numbers are specified for the IP Phone 2000 Series, IP Phone 1100 Series, IP Phone 1200 Series, and IP Softphone 2050. All ports in the following table are Listen ports, and specify the destination IP address and port number.

Table 50
Incoming IP Phone 2000 Series, IP Phone 1100 Series, IP Phone 1200 Series, and IP Softphone 2050 port numbers

L4 protocol (TCP/UDP)	Port number or range	Interface	Description	Comments
TCP	22	Ethernet	SSH	SSH connection (introduced in UNTStim 3.0)
UDP	67	Ethernet	DHCP	DHCP client
UDP	1024—1026	Ethernet	TFTP	TFTP session
UDP	5000	Ethernet	UNISStim	TPS (For the IP Softphone 2050, this port number is configured in Listener IP in the phone settings.)
UDP	5001	Ethernet	UNISStim	Text XAS
UDP	Variable	Ethernet	RTP, RTCP	Specified by TPS

The following table shows the port numbers for outgoing connections from IP Phone 2000 Series, IP Phone 1100 Series, IP Phone 1200 Series, and IP Softphone 2050.

Table 51
Outgoing IP Phone 2000 Series, IP Phone 1100 Series, IP Phone 1200 Series, and IP Softphone 2050 port numbers

L4 protocol (TCP/UDP)	Port number or range	Interface	Description	Comments
UDP	68	Ethernet	BOOTP	DHCP server port

L4 protocol (TCP/UDP)	Port number or range	Interface	Description	Comments
UDP	69	Ethernet	TFTP	Connection to TFTP server
UDP	4100	Ethernet	UNISlim	Connection to CS 1000
UDP	5000	Ethernet	UNISlim	Connection to text XAS IPCM (MCS) or CICM
UDP	5100	Ethernet	UNISlim	Connection to CS 1000
UDP	5105 (Variable)	Ethernet	UFTP	Firmware download (Specified by TPS)
UDP	7000	Ethernet	UNISlim	Connection to BCM
UDP	7300	Ethernet	UNISlim	Connection to CS 1000
UDP	Variable	Ethernet	RTP, RTCP	Specified by TPS
TCP	21	Ethernet	FTP	Auto Provisioning using HTTP (Introduced in UNISlim 3.0)
TCP	80 (Configurable)	Ethernet	HTTP	Auto Provisioning using HTTP (Introduced in UNISlim 3.0)
TCP	1049 (Configurable)	Ethernet	–	For IP Softphone 2050 only: License Server Manager
TCP	27000–27009 (Configurable)	Ethernet	–	For IP Softphone 2050 only: License Server Manager
TCP	44443 (Configurable)	Ethernet	Net6	Graphical XAS

FLEXnet licensing error codes

For information about FLEXnet licensing error codes, see [“FLEXnet licensing error codes”](#) (page 611).

Troubleshooting

The section assumes you have installed the License Server on a PC in the customer’s network. Nortel recommends you install the License Server as a Service. This ensures the server supplies licenses even if you are not logged on to the computer. Install the Licensing Server on a server that is always on.

You can use the `lmtools.exe` utility to manage the License Manager. It can be found in a directory on your PC. For example, `D:\Program Files\Nortel\IP Softphone 2050 Licensing Server\lmtools.exe`.

This section describes the following procedures:

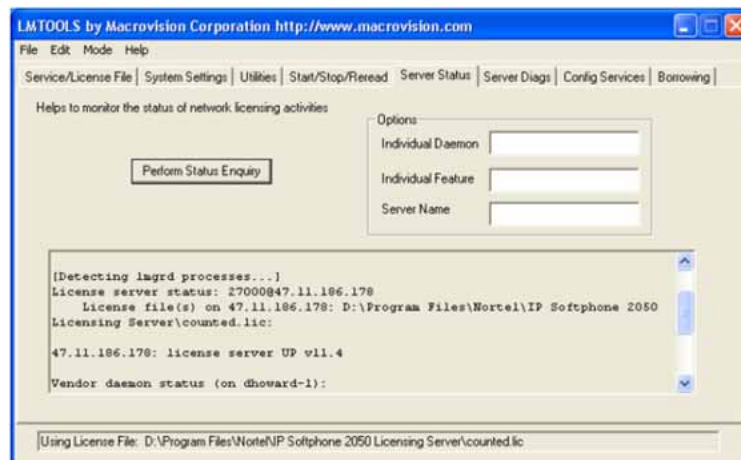
- [Procedure 48 “Checking the status of the server”](#) (page 213)
- [Procedure 49 “Verifying Config Services”](#) (page 214)

- Procedure 50 “Viewing the ServiceLog.log file” (page 214)
- Procedure 51 “Viewing log files for IP Softphone 2050 clients” (page 215)
- Procedure 52 “Viewing System Settings” (page 216)
- Procedure 53 “Displaying License Server DNS information” (page 216)
- Procedure 54 “Verifying an IP Softphone 2050 registers with the License Server” (page 217)
- Procedure 55 “Validating connection to the License Server” (page 219)
- Procedure 56 “Releasing an unused license on the IP Softphone 2050” (page 220)

Procedure 48 Checking the status of the server

Step	Action
1	Launch the <code>lmtools.exe</code> utility from the directory on your PC. For example, <code>D:\Program Files\Nortel\IP Softphone 2050 Licensing Server\lmtools.exe</code> . The LMTools Graphical User Interface (GUI) opens.
2	Click the Server Status tab.
3	Click the Perform Status Enquiry button. Information about the server status, the license server file, and the number of licenses available and in use display in the bottom section of the LMTools GUI window. See Figure 33 "Server status window" (page 213).

Figure 33
Server status window



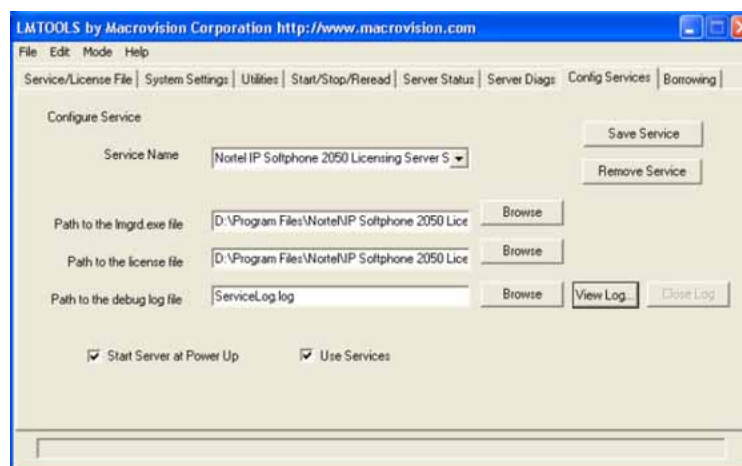
If the total number of licenses do not match the number you purchased ensure that you have the latest license file installed. The KRS generates the keycode license file. For more information, see [“Obtaining a valid license”](#) (page 208).

--End--

Procedure 49 Verifying Config Services

Step	Action
1	Launch the Lmtools.exe utility. The LMTools Graphical User Interface (GUI) opens.
2	Click the Config Service tab.
3	Ensure the Start Server at Power Up and Use Services check boxes are selected. See Figure 34 "Config Services window" (page 214).

Figure 34
Config Services window



--End--

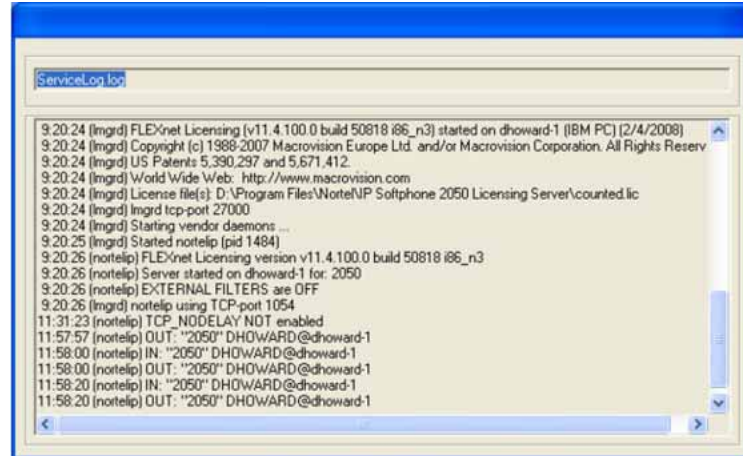
Procedure 50 Viewing the ServiceLog.log file

Step	Action
1	Launch the Lmtools.exe utility. The LMTools Graphical User Interface (GUI) opens.

- 2 Click the **Config Service** tab.
- 3 Click **View Log** to view the ServiceLog.log file.

The ServiceLog.log file shows if the license server is active and which users have checked in or checked out licenses. See [Figure 35 "Servicelog.log file window" \(page 215\)](#).

- 4 Click **Close Log**.
- Figure 35**
ServiceLog.log file window



--End--

You can also view logs for all IP Softphone 2050 clients that hold licenses.

Procedure 51 **Viewing log files for IP Softphone 2050 clients**

Step	Action
1	On your PC, click Start > Search to open the Search Results window. Search for usec.log in files and folders.
2	Enter usec.log to locate the log files.
3	Click Tools > Folder Options .
4	Select the View tab. Ensure that "Search hidden files and folders" check box is selected.
5	Click OK .
6	Click Search Now .

Log files appear in the left pane. Log files usually store in the Profiles folder. For example, D:\Profiles\jsmith\Application Data\Nortel\IP Softphone 2050\Logs.

--End--

Procedure 52 **Viewing System Settings**

Step	Action
1	Launch the lmttools.exe utility. The LMTools Graphical User Interface (GUI) opens.
2	Click the System Settings tab. The System Settings tab displays basic information, such as Server IP address and HostID. Select the "Include Domain" checkbox to display the Fully Qualified Domain Name (FQDN) Host ID. Ensure the Host ID is a FQDN. Also, ensure it is exactly the same as the name registered with KRS that was used to generate the keycode. If the names do not match the server does not come up.

--End--

Procedure 53 **Displaying License Server DNS information**

Step	Action
1	Go to Start > All Programs > Accessories > Command Prompt to open the Command Prompt window.
2	From the Command Prompt window, enter ipconfig -all . The Host Name and Primary DNS Suffix display. Ensure you configure the Primary DNS Suffix with the registered domain name; otherwise, your FQDN license keycode file does not work.

Figure 36
License Server DNS information

```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\dxprakas>ipconfig -all

Windows IP Configuration

Host Name . . . . . : LTC0291
Primary Dns Suffix . . . . . : STJH.INNOVATIA.INC
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : STJH.INNOVATIA.INC
    innovatia.net
    INNOVATIA.INC

Ethernet adapter Wireless Network Connection 3:

Media State . . . . . : Media disconnected
Description . . . . . : Intel(R) PRO/Wireless 2200BG Network
Connection
Physical Address. . . . . : 00-0E-35-D3-6A-00

Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix . : innovatia.net
Description . . . . . : Broadcom NetXtreme Gigabit Ethernet
Physical Address. . . . . : 00-12-79-BD-B3-23
Dhcp Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IP Address. . . . . : 207.179.154.69
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 207.179.154.1
DHCP Server . . . . . : 207.179.167.17
DNS Servers . . . . . : 142.134.135.20
    142.134.135.21
Primary WINS Server . . . . . : 142.134.135.21
Secondary WINS Server . . . . . : 142.134.135.20
Lease Obtained. . . . . : Monday, July 21, 2008 12:48:48 PM
Lease Expires . . . . . : Saturday, July 26, 2008 12:48:48 PM

```

--End--

Procedure 54
Verifying an IP Softphone 2050 registers with the License Server

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

- | | |
|---|---|
| 1 | Click the Menu button. |
| 2 | Select Help > IP Softphone 2050 Diagnostics . |

If the IP Softphone 2050 is registered with the License Server, the License Server address appears and show the **Current License Expiration** field appears as "No Expiration". See [Figure 37 "IP Softphone registered with the Licence Server"](#) (page 218).

Figure 37
IP Softphone registered with the Licence Server

The screenshot shows the 'Diagnostics' window of the IP Softphone 2050. It is divided into several sections: '2050 Memory Usage', 'Licensing Data', 'System Data', and 'User Data'.

2050 Memory Usage	
Current Working Set Size (MB)	31
Peak Paged Pool Usage (MB)	0
Current Paged Pool Usage (MB)	0
Peak Nonpaged Pool Usage (MB)	0
Current Nonpaged Pool Usage (MB)	0
Current Paged Pool Allocation (MB)	31
Peak Paged Pool Allocation (MB)	32

Licensing Data	
License Status	Current/Valid License
License Type	Service License
License Flavor	Release 3.0 License
License Server Address	47.11.106.178
Current License Expiration	7/6/2009

System Data	
IP Softphone 2050 Version	3.0.0.297
Install Location	D:\Program Files\Nortel\IP Softphone 2050
Last Profile Used	Default
Last Language Used	EN - English (United States) (1033)
Last Theme Used	D:\Program Files\Nortel\IP Softphone 2050\1033.am
Quick Start Dialog	Enabled
Profile Dialog on 2050 Startup	Disabled
Hardware ID	31-02-90-34-67-80-42-49-06-06
Launch 2050 on Windows Startup	Enabled
TSP Status	Installed

User Data				
Profile Name	DNIP Status	Primary Server (S1)	Secondary Server (S2)	Application Server (AS)
	Enabled	47.11.102.28	47.11.102.28	47.11.102.28
		47.11.102.28	47.11.102.28	47.11.102.28
		47.11.102.28	47.11.102.28	47.11.102.28

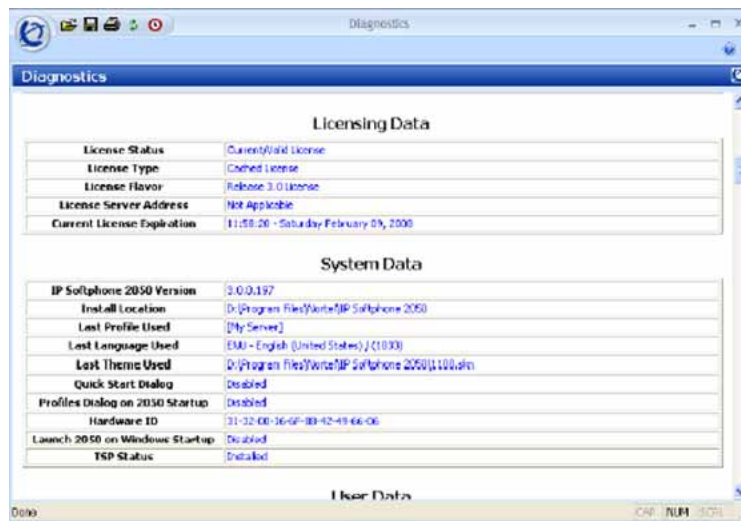
--End--

If the IP Softphone 2050 loses communication with the License Server the following occurs: the License type appears as Cashed License, the License Server Address appears as Not Applicable and the Current License Expiration field shows the cached license expiry date. The Licensing Server issue must be resolved by this date; otherwise, the IP Softphone 2050 does not function. See [Figure 38 "IP Softphone 2050 not registered with the License Server"](#) (page 219).

ATTENTION

5 days is the maximum time allowed before the IP Softphone 2050 becomes non-functional.

Figure 38
IP Softphone 2050 not registered with the License Server



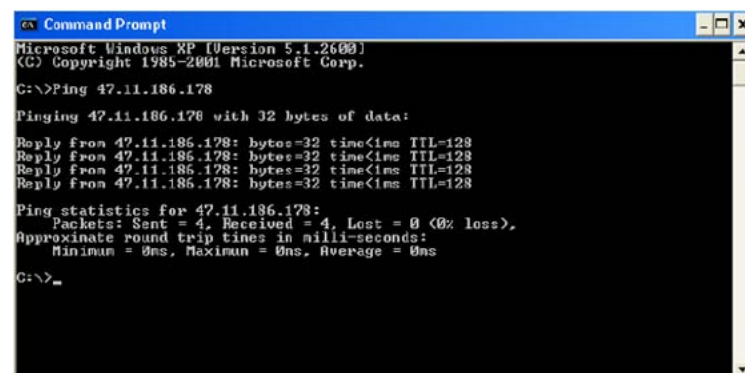
If the License Type field displays "Cached License", use the following steps to validate connectivity to the Licensing Server.

Procedure 55 Validating connection to the License Server

- | Step | Action |
|------|--|
| 1 | Go to Start > All Programs > Accessories > Command Prompt to open the Command Prompt window. |
| 2 | From the Command Prompt window, enter Ping and the Licence Server IP address. |

See [Figure 39 "Successful Ping"](#) (page 219).

Figure 39 Successful Ping



- 3 Validate License Server settings. Use one of the following options to open the Settings window:
 - From the Windows operating system:
 - Select **Start > Programs > Nortel > IP Softphone 2050 > IP Softphone 2050 Settings**.
 - Select **Start > Control Panel > IP Softphone 2050**. (In Windows XP, select Switch to Classic View to view the list of settings.)
 - From the IP Softphone 2050 Call Control window:
 - Click the **Menu** button and select **File > Settings**.
- 4 Select Server from the list in the left pane of the Settings window. Validate that the correct IP address or host name is configured.

--End--

Also, check with the system administrator that the port used for the License Server is open and is not blocked. If you are using a VPN connection, make sure it is connected and there are no port restrictions that can block access to the Licensing Server.

When two or more licenses are being used by the IP Softphone 2050, you can release the unused licenses.

Procedure 56 **Releasing an unused license on the IP Softphone 2050**

Step	Action
1	Press Ctrl + Alt + Delete simultaneously on your keyboard. The Window Security window opens.
2	Press Task Manager . The Windows Task Manager window opens.
3	Select the Applications tab.
4	Select the i2050.exe application(s) that you want to release.
5	Click End Task .

--End--

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. For more information, see ["IP Phone context-sensitive soft keys" \(page 605\)](#).

[Table 52 "IP Softphone 2050 soft keys" \(page 221\)](#) 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 52
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
Key 19	CFW	Call Forward key
	NUL	Removes function or feature from key

Table 52
IP Softphone 2050 soft keys (cont'd.)

Prompt	Response	Description
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 *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 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.
- 3 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 53 "IP Softphone 2050 package components" \(page 223\)](#) lists the IP Softphone 2050 package components.

Table 53
IP Softphone 2050 package components

Component	Code
Nortel Mobile USB Adapter	
Nortel Mobile USB Adapter Monaural Headset IP Softphone 2050 Kit includes	NTEX14MD
• IP Softphone 2050 application software CD/ROM	NTDW83BA
• Nortel Mobile USB Headset Adapter with Monaural Headset (Non-RoHS)	NTEX14MB

Table 53
IP Softphone 2050 package components (cont'd.)

Component	Code
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 57 Preinstallation checklist

Step	Action
1	Ensure you have the IP Softphone 2050 application software CD.
2	Ensure you install the Licensing Server.
3	Ensure the host call server is equipped with a Signaling Server that runs the Line Terminal Proxy Server (LTPS) application.
4	Understand the following configuration modes from which you can choose from as you proceed through the installation of the IP Softphone 2050. <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 58 "Configuring an IP Softphone 2050" \(page 225\)](#) to install an IP Softphone 2050 for the first time.

Procedure 58 Configuring an IP Softphone 2050

Step	Action
1	Install the Voice Gateway Media Card. For more information, see <i>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125).
2	Configure a virtual loop on the Call Server, using LD 97. For more information, see <i>Software Input Output Reference-Administration</i> (NN43001-611).
3	Configure the IP Softphone 2050 using LD 11. At the prompt, enter the following <pre>REQ: new TYPE: 2050PC</pre>
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 softw are. 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 Signaling 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 [“Dynamic Host Configuration Protocol” \(page 405\)](#).

- 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” \(page 203\)](#).

IP Softphone 2050 Release 3.1 supports remote installation, which enables you to deploy the software without the need to install it on each PC.

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.

Remote installation

IP Softphone 2050 Release 3.1 uses Active Directory to perform the remote installation. The Microsoft Installer Package (.MSI file) publishes or assigns the application. The Group Policy Object distributes the software to the groups you specify.

This section describes the following tasks:

- [Procedure 59 “Creating a distribution point ” \(page 227\)](#)
- [Procedure 60 “Creating a Group Policy Object” \(page 227\)](#)
- [Procedure 61 “Assigning software ” \(page 228\)](#)
- [Procedure 62 “Publishing software” \(page 229\)](#)
- [Procedure 63 “Redeploying software” \(page 230\)](#)
- [Procedure 64 “Removing software” \(page 231\)](#)

Procedure 59
Creating a distribution point

Step	Action
1	Log on to the server computer as an administrator.
2	Create a shared network folder, in which to place the Microsoft Software Installer (MSI) package that you want to distribute.
3	Configure permissions on the shared network folder to allow access to the distribution package.
4	Copy or install the MSI package to the distribution point.
--End--	

Procedure 60
Creating a Group Policy Object

Step	Action
1	Click Start > Programs > Administrative Tools > Active Directory Users and Computers to start the Active Directory Users and Computers snap-in.
2	In the console tree, right-click on your domain name.
3	Click Properties .
4	Click the Group Policy tab.

- 5 Click **New**.
- 6 Enter a name for this policy.
For example, Office distribution.
- 7 Press **Enter**.
- 8 Click **Properties**.
- 9 Click the **Security** tab.
- 10 Select the **Apply Group Policy** check box to clear it and to prevent the security groups from having this policy applied. Select the **Apply Group Policy** check box for the groups to which you want to apply this policy.

--End--

Procedure 61 Assigning software

Step	Action
1	Click Start > Programs > Administrative Tools > Active Directory Users and Computers to start the Active Directory Users and Computers snap-in.
2	In the console tree, right-click on your domain name.
3	Click Properties .
4	Click the Group Policy tab.
5	Select the group policy object.
6	Click Edit .
7	Press the plus (+) sign beside Computer Configuration, to expand it.
8	Press + beside Software Settings to expand it.
9	Right-click on Software Installation .
10	Select New .
11	Click Package .
12	In the Open dialog box, enter the full Universal Naming Convention (UNC) path to the shared folder that contains the MSI package that you want. For example, \\file server\share\file name.msi.
<p>ATTENTION Do not browse to the location. Ensure that you use the UNC path to the shared folder.</p>	
13	Click Open .

- 14 Click **Assigned**.
- 15 Click **OK**.
The package lists in the right pane of the Group Policy window.
- 16 Close the Group Policy snap-in.
- 17 Click **OK**.
The package lists in the right pane of the Group Policy window.
- 18 Exit the Active Directory Users and Computers snap-in.
When the client computer starts, the managed software package automatically installs.

--End--

Procedure 62
Publishing software

Step	Action
1	Click Start > Programs > Administrative Tools > Active Directory Users and Computers to start the Active Directory Users and Computers snap-in.
2	In the console tree, right-click on your domain name.
3	Click Properties .
4	Click the Group Policy tab.
5	Select the group policy object.
6	Click Edit .
7	Press the plus (+) sign beside Computer Configuration, to expand it.
8	Press + beside Software Settings to expand it.
9	Right-click on Software Installation .
10	Select New .
11	Click Package .
12	In the Open dialog box, enter the full Universal Naming Convention (UNC) path to the shared folder that contains the MSI package that you want. For example, \\file server\share\file name.msi.
<p>ATTENTION Do not browse to the location. Ensure that you use the UNC path to the shared folder.</p>	
13	Click Open .

- 14 Click **Published**.
- 15 Click **OK**.
- The package lists in the right pane of the Group Policy window.
- 16 Exit the Active Directory Users and Computers snap-in.
- When the client computer starts, the managed software package automatically installs.
- 17 To test the package, perform the following steps:
1. Log on to a workstation that is running Windows 2000 Professional or Windows XP Professional by using an account to which you published the package.
 2. In Windows 2000, click **Start > Settings > Control Panel**. In Windows XP, click **Start > Control Panel**.
 3. Double-click **Add/Remove Programs** (Windows 2000) or **Add or Remove Programs** (Windows XP).
 4. Click **Add New Programs**.
 5. In the Add Programs from your network list, click the program that you published.
 6. Click **Add**.The program is installed.
 7. Click **OK**.
 8. Close the program.

--End--

Procedure 63 Redeploying software

Step	Action
1	Click Start > Programs > Administrative Tools > Active Directory Users and Computers to start the Active Directory Users and Computers snap-in.
2	In the console tree, right-click on your domain name.
3	Click Properties .
4	Click the Group Policy tab.
5	Select the group policy object.
6	Click Edit .
7	Press the plus (+) sign beside Computer Configuration, to expand it.

- 8 Press **+** beside Software Settings that contains the Software installation item with which you deployed the package.
- 9 Click the Software installation container that contains the package.
The package lists in the right pane of the Group Policy window.
- 10 Right-click the program and select **All Tasks**.
- 11 Click **Redeploy application**.
The following message displays: "Redeploying this application will reinstall the application everywhere it is already installed. Do you want to continue?"
- 12 Click **Yes**.
- 13 Close the Group Policy snap-in.
- 14 Click **OK**.
- 15 Exit the Active Directory Users and Computers snap-in.

--End--

Procedure 64 Removing software

Step	Action
1	Click Start > Programs > Administrative Tools > Active Directory Users and Computers to start the Active Directory Users and Computers snap-in.
2	In the console tree, right-click on your domain name.
3	Click Properties .
4	Click the Group Policy tab.
5	Select the group policy object.
6	Click Edit .
7	Press the plus (+) sign beside Computer Configuration, to expand it.
8	Press + beside Software Settings that contains the Software installation item with which you deployed the package.
9	Click the Software installation container that contains the package. The package lists in the right pane of the Group Policy window.
10	Right-click the program and select All Tasks .
11	Click Remove .
12	Perform one of the following actions:

1. Click **Immediately uninstall the software from users and computers.**
2. Click **OK.**

Or

1. Click **Allow users to continue to use the software, but prevent new installations.**
2. Click **OK.**

13 Close the Group Policy snap-in.

14 Click **OK.**

15 Exit the Active Directory Users and Computers snap-in.

--End--

Silent installation

Silent installations run without a user interface. Configure the values of public properties, such as USERNAME, COMPANYNAME, and INSTALLDIR at the command line.

Use the following methods to pass data to the installation:

- The /v argument is used to pass command line switches and values of public properties.
- The /q option is used to configure the user interface level in conjunction with the following flags:
 - q or qn creates no user interface
 - qb creates a basic user interface (progress bar)
- To run a setup.msi silently, enter msiexec/i setup.msi/qn at the command line.
- To run a setup.exe silently, enter setup.exe/s /v/qn at the command line.
- To set installation properties run a command line, such as msiexec/i Product.msi/qnINSTALLDIR=D:\ProductFolderUSERNAME="Valued Customer".
- To repair or reinstall missing or corrupted files, install with the /f option, in conjunction with the following flags:
 - p reinstalls a file if it is missing
 - o reinstalls a file if it is missing or if an older version of the file is present on the user's system

- e reinstalls a file if it is missing or if an equivalent or older version of the file is present on the user's system
- c reinstalls a file if it is missing or if the stored checksum of the installed file does not match the new file's value
- a forces a reinstall of all files
- u or m rewrite all required user registry entries
- s overwrites any existing shortcuts

For example, to force a reinstall of all files, use the following syntax:
msiexec/fasetup.msi

- The /x switch causes Setup.exe to uninstall a previously installed product.

For example, msiexec /x setup.msi or setup.exe/s /x.

Upgrading

Use [Procedure 65 "Upgrading the IP Softphone 2050 on your PC"](#) (page 233) to upgrade the IP Softphone 2050 on the PC.

Procedure 65 Upgrading the IP Softphone 2050 on your PC

Step	Action
1	You must download the file of Product Category: Phones, Clients & Accessories, Product Name: IP Softphone 2050, Content type: Release. Obtain the precise Release, Status, and Title of the file from your next level of support. See www.nortel.com/downloadingcontent for 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 66 “Removing IP Softphone 2050 \(Version 1\)”](#) (page 234) to uninstall IP Softphone 2050 (Version 1).

Procedure 66
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 67
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 68 “Installing the Accessibility Interface”](#) (page 234) to install the Accessibility Interface from the IP Softphone 2050 CD-ROM.

Procedure 68
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

- 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 69 "Installing the Windows QoS Packet Scheduler" \(page 235\)](#) to install to install the Windows QoS Packet Scheduler for Windows 2000.

Procedure 69 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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125) 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 70
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 71
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” \(page 238\)](#)
- [“User data” \(page 238\)](#)

- “Ethernet statistics” (page 239)
- “IP Networking Statistics” (page 240)
- “ICMP Statistics” (page 241)
- “Audio Connection Data” (page 241)
- “USB Headset Data” (page 243)
- “Telchemy VQMon” (page 243)
- “PC System Information” (page 244)
- “Personal Call Recording Data” (page 245)
- “Licensing Data” (page 245)
- “Duplicate Media Stream Call Recording Data” (page 245)

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
- Large System TN
- 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, such as:

- 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)

The last call parameters for both the RX and TX displayed are as follows:

- 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
- RTCP 802.1p
- Remote IP Address

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” \(page 247\)](#)
- [“Features” \(page 248\)](#)
- [“Display characteristics” \(page 248\)](#)
- [“Configuration” \(page 249\)](#)
- [“Installation” \(page 250\)](#)

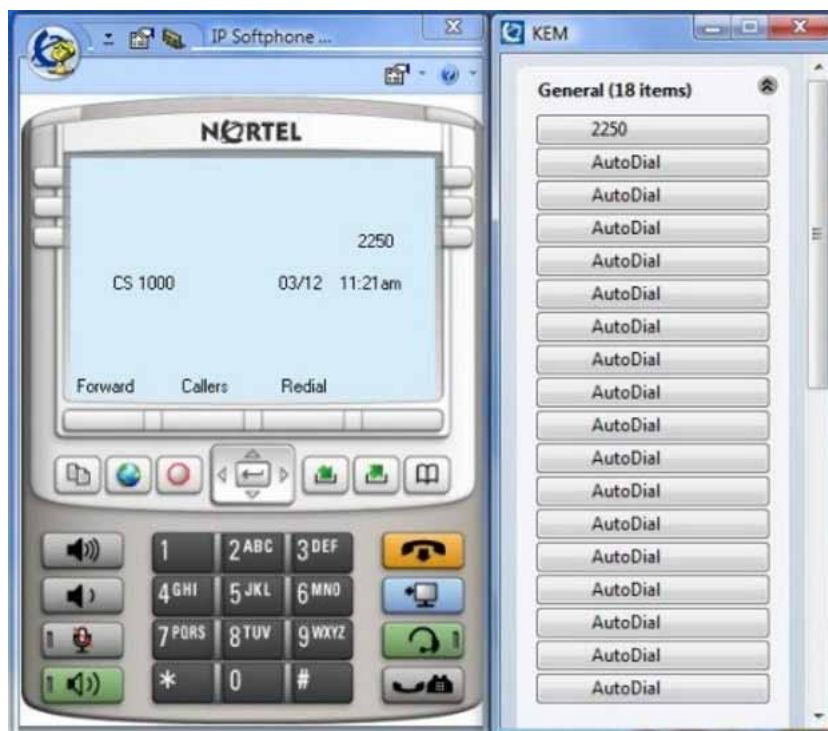
Description

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 40 "IP Softphone 2050 with Expansion Module" \(page 248\)](#) shows the IP Softphone 2050 1140 theme with the Expansion Module.

Figure 40
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.

Table 54
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: <table style="margin-left: 40px; border: none;"> <tr> <td style="padding-right: 40px;">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 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 253)
- “Description” (page 254)
- “System requirements” (page 254)
- “Supported features” (page 254)
- “MVC 2050 components” (page 256)
- “Operation” (page 263)
- “MVC 2050 installation” (page 264)
- “MVC 2050 removal” (page 265)
- “Configuration” (page 266)
- “802.1p and DiffServ” (page 273)
- “MVC 2050 and WLAN” (page 273)

Introduction

This section describes how to install, configure, and remove the Nortel Mobile Voice Client 2050 for Release 2.0. For information about using the MVC 2050, see *Mobile Voice Client 2050 User Guide* (NN43119-103).

This section contains the following procedures

- Procedure 72 “Starting MVC 2050” (page 263).
- Procedure 73 “Synchronizing a PDA with a desktop PC using ActiveSync” (page 264).
- Procedure 74 “Installing MVC 2050” (page 265).
- Procedure 75 “Removing MVC 2050 from your PDA” (page 265).
- Procedure 76 “Enabling Auto-Create” (page 268).

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” \(page 270\)](#).

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” \(page 272\)](#)

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” \(page 269\)](#) 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 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 72 "Starting MVC 2050" \(page 263\)](#) to start MVC 2050.

Procedure 72 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 MCV 2050 is installed on the PDA, remove it prior to installing a newer version. See [“MVC 2050 removal” \(page 265\)](#).

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 73 “Synchronizing a PDA with a desktop PC using ActiveSync” \(page 264\)](#).
3. Install the MVC 2050 from a Desktop using [Procedure 74 “Installing MVC 2050” \(page 265\)](#).

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 73 “Synchronizing a PDA with a desktop PC using ActiveSync” \(page 264\)](#) to synchronize your PDA with your desktop PC.

Procedure 73

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 74
Installing MVC 2050

Step	Action
1	Synchronize the PC and PDA. See Procedure 73 “Synchronizing a PDA with a desktop PC using ActiveSync” (page 264).
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, <i>Attend to your device (PDA)</i> message displays on the PC and <i>Do you want to perform a soft restart?</i> 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 75
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” \(page 258\)](#) .

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” \(page 269\)](#).

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 UNISTim 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 76 “Enabling Auto-Create” \(page 268\)](#) to enable **Auto-Create**.

Procedure 76
Enabling Auto-Create

Step	Action
1	Select Settings .
2	Select Hardware ID .
3	Select Auto-Create .

--End--

Table 55 "Hardware ID screen" (page 268) provides information about the Hardware ID screen.

Table 55
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

To control audio quality, use the slider tab to reduce audio delay and increase audio clarity. 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 56 "Advanced Audio screen" \(page 271\)](#) provides information about the Advanced Audio screen.

Table 56
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.
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 57 "Listener IP screen" \(page 272\)](#) for information about selections available on the Listener IP screen .

Table 57
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 275)
- “Description” (page 276)
- “Components and functions” (page 277)
- “Features” (page 279)
- “Display characteristics” (page 280)
- “Cleaning the IP Phone display screen” (page 281)
- “Package components” (page 281)
- “Installation and configuration” (page 283)
- “TFTP firmware upgrade ” (page 290)
- “Redeploying an IP Phone 1110” (page 290)
- “Replacing an IP Phone 1110” (page 291)
- “Removing an IP Phone 1110 from service” (page 291)

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 77 “Configuring the IP Phone 1110” (page 284)
- Procedure 78 “Connecting the components” (page 285)
- Procedure 79 “Changing the TN of an existing IP Phone 1110” (page 290)

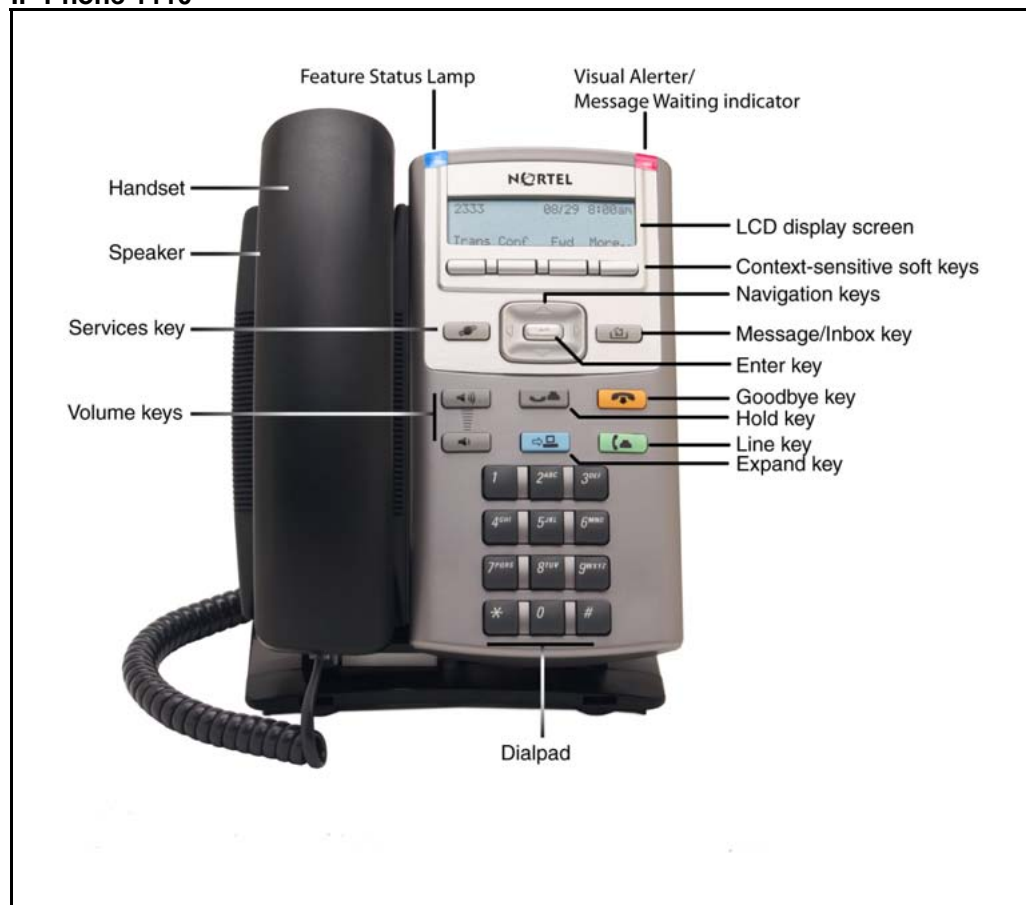
- Procedure 80 "Replacing an IP Phone 1110" (page 291)
- Procedure 81 "Removing an IP Phone 1110 from service" (page 291)

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 41 "IP Phone 1110" (page 276) shows the IP Phone 1110.

Figure 41
IP Phone 1110



Components and functions

This section describes the following components and functions of the IP Phone 1110

- “Keys and functions” (page 277)
- “Services menu” (page 278)
- “Local Tools menu” (page 279)

Keys and functions

Table 58 "IP Phone 1110 keys and functions" (page 277) describes the IP Phone 1110 keys and functions.

Table 58
IP Phone 1110 keys and functions

Key	Function
Line key	Press the Line key to access the single DN and make a call.
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.

Table 58
IP Phone 1110 keys and functions (cont'd.)

Key	Function
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 59 "Services menu" \(page 278\)](#) shows the Services menu.

Table 59
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 — Normal Mode Indication — Caller ID display order • 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

You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone 1110 User Guide* (NN43110-101).

If an incoming call is presented while you configure information in the Services menu, the phone rings. However, the display does not update with the caller ID, and the programming text is not disturbed.

While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.

Local Tools menu

[Table 60 "Local Tools menu" \(page 279\)](#) shows the Local Tools menu.

Table 60
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
2. Network Configuration
3. Network Configuration
4. Lock Menu

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 and the Local Tools menu, see ["Local Tools menu" \(page 521\)](#).

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.

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* (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

For more information about IP Phone features, see [“Features”](#) (page 369).

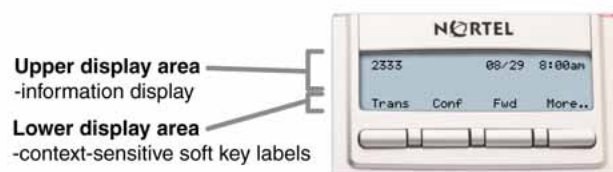
Display characteristics

An IP Phone 1110 has two major display areas:

- [“Context-sensitive soft key label display”](#) (page 280)
- [“Information line display”](#) (page 281)

[Figure 42 “IP Phone 1110 display area”](#) (page 280) shows the two display areas.

Figure 42
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

Do not use 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.

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 61 "Package components" \(page 281\)](#) lists the IP Phone 1110 package components.

Table 61
Package components

- | |
|--|
| <ul style="list-style-type: none">• IP Phone 1110• handset• handset cord• 2.1 m (7-ft) CAT5e Ethernet cable |
|--|

- number plate and lens
- Getting Started Card

Table 62 "IP Phone 1110 components list" (page 282) lists the IP Phone 1110 components and product codes.

Table 62
IP Phone 1110 components list

Component		Product code
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) CAT5e Ethernet cable		NTYS13ABE6
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

Table 62
IP Phone 1110 components list (cont'd.)

Component		Product code
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” \(page 283\)](#)
- [“First-time installation” \(page 283\)](#)
- [“Configuring the IP Phone 1110” \(page 284\)](#)
- [“Connecting the components” \(page 284\)](#)
- [“Startup sequence” \(page 289\)](#)

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. For a list of IP Phone 1110 package components, see [Table 61 "Package components" \(page 281\)](#).
- 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 62 "IP Phone 1110 components list" \(page 282\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).

**CAUTION**

Do not plug your IP Phone 1110 into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1110

Use [Procedure 77 “Configuring the IP Phone 1110” \(page 284\)](#) to configure the IP Phone 1110 for the first time.

Procedure 77
Configuring the IP Phone 1110

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>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Phone 1110 on the Call Server using LD 11. At the prompt, enter the following</p> <pre>REQ:new TYPE:1110</pre> <p>For more information about configuring the IP Phone 1110 using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
3	<p>Configure the IP Phone 1110 in Element Manager. IP Phones are configured using the Phones section in the Element Manager navigation tree. For more information about configuring the IP Phone 1110 using Element Manager, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>
--End--	

Connecting the components

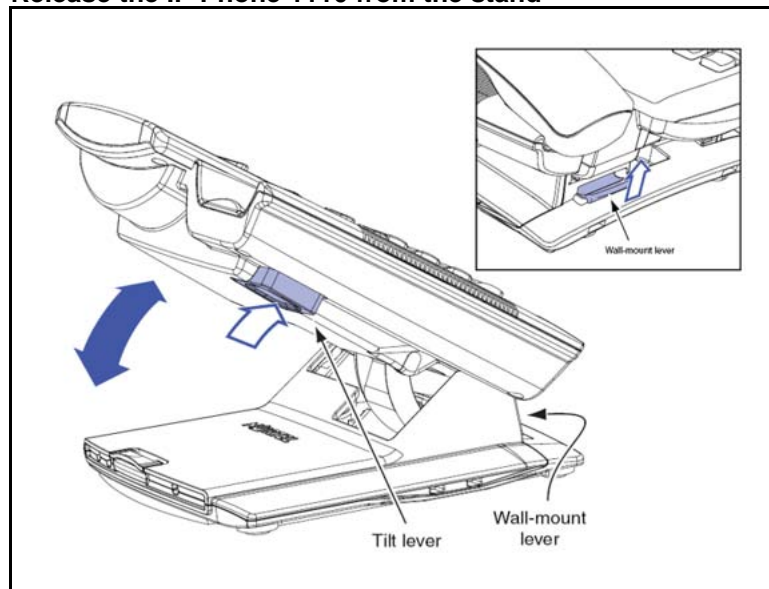
Use [Procedure 78 “Connecting the components” \(page 285\)](#) to connect the components for the IP Phone.

**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.

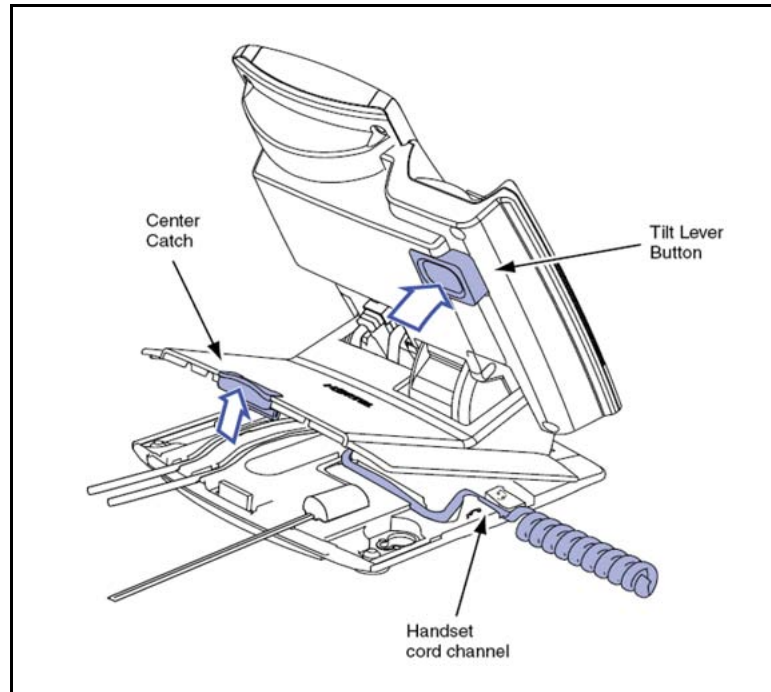
Procedure 78
Connecting the components

Step	Action
1	Press the wall-mount lever to release the stand and pull it away from the base using the tilt lever. See Figure 43 Release the IP Phone 1110 from the stand



2	Pull upward on the center catch and remove the stand cover, as indicated in Figure 44 "Stand cover removed" (page 286). The cable routing tracks are now accessible.
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Figure 44
Stand cover removed



- 3 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.



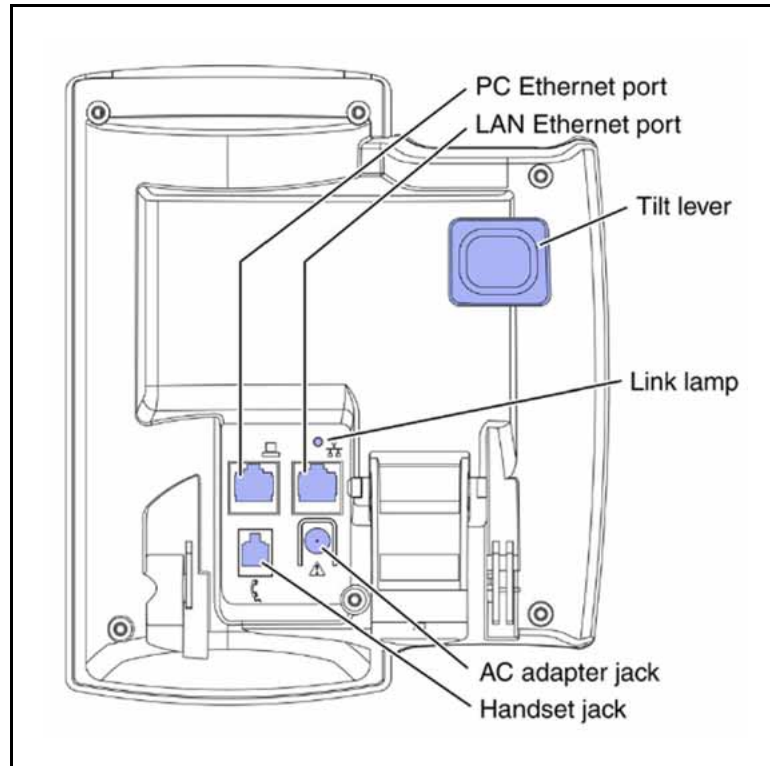
WARNING

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 CAT5e 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 45 "IP Phone 1110 connections" (page 287) shows the IP Phone 1110 connections.

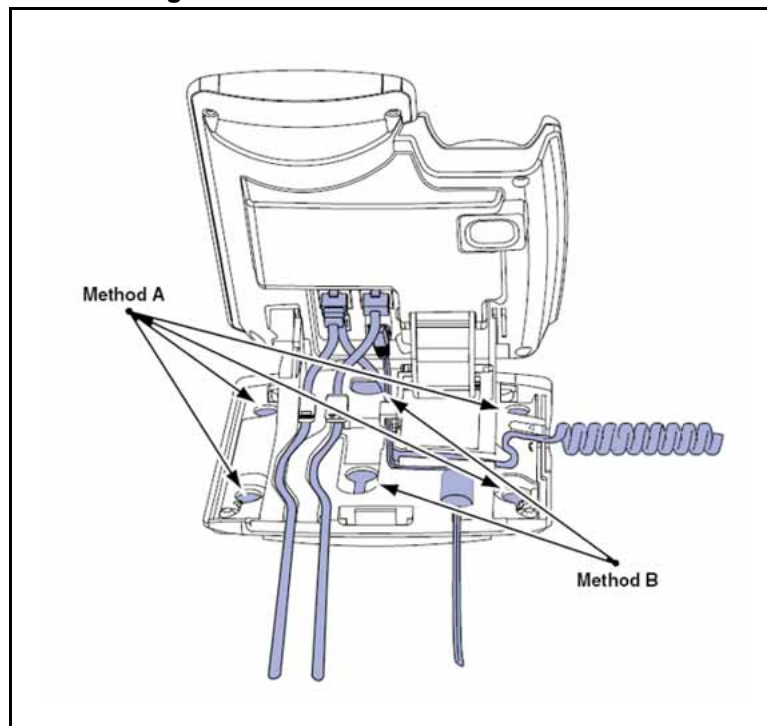
Figure 45
IP Phone 1110 connections



- 4 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 46 "Cable routing tracks"](#) (page 288).

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 46
Cable routing tracks



- 5 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5e cable (not provided), and thread the network cable through the channel.
- 6 If you are connecting your PC through the phone a second CAT5e 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 CAT5e connector (PC Ethernet port), and thread it through the channel. Connect the other end to the LAN connector on the back of your PC.

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.



CAUTION

Damage to Equipment

Do not plug any device into your IP Phone 1110 Ethernet port other than an IEEE 802.3 Ethernet network connection. The IP Phone 1110 does not support multiple devices connected through the PC Ethernet Port.

Complete steps 1 to 6, as needed, before wall-mounting the IP Phone.

- 7 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 CAT5e connector and a 15 cm (6 inch) CAT5e cord (not provided). See [Figure 46 "Cable routing tracks" \(page 288\)](#).
 - Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see step 2), 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) CAT5e 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.
- 8 Replace the stand cover. Ensure that all cables are neatly routed and press the stand cover into place until you hear a click.
- 9 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.
- 10 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--

When you complete the IP Phone connection, you must connect the phone to the network. See ["Dynamic Host Configuration Protocol" \(page 405\)](#).

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

- obtaining the provisioning parameters
- connecting to the Call Server

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones” \(page 447\)](#).

You can manually configure all or some parameters. For information about manually provisioning the IP Phone, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).

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 [“TFTP Server” \(page 593\)](#).

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 79

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 | 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 1110

ATTENTION

Two IP Phones cannot share the same TN. You must remove the IP Phone 1110 that currently uses the TN.

Procedure 80 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 to install the IP Phone 1110. To configure the IP Phone, see "Manual provisioning of IP Phone 1110 and 1200 Series" (page 479).
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 81 Removing an IP Phone 1110 from service

Step	Action
1	<p>Disconnect the IP Phone 1110 from the network or turn off the power.</p> <p>The service to the PC is disconnected as well if the PC connects to the IP Phone 1110.</p> <p>If the IP Phone 1110 was automatically configured, the DHCP lease expires and the IP address returns to the available pool.</p>
2	<p>In LD 11, enter the following:</p> <p>REQ: OUT TYPE: 1110 TN: LLL S CC UU</p>
<hr/> <p>--End--</p> <hr/>	

Nortel IP Phone 1120E

Contents

This section contains the following topics:

- “Introduction” (page 293)
- “Description” (page 294)
- “Components and functions” (page 294)
- “Features” (page 298)
- “Display characteristics” (page 299)
- “Package components” (page 301)
- “Installation and configuration” (page 302)
- “Redeploying an IP Phone 1120E” (page 309)
- “Replacing an IP Phone 1120E” (page 310)
- “Removing an IP Phone 1120E from service” (page 310)

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 82 “Configuring the IP Phone 1120E” (page 303)
- Procedure 83 “Connecting the components” (page 304)
- Procedure 84 “Changing the TN of an existing IP Phone 1120E” (page 309).
- Procedure 85 “Replacing an IP Phone 1120E” (page 310).
- Procedure 86 “Removing an IP Phone 1120E from service” (page 310).

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 47 "IP Phone 1120E" (page 294) shows the IP Phone 1120E.

Figure 47
IP Phone 1120E



Components and functions

This section describes the following components of the IP Phone 1120E

- ["Keys and functions" \(page 295\)](#)
- ["Services menu" \(page 296\)](#)
- ["Local Tools menu" \(page 297\)](#)

Keys and functions

Table 63 "IP Phone 1120E keys and functions" (page 295) lists the keys and functions for the IP Phone 1120E.

Table 63
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.
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.

Table 63
IP Phone 1120E keys and functions (cont'd.)

Key	Function
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.
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 64 "Services menu" (page 297) shows the Services menu.

Table 64
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 — Normal Mode Indication — Caller ID display order • 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>You can customize the IP Phone features to meet user requirements. For more information, see the <i>IP Phone 1120E User Guide</i> (NN43112-103).</p> <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> <p>While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.</p>
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Local Tools menu

Table 65 "Local Tools menu" (page 298) shows the Local Tools menu.

Table 65
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
2. Local Diagnostics
3. Network Configuration
4. Lock Menu

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 and the Local Tools menu, see [“Local Tools menu” \(page 521\)](#).

Press the Quit/Stop key to exit from any menu or menu item.

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
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* (NN43001-106).
- high quality speaker phone
- volume control keys to adjust ringer, speaker, handset, and headset volume
- ability to change the self-labeled line/programmable feature key labels
- six specialized feature keys
 - Quit
 - Directory
 - Message/Inbox
 - Shift/Outbox
 - Services
 - Copy
- six call-processing fixed keys

- Mute
- Handsfree
- Goodbye
- Expand
- Headset
- Hold

For more information about the Expansion Module, see [“Expansion Module for IP Phone 1100 Series”](#) (page 357).

For more information about IP Phone features, see [“Features”](#) (page 369).

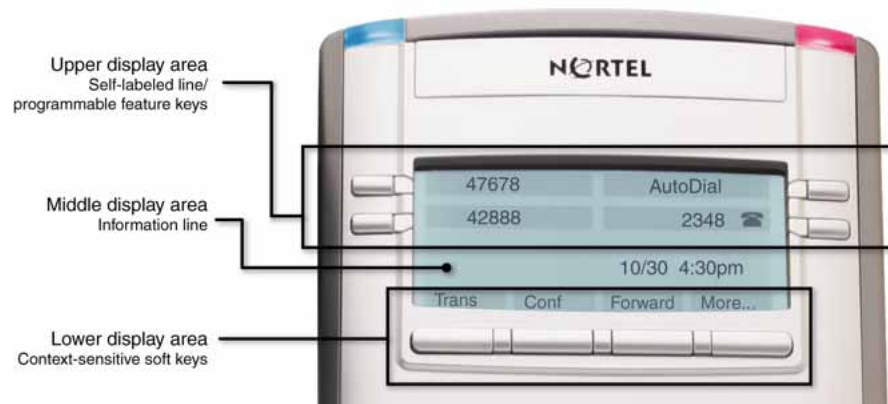
Display characteristics

An IP Phone 1120E has three major display areas

- [“Self-labeled line/programmable feature key label display”](#) (page 299)
- [“Information line display”](#) (page 300)
- [“Context-sensitive soft key label display”](#) (page 300)

[Figure 48 “1120E IP display area”](#) (page 299) shows these three display areas.

Figure 48
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

Do not use 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.

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 66 "Package components" \(page 301\)](#) lists the IP Phone 1120E package components.

Table 66
Package components

- IP Phone 1120E
- handset
- handset cord
- 2.1 m (7-ft) CAT5e Ethernet cable
- Number plate and lens
- Getting Started Card

[Table 67 "IP Phone 1120E components list" \(page 301\)](#) lists the IP Phone 1120E components and product codes.

Table 67
IP Phone 1120E components list

Component	Product code
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

Table 67
IP Phone 1120E components list (cont'd.)

Component		Product code
2.1 m (7-ft) CAT5e Ethernet cable		NTYS13ABE
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” \(page 303\)](#)
- [“First-time installation” \(page 303\)](#)
- [“Configuring the IP Phone 1120E” \(page 303\)](#)
- [“Connecting the components” \(page 304\)](#)
- [“Startup sequence” \(page 308\)](#)

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. For a list of IP Phone 1120E package components, see [Table 66 "Package components" \(page 301\)](#).
- 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 67 "IP Phone 1120E components list" \(page 301\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Damage to Equipment

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

Use [Procedure 82 "Configuring the IP Phone 1120E" \(page 303\)](#) to configure the IP Phone 1120E for the first time.

Procedure 82

Configuring the IP Phone 1120E

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>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>

- 2 Configure the IP Phone 1120E on the Call Server using LD 11. At the prompt, enter the following

REQ: new
TYPE: 1120

For more information about configuring the IP Phone 1120E using LD 11, see *Software Input Output Reference-Administration* (NN43001-611).

- 3 Configure the IP Phone 1120E in Element Manager. IP Phones are configured using the **Phones** section in the Element Manager navigation tree. For more information about configuring the IP Phone 1120E using Element Manager, see *Element Manager System Reference - Administration* (NN43001-632).

--End--

Connecting the components

Use [Procedure 83 "Connecting the components" \(page 304\)](#) to connect the components for the IP Phone.



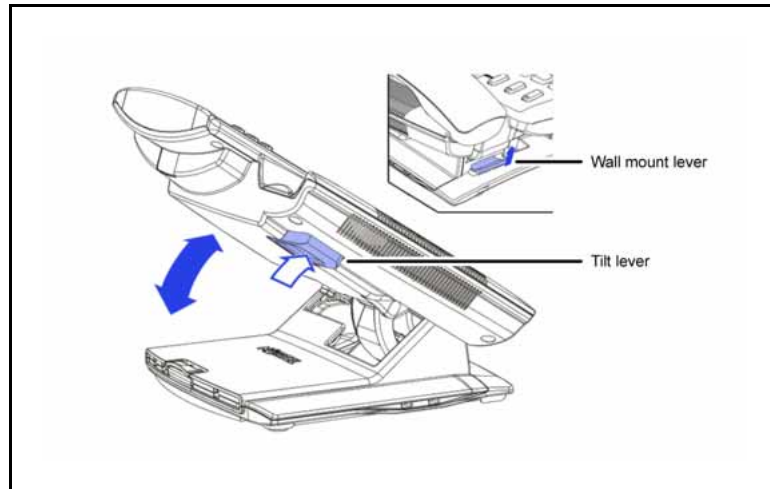
CAUTION

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.

Procedure 83 Connecting the components

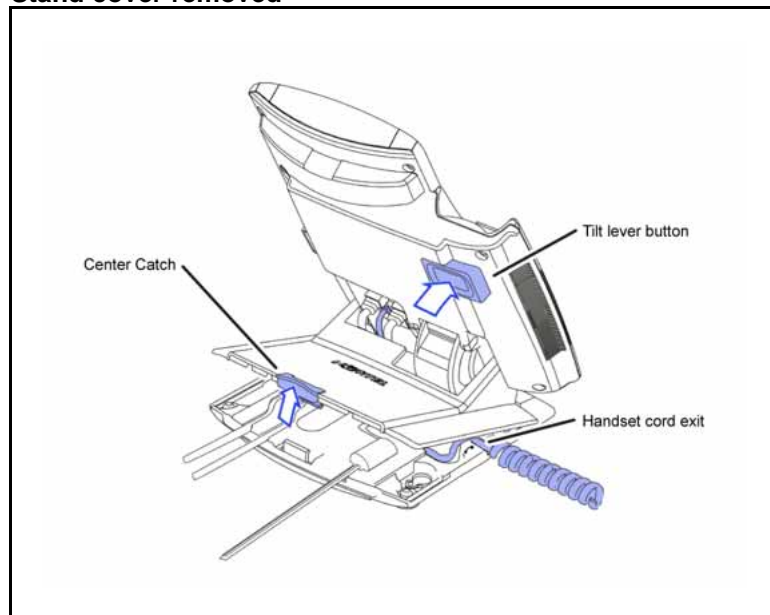
Step	Action
1	Press the wall-mount lever located under the Handsfree key to release the stand and pull it away from the phone. See Figure 49 "Release the IP Phone 1120E from the stand" (page 305) .

Figure 49
Release the IP Phone 1120E from the stand



- 2 Remove the stand cover. Pull upward on the center catch and remove the stand cover. The cable routing tracks are now accessible. See .

Figure 50
Stand cover removed



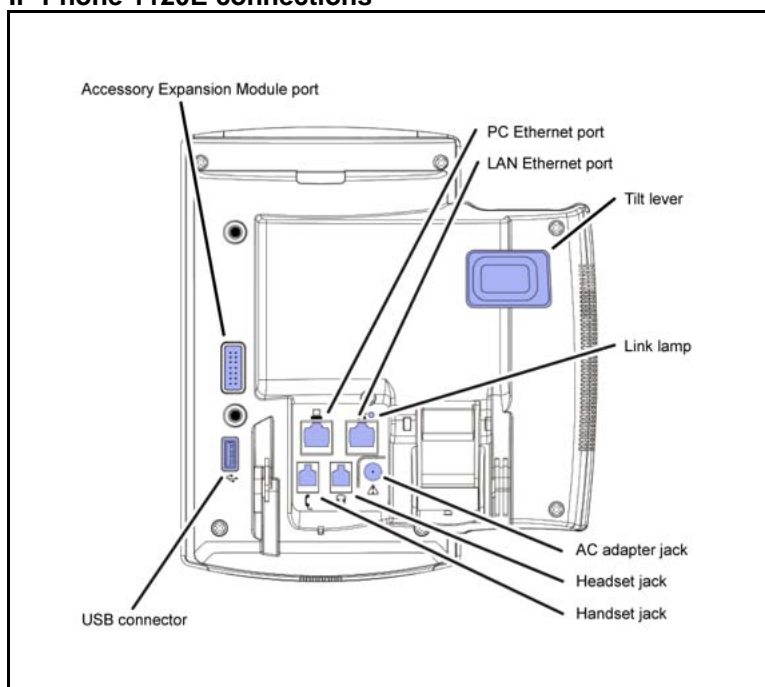
- 3 Connect the AC power adapter (optional). Leave the AC adapter unplugged from the power outlet, connect the adapter to the AC adapter jack in the bottom of the phone. Form a small bend in the cable, and then thread the adapter cord through the channels in the stand.

**WARNING**

Use your IP Phone 1120E with the approved Nortel global power supply (model number N0089601).

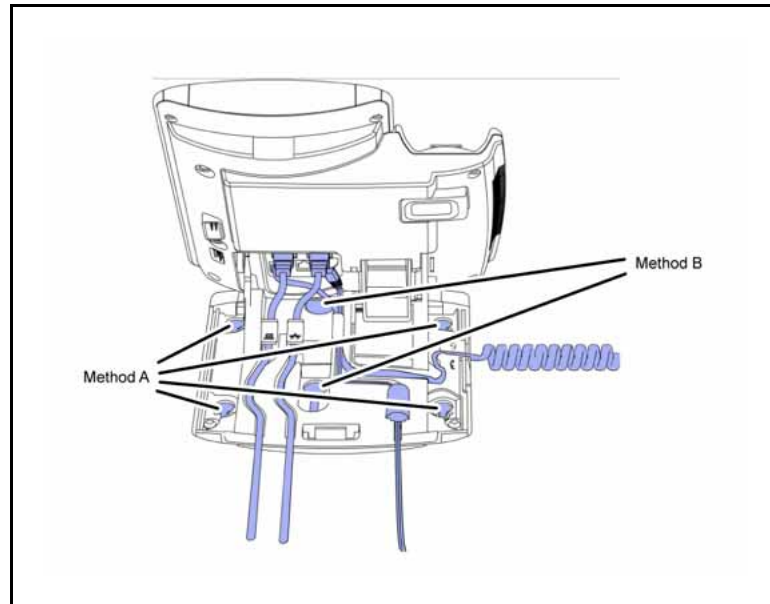
The IP Phone 1120E supports both AC power and Power over LAN options, including IEEE 802.3af Power Classification 3. To use Power over Ethernet, where power is delivered over the CAT5e cable, the LAN must support Power over Ethernet, and an AC adapter is not required. To use local AC power, the optional AC adapter can be ordered separately. You must use CAT5e (or later) cables if you want to use Gigabit Ethernet.

Figure 51
IP Phone 1120E connections



- 4 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 52 "Cable routing tracks"](#) (page 307).

Figure 52
Cable routing tracks



- 5 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5e connector (LAN Ethernet port), and thread the network cable through the channel (LAN Ethernet port).
- 6 If you are connecting your PC through the phone, a second CAT5e 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 CAT5e connector (PC Ethernet port), and thread it through the channel. Connect the other end to the LAN connector on the back of your PC.

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.



CAUTION
Damage to Equipment

Do not plug any device into your IP Phone 1120E Ethernet port other than an IEEE 802.3 Ethernet network connection.

- 7 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 7, 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 CAT5e connector and a 15 cm (6 inch) CAT5e cord (not provided).
 - Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see step 2), 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) CAT5e 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.
- 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 a click. Ensure the phone is securely locked in to position.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol” \(page 405\)](#).

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

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones” \(page 447\)](#).

You can manually configure all or some parameters. For information about manually provisioning the IP Phone, see [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#).

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 [“TFTP Server” \(page 593\)](#).

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 84 Changing the TN of an existing IP Phone 1120E

Step	Action						
1	<p>Repower the IP Phone 1120E.</p> <p>During the reboot sequence of a previously configured IP Phone, the IP Phone 1120E displays the existing node number for approximately 5 seconds.</p>						
2	<p>If the node password is enabled and NULL, choose one of the following</p> <ul style="list-style-type: none"> a Disable the password. b 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 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 85 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 to install the IP Phone 1120E. To configure the IP Phone, see "Manual provisioning of IP Phone 2007 and 1100 Series" (page 487).
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 86 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 the following:

REQ: OUT

TYPE: 1120

TN: LLL S CC UU

--End--

Nortel IP Phone 1140E

Contents

This section contains the following topics:

- “Introduction” (page 313)
- “Description” (page 314)
- “Components and functions” (page 315)
- “Features” (page 318)
- “Display characteristics” (page 319)
- “Cleaning the IP Phone display screen” (page 321)
- “Package components” (page 321)
- “Installation and configuration” (page 323)
- “TFTP firmware upgrade ” (page 329)
- “Bluetooth wireless technology” (page 329)
- “Redeploying an IP Phone 1140E” (page 329)
- “Replacing an IP Phone 1140E” (page 330)
- “Removing an IP Phone 1140E from service” (page 331)

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 *IP Phone 1140E Getting Started Card* (NN43113-103).

This section contains the following procedures

- Procedure 87 “Configuring the IP Phone 1140E” (page 324)
- Procedure 88 “Connecting the components” (page 324)
- Procedure 89 “Changing the TN of an existing IP Phone 1140E” (page 329).

- Procedure 90 “Replacing an IP Phone 1140E” (page 330).
- Procedure 91 “Removing an IP Phone 1140E from service” (page 331).

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 53 "IP Phone 1140E" (page 314) shows the IP Phone 1140E.

Figure 53
IP Phone 1140E



Components and functions

This section describes the following components of the IP Phone 1140E

- “Keys and functions” (page 315)
- “Services menu” (page 317)
- “Local Tools menu” (page 318)

Keys and functions

Table 68 “IP Phone 1140E keys and functions” (page 315) lists keys and functions for the IP Phone 1140E.

Table 68
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.
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 labels	Self-labeled line/programmable 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 external server applications, such as Nortel Application Server.

Table 68
IP Phone 1140E keys and functions (cont'd.)

Key	Function
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	<p>Press the Message/Inbox key to access your voice mailbox.</p>
Shift/Outbox	<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>
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>

Table 68
IP Phone 1140E keys and functions (cont'd.)

Key	Function
Volume control keys	Use 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.
Speaker	Press the Handsfree key to activate the speaker.
Handsfree key	Press the Handsfree key to activate handsfree. The LED lights to indicate when the handsfree feature is active.

Services menu

Table 69 "Services menu" (page 317) shows the Services menu.

Table 69
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

You can customize the IP Phone features to meet user requirements. For more information, see the *IP Phone 1140E User Guide* (NN43113-106).

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.

While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.

Local Tools menu

[Table 70 "Local Tools menu" \(page 318\)](#) shows the Local Tools menu.

Table 70
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
2. Local Diagnostics
3. Network Configuration
4. Lock Menu

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 and the Local Tools menu, see ["Local Tools menu" \(page 521\)](#).

Press the Quit/Stop key to exit from any menu or menu item.

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 DNs or features on 2 pages. Use the Shift/Outbox key to access the second page of DNs or 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* (NN43001-106).
- high quality speaker phone
- volume control keys to adjust ringer, speaker, handset, and headset volume
- ability to change user-defined feature key labels
- six specialized feature keys
 - Quit/Stop
 - Directory
 - Message/Inbox
 - Shift/Outbox
 - Services
 - Copy
- six call-processing fixed keys
 - Mute
 - Handsfree
 - Goodbye
 - Expand
 - Headset
 - Hold

For more information about the Expansion Module, see [“Expansion Module for IP Phone 1100 Series” \(page 357\)](#).

For more information about IP Phone features, see [“Features” \(page 369\)](#).

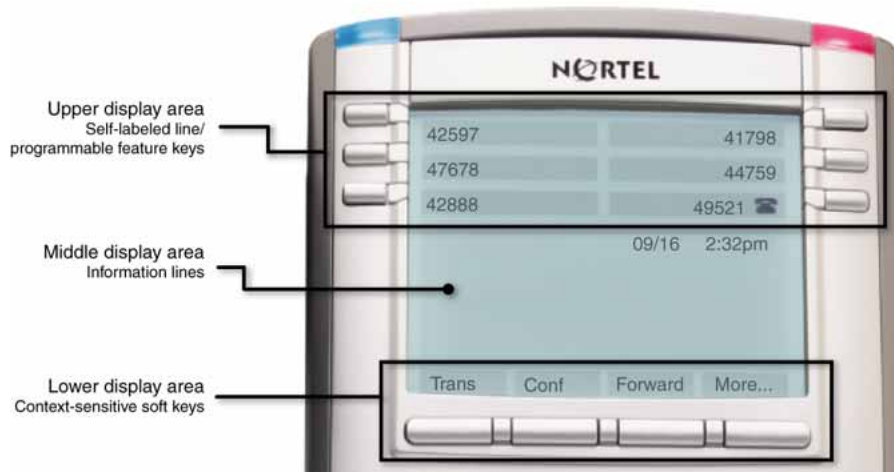
Display characteristics

The IP Phone 1140E has three major display areas

- [“Self-labeled line/programmable feature key label display” \(page 320\)](#)
- [“Information line display” \(page 320\)](#)
- [“Context-sensitive soft key label display” \(page 321\)](#)

Figure 54 "IP Phone 1140E display area" (page 320) shows the three display areas.

Figure 54
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

Do not use 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.

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 71 "Package components" \(page 321\)](#) lists the IP Phone 1140E package components.

Table 71
Package components

- IP Phone 1140E
- handset
- handset cord
- 2.1 m (7-ft) CAT5e Ethernet cable
- Number plate and lens
- Getting Started Card

[Table 72 "IP Phone 1140E component list" \(page 322\)](#) lists the IP Phone 1140E components and product codes.

Table 72
IP Phone 1140E component list

Component		Product code
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) CAT5e Ethernet cable		NTYS13ABE6
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 323)
- [“First-time installation”](#) (page 323)
- [“Configuring the IP Phone 1140E”](#) (page 323)
- [“Connecting the components”](#) (page 324)
- [“Startup sequence”](#) (page 329)

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. For a list of IP Phone 1140E package components, see [Table 71 “Package components”](#) (page 321).
- 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 72 “IP Phone 1140E component list”](#) (page 322).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Damage to Equipment

Do not plug your IP Phone 1140E into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1140E

Use [Procedure 87 “Configuring the IP Phone 1140E”](#) (page 324) to configure the IP Phone 1140E.

Procedure 87 Configuring the IP Phone 1140E

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>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
2	<p>Configure the IP Phone 1140E on the Call Server using LD 11. At the prompt, enter the following</p> <pre>REQ: new TYPE: 1140</pre> <p>For more information about configuring the IP Phone 1140E using LD 11, see <i>Software Input Output Reference-Administration</i> (NN43001-611).</p>
3	<p>Configure the IP Phone 1140E in Element Manager. IP Phones are configured using the Phones section in the Element Manager navigation tree. For more information about configuring the IP Phone 1140E using Element Manager, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>
--End--	

Connecting the components

Use [Procedure 88 "Connecting the components" \(page 324\)](#) to connect the components for the IP Phone.



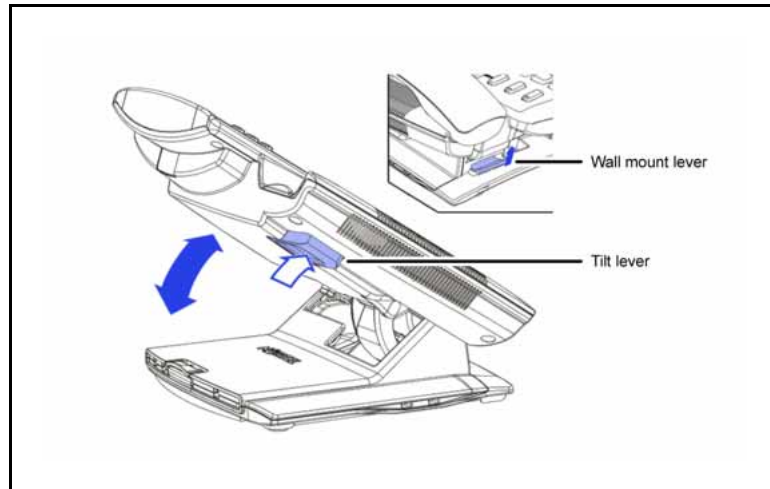
CAUTION

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.

Procedure 88 Connecting the components

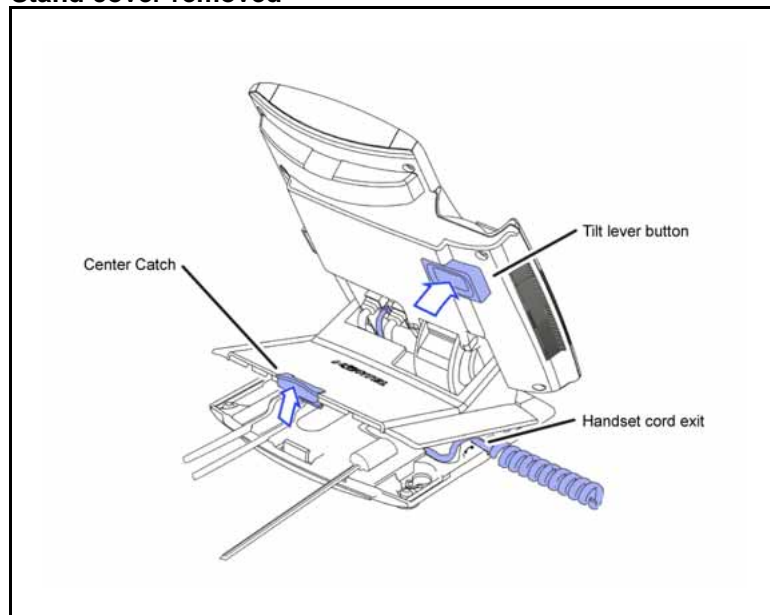
Step	Action
1	<p>Press the wall-mount lever located under the Handsfree key to release the stand and pull it away from the phone. See Figure 55 "Release the IP Phone 1140E from the stand" (page 325).</p>

Figure 55
Release the IP Phone 1140E from the stand



- 2 Remove the stand cover. Pull upward on the center catch and remove the stand cover. The cable routing tracks are now accessible. See [Figure 56 "Stand cover removed"](#) (page 325).

Figure 56
Stand cover removed



- 3 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**

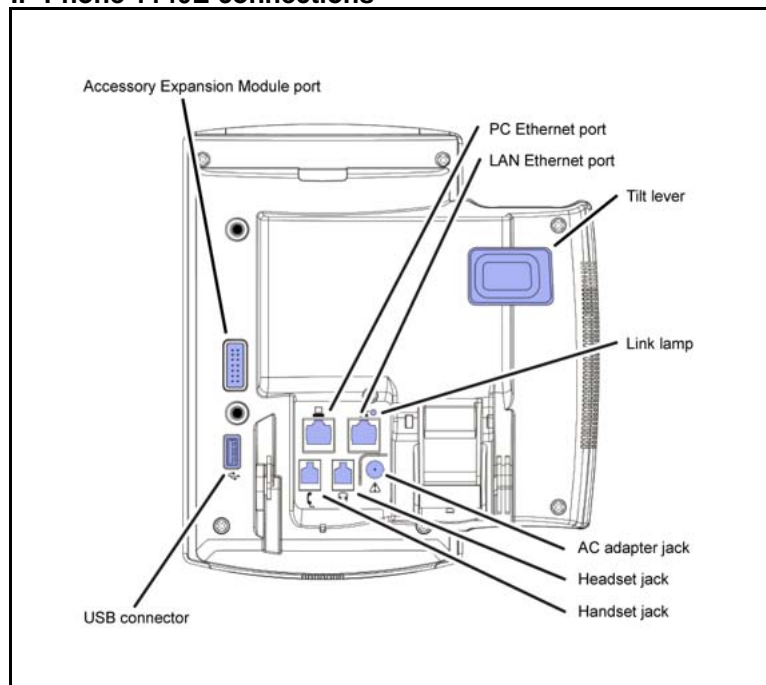
Use your IP Phone 1140E with the approved Nortel global power supply (model number N0089601).

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 CAT5e 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.

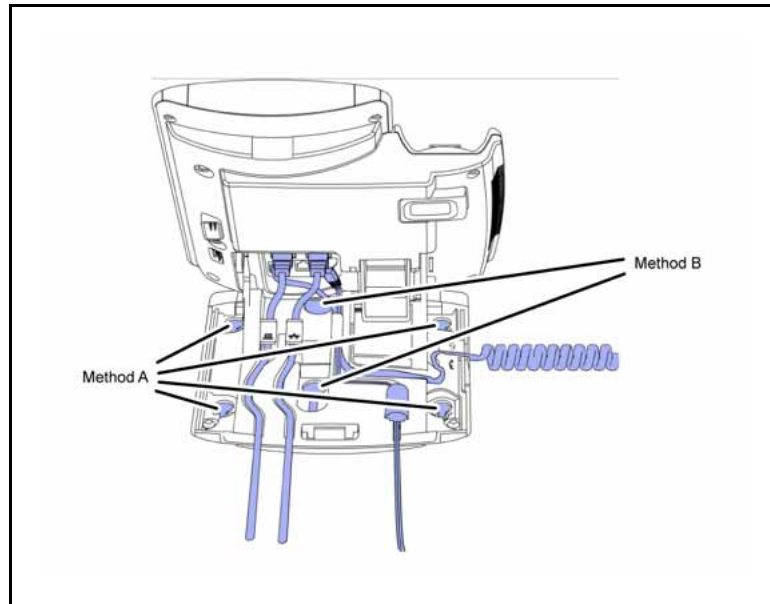
Figure 57

IP Phone 1140E connections



- 4 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 58 "Cable routing tracks"](#) (page 327).

Figure 58
Cable routing tracks



- 5 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 headset symbol. See [Figure 58 "Cable routing tracks" \(page 327\)](#).
- 6 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5e connector (LAN Ethernet port), and thread the network cable through the channel.
- 7 If you are connecting your PC through the phone, a second CAT5e 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 CAT5e (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.

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.

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

Do not plug any device into your IP Phone 1140E Ethernet port other than an IEEE 802.3 Ethernet network connection. The IP Phone 1140E 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 8, 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 CAT5e connector and a 15 cm (6 inch) CAT5e cord (not provided).
- Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see [step 2](#)), 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) CAT5e 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--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol” \(page 405\)](#).

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

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones” \(page 447\)](#).

You can manually configure all or some parameters. For information about manually provisioning the IP Phone, see [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#).

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 [“TFTP Server” \(page 593\)](#).

Bluetooth wireless technology

The IP Phone 1140E supports Bluetooth wireless technology. For information about configuring Bluetooth wireless technology on the IP Phone 1140E, see [“Headset support” \(page 581\)](#).

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 89

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	<p>If the node password is enabled and NULL, choose one of the following</p> <p>a Disable the password.</p> <p>b Set the password as non-NULL.</p>						
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</i> (NN43001-632).</p>						
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 90

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 to install the IP Phone 1140E. To configure the IP Phone, see [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#).
- 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 91

Removing an IP Phone 1140E from service

Step	Action
1	<p>Disconnect the IP Phone 1140E from the network or turn the power off.</p> <p>The service to the PC is disconnected as well if the PC connects to the IP Phone 1140E.</p> <p>If the IP Phone 1140E was automatically configured, the DHCP lease expires and the IP address returns to the available pool.</p>
2	<p>In LD 11, enter the following:</p> <p>REQ: OUT TYPE: 1140 TN: LLL S CC UU</p>

--End--

Nortel IP Phone 1150E

Contents

This section contains the following topics:

- “Introduction” (page 333)
- “Description” (page 334)
- “Components and functions” (page 336)
- “Features” (page 341)
- “Display characteristics” (page 343)
- “Headset support” (page 344)
- “Package components” (page 345)
- “Installation and configuration” (page 346)
- “TFTP firmware upgrade ” (page 353)
- “Bluetooth wireless technology” (page 353)
- “Redeploying an IP Phone 1150E” (page 354)
- “Replacing an IP Phone 1150E” (page 355)
- “Removing an IP Phone 1150E from service” (page 355)

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 *IP Phone 1150E Getting Started Card* (NN43114-103).

This section contains the following procedures

- Procedure 92 “Configuring the IP Phone 1150E” (page 347)
- Procedure 93 “Connecting the components” (page 348)
- Procedure 94 “Changing the TN of an existing IP Phone 1150E” (page 354).

- [Procedure 95 “Replacing an IP Phone 1150E” \(page 355\)](#).
- [Procedure 96 “Removing an IP Phone 1150E from service” \(page 355\)](#).

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.

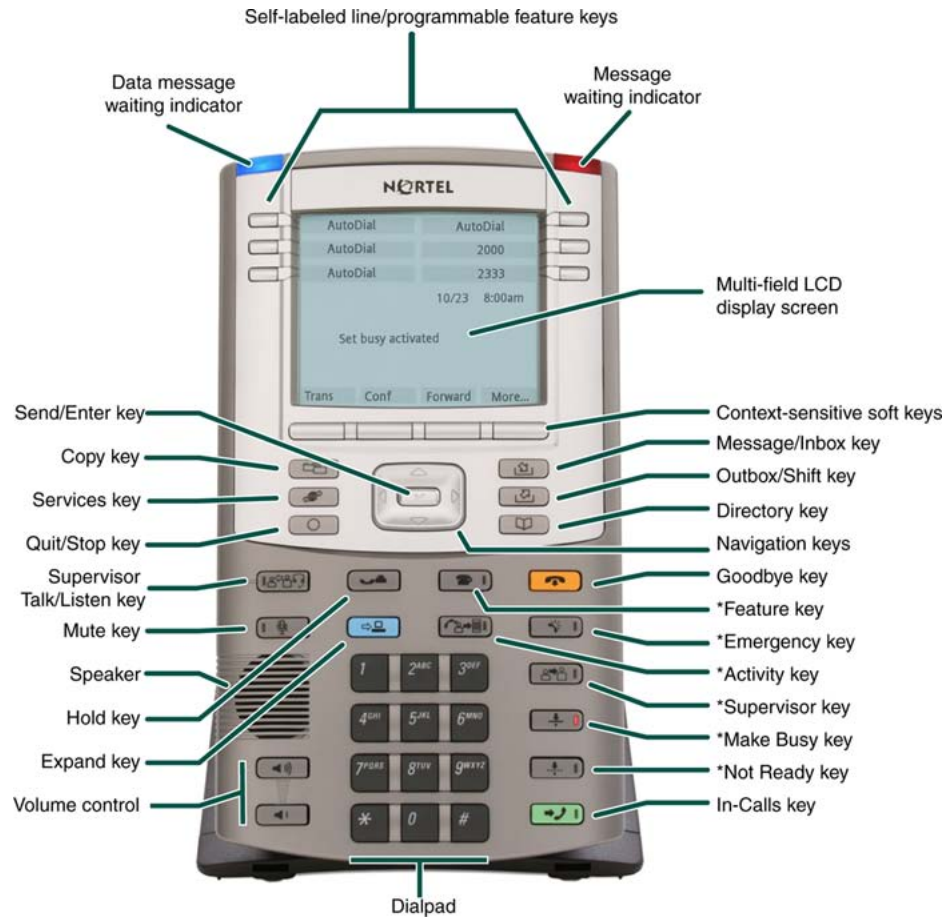
Description

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” \(page 345\)](#).

[Figure 59 "IP Phone 1150E default Agent key configuration" \(page 335\)](#) shows the IP Phone 1150E default Agent key configuration.

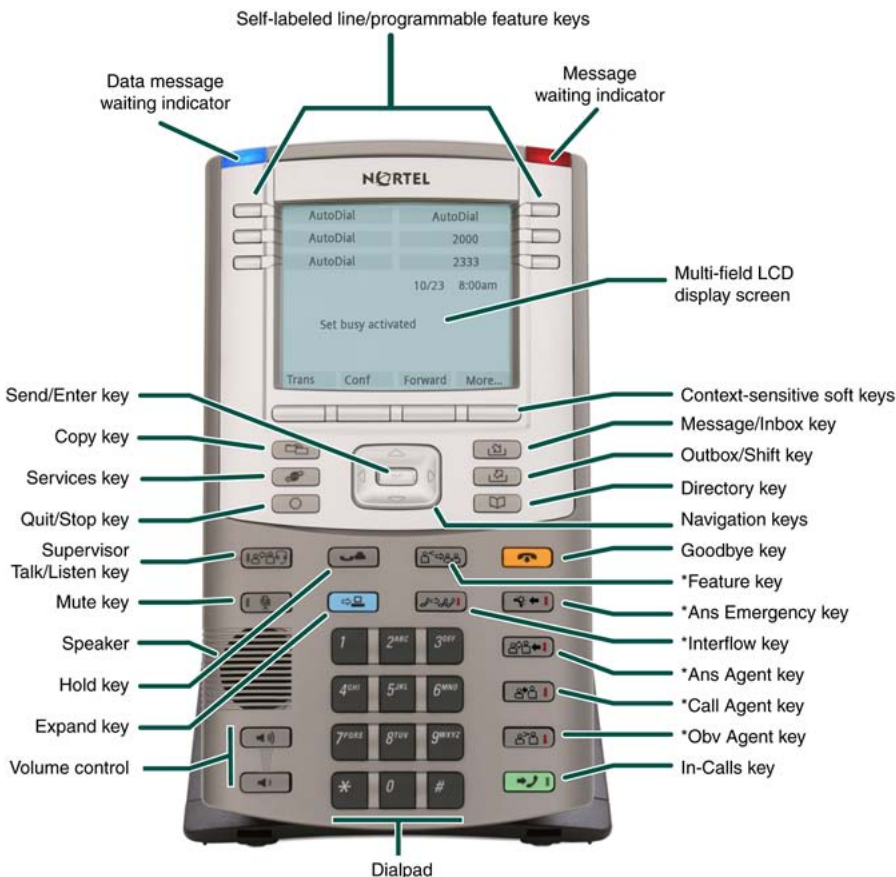
Figure 59
IP Phone 1150E default Agent key configuration



You can program the keys indicated with asterisks for different functions.

[Figure 60 "IP Phone 1150E Supervisor key configuration" \(page 336\)](#) shows the IP Phone 1150E Supervisor key configuration.

Figure 60
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 336)
- “Services menu” (page 339)
- “Local Tools menu” (page 340)

Keys and functions

Table 73 “IP Phone 1150E keys and functions” (page 337) shows the keys and functions for the IP Phone 1150E.

Table 73
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	<p>Self-labeled line/programmable feature key labels are configured for various features on IP Phones.</p> <p>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.</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	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	<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 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.</p>
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.

Table 73
IP Phone 1150E keys and functions (cont'd.)

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 74 "IP Phone 1150E keys and functions for default Agent key configuration" (page 339) shows IP Phone 1150E keys and functions for default Agent key configuration. You can configure these keys for different functions.

Table 74
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 75 "IP Phone 1150E keys and functions for Supervisor key configuration" \(page 339\)](#) shows IP Phone 1150E components and functions for Supervisor key configuration. You can configure these keys for different functions.

Table 75
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 76 "Services menu" \(page 340\)](#) shows the Services menu.

Table 76
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>You can customize the IP Phone features to meet user requirements. For more information, see the <i>IP Phone 1150E User Guide</i> (NN43114-100).</p> <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>While you are in the Services menu you cannot dial digits but you can use the programmable line keys, such as Redial (double-press a line key) and Auto dial key to make a call. However, the display does not update with the dialed digits or Caller ID.</p>
--

Local Tools menu

[Table 77 "Local Tools menu" \(page 341\)](#) shows the Local Tools menu.

Table 77
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
2. Local Diagnostics
3. Network Configuration
4. Lock Menu

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 and the Local Tools menu, see [“Local Tools menu” \(page 521\)](#).

Press the Quit/Stop key to exit from any menu or menu item.

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

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* (NN43001-106).

- ability to change user-defined feature key labels
- 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

For more information about the Expansion Module, see [“Expansion Module for IP Phone 1100 Series” \(page 357\)](#).

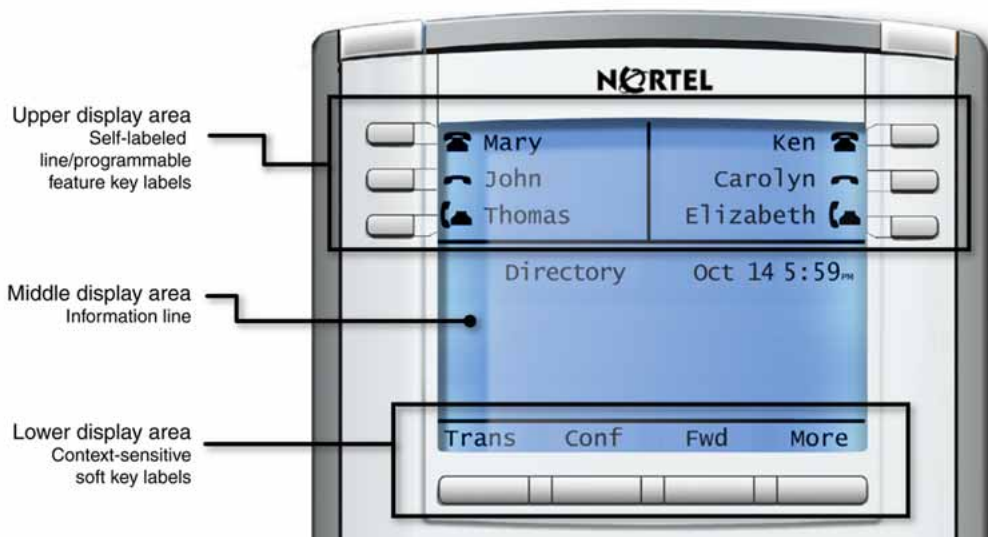
For more information about IP Phone features, see [“Features” \(page 369\)](#).

Display characteristics

An IP Phone 1150E has three major display areas

- “Self-labeled line/programmable feature key label” (page 343)
- “Information line display” (page 344)
- “Context-sensitive soft key label” (page 344)

Figure 61
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

Do not use 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

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 78 "Package components" \(page 345\)](#) lists the IP Phone 1150E package components.

Table 78
Package components

<ul style="list-style-type: none"> • IP Phone 1150E • 2.1 m (7-ft) CAT5e Ethernet cable • Getting Started Card

[Table 79 "IP Phone 1150E component list" \(page 345\)](#) lists the IP Phone 1150E components and product codes.

Table 79
IP Phone 1150E component list

Component	Product code
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) CAT5e Ethernet cable	NTYS13ABE6
Accessories	
Key cap removal tool	NTNM19AA
Expansion Module for IP Phone 1100 Series	NTYS08AA
Power adapter	
Global power supply	N0089601

Table 79
IP Phone 1150E component list (cont'd.)

Component		Product code
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” \(page 347\)](#)
- [“First-time installation” \(page 347\)](#)
- [“Configuring the IP Phone 1150E” \(page 347\)](#)
- [“Connecting the components” \(page 348\)](#)
- [“Startup sequence” \(page 353\)](#)

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. For a list of IP Phone 1150E package components, see [Table 78 "Package components" \(page 345\)](#).
- 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 79 "IP Phone 1150E component list" \(page 345\)](#).
- Ensure the latest IP Phone firmware is deployed to the IP telephony node. For more information, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 IP Line Applications Fundamentals* (NN43001-125).



CAUTION

Damage to Equipment

Do not plug your IP Phone 1150E into an ISDN connection. Severe damage can result.

Configuring the IP Phone 1150E

Use [Procedure 92 "Configuring the IP Phone 1150E" \(page 347\)](#) to configure the IP Phone 1150E.

Procedure 92 Configuring the IP Phone 1150E

Step	Action
1	Configure a virtual loop on the Call Server using LD 97. For more information about configuring a virtual loop, see <i>Signaling Server IP Line Applications Fundamentals</i> (NN43001-125) and <i>Software Input Output Reference-Administration</i> (NN43001-611).
2	Configure the IP Phone 1150E on the Call Server using LD 11. At the prompt, enter the following:

REQ: new
TYPE: 1150

For more information about configuring the IP Phone 1150E using LD 11, see *Software Input Output Reference-Administration* (NN43001-611).

- 3 Configure the IP Phone 1150E in Element Manager. IP Phones are configured using the **Phones** section in the Element Manager navigation tree. For more information about configuring the IP Phone 1150E using Element Manager, see *Element Manager System Reference - Administration* (NN43001-632).

--End--

Connecting the components

Use [Procedure 93 "Connecting the components" \(page 348\)](#) to connect the components for the IP Phone.



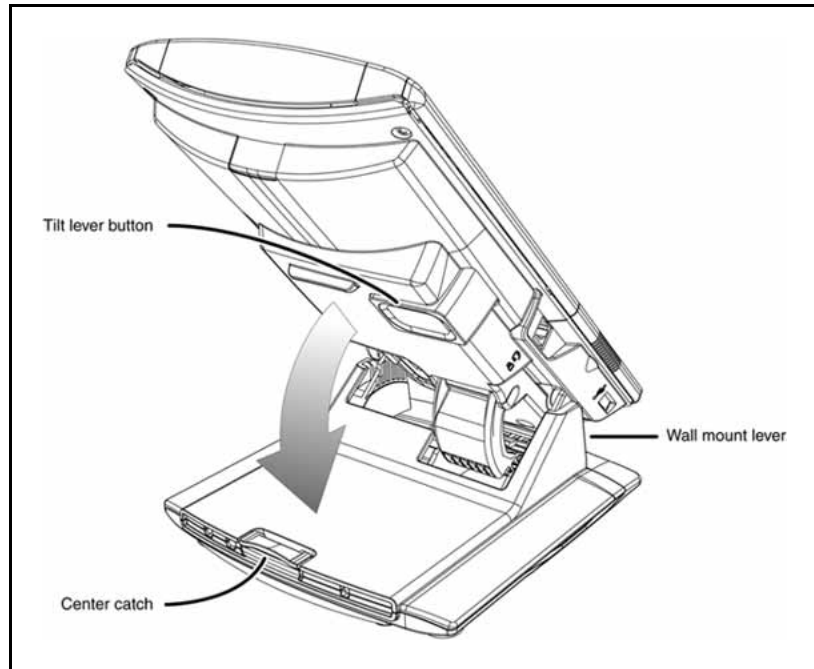
CAUTION

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.

Procedure 93 Connecting the components

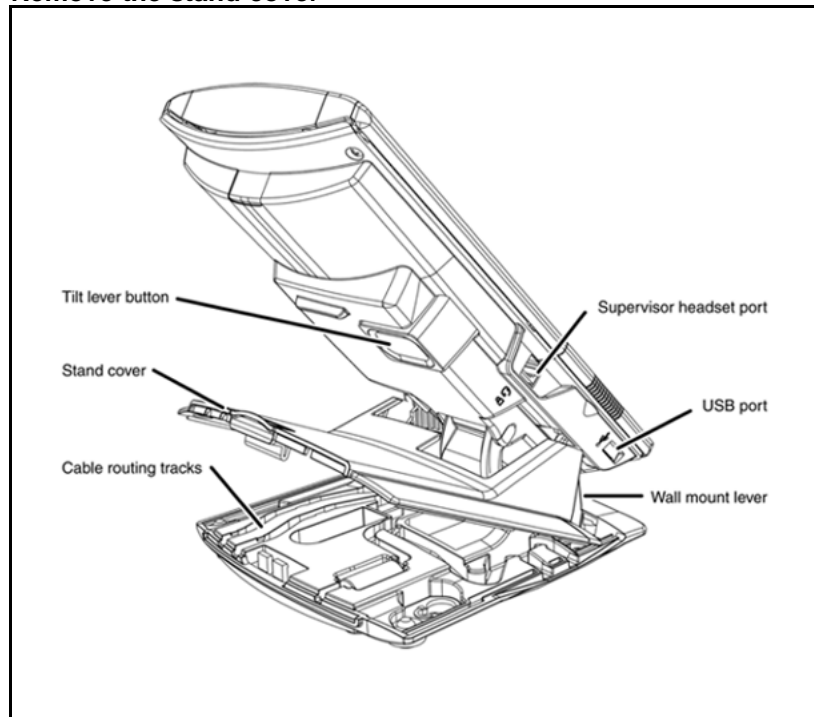
Step	Action
1	Press the wall-mount lever located under the base to release the stand and pull it away from the phone. See Figure 62 "Release the IP Phone 1150E from the stand" (page 349) .

Figure 62
Release the IP Phone 1150E from the stand



- 2 Remove the stand cover. Pull upward on the center catch and remove the stand cover. The cable routing tracks are now accessible. See [Figure 63 "Remove the stand cover"](#) (page 349).

Figure 63
Remove the stand cover



- 3 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**

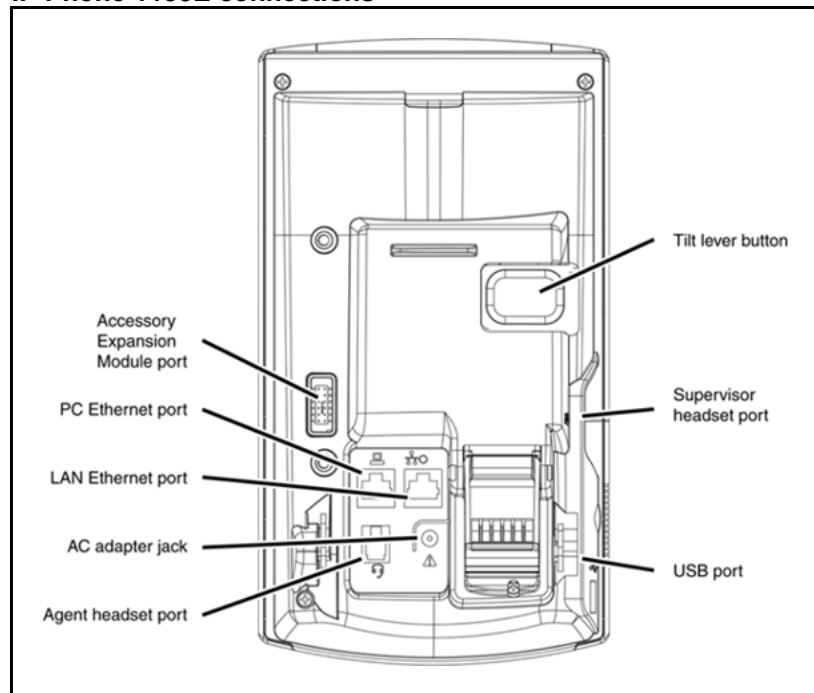
Use your IP Phone 1150E with the approved Nortel global power supply (model number N0089601).

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 CAT5e 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 64

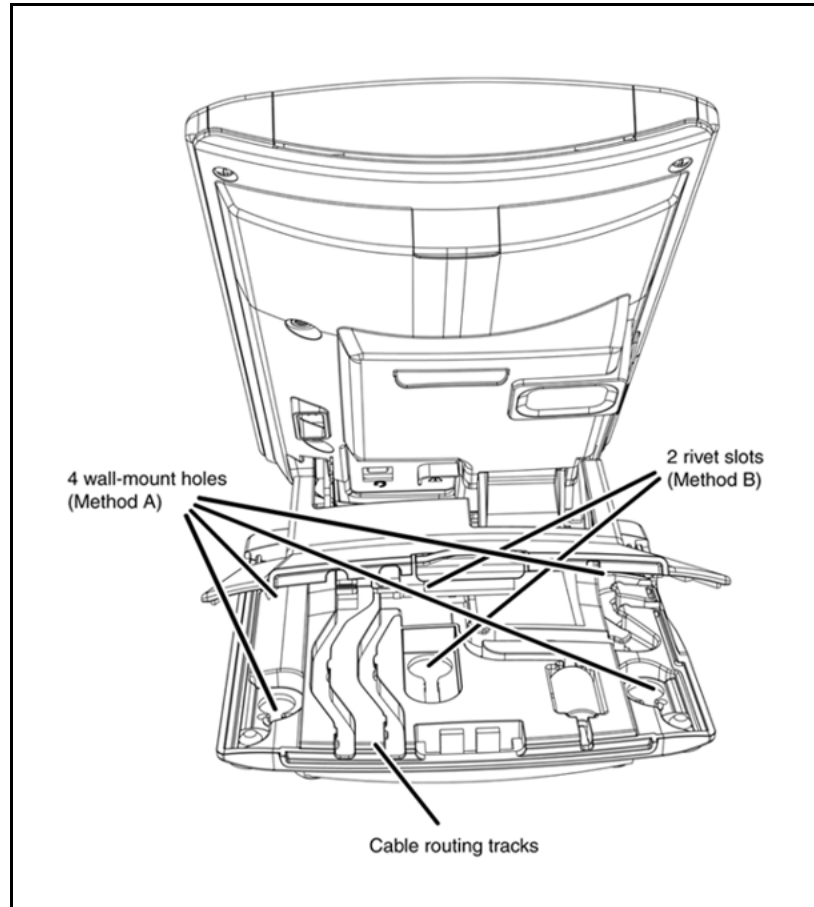
IP Phone 1150E connections



- 4 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 65
Cable routing tracks



- 5 Install the Ethernet cable. Connect one end of the supplied Ethernet cable to the back of your phone using the CAT5e connector (LAN Ethernet port), and thread the network cable through the channel.
- 6 If you are connecting your PC through the phone, a second CAT5e 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 CAT5e connector (PC Ethernet port) and thread it through the channel. Connect the other end to the LAN connector on the back of your PC.

The LAN Ethernet port supports Auto-Media Dependent Interface Crossover (MDIX). Auto-MDIX is supported only when the Ethernet port is configured for autonegotiation. The PC Port does not support Auto-MDIX.

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

Do not plug any device into your IP Phone 1150E Ethernet port other than an IEEE 802.3 Ethernet network connection. The IP Phone 1150E does not support multiple devices connected through the PC Ethernet port.

- 7 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 7, 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 CAT5e connector and a 15 cm (6 inch) CAT5e cord (not provided).
 - Method A: Press the wall-mount lever, and pull away from the stand. Using the stand cover (see [Figure 63 "Remove the stand cover" \(page 349\)](#)), 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 65 "Cable routing tracks" \(page 351\)](#).
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) CAT5e 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 65 "Cable routing tracks" \(page 351\)](#).
- 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 a click. Ensure the phone is securely locked in to position.

--End--

When you complete the IP Phone connection, you must connect the phone to the network. See [“Dynamic Host Configuration Protocol”](#) (page 405).

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

The IP Phone is configured for automatic provisioning by default. For more information about provisioning the IP Phone automatically, see [“Provisioning the IP Phones”](#) (page 447).

You can manually configure all or some parameters. For information about manually provisioning the IP Phone, see [“Manual provisioning of IP Phone 2007 and 1100 Series”](#) (page 487).

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 [“TFTP Server”](#) (page 593).

Bluetooth wireless technology

The IP Phone 1150E supports Bluetooth wireless technology . For information about configuring Bluetooth wireless technology on the IP Phone 1150E, see [“Headset support”](#) (page 581).

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 94 Changing the TN of an existing IP Phone 1150E

Step	Action						
1	<p>Repower the IP Phone 1150E.</p> <p>During the reboot sequence of a previously configured IP Phone, the IP Phone 1150E 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> <ul style="list-style-type: none"> a Disable the password. b 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 the password at the password screen, and press OK.</p> <p>A TN screen displays.</p> <p>To obtain the password, enter the nodePwdShow command in Element Manager. For further information, see <i>Element Manager System Reference - Administration</i> (NN43001-632).</p>						
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 95

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 to install the IP Phone 1150E. To configure the IP Phone, see "Manual provisioning of IP Phone 2007 and 1100 Series" (page 487) .
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 96

Removing an IP Phone 1150E from service

Step	Action
1	<p>Disconnect the IP Phone 1150E from the network or turn the power off.</p> <p>The service to the PC is disconnected as well if the PC connects to the IP Phone 1150E.</p> <p>If the IP Phone 1150E was automatically configured, the DHCP lease expires and the IP address returns to the available pool.</p>
2	<p>In LD 11, enter the following:</p> <p>REQ: OUT TYPE: 1150 TN: LLL S CC UU</p>

--End--

Expansion Module for IP Phone 1100 Series

Contents

This section contains the following topics:

- “Description” (page 357)
- “Features” (page 358)
- “Display characteristics” (page 359)
- “Package components” (page 359)
- “Configuration” (page 359)
- “Installation” (page 360)
- “Expansion Module startup initialization” (page 364)
- “Operating parameters” (page 365)
- “Services key operation” (page 366)
- “Firmware” (page 368)

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 66 "IP Phone 1140E with Expansion Module for IP Phone 1100 Series" (page 358) shows an IP Phone 1140E with the Expansion Module attached.

Figure 66
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 66 "IP Phone 1140E with Expansion Module for IP Phone 1100 Series" \(page 358\)](#)). 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 80 "Expansion Module components list" \(page 359\)](#) lists the Expansion Module package components.

Table 80
Expansion Module components list

Expansion Module for IP Phone 1100 Series	NTYS08AAE6
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Configuration

Use LD 11 to configure the Expansion Module.

Table 81
LD 11 - Configure the Expansion Module

Prompt	Response	Description
REQ: TYPE	NEW/CHG 1120/1140/1150	Add new or change existing data. For IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E

Table 81
LD 11 - Configure the Expansion Module (cont'd.)

Prompt	Response	Description										
...										
KEM	(0) - 3/<CR>	Number of attached Expansion Modules (0). Up to three Expansion Modules are supported.										
...										
CLS	KEM3	KEM3 CLS must be defined										
KEY	0 - <see text>/<CR>	Key number range expanded to support number of Expansion Modules specified by KEM prompt. The range on the IP Phone is as follows: <table style="margin-left: 40px;"> <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>	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 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 97 "Connecting the Expansion Module to the IP Phone" \(page 361\)](#) 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 97**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 67 "Wall-mount lever" (page 361) . You can adjust the stand angle to maximum, instead of removing the stand. See Figure 68 "Adjusting the stand angle on the IP Phone" (page 362) .

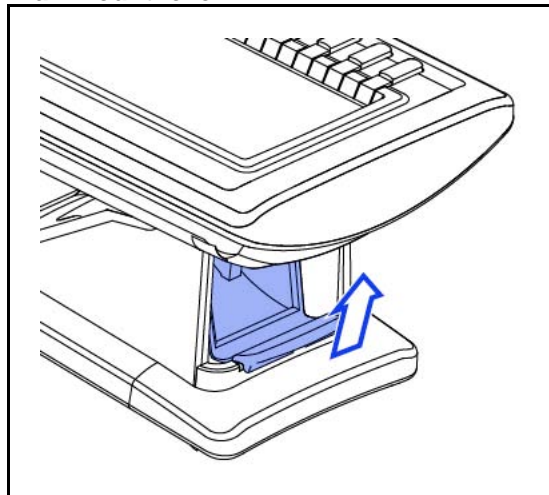
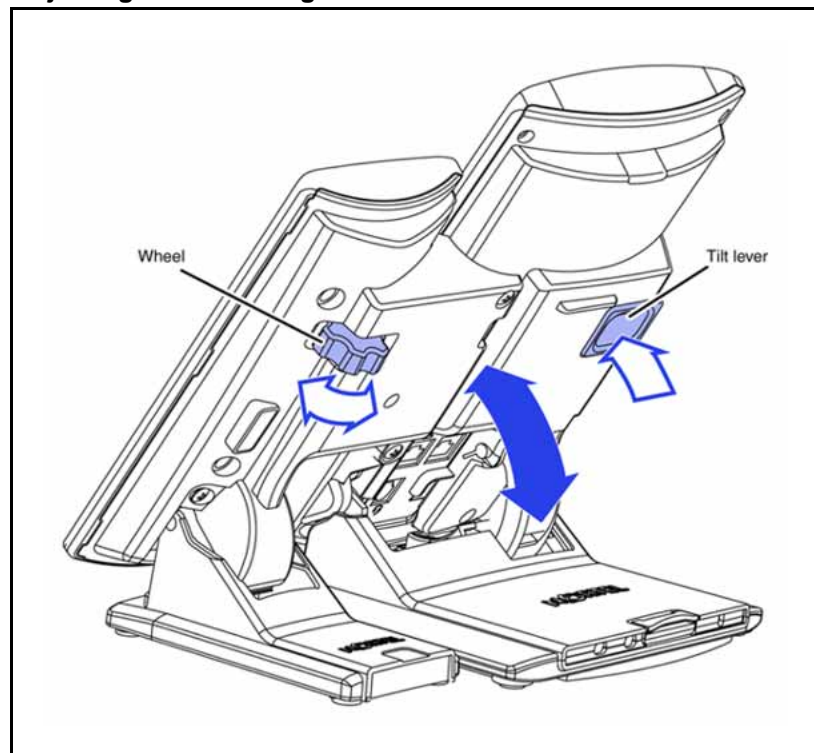
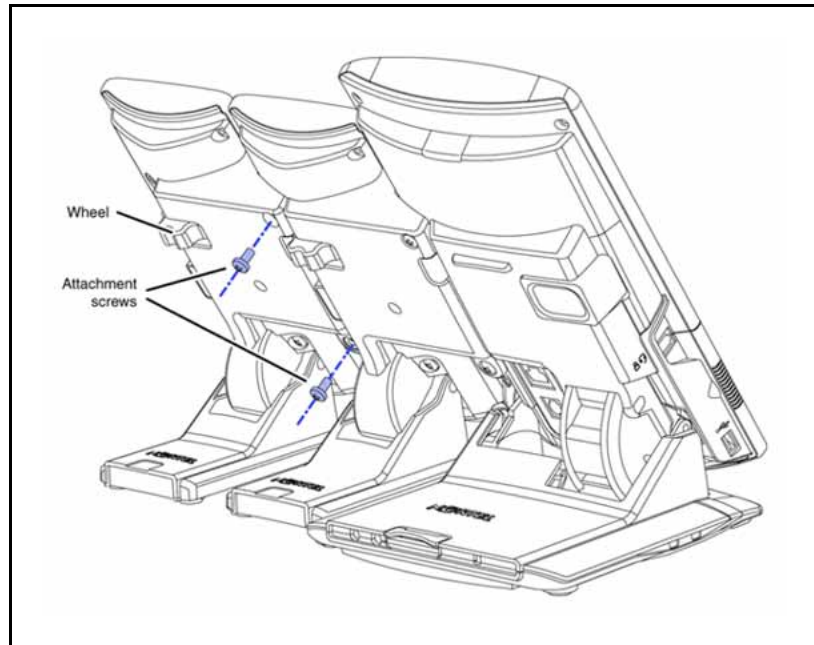
Figure 67**Wall-mount lever**

Figure 68
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 69 "Connecting the Expansion Module" \(page 363\)](#).

Figure 69
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 82 "Startup initialization process for the Expansion Module" (page 364) lists the initialization process for the Expansion Module.

Table 82
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 Modules 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 mode, 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” \(page 367\)](#)
- [“Full Contrast” \(page 367\)](#)
- [“LED Test” \(page 367\)](#)
- [“Character Test” \(page 367\)](#)

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 83 "Display diagnostic operation on the IP Phone and the Expansion Module for IP Phone 1100 Series" \(page 367\)](#) shows the display diagnostic operation on the IP Phones and the Expansion Module.

Table 83

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 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 [“TFTP Server” \(page 593\)](#).

For more information about Expansion Module, see *Expansion Module for IP Phones 1100 Series User Guide* (NN43130-101).

Features

Contents

This section contains the following topics:

- “Telephony features” (page 369)
- “Network features” (page 382)

Telephony features

The IP Phones support the following features (unless otherwise stated).

- “Corporate Directory” (page 370)
- “Personal Directory” (page 370)
- “Redial List” (page 370)
- “Callers List” (page 370)
- “Password Administration” (page 371)
- “IP Call Recording” (page 371)
- “Virtual Office” (page 371)
- “Emergency Services for Virtual Office” (page 371)
- “Active Call Failover” (page 371)
- “Enhanced UNISlim Firmware download” (page 372)
- “Media security” (page 373)
- “Live Dialpad” (page 377)
- “Languages” (page 378)
- “Key number assignments” (page 380)

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 4.0 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* (NN43001-106).

Corporate Directory is not supported on the IP Phone 2001, IP Audio Conference Phone 2033, IP Phone 1110, or IP Phone 1210.

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* (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, IP Phone 1110, or IP Phone 1210.

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* (NN43001-106).

Redial List is not supported on the IP Phone 2001, IP Audio Conference Phone 2033, IP Phone 1110, or IP Phone 1210.

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* (NN43001-106).

Callers List is not supported on the IP Phone 2001, IP Audio Conference Phone 2033, IP Phone 1110, or IP Phone 1210.

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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125) 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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125) and *Features and Services Fundamentals* (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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

Media security

Media security normally shares keys using a secure UNISTim 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
- IP Phone 1210
- IP Phone 1220
- IP Phone 1230

ATTENTION

The IP Softphone 2050 supports media security for CS 1000 Release 5.0 and later. The IP Softphone 2050 supports UNISTim key (USK) SRTP media encryption only.

Media security is not available on the IP Phones 1210, 1220, and 1230 for the following payloads: G.711 10ms, G.723 10ms, and G.729 10ms

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.

ATTENTION

A maximum of 24 characters for a name in the Personal Directory, Callers List, or Redial List can appear in the display area. If PSK SRTP is enabled and the name has the maximum of 24 characters, the last character in the name truncates to display the secure lock icon.

- 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.

ATTENTION

The IP Phone 1210, IP Phone 1220, and IP Phone 1230 do not support 10ms G.729.

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” \(page 375\)](#) . To configure PSK SRTP on the IP Phone, see [“PSK SRTP configuration” \(page 375\)](#) .

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 200 ms.

The automatic provisioning feature enables you to configure SRTP automatically through a provisioning file. For more information, see [“Provisioning the IP Phones” \(page 447\)](#).

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, IP Phone 1110, IP Phone 1210, IP Phone 1220, and IP Phone

1230—[Procedure 98 “Enabling SRTP media encryption on a Phase II IP Phone, IP Phone 1110 or IP Phone 1200 Series” \(page 376\)](#)

- [IP Phone 2007—Procedure 99 “Enabling SRTP media encryption on an IP Phone 2007” \(page 376\)](#)
- [IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E—Procedure 100 “Enabling SRTP media encryption on an IP Phone 1120E, IP Phone 1140E, or IP Phone 1150E” \(page 377\)](#)

For more information about configuring an IP Phone, see the applicable section in this document.

Procedure 98
Enabling SRTP media encryption on a Phase II IP Phone, IP Phone 1110 or IP Phone 1200 Series

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 [“Provisioning the IP Phones” \(page 447\)](#).

Procedure 99
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 100

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.

Normal Mode Indication

The Normal Mode Display notification can be on or off for IP Phones registered in normal mode. This feature prevents the Branch User ID (BUID) overwriting the date and time on the IP Phone 2002, IP Phone 1120E, and IP Phone 1220. This feature also stops infinite scrolling on the IP Phone 2001, IP Phone 1110, IP Phone 1210, and IP Audio Conference Phone 2033.

The Normal Mode Indication menu item is only available for single-line phones with cookie support.

To turn notification on, select Telephone Options > Normal Mode Indication, and then change Normal Mode Display to On.

To turn notification off, select Telephone Options > Normal Mode Indication, and then change Normal Mode Display to Off.

Caller ID display order

The Caller ID can appear in two formats:

- Number, name (Default)
- Name, number

To select the format, select Telephone Options > Caller ID display order.

If you select Number, name, then the Caller ID number always appears on the first line. If the number and name (Calling Party Name Display [CPND] or Proffered Name Match [PNM]) cannot fit on one line, then the name appears on the second or third line.

If you select Name, number, then the Caller ID name always appears on the first line and the number is displayed on the second line. If the name does not exist, the number appears on the first line.

The Caller ID display order menu item is only available for single-line phones with cookie support.

Languages

The IP Phones support the following languages:

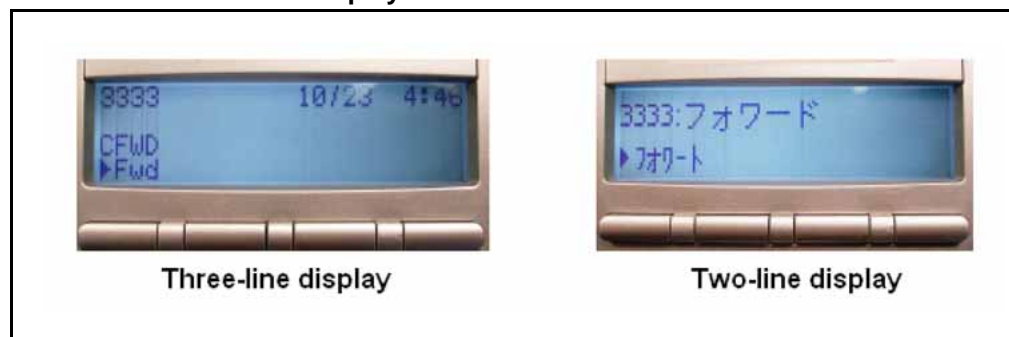
- Arabic
- Chinese Simplified
- Chinese Traditional
- Czech
- Danish

- Dutch
- English
- Finnish
- French
- German
- Greek
- Hebrew
- Hungarian
- Italian
- Japan Kanji
- Japan Katakana
- Korean
- Latvian
- Norwegian
- Polish
- Portuguese
- Russian
- Spanish
- Swedish
- Turkish

With the appropriate downloaded fonts, the IP Phone supports Chinese Simplified, Chinese Traditional, Japanese, and Korean. For more information about downloadable fonts, see [“Language enhancement” \(page 591\)](#).

For the IP Phone 1110 and IP Phone 1210, the IP Phone display changes from three-line mode to two-line mode when the language is Greek, Hebrew, Arabic, Chinese Simplified, Chinese Traditional, Japanese, and Korean. The IP Phone displays two-line mode for these languages as the characters require more space.

Figure 70
Three-line and two-line displays



Key number assignments

This section describes the key number assignments for the IP Phone 2001, IP Phone 2002, IP Phone 2004, IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, IP Phone 1210, IP Phone 1220, and IP Phone 1230. The IP Phone 1150E feature key number assignments are described in [“IP Phone 1150E feature key number assignments”](#) (page 380).

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 a description of the IP Phone function assignment for each soft key, see [“IP Phone context-sensitive soft keys”](#) (page 605).

IP Phone 1150E feature key number assignments

This section describes the following keys supported on the IP Phone 1150E

- [“Self-labeled line/programmable feature keys”](#) (page 381)
- [“ACD fixed feature keys”](#) (page 381)
- [“Soft keys”](#) (page 382)

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 84 "ACD default Agent fixed feature keys" \(page 381\)](#) for a list of the ACD default Agent fixed feature keys or [Table 85 "Supervisor fixed feature keys" \(page 381\)](#) for a list of Supervisor fixed feature keys.

For a description of supported call features, see ["Call features" \(page 607\)](#).

Table 84
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 85
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” \(page 344\)](#). [Figure 61 “IP Phone 1150E display area” \(page 343\)](#) 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 [“IP Phone context-sensitive soft keys” \(page 605\)](#).

Network features

This section provides a description of the following IP Phone network capabilities

- [“Full Duplex ” \(page 382\)](#)
- [“802.1x Port-based network access control” \(page 387\)](#)
- [“802.1ab Link Layer Discovery Protocol” \(page 404\)](#)
- [“Dynamic Host Configuration Protocol” \(page 405\)](#)

Full Duplex

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 the following procedure to enable Full Duplex mode for IP Phone 2001, IP Phone 2002, IP Phone 2004, IP Audio Conference Phone 2033, IP Phone 1210, IP Phone 1220, and IP Phone 1230.

Procedure 101
Enabling Full-duplex mode for 2000 Series and 1200 Series IP Phones

Step	Action
1	Double-press the Services key to access the Local Tools menu. Press 3. Network Configuration to access the configuration menu.
2	If you do not require other configuration changes, press OK repeatedly until the Speed option appears.
3	Select one of the following: <ul style="list-style-type: none"> • 1 for 10 Mb/s • 2 for 100 Mb/s
4	Press OK repeatedly until the Duplex network option appears.
5	Select 1 to enable Full-duplex mode or 2 to enable Half-duplex mode.
6	Select OK to confirm the change.
7	Press OKEnter repeatedly. The IP Phone saves the configuration and then reboots.
8	Restart the IP Phone. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.
--End--	

If 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 to confirm activation of Full Duplex mode.

Procedure 102
Checking Ethernet statistics

Step	Action
1	Double-press the Services key.
2	Use the navigation keys to scroll and highlight Local Diagnostics .
3	Press the Select soft key.
4	Use the navigation keys to scroll and highlight Ethernet Statistics .
5	Press the Select soft key.
6	If Full-duplex mode is active, use the navigation keys to scroll the following information: <ul style="list-style-type: none">• Link: UP• Duplex: Full• Speed: 10 (Mb) or 100(Mb)• Auto-Negotiate Capability: N• Auto Sense/Negotiate• Auto-Negotiate Completed: N• VLANPriority• VLAN ID• PktColl• CRCErrors• FrameError• UcastPktTx• UcastPktRx• BcastPktRx• McastPktRx• 802.1x Status• EAP Status

--End--

Use the following procedure to enable Full Duplex mode for the IP Phone 2007.

Procedure 103
Enabling Full Duplex mode for IP Phone 2007

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 ” (page 521).
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 the following procedure to confirm activation of Full Duplex mode.

Procedure 104
Checking Ethernet Statistics for IP Phone 2007

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--

Use the following procedure to enable Full Duplex mode on the IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E.

Procedure 105
Enabling Full Duplex mode for 1100 Series IP Phones

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. The firmware settings are read and are applied to UPLINK and the PC Ethernet Port.

--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 106 "Checking Ethernet Statistics for IP Phone 1110 Series"](#) (page 387) to confirm activation of Full Duplex mode.

Procedure 106
Checking Ethernet Statistics for IP Phone 1110 Series

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 <ul style="list-style-type: none"> • Link Status: UP • Duplex Mode: Full • Network Speed: 10 MB, 100 MB, or 1 G • Auto Sense/Negotiate <ul style="list-style-type: none"> — Auto-Negotiate Capability: No — Auto-Negotiate Completed: No
--End--	

802.1x Port-based network access control

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.

Extensible Authentication Protocol

Extensible Authentication Protocol (EAP) supports multiple authentication methods, such as EAP-PEAP, EAP-MD5, and EAP-TLS 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.

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 resets then reinitiates a reauthentication. The IP Phone fails to authorize if the credentials that the IP Phone presents do not authenticate. Each EAP type requires different credentials. 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 if MHMA is properly configured on the Layer 2 switch and if the PC successfully authenticates using EAP. Otherwise, the PC disconnects from the network, as well.

If EAP is enabled, multihost must be configured on the Layer 2 switch or PC cannot connect. If MHMA is properly configured, the PC must authenticate, as well. If MHSA is configured, the IP Phone and the PC cannot authenticate and the PC is blocked.

Authentication methods

[Table 86 "IP Phone authentication methods" \(page 388\)](#) shows the authentication methods and the IP Phone it supports.

Table 86
IP Phone authentication methods

Authentication method	IP Phone
EAP MD5	IP Phone 2001, IP Phone 2002, IP Phone 2004, IP Audio Conference Phone 2033, IP Phone 1210, IP Phone 1220, IP Phone 1230, IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E
EAP PEAP, EAP TLS	IP Phone 1210, IP Phone 1220, IP Phone 1230, IP Phone 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E

EAP-TLS requires root and device certificates while EAP-PEAP requires a root certificate only.

If you configure EAP-TLS, then the root and device certificate must first be installed on the phone. The Certificate Authority (CA), Domain Name, and Hostname (optional) must be configured on the phone. After configuration, the phone uses Simple Certificate Enrollment Protocol (SCEP) to request the root and devices certificates from the CA Server. To install the root

certificate, you can be prompted to accept the root certificate fingerprint. You can permanently save the root certificate and the device certificate in the trusted certificate store.

It is possible to install more than one customer root certificate on the phone if more than once Certificate Authority is used.

The IP Phone sends a request to server to obtain a root certificate and a device certificate.

If you configure EAP-PEAP, the root certificate extracts from the configuration file and stores in the trusted certificate store.

If the certificate installation fails, EAP-TLS or EAP-PEAP does not initialize. The IP Phone does not authenticate and cannot access the network.

802.1x EAP enhancements

This section describes 802.1x EAP enhancements for the IP Phones.

The IP Phones require root certificates.

After the IP Phone powers up for the first time the Nortel root certificates automatically configure.

Customer Certificates must be validated and signed. For more information about validating Customer Certificates, see [“Validating certificates” \(page 391\)](#) “. After you install the root certificates on the IP Phone, all customer-created installable files, such as Customer Certificates or Certificate Revocation Lists (CRL) must be properly signed or the IP Phone rejects the files. The signature attached to a file must be created by a certificate with a valid certificate chain that is rooted in the customer root certificate. Device Configuration and Security Policy installable files are also supported although they are rarely used. For more information about signing the files, see [“File signing” \(page 393\)](#) .

Installing the first customer certificate on the IP Phone

You must install customer certificates if you use EAP-TLS or EAP-PEAP. Install a customer root certificate on the phone to provide a trust anchor to verify a signature on a signed configuration file or to verify a certificate presented by the server end of a TLS connection. The trust anchor must either have issued the presented certificate or there must be a valid certificate chain that can validate to the trust anchor. In other words, the installed certificate is the customer’s Certificate Authority (CA). The CA can be a third party CA or a self-signed root certificate.

For certificate chaining, the TLS server or the digital file signing process must ensure that all certificates in the chain up to, but not including, the trust anchor are provided. Otherwise, the certificate chain cannot be validated by the phone. After one customer root certificate installs on the phone, all customer configuration files (including additional certificate files) must be signed or they reject without any user input or options. It is possible to install more than one customer root certificate on the phone if more than once Certificate Authority is used.

Use the following procedure to install the first customer certificate on the IP Phone.

Procedure 107
Installing the first customer certificate on the IP Phone

Step	Action
1	Export the public CA certificate in Privacy Enhanced Mail (PEM) format. The exporting process depends on the management certificate program (for example, Microsoft CA Server, OpenSSL, EJBCA). Keep the private key secure and do not install the private key on the phone.
2	If you store more than one certificate in PEM format in this file, insert a blank line to separate the certificates. See Figure 75 "Certificate file with more than one certificate" (page 403) .
3	Add a section to the configuration file for each IP Phone where FILENAME is the name of the file created in step 1 . For more information about the configuration file, see "Configuration file" (page 397) .
4	Use DHCP or manual configuration to properly set the Provisioning Server address.
5	Reboot the IP Phone.
6	When the phone connects to the provisioning server, the [USER_KEYS] section is read and the file(s) downloads.
7	Select Install to proceed. The phone displays the fingerprint of the certificate file.
8	Select Accept to install the certificate on the IP Phone. For more information about certificate validation options, see "Validating certificates" (page 391) .
--End--	

It is possible to change the default behavior described in [Procedure 107 "Installing the first customer certificate on the IP Phone" \(page 390\)](#) so that the user must enter the fingerprint of the certificate file rather than just accept a displayed value. To do this, you must change the Security Policy on the phone. For more information about the Security Policy, see ["Security Policy" \(page 398\)](#) .

All new certificates that are received and are meant to be stored on the IP Phone must be validated. Certificates that are digitally signed and can be authenticated using one of the certificates in the trusted certificate store are considered validated and do not require user input. If one or more Customer Certificates are installed in the IP Phone trusted certificate store, any certificate that does not pass the digital authentication is rejected and an error is logged.

If Customer Certificates are not installed in the trusted certificate store on the IP Phone, you can use one of the following methods to manually validate an unsigned certificate

- Manual A (default)
- Manual B

Manual A

If the file containing a Customer Certificate is not signed a prompt appears on the screen with a fingerprint for the file as a whole, regardless of the number of certificates contained in the file. If you confirm that the fingerprint is correct, all certificates in the file validate and save. You cannot use this method to validate Nortel certificates.

Manual A uses a 20 digit (64 bit) fingerprint. You must confirm the fingerprint, which appears on the screen. See [Figure 71 "Fingerprint verification" \(page 392\)](#).

The screen shows the file type and a prompt to install or reject the file. After 30 seconds, the prompt times out and the certificate is automatically rejected.

Figure 71
Fingerprint verification



If you select **Install**, the 20-character fingerprint value displays. See [Figure 72 "Fingerprint value screen"](#) (page 392).

Figure 72
Fingerprint value screen



You must verify the fingerprint is correct and either select **Accept** or **Reject** based on the verification. A 5-minute timeout occurs so you can perform the verification, after which the screen disappears. The file rejects if you take no action.

Manual B

Manual B uses a 20 digit fingerprint.

If the file containing a service provider certificate is not signed you must enter a fingerprint for the file as a whole, regardless of the number of certificates contained in the file. If you enter the correct fingerprint, all certificates in the file validate and save. This is more secure than Manual A as the tendency would be to automatically accept the prompted value.

In Manual B mode, the description of the file presents and you are prompted to enter the fingerprint you receive for example, by email.

If you select **Install** the file type, a prompt to enter the fingerprint and a cursor appears on the screen. See [Figure 72 "Fingerprint value screen" \(page 392\)](#).

Enter the fingerprint and select **Accept**. If the fingerprint is correct, the certificate saves and the IP Phone continues with its operation. If the fingerprint is incorrect an error message displays for a few seconds and you are prompted again to re-enter the fingerprint.

See [Figure 72 "Fingerprint value screen" \(page 392\)](#).

After 3 consecutive errors, the certificate rejects and the IP Phone continues its operations. A 30-second timeout occurs after which the screen disappears and the certificate rejects.

A file is signed by appending a digital signature, which is created using a Signing Certificate. The Signing Certificate must either be directly issued by a CA root certificate installed on the phone or there must be a certificate chain that can be followed, which ends with a CA root certificate installed on the phone. In either case, there must be a trust anchor on the phone, which can verify the authenticity of the Signing Certificate.

Certificate requirements

The file signing certificate requires the following minimum attributes

- Version—3
- Key Usage—Digital signature

- Extended Key Usage—Code signing, secure email
- Key—1024 bits

In addition, the Signing Certificate cannot be a self-signed root certificate and must have a valid Subject Key Identifier and an Authority Key Identifier (which uniquely identifies the issuing certificate).

Certificate authority requirements

You can use many commercial CAs, Open source CAs, such as OpenSSL, and EJBCA to create and manage these certificates. The CA must meet the following requirements:

- The root certificate must be exportable in PEM format without the private key.
- The CA must be capable of issuing a Signing Certificate with the above attributes and an exportable private key.

This requirement can require additional CA configuration. Often in commercial CAs the private key is not exportable by default. However, the Signing Certificate private key only required if the CA does not provide built-in support for the creation of detached PKCS7 signatures.

Signed file structure

A signed file consists of the following two parts

- original unsigned file content
- digital signature

The two parts are appended together with the original unsigned file content first, followed by the digital signature.

The signature must be in the form of a PKCS7 detached signature of the file in PEM format. A detached signature is a signature that does not embed the content that is signed. [Figure 73 "Signed certificate file" \(page 395\)](#) provides an example of a signed file.

ATTENTION

Do not insert additional characters between the two parts. Otherwise the validation fails.
--

ATTENTION

Do not change any information from the original file content that was used to create the signature. Otherwise the signature becomes invalid and new signature must be created.
--

You can use the following script to generate a signed file using OpenSSL (version 0.9.8a or greater) on Linux. The input requirements in the script include:

- Unsigned data file
- Public Signing Certificate
- Private key for the Signing Certificate

ATTENTION

The signing certificate and associated private key must be exported from the Certificate Management system. Some Certificate Management systems (for example, Microsoft CA Server) restrict the ability to export the private key. You must take care when you generate certificates to ensure that you properly configure the ability to export.

You should sign the file in a secure environment because the signing certificate private key must be accessible. If the private key is password-protected, you must enter this password to successfully create a signature.

[Table 87 " OpenSSL-based Linux script for file signing" \(page 396\)](#) provides an example of Open SSL-based Linux script for file signing.

Table 87
OpenSSL-based Linux script for file signing

```
#!/bin/sh
# $1 - Input Unsigned File
# $2 - Signing Certificate
# $3 - Signing Certificate Private Key
# $4 - Output Signed File

unsigned_file=$1
sign_cert_file=$2
sign_cert_pk_file=$3
signed_file=$4

# Setup temporary files
tmp_signature_file="/tmp/resource$$ .tmp"

# Create a detached signature
openssl smime -sign -in ${unsigned_file} -signer ${sign_cert_file} -outform
PEM -binary -inkey ${sign_cert_pk_file} -out ${signed_file}

# Now append the signature to the unsigned file
cat ${unsigned_file} ${tmp_signature_file} > ${signed_file}

# Clean up
rm -f ${tmp_signature_file}
```

[Table 88 " OpenSSL-based Windows script for file signing" \(page 397\)](#) provides an example of Open SSL-based Windows script for file signing.

Table 88
OpenSSL-based Windows script for file signing

```

REM %1 - Input Unsigned File
REM %2 - Signing Certificate
REM %3 - Signing Certificate Private Key
REM %4 - Output Signed File

set unsigned_file=%1
set sign_cert_file=%2
set sign_cert_pk_file=%3
set signed_file=%4

REM Setup temporary files
set tmp_signature_file="sig.tmp"

REM Create a detached signature
openssl smime -sign -in %unsigned_file% -signer %sign_cert_file% -outform
PEM -binary -inkey
%sign_cert_pk_file% -out %tmp_signature_file%

REM Now append the signature to the unsigned file
copy /y /b %unsigned_file% + %tmp_signature_file% %signed_file%

REM Clean up
del %tmp_signature_file%

```

You can use other Certificate Management systems if the system includes the ability to generate a detached signature.

Configuration file

This section describes customer certificate files options and effects.

Each phone type has a unique default name for the configuration file. For example, the default name for the 1140e is 1140e.cfg. You can use the configuration file to specify the firmware to install on the phone and to specify other downloadable files. The configuration file downloads (if available) when the phone boots. All sections defined in the file process in the order they are specified in the file. For each section in the file, one or more files can be downloaded.

The format of the [USER_KEYS] section in the configuration file triggers the download of a customer certificate.

```

[FW]
DOWNLOAD_MODE AUTO
VERSION 0625C68
PROTOCOL TFTP
FILENAME 0625C68.bin
[USER_KEYS]
DOWNLOAD_MODE AUTO
VERSION 1

```

```
PROTOCOL TFTP
FILENAME cacert.pem
[DEVICE_CONFIG]
DOWNLOAD_MODE AUTO
VERSION 3
PROTOCOL TFTP
FILENAME *.dev.sig
```

The order of the sections in the file can affect whether files successfully download. All customer-defined files must be signed after a customer root certificate is installed on the phone so all sections that appear after [USER_KEYS] which download customer files must be signed. In the example above, the Device Configuration file must be signed or it does not install on the phone. Nortel recommends that you place the [USER_KEYS] section before all sections so that subsequent downloads do not fail.

Nortel supplied files are always signed. You can specify TFTP, HTTP, or FTP protocol. You can specify more than one FILENAME although be careful when you use this feature with certificates as only the first certificate file can download unsigned. The asterisk (*) in the Device Configuration filename indicates that when the phone attempts to download the file, it substitutes the "*" with the MAC address of the phone. This allows phone-specific configuration files but if a customer root certificate is installed, all phone-specific files must be signed, as well. For the special case of certificate download ([USER_KEYS]), the VERSION is required but it is not actually used. The certificate(s) always downloads, however, if the certificate already exists in the phone, it does not save. The VERSION is ignored because the certificate completely identifies itself and its version internally. This allows the same configuration file to be used even after the customer root certificate is installed.

Security Policy

The Security Policy defines some optional elements of certificate management and defines the authentication procedure for some (but not all) unsigned installable customer files.

You can download a Security Policy to the phone using the [SEC_POLICY] section in the configuration file. An example Security Policy is shown in [Table 89 "Security policy" \(page 399\)](#). If a customer certificate does not exist, accept the security policy file by confirming a displayed fingerprint. If a customer certificate exists, the Security Policy file must be signed and authenticated before it can update.

[Table 89 "Security policy" \(page 399\)](#) provides an example of the security policy and the default values.

Table 89
Security policy

SEC_POLICY_ACCEPT	VAL_MANUAL_A
CUST_CERT_ACCEPT	VAL_MANUAL_A
CERT_EXPIRE	LOG_EXPIRE

Table 90 "Security Policy parameters" (page 399) provides a description of the Security Policy parameters.

Table 90
Security Policy parameters

Security parameter	Description
SEC_POLICY_ACCEPT	<p>This parameter defines how an unsigned Security Policy (SEC_POLICY) authenticates when downloaded to a phone with no customer certificate installed. If a customer certificate is installed on the phone, the Security Policy file must be signed and this parameter has no effect.</p> <p>Acceptable values</p> <p>VAL_MANUAL_A (default)—you must accept a displayed fingerprint</p> <p>VAL_MANUAL_B —you must enter the correct fingerprint</p> <p>VAL_NO_MANUAL—always reject unsigned Security Policy files</p>
CUST_CERT_ACCEPT	<p>This parameter defines how an unsigned Certificate file (USER_KEYS) authenticates when downloaded to a phone without an installed customer certificate (for example, the first certificate download only). If a customer certificate was previously installed on the phone, the Certificate file must be signed and this parameter has no effect.</p> <p>Acceptable values</p> <p>VAL_MANUAL_A (default)—you must accept a displayed fingerprint</p> <p>VAL_MANUAL_B —you must enter the correct fingerprint</p> <p>VAL_NO_MANUAL—always reject unsigned Security Policy files</p>

Security parameter	Description
CERT_EXPIRE	<p>This parameter defines how expired certificates are handled. The default behavior is to log an expired certificate and not delete it. If a certificate is determined to be expired based on the current system time, it cannot be used to authenticate a signature, regardless of the value of this parameter.</p> <p>Acceptable values</p> <p>DELETE_CERT—permanently delete a certificate when it expires</p> <p>LOG_EXPIRE(default)—log an expired certificate but do not delete it</p> <p>NO_EXPIRE_LOG—do not delete an expired certificate and log no event</p>

The SEC_POLICY_ACCEPT and CUST_CERT_ACCEPT parameters define how these two file types authenticate when customer certificates are not installed. All other customer created files, which download to the phone are automatically accepted if customer certificates are not installed. If customer certificates are installed on the phone, then the Device Configuration file must be signed in addition to the Security Policy and Certificate files.

EAP TLS

To support EAP-TLS, the phone must obtain the CA root certificate and then request its own device certificate. Currently, the only mechanism that can be used to complete this configuration is the Simple Certificate Enrollment Protocol (SCEP). SCEP is a protocol that can obtain a device certificate from a CA. SCEP is only intended to be used in conjunction with EAP-TLS. If EAP-TLS is enabled, the SCEP client on the phone requests a device certificate using the following process:

1. The phone sends a `GetCACert` request to the SCEP server.
2. The SCEP server responds with the CA certificate.
3. If the CA certificate is not already on the phone, the fingerprint computes and displays.
 - a. The user must accept or reject the fingerprint.
 - b. If the user rejects the fingerprint, the SCEP process terminates.
 - c. If the user accepts the fingerprint, the CA certificate permanently stores on the phone.

The EAP-TLS CA root certificate permanently installs on the phone if it is accepted. If the SCEP process is performed at a later date (for example, the device certificate request failed the first time), then the

user is not prompted to accept the CA root certificate because it is already on the phone and is trusted.

4. The phone creates a certificate request using the CA certificate and a locally generated private key.
5. The phone sends `PKCSReq` to the SCEP server which includes the certificate request.
6. The SCEP server responds with either a failure status or with a properly signed device certificate.
7. If a device certificate returns, it installs on the phone.

ATTENTION

After the EAP-TLS CA root certificate installs on the phone during the SCEP process, installable customer files (Security Policy, Certificates, Device Configuration) must be signed or they reject.

If you use the same CA for EAP-TLS and for the file signing, which Nortel recommends, it is not necessary to install any other certificates. This means that you are not required to add [USER_KEYS] to the configuration file. However, if EAP-TLS is not configured, use [USER_KEYS] to install a CA root certificate rather than SCEP.

If you use different CAs for EAP-TLS and file signing, it is necessary to install the CA root certificate for file signing on the phone, as well. In this case, the order in which you perform the configuration is important. If the EAP-TLS CA root certificate is installed first using SCEP, it is necessary to install the file signing CA root certificate on the phone by signing it with a certificate from the EAP-TLS certificate chain. Otherwise, it is not possible to install the file signing root certificate on the phone.

Nortel recommends that you install the file signing certificate first because no additional requirements are imposed on the installation of the EAP-TLS certificate, provided it is retrieved using SCEP.

[Figure 74 "Certificate file with one certificate" \(page 402\)](#) provides an example of the certificate file with one certificate.

Figure 74
Certificate file with one certificate

```

-----BEGIN CERTIFICATE-----
MIID8TCCA1qgAwIBAgIIQ5c1hFIJ0AowDQYJKoZIhvcNAQEFBQAwZUxhZGJmZG91
BAYTAKNBMRAwDgYDVQQIEwdPbnRhcmlvMRMwEQYDVQQHEwpCZWxsZXZpbGx1MQ8w
DQYDVQQKEwZ0b3J0ZWwxFtATBgNVBAsTDElQVCBTZW50eTEwEjEwMDUwMDUw
d3d3Lm5vcnRlbC5jb20xHjAcBgkqhkiG9w0BCQEW2luZm9Abm9ydGVsLmNvbTAe
Fw0wNjAxMDEwMjAwMDAwODAxMzExMjAwMDAwMIGYMQswCQYDVQQGEwJDQTEQ
MA4GA1UECBMT250YXJpbzETMBEGA1UEBxMKQmVsbGV2aWxsZTEPMA0GA1UEChMG
Tm9ydGVsMRgwFgYDVQQLEw9JUFQgU2VjdXJpdHkgUTQxZAVBgnVBAmtDnd3dy5u
b3J0ZWwvY29tMR4wHAYJKoZIhvcNAQkBFg9pbmZvQG5vcnRlbC5jb20wgZ8wDQYJ
KoZIhvcNAQEBBQADgY0AMIGJAoGBA0ID5IuhPFhGopRn3d03iqxPFJIGXZvEC4mG
8FlfDvseZZoBShKThQo5dPkpOtxFnKpWx1f2t8rWapinuaZQfIXCAKlbJ5zaTAo5
WrmVLUizQResCmsrS3XNRax8YJk5a2PJZ7DktuepyCrIxTgQmUos4MR8EgQBj+JQ
mUwa49vXAgMBAAGjggFDMIIBPzAZBgNVHREEEjAQgg53d3cubm9ydGVsLmNvbTAJ
BgNVHRMEAjAAMBOGA1UdDgQWBBS0TD1Rxt01WsfceSAKiGUQK7InKzCBxQYDVR0j
BIG9MIG6gBSU1H/qBalZofJQ7raTJVb5QSix9qGBm6SBmDCB1TELMakGA1UEBhMC
Q0ExEDA0BgNVBAGTB09udGFyaW8xEzARBgNVBACTCk1lbGxldm1sbGUxZDZANBgNV
BAoTBk5vcnRlbDEVMBMGGA1UECXMMSVBUIFN1Y3VyaXR5MRcwFQYDVQQDEw53d3cu
bm9ydGVsLmNvbTEeMBwGCSSqGSIB3DQEJARYPaW5mb0Bub3J0ZWwvY29tggQpHWPq
MA4GA1UdDwEB/wQEAwIHGDAGBgNVHRSUBAaf8EFjAUBggRBgEFBQcDAwYIKwYBBQUH
AwQwDQYJKoZIhvcNAQEFBQADgYEAN1+9vmar7smsQQFG9YRa8BY0CVsVbOqto8Wi
WgA1mL/jeGJFByarDG+P6GDwQDYEzbURb2TE6GMBh5RKxaudbmXPX0TrJiSOYL1q
NeSN9N41CutH3msOVrRilHsR6XZ1vr8dCDH7d0ICym41TUVj8iWz2F87idvXc9X2
GWcEk3g=
-----END CERTIFICATE-----

```

Figure 75 "Certificate file with more than one certificate" (page 403) provides an example of the certificate file with more than one certificate.

Restore factory defaults

If you invoke Restore factory default, the security settings restore to the following default values:

- Delete all non-Nortel certificates and non-Nortel CRLs from the phone
- Purge all security log entries on the phone
- Restore the “last-known-time” to the factory default value
- Reset all Security Policy values to their defaults
- Add a security log entry to indicate that restore to factory defaults was invoked

Security log

All security related events log in the security log. For example, the following list provides some events that log in the security log.

- Import a certificate
- Update a certificate
- Update the security policy
- Revoke a certificate
- Certificate expiry
- File authentication fail - firmware, resource, configuration
- Manual file authentication rejection

802.1ab Link Layer Discovery Protocol

802.1ab Link Layer Discovery Protocol is available for 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 Phone 1210

- IP Phone 1220
- IP Phone 1230

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 [“Provisioning the IP Phones” \(page 447\)](#).

Dynamic Host Configuration Protocol

This section provides information about Dynamic Host Configuration Protocol (DHCP) server installation, configuration, and operation.

If you are not familiar with DHCP, Nortel recommends reading Request for Comments (RFC) 2131 "Dynamic Host Configuration Protocol", RFC 1533 "DHCP Options and BOOTP Vendor Extensions", and the Help manual for the DHCP server on the host.

IP Phones

IP Phones function as a telephone to the Meridian 1 and CS 1000 systems. The IP Phone encodes voice as binary data and packetizes the data for transmission over an IP network to the Call Server, to the Terminal Proxy Server (TPS), or to another IP Phone.

The Phase II IP Phones (IP Phone 2001, IP Phone 2002, and IP Phone 2004), IP Audio Conference Phone 2033, and IP Softphone 2050 can act as a DHCP client in one of two modes:

- partial DHCP mode
- full DHCP mode

The IP Phone 2007, IP Phone 1110 Series, and IP Phone 1200 Series act as a DHCP client in auto DHCP mode.

IP Phone parameters can be entered manually or obtained automatically. For more information, see [“Provisioning the IP Phones” \(page 447\)](#).

All the IP Phone configuration parameters can be entered manually. Each IP Phone requires the network configuration parameters, Connect Server parameters, IP Telephony node ID, and Virtual TN. If there are a number of IP Phones to configure, manual configuration is time-consuming and prone to error. Using full or partial DHCP or auto DHCP to automatically configure the IP Phones is more efficient and flexible. This ensures that current information is used.

Auto DHCP mode

When an IP Phone 2007, IP Phone 1110 Series, or IP Phone 1200 Series is configured to operate in Auto DHCP mode, the DHCP Server provides the network configuration parameters from the DHCP server.

Partial DHCP mode

When the Phase II IP Phone (IP Phone 2001, IP Phone 2002, and IP Phone 2004), IP Audio Conference Phone 2033, or IP Softphone 2050 is configured to operate in partial DHCP mode, the DHCP server needs no special configuration to support IP Phones. The IP Phone receives the following network configuration parameters from the DHCP server:

- IP address configuration for the IP Phone
- subnet mask for the IP Phone IP address
- default gateway for the IP Phone LAN segment

In partial DHCP mode the Connect Server parameters, node ID, and Virtual TN must be entered manually.

Full DHCP mode

When the Phase II IP Phone (IP Phone 2001, IP Phone 2002, and IP Phone 2004), IP Audio Conference Phone 2033, or IP Softphone 2050 is configured to operate in full DHCP mode, the DHCP server requires special configuration. The IP Phone obtains network configuration parameters and Connect Server configuration parameters from specially-configured DHCP servers.

The following parameters are provided for the primary and secondary Connect Servers:

- Connect Server IP address — for IP Line, the Connect Server IP address is the IP Telephony node IP address.
- port number = 4100
- command value = 1; identifies the request to the Connect Server as originating from an In partial DHCP mode the Connect Server parameters, node ID and Virtual TN must be entered manually.
- retry count = 10 (typically)

The IP Telephony node ID and Virtual TN must always be configured manually even in full DHCP mode.

Configuring the DHCP server to support full DHCP mode

The DHCP capability of the IP Phone enables the phone to receive network configuration parameters and specific Connect Server parameters. This section describes the IP Phone unique class identifier and requested network configuration and Connect Server parameters for automatic configuration.

IP Phone class identifier

The IP Phone is designed with a unique class identifier that the DHCP server can use to identify the telephone. All Nortel IP Phones use the text string Nortel-i2004-A or Nortel-i2004-B. The ASCII string is sent inside the Class Identifier option of the IP Phone DHCP messages.

The DHCP server also includes the string in its responses to the IP Phone DHCP client. This makes it possible to notify the IP Phone that the server is IP Phone-aware, and that it is safe to accept the server's offer. This string appears in the beginning of a list of specific Call Server or TPS information that the IP Phone DHCP client requests.

When the DHCP server is configured to recognize the IP Phone as a special class, the DHCP server can treat the IP Phone differently than other DHCP clients. DHCP host configuration parameters can then be

grouped by class to supply only information relevant to the IP Phone DHCP client, such as the Connect Server parameters. The administrator can also design the network according to the client's class, if necessary, making maintenance easier.

Depending on the capabilities and limitations of the DHCP server used and the design of the network, some of these advanced functions are not available.

Requested network configuration parameters

In full DHCP mode, an IP Phone-aware DHCP server can automatically configure Nortel IP Phones by requesting a list of Connect Server configuration parameters. The IP Phone uses DHCP to request and receive the information.

[Table 91 "IP Phone network configuration parameters" \(page 408\)](#) lists the network configuration parameters requested by the IP Phone in the Parameter Request List option (Option Code 55) in the DHCPDISCOVER and DHCPREQUEST messages. The DHCPOFFER and the DHCPACK reply messages from the DHCP server must contain the options in [Table 91 "IP Phone network configuration parameters" \(page 408\)](#).

Table 91
IP Phone network configuration parameters

Parameters requested by IP Phone (Option Code 55)	DHCP server response: Option Code
Subnet mask — the client IP subnet mask	1
Router/gateway(s) — the client default gateway IP address (not required in DHCPOFFER in IP Phone Firmware 1.25 and later for compatibility with Novell DHCP server)	3
DNS Server IP	6
DNS domain	15
Lease time — implementation varies according to DHCP server	51
Renewal time — implementation varies according to DHCP server	58
Rebinding interval — implementation varies according to DHCP server	59
TFTP Server Name	66

Table 91
IP Phone network configuration parameters (cont'd.)

Parameters requested by IP Phone (Option Code 55)	DHCP server response: Option Code
IP Line site-specific or vendor-specific encapsulated or site options.	43, "128" (page 409), 131, 144, 157, 188, 191, 205, 219, "223" (page 409), 224, 227, 230, 232, 235, 238, 241, 244, 247, 249, 251, and 254
RFC 3942 states that DHCP site-specific options 128 to 223 are hereby reclassified as publicly defined options. The IP Phone supports 9 vendor specific options in this range and continues to do so for backward compatibility. However, as suggested in RFC 3942, the use of these options is discouraged to avoid potential future collisions.	

The first eight parameters in [Table 91 "IP Phone network configuration parameters" \(page 408\)](#) are standard DHCP options and have pre-defined option codes. The last parameter is for Call Server or TPS information, which do not have a standard DHCP option. The server administrator must define a vendor-encapsulated or site-specific option or both to transport this information to the IP Phone.

This non-standard information includes the unique string identifying the IP Phone and the Connect Server parameters for the primary and secondary servers. The IP Phone must receive the Connect Server parameters to connect to the IP Telephony node.

The administrator must use one of the site-specific or vendor-encapsulated option codes to implement the Call Server or TPS information. This user-defined option can then be sent as-is, or encapsulated in a Vendor Encapsulated option with Option Code 43. The method used depends on the DHCP server's capabilities and what options are already in use by other vendors.

The IP Phone rejects any DHCP OFFER and DHCP ACK messages that do not contain the following options:

- a router option — IP Phone requires a default gateway (router)
- a subnet mask option
- a vendor-specific option or a site-specific option

The vendor-specific option code is 43. A Windows NT DHCP Server (up to SR4) supports only 16 octets of data for the vendor-specific option, which is insufficient to support the minimum length of the IP

Phone-specific string. If you use a Windows NT DHCP Server, select the Site Specific option to accommodate the IP Phone-specific string.

The site-specific options are all DHCP options between 128 (0x80) and 254 (0xFE). These options are reserved for site-specific use by the DHCP RFCs.

ATTENTION

Phase 0 and Phase I IP Phones cannot accept a DHCP OFFER that contains a list of OPTIONS larger than 312 bytes. If the total size of the DHCP OPTIONS is larger than 312 bytes the Phase 0 and Phase I 1 IP Phones do not successfully boot and register to the TPS.

Format for IP Phone DHCP Class Identifier option

All IP Phones fill in the Class ID option of the DHCPDISCOVER and DHCPREQUEST messages with the null-terminated, ASCII-encoded string Nortel-i2004-A or Nortel-i-2004-B, where A or B identifies the version number of the information format of the IP Phone.

The Class Identifier Nortel-i2004-A and Nortel-i-2004-B must be unique in the DHCP server domain.

The following definition describes the Nortel-specific, encapsulated IP Phone Vendor Specific Option. This option must be encapsulated in a DHCP vendor-specific option (refer to RFC 1533) and returned by the DHCP server as part of each DHCP OFFER and DHCPACK message for the IP Phone to accept these messages as valid. The IP Phone extracts the relevant information from this option and uses it to configure the Connect Server IP address, the port number (4100), a command value (1), and the retry count for the primary and secondary Connect Servers.

Either this encapsulated Vendor Specific Option or a similarly encoded site-specific option must be sent. The DHCP server must be configured to send one or the other, but not both. The choice of using the vendor-specific or the site-specific option is provided to enable Windows NT DHCP servers to support the IP Phone. Windows NT servers do not properly implement the Vendor Specific Option, and as a result, Windows NT implementations must use the Site Specific version.

The format of the encapsulated Vendor Specific option is Type, Length, and Data, described in the following sections.

Type (1 octet):

There are five types:

- 0x80 (Site Specific option 128)
- 0x90 (Site Specific option 144)
- 0x9d (Site Specific option 157)
- 0xbf (Site Specific option 191)
- 0xfb (Site Specific option 251)

The choice of five types enables the IP Phone to work one or more values are already in use by a different vendor. Select one value for the Type byte.

Length (1 octet)

The Length value is variable. Count only the number of octets in the data field. See [“Data \(variable number of octets\)” \(page 411\)](#) .

Data (variable number of octets)

The Data field contains an ASCII-encoded character string as follows:

```
Nortel-i2004-A,iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:ppppp,aaa,rrr.
```

This string can be NULL-terminated, although the NULL is not required for parsing.

The parameters for the data field are described in [Table 92 "Data field parameters" \(page 411\)](#) and in the notes following the table.

Table 92
Data field parameters

Parameter	Description
Nortel-i2004-A	Uniquely identifies that this is the Nortel option, and is a response from a server that can provide the correct configuration information to the IP Phones.
iii.jjj.kkk.lll:ppppp	Identifies IP address and port number for server (ASCII-encoded decimal)
aaa	Identifies action for server (ASCII encoded decimal, range 0 to 255)

Table 92
Data field parameters (cont'd.)

Parameter	Description
rrr	Identifies retry count for server (ASCII encoded decimal, range 0 to 255)
comma (,)	ASCII "," separates fields.
colon (:)	ASCII ":" separates the IP address of the bootstrap server node IP address from the Transport Layer port number.
semicolon (;)	ASCII ";" separates the Primary from Secondary bootstrap server information. The bootstrap server is the Active Leader of the IP Telephony node.
period (.)	ASCII "." signals end of structure.

- "aaa" and "rrr" are ASCII encoded decimal numbers with a range of 0 to 255. They identify the "Action Code" and "Retry Count", respectively, for the associated TPS server. They are stored as one octet (0x00 to 0xFF) in the IP Phone. These fields must be no more than three digits long.
- Two Connect Servers and an optional external application server (XAS) can be specified in the DHCP string:
 - The first Connect Server is always considered primary.
 - The second Connect Server is always considered secondary.
 - An optional XAS can be appended to the Connect Servers.
- The string enables the configuration of information for two Connect Servers. One Connect Server exists for each IP node. In the typical system configuration of a single IP node, only the primary Connect Server is required. In this case, the primary Connect Server string must end with a period (.) instead of a semi-colon (;). For example:
`Nortel-i2004-A,iii.jjj.kkk.lll:ppppp,aaa,rrr`

If the secondary Connect Server portion of the string is specified, then the string information is typically the same as the primary Connect Server information. For example:

```
Nortel-i2004-A,iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:ppppp,aaa,rrr
```

When the Enhanced Redundancy for IP Line Nodes feature is used, two different Connect Server strings can be configured, separated with a semi-colon (;). This enables the telephone to register to two different nodes. For more information about the Enhanced Redundancy for IP Line Nodes feature, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

- Action code values:
 - 0 — reserved
 - 1 — UNISlim Hello (currently this type is the only valid choice)
 - 2 to 254 — reserved
 - 255 — reserved
- `iii.jjj.kkk.lll` are ASCII-encoded decimal numbers representing the IP address of the server. They do not need to be three digits long because the `.` and `:` delimiters guarantee parsing. For example, `'001'`, `'01'`, and `'1'` would be parsed correctly and interpreted as value 0x01 internal to the IP Phone. These fields must be no longer than three digits.
- `ppppp` is the port number in ASCII-encoded decimal. It does not need to be five digits long as the `:` and `,` delimiters guarantee parsing. For example, `'05001'`, `'5001'`, `'1'`, `'00001'` would be parsed correctly and accepted as correct. The valid range is 0 to 65535 (stored internally in the IP Phone as hexadecimal in range 0 to 0xFFFF). This field must be no longer than five digits.
- In all cases, the ASCII-encoded numbers are treated as decimal values and all leading zeros are ignored. Specifically, a leading zero does not change the interpretation of the value to be OCTAL-encoded. For example, `0021`, `021`, and `21` are all parsed and interpreted as decimal 21.
- When using the Full DHCP option, the XAS IP address can be provided. To do this, append the XAS IP address and port to the Nortel DHCP option currently used to specify the first and second server IP address, ports, and retry and action codes. For Graphical XAS (GXAS), the action code (`aaa`) and retry count (`rrr`) must be appended. For Text XAS, it is not necessary to append these values.

The format of the exchange application server IP address and port is:

```
iii.jjj.kkk.lll:ppppp,aaa,rrr
```

The XAS port action code (`aaa`) byte values are:

- 1=Graphical XAS
- 0=Text XAS

The port field is processed if GXAS is selected, but ignored for Text XAS (the fixed text port is used). XAS always uses port 5000.

If the XAS port action code (`aaa`) byte value is 0 (Text XAS), then the port action code and retry count fields are not required. If the XAS port action code (`aaa`) byte value is 1 (Graphical XAS), then the port action code and retry count fields are not optional and must be included in the configuration string.

For example, the format of the option used to specify Connect Server 1, Connect Server 2, and the exchange application server (XAS), where the XAS port action code (aaa) byte value is 1 (Graphical XAS) is:

```
Nortel-i2004A,iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:ppppp,aaa,rrr.
```

If the XAS port action code (aaa) byte value is 0 (Text XAS), the format of the option used to specify Connect Server 1, Connect Server 2, and the exchange application server (XAS) is:

```
Nortel-i2004A,iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:ppppp.
```

Configuration string examples

The following examples show configuration strings with one or more Connect Servers and exchange application servers

- [Table 93 "Configuration string for one Connect Server" \(page 414\)](#)
- [Table 94 "Configuration string for two Connect Servers" \(page 415\)](#)
- [Table 95 "Configuration string for one Connect Server and an XAS \(Text\)" \(page 415\)](#)
- [Table 96 "Configuration string for one Connect Server and an XAS \(Graphical\)" \(page 415\)](#)

The following conventions are used:

- The Nortel Class Identifier is separated from the servers by a comma (,).
- The servers are separated by semi-colons (;).
- The IP address and port numbers are separated by a colon (:).
- The string is terminated with a period (.).

Table 93
Configuration string for one Connect Server

Nortel-i2004-A,iii.jjj.kkk.lll:ppppp,aaa,rrr.	
Nortel Class Identifier Field	Primary Connect Server
Nortel-i2004-A	iii.jjj.kkk.lll:ppppp,aaa,rrr

Table 94
Configuration string for two Connect Servers

Nortel-i2004-A, iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp, aaa, rrr.		
Nortel Class Identifier Field	Primary Connect Server	Secondary Connect Server
Nortel-i2004-A	iii.jjj.kkk.lll:pppp, aaa, rrr	iii.jjj.kkk.lll:pppp, aaa, rrr

Table 95
Configuration string for one Connect Server and an XAS (Text)

Nortel-i2004-A, iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp			
Nortel Class Identifier Field	Primary Connect Server	Placeholder Secondary Connect Server	XAS
Nortel-i2004-A	iii.jjj.kkk.lll:pppp, aaa, rrr	iii.jjj.kkk.lll:pppp, aaa, rrr	iii.jjj.kkk.lll:ppppp
<p>Three IP addresses must be specified when using just one Connect Server and XAS. If only two IP addresses are specified, the IP Phone assumes the second IP address is for the second Connect Server. The IP Phone does not recognize that it is for the XAS. Therefore, a placeholder IP address must be inserted for the second Connect Server in this situation. The placeholder IP address ensures that the XAS IP address appears as the third address in the string (where the IP Phone expects to find it). Nortel recommends simply repeating the IP address of the first Connect Server for the second Connect Server, to create the placeholder IP address.</p>			

Table 96
Configuration string for one Connect Server and an XAS (Graphical)

Nortel-i2004-A, iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp, aaa, rrr.			
Nortel Class Identifier Field	Primary Connect Server	Placeholder Secondary Connect Server	XAS
Nortel-i2004-A	iii.jjj.kkk.lll:pppp, aaa, rrr	iii.jjj.kkk.lll:pppp, aaa, rrr	iii.jjj.kkk.lll:pppp, aaa, rrr
<p>Three IP addresses must be specified when using just one Connect Server and XAS. If only two IP addresses are specified, the IP Phone assumes the second IP address is for the second Connect Server. The IP Phone does not recognize that it is for the XAS. Therefore, a placeholder IP address must be inserted for the second Connect Server in this situation. The placeholder IP address ensures that the XAS IP address appears as the third address in the string (where the IP Phone expects to find it). Nortel recommends simply repeating the IP address of the first Connect Server for the second Connect Server, to create the placeholder IP address.</p>			

Table 97
Configuration string for two Connect Servers and an XAS (Text)

Nortel-i2004-A, iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp			
Nortel Class Identifier Field	Primary Connect Server	Secondary Connect Server	XAS
Nortel-i2004-A	iii.jjj.kkk.lll:p pppp, aaa, rrr	iii.jjj.kkk.lll:p pppp, aaa, rrr	iii.jjj.kkk.lll: ppppp

Table 98
Configuration string for two Connect Servers and an XAS (Graphical)

Nortel-i2004-A, iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp, aaa, rrr; iii.jjj.kkk.lll:ppppp, aaa, rrr.			
Nortel Class Identifier Field	Primary Connect Server	Secondary Connect Server	XAS
Nortel-i2004-A	iii.jjj.kkk.lll:p pppp, aaa, rrr	iii.jjj.kkk.lll:p pppp, aaa, rrr	iii.jjj.kkk.lll:p pppp, aaa, rrr

Format for IP Phone DHCP site-specific option

This section describes the Nortel-specific, site-specific option for the IP Phones. This option uses the "reserved for site specific use" DHCP options (128 to 254) (refer to RFC 1541 and RFC 1533), and must be returned by the DHCP server as part of each DHCPOFFER and DHCPACK message for the Internet Telephoneto accept these messages as valid.

The IP Phone retrieves the relevant information and uses it to configure the IP address for the primary TPS and optional secondary TPS. Either this site-specific option must be present or a similarly encoded vendor-specific option must be sent. That is, configure the DHCP server to send one or the other but not both. The choice of using either vendor-specific or site-specific options enables Windows NT DHCP servers to be used with the IP Phone. Windows NT servers do not properly implement the vendor-specific option and as a result, Windows NT implementations must use the site-specific version.

The format of the option is Type, Length, and Data. The format of the same as that of the encapsulated vendor-specific option. See ["Format for IP Phone DHCP encapsulated Vendor Specific Option"](#) (page 410) .

Operation

DHCP is an extension of BootP. Like BootP, it operates on the client-server model. However, DHCP has more message types than BootP. DHCP enables the dynamic allocation of IP addresses to different clients. It can be used to configure clients by supplying the network configuration parameters such as gateway or router IP addresses.

In addition, DHCP has a lease system that controls the duration an IP address is leased to a client. The client can request a specific lease length, or the administrator can determine the maximum lease length. A lease can range from one minute to 99 years. When the lease is up or released by the client, the DHCP server automatically retrieves it and reassigns it to other clients, if necessary. This is an efficient and accurate way to configure clients quickly. This saves the administrator from an otherwise repetitive task. IP addresses can be shared among clients that do not require permanent IP addresses.

DHCP messages

There are seven different DHCP messages. Each message relays certain information between the client and server. See [Table 99 "DHCP message types" \(page 417\)](#).

Table 99
DHCP message types

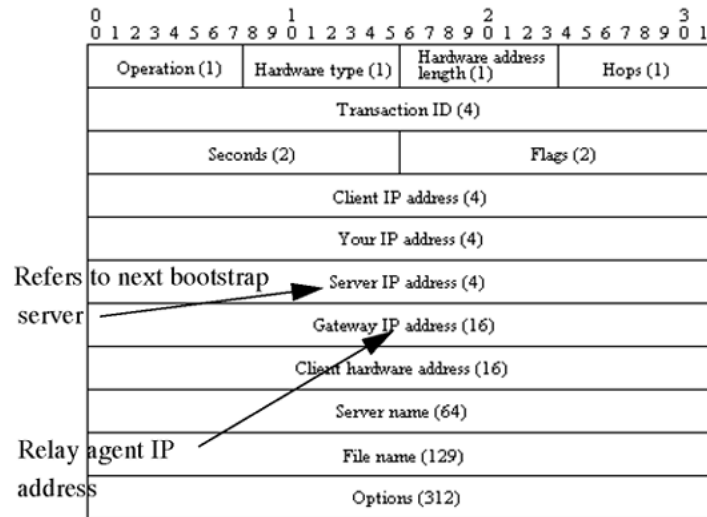
DHCP Message Types	Description
DHCPDISCOVER	Initiates a client request to all servers.
DHCPOFFER	Offer from server following client request.
DHCPREQUEST	Requests a particular server for services.
DHCPACK	Notifies client that requested parameters can be met.
DHCPNAK	Notifies client that requested parameters cannot be met.
DHCPDECLINE	Notifies server that offer is unsatisfactory and will not be accepted.
DHCPRELEASE	Notifies server that IP address is no longer needed.

DHCP message format

The DHCP message format shown in [Figure 76 "DHCP message format" \(page 418\)](#) is common to all DHCP messages. Each message consists of 15 fields: 14 fixed-length fields and one variable length field. The

fixed-length fields must be the specified number of bytes, as indicated in the brackets. If there is not enough data, or there is no data at all, zeros are used to fill in the extra spaces.

Figure 76
DHCP message format



The Options field is the only field with a variable length. It is optional, but very important, as it transports additional network configuration parameters. The DHCP options are the actual subfields that are used in this project.

DHCP message exchange

For a client to receive services from a DHCP server, an exchange of DHCP messages between the client and server must take place. The sequence and types of DHCP message exchanged can differ, but the mechanism of acquiring and supplying information remains the same.

Usually the client initiates the exchange with a DHCP message broadcast. Using a broadcast enables the client to send messages to all servers on the network without having an associated IP address. The broadcast is local to the LAN, unless a DHCP relay agent is present to forward the packet.

At this point, the client has no information about the server or the IP address it is going to receive (unless it is requesting a renewal), so the fields in the DHCP message are empty. However, the client knows its own MAC address and includes it in the Client hardware address field. The

client can also have a list of parameters it would like to acquire and can request them from the DHCP server by including the Parameter Request List option (Option Code 55) in the DHCPDISCOVER message.

When the DHCP server sees the broadcast, it responds by broadcasting its own DHCP message. The server, since it knows more about the network, is able to fill in most of the information in the message. For example, information such as the server IP address and gateway IP address are included in their respective fields. Since the client does not have an IP address yet, the server uses the client's MAC address to uniquely identify it. When the client sees the broadcast, it matches its MAC address against the one in the message.

DHCP options

DHCP options are the sub-fields of the Options field. They carry additional network configuration information requested by the client such as the IP address lease length and the subnet mask.

Each DHCP option has an associated option code and a format for carrying data. Usually the format is as follows:

Option code Length Data

There are two categories of DHCP options: standard and non-standard. The standard options are predefined by the industry. The non-standard options are user-defined to fit the needs of a particular vendor or site.

There are a total of 255 DHCP option codes where option codes 0 and 255 are reserved, 1 to 77 are predefined, 1 to 254 can be used for Vendor Specific Options, and 128 to 254 are designated for Site Specific Options. This arrangement enables future expansion and is used as a guideline for choosing option codes.

Vendor Specific/Encapsulated option

The Vendor Specific DHCP options are vendor-defined options for carrying vendor-related information. It is possible to override predefined standard options; however, doing so can cause conflict when used with components that follow the industry standard.

A useful option is the standard Vendor Encapsulated option – code 43. It is used to encapsulate other DHCP options as sub-options. For example, the IP Phone 2004 requires vendor specific Voice Gateway Media Card information. The vendor, Nortel, decided to carry this information in one of several Site Specific options and then encapsulate it into option 43. Since

the information is specific to a Nortel product, it is vendor-specific. Once encapsulated, the information appears as one or more sub-options inside option 43, which the IP Phone decodes.

Site Specific option

Another way to transport the Voice Gateway Media Card information is through Site Specific options. These are unused DHCP options that have not been predefined to carry standard information. Unlike the Vendor Specific options, the information transported is "site" specific and option codes 128 to 254 are used for encoding.

For Nortel IP Phones, the Voice Gateway Media Card information involves the location of the Voice Gateway Media Card in the network. This varies for different sites and can be implemented in a Site Specific option. If the Vendor Encapsulation option is used, the information is first encoded in a Site Specific option. Nortel has provided a list of five possible Site Specific option codes to implement the Voice Gateway Media Card information. Only one of the five codes must be configured to carry the information, but the choice is available to offset the possibility that the option code chosen has been used for other purposes.

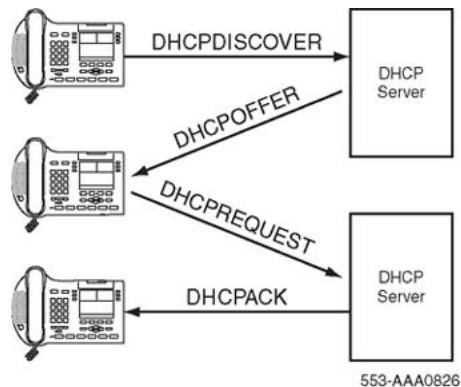
IP acquisition sequence

This section focuses on the mechanics and sequence of the DHCP message exchange as the IP Phone uses DHCP for IP acquisition. Although the IP Phone requests many network configuration parameters as well as an IP address, the following cases focus on the concept of "how" instead of "what" information is acquired. Also, the IP Phone is used as the sample client but the situations apply to other DHCP clients as well.

Case 1

Case 1 is a typical situation where an IP Phone 2004 requests services from a DHCP server. See [Figure 77 "IP acquisition phase: Case 1" \(page 421\)](#).

Figure 77
IP acquisition phase: Case 1



Step	Action
1	The IP Phone initiates the sequence by broadcasting a DHCPDISCOVER message.
2	A DHCP server on the network sees the broadcast, reads the message, and records the MAC address of the client.
3	The DHCP server checks its own IP address pool(s) for an available IP address and broadcasts a DHCPOFFER message if one is available. Usually the server ARPs or PINGs the IP address to make sure it is not being used.
4	The IP Phone sees the broadcast and after matching its MAC address with the offer, reads the rest of the message to find out what else is being offered.
5	If the offer is acceptable, the IP Phone sends out a DHCPREQUEST message with the DHCP server's IP address in the Server IP address field.
6	The DHCP server matches the IP address in the Server IP address field against its own to find out to whom the packet belongs.
7	If the IPs match and there is no problem supplying the requested information, the DHCP server assigns the IP address to the client by sending a DHCPACK.
8	If the final offer is not rejected, the IP acquisition sequence is complete.

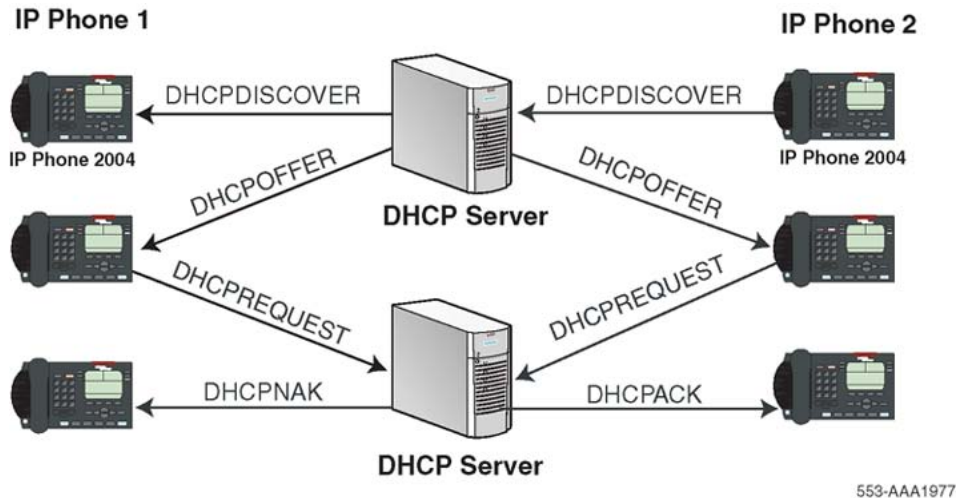
--End--

Case 2

The IP acquisition is unsuccessful if either the server or the client decides not to participate, as follows:

- If the DHCP server cannot supply the requested information, it sends a DHCPNAK message and no IP address is assigned to the client. This can happen if the requested IP address has already been assigned to a different client. See [Figure 78 "IP acquisition sequence: Case 2" \(page 422\)](#).
- If the client decides to reject the final offer (after the server sends a DHCPACK message), the client sends a DHCPDECLINE message to the server, telling the server the offer is rejected. The client must restart the IP acquisition by sending another DHCPDISCOVER message in search of another offer.

Figure 78
IP acquisition sequence: Case 2



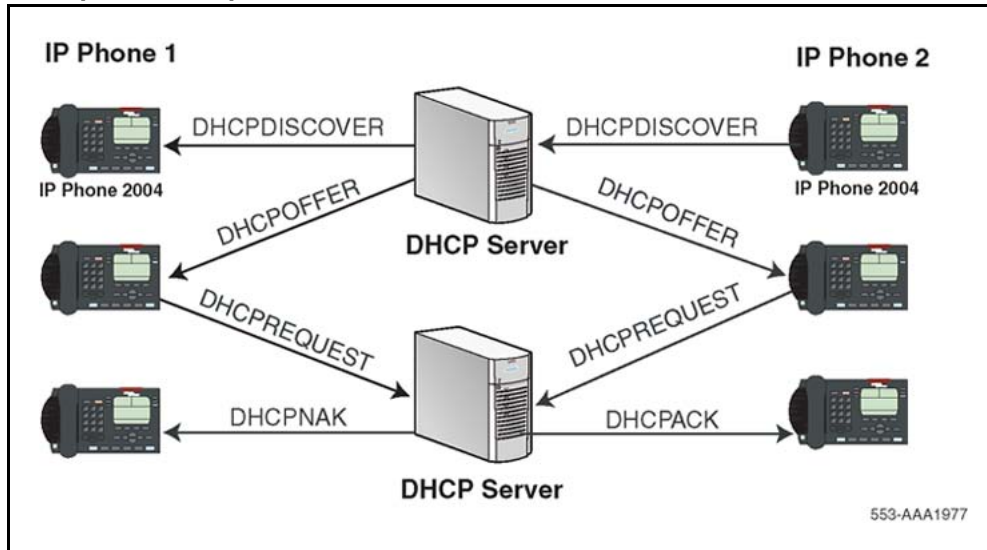
Case 3

Finally, when a client is finished with a particular IP address, it sends a DHCPRELEASE message to the server which reclaims the IP address. If the client requires the same IP address again, it can initiate the process as follows:

1. The IP Phone broadcasts a DHCPREQUEST to a particular DHCP server by including the server's IP address in the Server IP Address field of the message. Since it knows the IP address it wants, it requests it in the DHCP message.
2. The DHCP server sends a DHCPACK message if all the parameters requested are met.

Case 3 is similar to Case 1, except the first two messages have been eliminated. This reduces the amount of traffic produced on the network. See [Figure 79 "IP acquisition sequence: Case 3" \(page 423\)](#).

Figure 79
IP acquisition sequence: Case 3



Multiple DHCPOFFERS

In some networks, if more than one DHCP server is present, a client can receive multiple DHCPOFFER messages. Under these situations, the IP acquisition sequence depends on the client. The client can wait for multiple offers, or accept with the first offer it receives. If it accepts multiple offers, it compares them before choosing one with the most fitting configuration parameters. When a decision is made, the message exchange is the same as if there is only one DHCP server and proceeds as in the previous cases. The servers that were not chosen to provide the service do not participate in the exchange.

For example, the IP Phone 2004 responds only to DHCPOFFERs that have the same unique string identifier, "Nortel-i2004-A", as the IP Phone 2004. This string must appear in the beginning of the list of Voice Gateway Media Card parameters. Without this string, the IP Phone 2004 does not accept the DHCPOFFER, even if all parameters requested and Voice Gateway Media Card information are present. If no valid DHCPOFFERs are sent then, the IP Phone 2004 keeps broadcasting in search of a valid offer.

With multiple DHCP servers on the same network, a problem can occur if any two of the servers have overlapping IP address range and no redundancy. DHCP redundancy is a property of DHCP servers. This

redundancy enables different DHCP servers to serve the same IP address ranges simultaneously. Administrators must be aware that not all DHCP servers have this capability.

IP Phone support for DHCP

This section covers the three uses of DHCP (Full, Partial, and VLAN Auto Discovery).

An "IP Phone 2004-aware" DHCP server is needed only for the Full DHCP and VLAN Auto discovery. An IP Phone can obtain its IP address and subnet mask using Partial DHCP. The "IP Phone 2004 aware" part returns the Node IP and registration port number. In the case of the DHCP Auto Discovery, it returns the VLAN IDs. Separate DHCP vendor-specific entries are needed for the Full DHCP data and the VLAN Auto Discovery data. When using the VLAN Auto Discovery, both Full DHCP and VLAN Auto Discovery must be configured. Full DHCP and Auto VLAN are implemented as separate functions in the IP Phone firmware. However, in practice, Full DHCP and Auto VLAN are frequently used together.

DHCP support in the IP Phone requires sending a "Class Identifier" option with the value "Nortel-i2004-A" in each DHCP DHCPOFFER and DHCPACK message. Additionally, the telephone checks for either a Vendor Specific option message with a specific, unique to Nortel IP Phone 2004, encapsulated sub-type, or a Site Specific DHCP option.

In either case, an IP Phone 2004-specific option must be returned by the IP Phone 2004 aware DHCP server in all Offer and Acknowledgement (ACK) messages. The IP Phone uses this option's data it to configure the information required to connect to the TPS.

The DHCP response is parsed to extract the IP Phone's IP address, subnet mask, and gateway IP address. The vendor specific field is then parsed to extract the Server 1 (minimum) and optionally Server 2. By default, Server 1 is always assumed to be the "primary" server after a DHCP session.

For the IP Phone to accept Offers/Acks, the messages must contain all of the following:

- A router option (needs a default router to function)
- A subnet mask option
- A Vendor Specific option as specified below or a Site Specific option as specified below.
 - The initial DHCP implementation required only the Vendor Specific encapsulated sub-option. In inter-op testing with Windows NT (up to Service Release 4), it was discovered that Windows NT does

not properly adhere to RFC 1541. As a result this option is not possible. The implementation was changed to add support for either Vendor Specific sub-ops or Site Specific options. This new extension has been tested and verified to work with Windows NT.

- The site-specific options are all DHCP options between 128 (0x80) and 254 (0xFE). These options are reserved for site specific use by the DHCP RFCs.

Format for IP Phone DHCP Class Identifier Field

All IP Phones fill in the Class ID field of the DHCP Discovery and Request messages with the following:

"Nortel-i2004-A", where:

- ASCII encoded, NULL (0x00) terminated
- unique to IP Phone 2004
- "-A" uniquely identifies this version

Format for IP Phone DHCP Encapsulated Vendor Specific Field

This sub-option must be encapsulated in a DHCP Vendor Specific Option (refer to RFC 1541 and RFC 1533) and returned by the DHCP server as part of each DHCP OFFER and ACK message in order for the IP Phone to accept these messages as valid.

The IP Phone parses this option's data and uses it to configure the information required to connect to the TPS. The sub-option must be present, or a similarly encoded site-specific option must be sent. See ["Format of the Encapsulated Vendor Specific Sub-option field" \(page 425\)](#) . Configure the DHCP server to send one or the other – not both.

The choice of using either Vendor Specific or Site Specific options is provided to enable Windows NT DHCP servers to be used with the IP Phone. Windows NT servers do not properly implement the Vendor Specific Option and as a result, Windows NT implementations must use the Site Specific version.

Format of the Encapsulated Vendor Specific Sub-option field

The format of the field is as follows:

- **Type (1 octet):** 5 choices are provided (0x80, 0x90, 0x9d, 0xbf, 0xfb [128, 144, 157, 191, 251]), allowing the IP Phone to operate when one

or more values is already in use by a different vendor. Select only one TYPE byte.

- **Length (1 octet):** variable – depends on message content.
- **Data (length octets):** ASCII based with the following format:
Nortel-i2004 -A,iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.
lll:pppp,aaa,rrr.

The components in this string are described in [Table 100](#) "Encapsulated Vendor Specific Sub-option field" (page 426) .

Table 100
Encapsulated Vendor Specific Sub-option field

Parameter	Description
Nortel-i2004-A	Uniquely identifies this as the Nortel option Signifies this version of this specification
iii.jjj.kkk.lll:ppppp	Identifies IP address:port for server (ASCII encoded decimal)
aaa	Identifies Action for server (ASCII encoded decimal, range 0 to 255)
rrr	Identifies retry count for server (ASCII encoded decimal, range 0 to 255). This string can be NULL terminated although the NULL is not required for parsing.
ACSII symbols	The comma "," is used to separate fields The semicolon ";" is used to separate Primary from Secondary server information The period "." is used to signal end of structure

[Table 101 "Nortel option string" \(page 426\)](#) shows the "pieces" of the Nortel option string. The Nortel designator Nortel-i2004-A is separated from the Connect Server strings using a comma. The Connect Servers are separated using a semi-colon.

Table 101
Nortel option string

Nortel-i2004-A,iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:pppp,aaa,rrr.					
Nortel Class Identifier Field	comma	Primary Connect Server	semicolon	Secondary Connect Server	period
Nortel-i2004-A	,	iii.jjj.kkk.lll:ppppp,aaa,rrr	;	iii.jjj.kkk.lll:ppppp,aaa,rrr	.

"aaa" and "rrr" are ASCII encoded decimal numbers with a range of 0 to 255. They identify the "Action Code" and "Retry Count", respectively, for the associated TPS server. Internally to IP Phone 2004 they are stored as 1 octet (0x00 to 0xFF). Note that these fields must be no more than 3 digits long.

The string enables the configuration of information for two Connect Servers. One Connect Server exists for each IP node. In the typical system configuration of a single IP node, only the primary Connect Server is required. In this case, the primary Connect Server string must be ended with a period (.) instead of a semi-colon (;). For example,

```
Nortel-i2004-A,iii.jjj.kkk.lll:ppppp,aaa,rrr.
```

If the secondary Connect Server portion of the string is specified, then the string information is typically the same as the primary Connect Server information. For example:

```
Nortel-i2004-A,iii.jjj.kkk.lll:ppppp,aaa,rrr;iii.jjj.kkk.lll:ppppp,aaa,rrr.
```

When the Enhanced Redundancy for IP Line Nodes feature is used, two different Connect Server strings can be configured, separated with a semi-colon (;). This enables the telephone to register to two different nodes. For more information about the Enhanced Redundancy for IP Line Nodes feature, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

Action code values (0 to 255):

- 1 — UNISlim Hello (currently only this type is a valid choice)
- all other values (0, 2 to 255) — reserved

iii, jjj, kkk, lll are ASCII-encoded, decimal numbers representing the IP address of the server. They do not need to be 3 digits long as the "." and ":" delimiters guarantee parsing. For example, '001', '01', and '1' would all be parsed correctly and interpreted as value 0x01 internal to the IP Phone 2004. Note that these fields must be no more than three digits long each.

ppppp is the port number in ASCII encoded decimal. The port number must be set to 4100.

In all cases, the ASCII encoded numbers are treated as decimal values and all leading zeros are ignored. More specifically, a leading zero does not change the interpretation of the value to be OCTAL encoded. For example, 0021, 021, and 21 are all parsed and interpreted as decimal 21.

Format for IP Phone DHCP Site Specific Option

This option uses the "reserved for site specific use" DHCP options (number 128 to 254 – refer to RFC 1541 and RFC 1533) and must be returned by the DHCP server as part of each DHCP OFFER and ACK message for the IP Phone to accept these messages as valid.

The IP Phone pulls the relevant information out of this option and uses it to configure the IP address and so on for the primary and (optionally) secondary TPS.

Either this site specific option must be present or a similarly encoded vendor-specific option must be sent (as previously described). For example, configure the DHCP server to send one or the other – not both.

The choice of using either Vendor Specific or Site Specific options is provided to enable Windows NT DHCP servers to be used with the IP Phone. Windows NT servers do not properly implement the Vendor Specific Option and as a result, Windows NT implementations must use the Site Specific version.

Format of the DHCP Site Specific field

The format of the DHCP Site Specific field is the same as the format of the Encapsulated Vendor Specific Sub-option field. See [“Format of the Encapsulated Vendor Specific Sub-option field” \(page 425\)](#) .

DHCP Auto Discovery must be used only if the telephone and PC are:

- connected to the same Layer 2 switch port through a three-port switch
- on separate subnets

The DHCP server can be configured to supply the VLAN information to the IP Phones. The server uses the Site Specific option in the DHCP offer message to convey the VLAN information to the IP Phone.

Configuring a DHCP Server for VLAN Discovery is optional. This configuration is done in addition to any done for Full DHCP configuration and it is required only when configuring the VLAN Auto Discovery.

802.1Q VLAN support is configured using the display interface of the IP Phones during the initial configuration procedure of the IP Phone.

This method is based on the assumption that the default VLAN will be the data VLAN and the tagged VLAN will be the voice VLAN. Enter the voice VLAN information into the data VLAN and subnet's DHCP server. Enter the standard IP Phone configuration string into the voice VLAN and subnet's DHCP server pool.

The following definition describes the IP Phone 2004-specific, Site Specific option. This option uses the "reserved for Site Specific use" DHCP options (DHCP option values 128 to 254) and must be returned by the DHCP server as part of each DHCPOFFER and DHCPACK message for the IP Phone to accept these messages as valid. The IP Phone extracts the relevant information and uses the information to configure itself.

Format of the field

The format of the field is: Type, Length, Data.

Type (1 octet):

There are five choices:

- 0x80 (128)
- 0x90 (144)
- 0x9d (157)
- 0xbf (191)
- 0xfb (251)

Providing a choice of five types enables the IP Phones to operate if a value is already in use by a different vendor. Select only one Type byte.

Length (1 octet):

This is variable; it depends on message content.

Data (length octets):

ASCII based format: "VLAN-A:XXX+YYY+ZZZ." where,

- "VLAN-A:" – uniquely identifies this as the Nortel DHCP VLAN discovery. Additionally, the "-A" signifies this version of this spec. Future enhancements could use "-B" for example.
- ASCII "+" or "," is used to separate fields.
- ASCII "." is used to signal end of structure.
- XXX, YYY and ZZZ are ASCII encoded decimal numbers with a range of 0-4095. The number is used to identify the VLAN Ids. There are a maximum of 10 VLAN IDs can be configured in the current version. String "none" or "NONE" means no VLAN (default VLAN).

The DHCP OFFER message carrying VLAN information is sent out from the DHCP server without a VLAN tag. However, the switch port adds a VLAN tag to the packet. The packet is untagged at the port of the IP Phone.

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 102 "EMC compliance" (page 432) lists EMC compliance for various jurisdictions.

Table 102
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 103 "Safety compliance" (page 432) lists safety compliance for various jurisdictions.

Table 103
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
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 compliances

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 Specifications

Contents

This section contains the following topics:

- [“IP Phone power requirements” \(page 435\)](#)
- [“Environmental specifications” \(page 437\)](#)

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.

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, IP Phone 1210, IP Phone 1220, or IP Phone 1230, 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 104 "Power requirements \(US, CA, CALA, AP, GC\) " \(page 436\)](#) shows the power requirements for the IP Audio Conference Phone 2033 (US, CA, CALA, AP, GC) using Power over Ethernet Classification 0.

Table 105 "Power requirements (EMEA) " (page 436) 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 104
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 105
Power requirements (EMEA)

IP Phone	Product Code	Maximum Load	Normal Load
2033	NTEX11AA70E6 NTEX11BA70E6 NTEX11EA70E6 NTEX11FA70E6	10.5 W	8.5 W

Table 106 "Power requirements for IP Phones using Power over Ethernet Classification 2" (page 436) provides power requirements for IP Phones, which use Power over Ethernet Classification 2.

Table 106
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
1210	NTYS18AA70E6 NTYS18BA70E6	4.6 W	3.2 W
1220	NTYS19AA70E6 NTYS19BA70E6	4.6 W	3.2 W
1230	NTYS20AA70E6 NTYS20BA70E6	4.6 W	3.2 W

Table 107 "Power requirements for IP Phones using Power over Ethernet Classification 3" (page 437) provides power requirements for IP Phones, which use Power over Ethernet Classification 3.

Table 107
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 NTYSO6BA NTYS15AAE6	9.1 W	6.0 W

Environmental specifications

[Table 108 "Environmental specifications" \(page 437\)](#) shows the environmental specifications of IP Phones.

Table 108
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

802.1Q VLAN description

Contents

This section contains the following topics:

- “Introduction” (page 439)
- “Description” (page 440)
- “IP Phone support” (page 441)
- “IP Softphone 2050 support” (page 441)
- “Three-port switch support” (page 441)
- “VLAN IDs” (page 442)
- “Enhanced DATA VLAN” (page 444)

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
- IP Phone 1210

- IP Phone 1220
- IP Phone 1230

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
- IP Phone 1220
- IP Phone 1230

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" \(page 444\)](#) 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 IP Phone 1110, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, IP Phone 1210, IP Phone 1220, IP Phone 1230, Phase II IP Phone 2002, Phase II IP Phone 2004, and IP Phone 2007.

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.

For about how to implement Automatic VOICE VLAN ID, see [“DHCP Auto Discovery” \(page 428\)](#) .

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

- 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.
- 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

Provisioning the IP Phones

Contents

This section contains the following topics:

- “Introduction” (page 447)
- “Description” (page 448)
- “Manual provisioning” (page 448)
- “Automatic provisioning” (page 449)
- “Operation” (page 474)

Introduction

The following IP Phones support manual provisioning

- Phase II IP Phone 2001
- Phase II IP Phone 2002
- Phase II IP Phone 2004
- IP Audio Conference Phone 2033
- IP Phone 2007
- IP Phone 1210
- IP Phone 1220
- IP Phone 1230
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

The following IP Phones also support automatic provisioning

- IP Phone 2007
- IP Phone 1210
- IP Phone 1220
- IP Phone 1230
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

Description

The IP Phone supports the following provisioning modes:

- Manual provisioning
- Automatic provisioning
 - Automatic provisioning using 802.1ab Link Layer Discovery Protocol (LLDP)
 - Automatic provisioning using Dynamic Host Configuration Protocol (DHCP)
 - Automatic provisioning using configuration files
 - Automatic provisioning using Unified Networks IP Stimulus Protocol (UNIStim)

Manual provisioning

The following sections provide information about the applicable IP Phone.

- [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#)—IP Phone 1110, IP Phone 1210, IP Phone 1220, and IP Phone 1230
- [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#)—IP Phone 2007, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E
- [“Manual provisioning of IP Phone 2000 Series” \(page 495\)](#)—IP Phone 2001, IP Phone 2002, IP Phone 2004, and IP Audio Conference Phone 2033

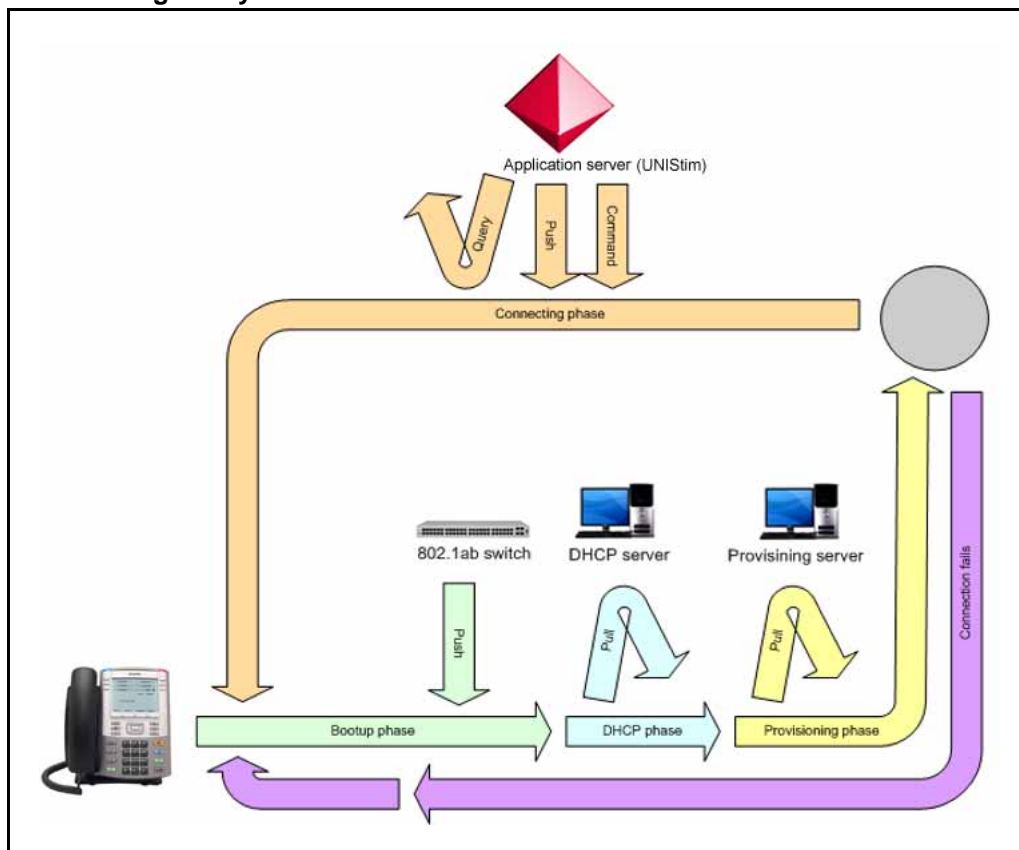
Automatic provisioning

The Automatic provisioning feature creates a flexible provisioning method, which

- covers the existing provisioning parameters
- supports the extension of the provisioning parameters
- supports provisioning parameters in automatic provisioning modes, when possible
- creates a common provisioning information format that supports DHCP and Trivial File Transfer Protocol (TFTP) provisioning

Figure 80 "Provisioning life cycle" (page 449) provides an example of the provisioning life cycle.

Figure 80
Provisioning life cycle



The IP Phone 2007, IP Phone 1110 Series, and IP Phone 1200 Series support LLDP, DHCP, configuration files and UNISim automatic provisioning methods. The Phase II IP Phones (IP Phone 2001, IP Phone 2002, and IP Phone 2004) support LLDP, DHCP, and UNISim automatic provisioning methods but the phones do not support configuration files.

Configuration

You can store common provisioning parameters in a managed central server, such as a DHCP or a TFTP server, or both. You can configure the IP Phone to automatically or manually obtain the provisioning parameters from the various provisioning sources.

For automatic provisioning, the IP Phone receives the parameters from the provisioning server. You can switch between automatic provisioning to manual provisioning on the Auto Provisioning page. You enter parameter information on the Configuration page.

Provisioning IP Phone parameters

By default, the IP Phone can automatically provision most parameters. However, you can manually provision parameters. The Auto Provisioning page provides the selection to manually override the parameter. Use the Network Configuration menu item to configure IP Phone parameters. Double-press the Services key to open the Local Tools menu and press 3 on the dial pad to open the Network Configuration menu.

The automatic provisioning menu supports both the graphical user interface (GUI) and text-based user interface.

The following IP Phones support a GUI:

- IP Phone 2007
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

The Configuration page appears when you select the Network Configuration menu item. Any automatic provisioned parameters appear dimmed.

For more information about the Auto Provisioning page for GUI, see [“Auto Provisioning page for graphical user interface” \(page 451\)](#) . For information about the Configuration page for GUI, see [“Configuration page for graphical user interface” \(page 454\)](#) .

The following IP Phones support a text-based user interface:

- IP Phone 1110
- IP Phone 1210
- IP Phone 1220
- IP Phone 1230

The Network Configuration menu shows the configuration parameters that are configured as Manual on the Auto Provisioning page. Use the Up and Down navigation keys to scroll through the main configuration options and the Right or Left navigation keys to scroll through the sub configuration options.

For information about the Auto Provisioning page for text user interface, see [“Auto Provisioning page for text user interface” \(page 454\)](#) .
For information the Configuration page for text user interface, see [“Configuration page for text user interface” \(page 457\)](#) .

For all supported IP Phones, you can press the Auto soft key to switch to the Auto Provisioning page to define parameters that you can obtain automatically or manually. Then from the Auto Provisioning page, you can press the Cfg soft key to switch to the Network Configuration option.

[Table 109 "Auto Provisioning page" \(page 451\)](#) shows the Auto Provisioning page for the graphical user interface (GUI).

Table 109
Auto Provisioning page

- 01. EAP Mode []
- 02. LLDP Enable []
- 03. Primary DNS IP []
Secondary DNS IP []
- 04. Certificate Server []
Domain Name []
Hostname []
- 05. S1 Port []
S1 Action []
S1 Retry []
S1 PK []

- 06. S2 Port []
 - S2 Action []
 - S2 Retry []
 - S2 PK []
- 07. XAS IP []
 - Enable Graphic XAS []
 - XAS Port []
- 08. Voice 802.1Q []
 - Voice VLAN Filter []
 - Voice Control pBits []
 - Voice Media pBits []
- 09. PC Port Enable []
 - PC Port Speed []
 - PC Port Duplex []
 - PC Port UntagAll []
- 10. Data 802.1Q []
 - Data VLAN []
 - Data pBits []
- 11. Stickiness []
 - Cached IP []
 - Ignore GARP []
 - Enable SRTP PSK []
- 12. Provision Server []
 - Provisioning Zone ID []
- 13. Menu Lock Enable []

14. Auto Recover Flag []
- SSH User ID []
- SSH Password []
15. Screen Contrast []
- Screen Brightness []
- Screen Backlight []
- Display Dim Enable [] (IP Phone 2007)
16. Headset Type []
- Bluetooth Enable [] (IP Phone 1140E and IP Phone 1150E)
17. Bold []

Perform the following procedures to configure all parameters or specific parameters to automatic provisioning or manual provisioning for the GUI.

Procedure 108
Configuring parameters automatically for GUI

Step	Action
1	Press Auto on the Configuration page to switch to the Auto Provisioning page.
2	Perform one of the following actions: <ul style="list-style-type: none"> • Press the All-Auto content-sensitive soft key on the Auto Provisioning page to automatically provision all parameters. • Use the dial pad to enter the number associated with the parameter, or use the navigation keys to scroll and highlight the specific parameter. Then press Auto to configure specific parameters, which were previously configured automatically.
<div style="border: 1px solid black; padding: 5px;"> <p>ATTENTION</p> <p>If you configure any group item for automatic provisioning, all items of the group configured for automatic provisioning.</p> </div>	
3	Press Apply to save the settings or press Cancel to exit the Network Configuration without saving changes.

--End--

Procedure 109
Configuring parameters manually for GUI

Step	Action
1	Press Auto on the Configuration page to switch to the Auto Provisioning page.
2	Perform one of the following actions: <ul style="list-style-type: none">• Press the All-Ma content-sensitive soft key on the Auto Provisioning page to manually provision all parameters.• Use the dial pad to enter the number associated with the parameter, or use the navigation keys to scroll and highlight the specific parameter. Then press Manual to configure specific parameters, which were previously configured automatically.
ATTENTION If you configure any item of a group for automatic provisioning, all items of the group configured for automatic provisioning.	
3	Press Apply to save the settings or press Cancel to exit the Network Configuration without saving changes.

--End--

Configuration page for graphical user interface

Press **Config** on the Auto Provisioning page to access the Configuration page.

For manual configuration steps, see [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#).

If you configure parameters for automatic provisioning in the Auto Provision page, the parameter appears dimmed in the Configuration page.

Auto Provisioning page for text user interface

[Table 110 "Auto Provisioning page" \(page 455\)](#) shows the Auto Provisioning page for a text user interface.

Table 110
Auto Provisioning page

1. EAP Enable
 - EAP Device ID1
 - EAP Device ID2 []
 - EAP Password
2. LLDP Enable
3. Primary DNS IP
 - Secondary DNS IP
4. S1 Port
 - S1 Action
 - S1 Retry S1 PK
5. S2 Port
 - S2 Action
 - S2 Retry
 - S2 PK
6. XAS IP
 - Enable Graphic XAS
 - XAS Port
7. Voice 802.1Q
 - Voice VLAN Filter
 - Voice Control pBits
 - Voice Media pBits
8. PC Port Enable
 - PC Port Speed
 - PC Port Duplex
 - PC Port UntagAll

- 9. Data 802.1Q
 - Data VLAN
 - Data pBits
- 10. Stickiness
 - Cached IP
 - Ignore GARP
 - Enable PSK and SRT
- 11. Provision Server
 - Provisioning Zone ID
- 12. Menu Lock Enable
- 13. Auto Recover Flag
 - SSH User ID
 - SSH Password
- 14. Screen Contrast
 - Screen Brightness
 - Screen Backlight
 - Display DIM Enable
- 15. Headset Type
 - Bluetooth Enable
- 16. Bold

Use the following procedures to configure all parameters or specific parameters to automatic provisioning or manual provisioning for a text user interface.

Procedure 110
Configuring parameters automatically for text user interface

Step	Action
1	Press Auto on the Configuration page to switch to the Auto Provisioning page.
2	Perform one of the following actions:

- Press the **AllAut** content-sensitive soft key on the Auto Provisioning page to automatically configure all parameters.
- Use the dial pad to enter the number associated with the parameter, or use the navigation keys to scroll and highlight the specific parameter. Then press **Auto** to configure specific parameters, which were previously configured automatically.

ATTENTION

If you configure a group item for automatic provisioning, all items of the group configured for automatic provisioning.

- 3 Press **Enter** to save the settings or press **Cancel** to exit the Network Configuration without saving changes.

--End--

Procedure 111**Configuring parameters manually for text user interface**

Step	Action
1	Press Auto on the Configuration page to switch to the Auto Provisioning page.
2	Perform one of the following actions: <ul style="list-style-type: none"> • Press the AllMan content-sensitive soft key on the Auto Provisioning page to manually configure all parameters. • Use the dial pad to enter the number associated with the parameter, or use the navigation keys to scroll and highlight the specific parameter. Then press Man to configure specific parameters, which were previously configured automatically.

ATTENTION

If you configure a group item for automatic provisioning, all items of the group configured for automatic provisioning.

- 3 Press **Enter** to save the settings or press **Cancel** to exit the Network Configuration without saving changes.

--End--

Configuration page for text user interface

Press **Cfg** on the Auto Provisioning page to access the Configuration page.

For manual configuration steps, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).

If you configure parameters for automatic provisioning in the Auto Provision page, the parameter appears dimmed in the Configuration page.

Automatic configuration

Provisioning information is stored on a managed central server. The IP Phones can automatically obtain parameter values.

ATTENTION

The IP Phone receives provisioning information from a DHCP or TFTP server. Some parameters require the IP Phone to reset in order for an updated value to take effect.

[Table 111 "Automatic provisioning parameters legend" \(page 458\)](#) provides a legend for [Table 112 "Provisioning parameters " \(page 458\)](#).

Table 111
Automatic provisioning parameters legend

Configuration menu option	List each configuration parameter.
Options or input	List every choice available for the parameter and the minimum and maximum number of characters or digits allowed.
Description	Describe the option.
Manual	List parameters that you can manually provision.
Automatic	List parameters that you can automatically provision.

Only DHCP and TFTP provide the automatic provisioning datablock.

The parameters list in order of appearance.

Table 112
Provisioning parameters

Config option	Options or input	Description	Automatic	Manual
EAP mode	Disable	EAP disabled	Yes	Yes
	MD5	MD5 encryption		
	PEAP	PEAP encryption		
	TLS	TLS encryption		
ID 1	4 to 8 characters	EAP ID	Yes	Yes
ID 2	4 to 8 characters	EAP ID	Yes	Yes

Config option	Options or input	Description	Automatic	Manual
Password	4 to 12 characters	EAP password	Yes	Yes
Enable 802.1ab (LLDP)	Checked	Enable LLDP	Yes	Yes
	Unchecked	LLDP not used		
DHCP	Yes	DHCP used	No	Yes
	No	Static IP and config used		
Set IP	IP address	IP Phone IP address	Yes	Yes
Net mask	Subnet mask	IP Phone subnet mask	Yes	Yes
Gateway	IP address	IP Phone gateway IP address	Yes	Yes
DNS IP1	IP address	DNS server 1 IP address	Yes	Yes
DNS IP2	IP address	DNS server 2 IP address	Yes	Yes
CA Server	IP address	Certificates Server IP address	Yes	Yes
Domain Name	4 to 12 characters	IP Phone domain name	Yes	Yes
Hostname	4 to 12 characters	IP Phone host name	Yes	Yes
S1 IP	IP address	TPS server 1 node IP address	Yes	Yes
Port	1 to 5 digits	TPS server 1 port number	Yes	Yes
S1 action	1 digit	TPS server 1 action value	Yes	Yes
Retry	2 digits	TPS server 1 retry count	Yes	Yes
S1 PK	16 hex characters	TPS server 1 PK string. For example, 0 to 9 or A to F.	Yes	Yes
S2 IP	IP address	TPS server 2 node IP address	Yes	Yes
Port	1 to 5 digits	TPS server 2 port number	Yes	Yes
S2 action	1 digit	TPS server 2 action value	Yes	Yes
Retry	2 digits	TPS server 2 retry count	Yes	Yes
S2 PK	16 hex characters	TPS server 2 PK string For example, 0 to 9 or A to F.	Yes	Yes
Ntwk Port Speed	Auto	Auto sense	No	Yes
	10BT	Forced 10BT		
	100BT	Forced 100BT		
Ntwk Port Duplex	Auto	Auto negotiate	Yes	Yes
	Forced Full	Forced full duplex		

Config option	Options or input	Description	Automatic	Manual
	Forced Half	Forced half duplex		
XAS IP	IP address	AG server IP address	Yes	Yes
Graphical XAS	checked	Graphical XAS used	Yes	Yes
	unchecked	Text XAS used		
XAS Port	1 to 5 digits	AG server port number	Yes	Yes
Enable Voice 802.1Q	checked	802.1Q header and features used	Yes	Yes
	unchecked	802.1Q not used		
Voice VLAN	No VLAN		No	Yes
	DHCP	VLAN ID from DHCP Auto VLAN		
	LLDP VLAN Name	VLAN ID from LLDP VLAN Name TLV		
	LLDP MED	VLAN ID from Network Policy Discovery TLV.		
	Enter VLAN ID	VLAN ID entered 1 to 4094		
VLAN Filter	checked	Filter frames without Voice VLAN tag	Yes	Yes
	unchecked	Process all frames		
Ctrl Priority Bits	Auto	Use value from received LLDP Network Policy TLV, UNIStim, or default value of 1.	Yes	Yes
	0 to 7	Force signalling related priority bits to chosen value.		
Media Priority Bits	Auto	Use value from received LLDP Network Policy TLV, UNIStim, or default value of 1.	Yes	Yes
	0 to 7	Force media related priority bits to chosen value.		
Enable PC Port	checked	PC port active.	Yes	Yes
	unchecked	PC port disabled.		
PC Port Speed	Auto	Auto sense.	Yes	Yes
	10BT	Forced 10 BT.		
	100BT	Forced 100 BT.		
PC Port Duplex	Auto	Auto negotiate.	Yes	Yes

Config option	Options or input	Description	Automatic	Manual
	Force Full	Forced full duplex.		
	Force Half	Forced half duplex.		
Enable Data 802.1Q	checked	802.1Q header and features used.	Yes	Yes
	unchecked	802.1Q not used.		
Data VLAN	No VLAN		Yes	Yes
	Auto	VLAN ID from LLDP VLAN Name TLV or from the info block.		
	Enter VLAN ID	VLAN ID entered 1 to 4094.		
Data Priority Bits	Auto	Use value from the info block or default of 7.	Yes	Yes
	0 to 7	Force all priority bits to chosen value.		
PC-Port Untag All	checked	Removes the 802.1Q header from a packet before it forwards to the IP Phone PC port.	Yes	Yes
	unchecked			
Enable Stickiness	checked	Receives a value for an item, which is configured for automatic provisioning.	Yes	Yes
	unchecked	Must enter value for an item, otherwise IP Phone does not register to TPS.		
Cached IP	checked	Last IP Phone IP address info received is used if DHCP server not reached.	Yes	Yes
	unchecked	Must receive response to assign IP Phone IP address.		
Ignore GARP	checked	IP Phone ignores Gratuitous ARP requests. See “Gratuitous Address Resolution Protocol Protection” (page 519) for more information.	Yes	Yes
	unchecked	IP Phone responds to Gratuitous ARP requests.		

Config option	Options or input	Description	Automatic	Manual
Enable SRTP PSK	checked	When non-SRTP USK call is set up, IP Phone tries to establish SRTP PSK call with far end.	Yes	Yes
	unchecked	IP Phone does not try SRTP PSK.		
DiffServ Code Point for control	Auto	Use value from LLDP Network Policy TLV, or UNISlim.	Yes	No
DiffServ Code Point for media	Auto	Use value from LLDP Network Policy TLV, or UNISlim.	Yes	No
Provision	up to 40 character URL	URL for provisioning server.		
Provision Zone ID	1 to 5 characters	IP Phone provisioning zone.	Yes	Yes
Enable Bluetooth	Yes	Enables Bluetooth on the IP Phone.	Yes	Yes
	No	Disables Bluetooth on the IP Phone		
Menu lock	Full	Locks Local Tools menu.	Yes	Yes
	Partial	Locks Local Diagnostics, Network Configuration, and Lock menus.		
	Unlock	Unlocks Local Tools menu.		
Contrast	0 to 15	Configures contrast values.	Yes	Yes
Brightness	2 to 32	Configures brightness values.	Yes	Yes
Backlight timer	0 to 6	Configures backlight timer values.	Yes	Yes
Display DIM enabled	Yes	Configures the screen dimmer.	Yes	Yes
	No	Disables the screen dimmer.		
Bold	Yes	Configures bold for the font.	Yes	Yes
	No	Disables bold for the font.		
Enable SSH	Yes	Configures Secure Shell (SSH).	Yes	Yes
	No	Disables SSH.		
NodeID	0 to 9999	Node ID of the TPS.	Yes	Yes

Config option	Options or input	Description	Automatic	Manual
TN	LLL-SS-CC-UU or LLL SS CC UU	Terminal Number of phone on system.	Yes	Yes
	CC-UU or CC UU			

You can reset the IP Phone parameters to the factory default. For more information, see [“Factory default” \(page 475\)](#).

Automatic provisioning using 802.1ab switch (LLDP)

You can use LLDP to provision a limited number of parameters, such as Voice VLAN, Data VLAN, Layer 2 priority bits, and DiffServ.

Automatic provisioning using DHCP

You can use DHCP to provision all parameters in the info block. For more information, see [Table 113 “Provisioning info block format” \(page 465\)](#).

The text below shows an example of the DHCP Nortel i2004-B option string using the provisioning info block.

```
Nortel-i2004-B,s1ip=47.11.62.20;p1=4100;a1=1;r1=255;s2ip=47.11.62.21;p2=4100;a2=1;r2=2;xip=47.11.62.147;xp=44443;xa=g;menulock=p;lldp=y;pk1=438A64FC24127C23;pk2=64FC23CD24AB1413;igarp=y;sntp=y;zone=4thfloor;file=ztd;
```

Automatic provisioning using TFTP You can use TFTP to provision all parameters in the info block. For a list of these parameters, see [Table 113 “Provisioning info block format” \(page 465\)](#).

ATTENTION

The IP Phone attempts to locate firmware updates and font resources files using the <type>.cfg file. For more information, see [“TFTP Server” \(page 593\)](#).

ATTENTION

Automatic provisioning using TFTP still requires a DHCP server to push down IP Phone IP addresses and the DHCP option Nortel i2004-B and the prov= argument of the provisioning info block for the location of the TFTP server.

The text below shows an example of the configuration file using the provisioning info block.

```
slip=47.11.62.20; /* Primary server IP address */
p1=4100; /* Primary server port number */
a1=1; /* Primary server action code */
r1=2; /* Primary server retry count */
s2ip=47.11.62.21; /* Secondary server IP address */
p2=4100; /* Secondary server port number */
a2=1; /* Secondary server action code */
r2=2; /* Secondary server retry count */
xip=47.11.62.147; /* Secondary server retry count */
xp=5000; /* XAS server port number */
xa=g; /* XAS server action code */
unid=Main-tower; /* Unique network identification */
menulock=p; /* Menu lock mode */
vq=y; /* Enable 802.1Q for voice */
vlanf=y; /* Enable VLAN filter */
pc=y; /* Enable PC port */
pcs=a; /* PC port speed */
pcd=a; /* PC port duplex */
dq=y; /* Enable 802.1Q for PC port */
dv=60; /* VLAN ID data VLAN */
dp=5; /* 802.1Q p bit for PC port or data */
pcuntag=y; /* PC port untag all */
lldp=y; /* PC port untag all */
pk1=438A64FC24127C23; /* S1 PK */
pk2=64FC23CD24AB1413; /* S1 PK */
stickiness=y; /* Enable stickiness */
cachedip=n; /* Enable cached IP */
igarp=n; /* Ignore GARP */
srtp=n; /* Enable PSK SRTP */
eap=peap; /* Enable 802.1x (EAP) */
eapid1=DEV1024; /* 802.1x (EAP) device ID */
eappwd=D3c6v5; /* 802.1x (EAP) password */
cdiff=13; /* DiffServ code point for control */
mdiff=12; /* DiffServ code point for media */
prov=47.11.232.115; /* Provisioning server IP address */
dns=47.11.20.20; /* Primary DNS server IP address */
dns2=47.11.20.21; /* Secondary DNS server IP address */
ct=20; /* Contrast value */
br=18; /* Brightness value */
blt=1; /* Backlight timer */
dim=y; /* Enable dim */
bt=y; /* Enable Bluetooth */
zone=NE1F; /* Zone id */
file=ztd; /* Exist in system specific */
hd=w; /* Headset type */
ar=y; /* Enable auto recovery */
arl=ma; /* Auto recovery level */
ll=mi; /* Log level */
ssh=y; /* Enable SSH */
sshid=1234 /* Configure SSH ID */
sshpwd=1234 /* Configure SSH password */
```


Provisioning files The IP Phones receive provisioning files from the TFTP server. The IP Phone supports only a single provisioning server to provide the .prv files.

The provisioning server (TFTP server) contains the following provisioning files:

- SYSTEM provisioning file—provides provisioning information to all IP Phones that support the automatic provisioning feature.
- ZONE provisioning file— provides provisioning information to IP Phones that belong to a unique defined zone or group.
- TYPE provisioning file—provides provisioning information to particular IP Phone types.
- DEVICE provisioning file— specifies device-specific provisioning information and to provide unique an individual end-user or specific IP Phone with unique provisioning information.

The provisioning file contains the Provisioning Info Block only. The IP Phone continues to use the TYPE.cfg file for obtaining firmware and font file updates.

The provisioning file is a text-based file, which contains parameters that require configuration. See [Table 113 "Provisioning info block format" \(page 465\)](#) for syntax, parameters, and values.

Table 113
Provisioning info block format

Parameter	Value	Description
EAP (802.1x)		
eap	dis for disable md5 for EAP-MD5 peap for EAP-PEAP tls for EAP-TLS	Enable 802.1x (EAP).
eapid	Character string up to 32 characters	802.1x (EAP) device ID.
eappwd	Character string up to 32 characters	802.1x (EAP) password.
Connect server access		
s1ip	Value from 0.0.0.0 to 255.255.255.255	Primary server IP address.
p1	Value from 0 to 65535	Primary server port number.
a1	Value from 0 to 255	Primary server action code.
r1	Value from 0 to 255	Primary server retry count.

Parameter	Value	Description
pk1	Character string of 16 characters, which represents 16 hexadecimal digits	S1 PK.
s2ip	Value from 0.0.0.0 to 255.255.255.255	Secondary server IP address.
p2	Value from 0 to 65535	Secondary server port number.
a2	Value from 0 to 255	Secondary server action code.
r2	Value from 0 to 255	Secondary server retry count.
pk2	Character string of 16 characters, which represents 16 hexadecimal digits	S2 PK.
Other networking		
lldp	y for yes n for no	Enable 802.1ab LLDP.
stickiness	y for yes n for no	Enable stickiness.
cachedip	y for yes n for no	Enable cached IP.
igarp	y for yes 'n' no	Enable GARP.
srtip	y for yes n for no	Enable SRTP-PSK.
Voice VLAN		
vq	y for yes n for no	Enable 802.1Q for voice.
vcp	Value from 0 to 8 8 = Auto	802.1Q control p bit for voice stream. If value is configured to 8 then the p bit value is received through LLDP or TPS. If value is not configured the IP Phone defaults to 6.

Parameter	Value	Description
vmp	Value from 0 to 8 8 = Auto	802.1Q media p bit for voice stream 802.1Q control p bit for voice stream. If value is configured to 8 then the p bit value is received through LLDP or TPS. If value is not configured the IP Phone defaults to 6.
vlanf	y for yes n for no	Enable VLAN filter on voice stream.
PC Port		
pc	y for yes n for no	Enable PC port. This parameter does not apply to the IP Phone 2001.
pcs	a for automatic negotiation 10 for 10 Mbps 100 for 100 Mbps	PC port speed.
pcd	a for automatic negotiation f for full duplex h for half duplex	PC port duplex.
Data VLAN		
dq	y for yes n for no	Enable 802.1Q for PC port.
dv	y for yes n for no	Enable VLAN for data. This parameter does not apply to the IP Phone 2001.
dvid	Value from 0 to 4095	VLAN ID for data VLAN.
dp	Value from 0 to 15	802.1Q p bit for data stream.
Diffserv Codepoint		
ediff	Value from 0 to 255	DiffServ code point for controlled packets.
mdiff	Value from 0 to 255	DiffServ code point for media packets.
pcuntag	y for yes n for no	Enable tag stripping on packets forwarded to PC port.

Parameter	Value	Description
Application gateway access		
xip	Value from 0.0.0.0 to 255.255.255.255	XAS server IP address.
xp	Value from 0 to 65535	XAS server port number. This value is a fixed value when XAS (text mode) is used.
xa	Up to a three-character string of one of the following: <ul style="list-style-type: none"> • g for graphical • f for full screen • s for secure No required order among these choices.	XAS server action code (IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, and IP Phone 2007 only).
Miscellaneous		
bt	y for yes n for no	Enable Bluetooth (IP Phone 1140E and IP Phone 1150E only).
zone	Character string up to 8 characters	Zone ID.
file	Character string up to 3 of the following characters: <ul style="list-style-type: none"> • z for read zone file • t for read type file • d for read device file No required order among these choices.	Exist in system specific.
hd	w for wired b for bluetooth (n for none)	Headset type (IP Phone 1140E and IP Phone 1150E only).
menulock	f for full lock p for partial u for unlock	Menu lock mode.
unid	Character string up to 32 characters	Unique network identification.
Display control		

Parameter	Value	Description
ct	Value from 0 to 15 (IP Phone 1100 Series) Value from 0 to 39 (for IP Phone 2007)	Contrast value.
br	Value from 2 to 32	Brightness value (IP Phone 2007 only).
blt	Value from 0 to 6 0 = 5 seconds 1 = 1 minute 2 = 5 minutes 3 = 10 minutes 4 = 15 minutes 5 = 30 minutes 6 = 1 hour	Backlight timer (IP Phone 1110, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, and IP Phone 2007 only).
dim	y for yes n for no	Enable screen dimmer (IP Phone 2007 only).
Error logging		
ar	y for yes n for no	Enable automatic recovery.
arl	cr for critical ma for major mi for minor	Auto recovery level.
ll	cr for critical ma for major mi for minor in for information	Log level.
Security		
ssh	y for yes n for no	Enable Secure Shell (SSH).
sshid	4 to 12 characters	SSH ID.
sshpwd	4 to 12 characters	SSH password.
Warning: Provisioning Info Block is transferred by unsecured protocols TFTP and/or DHCP.		
Warning: Changing this parameter could impact the network connectivity and may require manual correction.		

Table 114 "Dependencies" (page 470) shows the dependencies between provisioning options.

Table 114
Dependencies

Primary provisioning option	Rules
VQ	If VQ is present and configured to N, then VCP, VMP, and VLANF are ignored if they are present.
DQ	If DQ is present and configured to N, then DV and DP are ignored if they are present.
PC	If PC is present and configured to N, then PCS, PCD, PCQ, PCP, and PCUNTAG are ignored if they are present.
PCQ	If PCQ is present and configured to N, then PCP and PCUNTAG are ignored if they are present.
PCS	If PCS is present and configured to A, then PCD is ignored if it is present.
Menu Lock mode	If the Menu Lock mode is not configured as Auto on the phone, then menulock is ignored if it is present.

The following list shows the provision files in order of priority:

- <DEVICE>.PRV
- <ZONE>PRV
- <TYPE>.PRV
- SYSTEM.PRV

For example, if a unique S1 IP is defined in the SYSTEM.PRV file and a different S1 IP address is defined in the <DEVICE>.PRV file, the <DEVICE>.PRV file provisioning is used for S1 IP.

When you configure the provisioning files, you must end each parameter with a semicolon (;) or the IP Phone does not use the provisioning file.

Table 115
System.prv (SYSTEM)

```
file=ztd;                /*z = zone, t = type, d= device */
zone=4thfloor;
```

Table 116
1140e.prv (TYPE)

```
bt=yes;                 /* bluetooth enabled */
```

Table 117
4thfloor.prv (ZONE)

```
slip=192.168.1.2;          /*Primary Server IP address*/
pl=4100;                  /*Primary Server Port*/
al=1;                     /*Primary Server action code*/
r1=10;                    /*Primary Server retry count*/
```

Table 118
001765fd67d0.prv (DEVICE)

```
ct=100;                  /*contrast*/
BlT=100;                 /*Backlight timer*/
```

NodeID and TN provisioning The IP Phone processes the Node and TN information when they are contained in any of the existing .PRV files.

Table 119
Node and TN information in a PRV file

<pre>reg=<MACAddr> <CallServerType> [<ConnectServer> <NodeID> <TN>] ; or reg=<MACAddr>,<CallServerType> [, <ConnectServer>,<NodeID>,<TN>] ;</pre>	
<p>where:</p> <p>[]</p>	<p>Items are optional and variable depending on <CallServerType>.</p> <p>The items can be separated by spaces or commas or any combination of them. The string is case insensitive, so upper, lower, and mixed case are all acceptable.</p>
<MACAddr>	<p>MAC address of phone. Minimum size of 12 characters. Specifies which phone should use the information on that line. Delimiters in the MAC address can be spaces, colons and dashes, or any combination of them. The following are examples of valid MAC address formats:</p> <ul style="list-style-type: none"> • 00-13-65-FE-F4-D4 • 00:13:65:FE:F4:D4 • 001365FEF4D4 • 00 13 65 FE F4 D4
<CallServerType>	CS1K is the value of the Communication Server 1000.
<ConnectServer>	S1 and S1S2 values of the Connect Server.

<NodeID>	0 to 9999 value for the Node ID of the TPS.
<TN>	<p>Terminal Number of phone on system. Large system TN: LLL-SS-CC-UU or LLL SS CC UU</p> <p>Numbers in the TN can be separated by spaces, dashes, or any combination of spaces and dashes. Fields can have leading zeros to fill the field size.</p>

You can place the "reg" item(s) in one of the supported provisioning files. Place the "reg" item(s) at the end of the file provisioning info data items. Do not place any other provisioning info items after the "reg" item(s). This is required to optimize the speed of the parsing.

The defined file precedence rules apply. If an IP Phone MAC address is found in more than one valid "reg" item across the different files, the file that follows the defined precedence order is used.

Although the Device file is specific to a phone it can contain one or more "reg" items. The MAC address of the "reg" item(s) is still searched to match the IP Phone MAC address, even though the file is the device file.

When there is a list of "reg" items, the IP Phone searches the list and only processes the "reg" item that contains the IP Phone MAC address. The parser silently discards "reg" items that have invalid format or invalid data for any field.

The first valid "reg" item found in a file matching the IP Phone MAC address is used and the parsing of "reg" items in the file terminates. A valid "reg" item is one that has the same MAC address as the IP Phone and has valid data in all of its fields.

The following SYSTEM.PRIV file content contains examples of various valid string formats. The "reg" item data can also appear in any of the supported .PRV files.

```
s1ip=47.11.84.184;

REG= 00:1B:BA:F8:82:0D CS1K S1 123 096-1-22-00;

REG= 00:1B:BA:F8:82:0E CS1K S1 44 096-1-22-01;

REG= 00:1B:BA:F8:82:0F CS1K S1 7777 096-1-22-02;

REG= 00:1B:BA:F8:82:1D CS1K S1 7777 096-1-22-03;

REG= 00:1B:BA:F8:82:1E, CS1K,S1,7777,096-1-22-04;
```



```
REG= 00:1B:BA:F8:82:1F CS1K S1 7777 096-1-22-05;  
REG= 00:1B:BA:F8:82:2D CS1K S1 7777 096-1-22-06;  
REG= 00:1B:BA:F8:82:2E CS1K S1 7777 096-1-22-07;  
REG= 00:1B:BA:F8:82:2F CS1K S1 7777 096-1-22-08;  
REG= 00:1B:BA:F8:82:3D CS1K S1 7777 096-1-22-09;  
reg= 00 1B BA F8 82 3E CS1K S1 7777 096-1-22-10;  
reg= 001BbaF8823f Cs1k s1 8972 61 0;  
reg= 00-1b-Ba-f8-82-4d cs1k S1 3434 96 00 01 11;
```

Automatic provisioning using UNISlim You can use UNISlim to automatic provision a limited number of parameters, such as Layer 2 priority bits (Ctrl and Media priority bits) and Differentiated Service Code Point (DiffServ). For information about configuring these parameters, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

Provisioning Info Block

You can obtain configuration parameters in the IP Phone that are defined as AUTO from the Auto Provisioning page from an 802.1ab switch (LLDP), DHCP, TFTP, or UNISlim.

You can obtain the configuration options in the following priority, from lowest to highest:

- Manual provisioning
- Automatic provisioning using 802.1ab switch (LLDP)
- Automatic provisioning using TFTP
 - Current device-specific Provisioning Info Block carried by the provisioning server
 - Current zone-specific Provisioning Info Block sent by the provisioning server
 - Current type-specific Provisioning Info Block sent by the provisioning server
 - Current system-specific Provisioning Info Block sent by the provisioning server
- Automatic provisioning using DHCP

- Current system-specific Provisioning Info Block carried by Nortel-i2004-B DHCP options
- Current existing Nortel DHCP options (existing Nortel-i2004-A and VLAN-A options)
- Automatic provisioning using UNISlim
- LPR (Last auto received value)
- Factory default

For more information configuration options priorities, see [“Precedence rule and stickiness control”](#) (page 474).

The TFTP provisioning server, the DHCP server, or both can provide the automatic Provisioning Info Block. The servers share the same syntax defining the Provisioning Info Block. The TFTP provisioning server provides the Provisioning Info Block in a set of .PRV files, where the DHCP Server provides the Provisioning Info Block with a new Vendor Specific String Nortel-i2004-B.

Operation

This section describes the automatic provisioning feature operation.

Precedence rule and stickiness control

The IP Phone 2007, IP Phone 1100 Series, and IP Phone 1200 Series can obtain provisioning information from many sources at various times. A precedence rule can resolve the possible conflict when different values are specified in various sources for one parameter. The Phase II IP Phones (IP Phone 2001, IP Phone 2002, and IP Phone 2004) do not support the precedence rule, therefore the phones use the last value received.

Provisioning information from a provisioning source with high priority can overwrite the provisioning information from a provisioning source with low priority. The manual provisioning has highest priority. The other provisioning sources are auto-provisioning sources.

Automatic provisioning defines provisioning control for each parameter. You can either manually or automatically provision each parameter. Each provisioning parameter provides an attribute that specifies if the parameter was previously provisioned manually or automatically.

The default value of the stickiness attribute is AUTO. If the provisioning parameter is AUTO, the IP Phone can receive the value from automatic provisioning sources based on the precedence rule. If you manually change the parameter, the attribute value is MANUAL. If the attribute is MANUAL, the provisioning information from automatic provisioning

sources is ignored. To manually reconfigure the attribute for an individual parameter or attributes for all parameters to AUTO, use the Set to Factory Default function.

If you enable DHCP, then the IP address, the subnet mask, the default gateway, which the IP Phone obtains from the DHCP server, overwrites the manually configured value. The value for EAP device ID and password can also overwrite the manually configured value.

If you configure stickiness and the current provisioning source does not provide the provisioning information for the particular parameter, the last received provisioning value is used.

IP Phone reset

The IP Phone compares the provisioning information in the provisioning files with the existing provisioning information. The IP Phone applies the new provisioning information and then

- resets silently
- resets immediately during boot phase, DHCP phase, and provisioning phase
- resets in a few seconds during TPS connecting phase

If the IP Phone is idle, information appears on the display. If the IP Phone is in an active call, the phone resets after the call ends.

Factory default

You can reset the following IP Phone parameters to the factory default

- IP Phone 2007
- IP Phone 1210
- IP Phone 1220
- IP Phone 1230
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

Use [*][*][7][3][6][3][9] IP Phone MAC address [#][#] to reset the IP Phone parameters to the factory default.

[Table 120 "Factory default values" \(page 476\)](#) shows the factory default values for the IP Phone parameters.

Table 120
Factory default values

Parameter	Factory default value
Enable 802.1x (EAP)	Disabled
802.1x Device ID	None
802.1x Password	None
Enable 802.1ab (LLDP)	Yes
	<div style="border: 1px solid black; padding: 5px;"> <p>ATTENTION The new firmware versions (U3.2 and newer) set this option to No because LLDP enabled by default was causing interoperability issues with some switches.</p> </div>
DHCP mode	On
Set IP	0.0.0.0
Net Mask	0.0.0.0
Gateway	0.0.0.0
S1 IP	0.0.0.0
S1 Port	0
S1 Action	1
S1 Retry	255
S1 PK	0xffffffffffff
S2 IP	0.0.0.0
S2 Port	0
S2 Action	1
S2 Retry	255
S2 PK	0xffffffffffff
Network Speed	Auto
Network Duplex Mode	Auto
Voice 802.1Q	Enabled
Voice VLAN Mode	DHCP Auto
Voice VLAN ID	4095
Voice Control pBit	8 (Auto)
Voice Media pBit	8 (Auto)
VLAN Filter	Disabled
Enable PC Port	Yes
PC Port Speed	Auto

Parameter	Factory default value
PC Port Duplex Mode	Auto
Data 802.1Q	Enabled
Data VLAN Mode	Disabled
Data VLAN ID0	4095
Data pBit	8 (Auto)
PC-Port Untag All	Off
Stickiness	Enabled
Cached IP	Disabled
Ignore GARP	Disabled
PSK SRTP	Off
DiffServ Code Points for control message	0
DiffServ Code Points for media message	0
XAS IP	0.0.0.0
XAS Port	0
XAS Action	Gfs (graphical, full screen, and secure)
Primary DNS IP	0.0.0.0
Secondary DNS IP	0.0.0.0
Provisioning server IP	0.0.0.0
Provisioning server port	0
Provisioning server type	TFTP
UNID	None
Menu Lock	Disabled
Bluetooth (1140E and 1150E only)	Disabled
Zone ID	None
Read zone/type/device specific provisioning file	None
Contrast	7
Brightness	0x20
Backlight	1 hour
Display DIM Enabled	On
Headset type	None
Auto recovery flag	On
Recovery level Not accessible from the local menu.	Critical

Parameter	Factory default value
Log level Not accessible from the local menu.	Minor
CPU sampling rate Not accessible from the local menu.	180 seconds
SSH user ID	None
SSH password	None
Bold	Off

Appendix

Manual provisioning of IP Phone 1110 and 1200 Series

Contents

This section contains the following topics:

- “Introduction” (page 479)
- “Provisioning parameters” (page 479)

Introduction

This section applies to the following IP Phones

- IP Phone 1110
- IP Phone 1210
- IP Phone 1220
- IP Phone 1230

Provisioning parameters

Use the Network Configuration menu item to configure IP Phone parameters. You can access the Network Configuration menu for text-based phone in one of the following ways:

- Press the 4 soft keys at the bottom of the display area in sequence from left to right when the IP Phone boots and the text Nortel appears in the display.
- Double-press the Services key. To make a menu selection, you can press the number associated with the menu item (for example, press 2 3 for Network Configuration) or you can use the navigation keys to scroll through the list of menu items.

For more information about provisioning parameters for the IP Phones, see [“Provisioning the IP Phones” \(page 447\)](#).

Use the keys in [Table 121 "Keys and descriptions" \(page 480\)](#) to provision the parameters for the text-based IP Phones.

Table 121
Keys and descriptions

Key	Description
[]	Check box, select or clear: Auto-checked, Manual-unchecked.
Dial pad	Enter number of index to jump to option.
Up	Enter number of index to jump to previous group.
Down	Enter number of index to jump to the next group.
Left	Go to previous item.
Right	Go to next item.
Enter	Select or clear the check box for item or group.
Check for Auto	Context-sensitive.
Uncheck for manual	Context-sensitive.
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.
Cancel	Cancel network configuration.
Clear	Clear an entire configuration entry.

[Table 122 "Provisioning parameters legend" \(page 480\)](#) provides a legend for [Table 123 "Provisioning parameters for text-based IP Phones" \(page 481\)](#).

Table 122
Provisioning parameters legend

Configuration menu option	List each configuration parameter in the order it appears in the menu.
Options or input	List every choice available for the parameter and the minimum and maximum number of characters or digits allowed.

Description	Describe the option.
Dependency	<p>Show any dependency that controls when that option is enabled or can be used.</p> <p>If the prompt has a dependency, the dependency appears on the same line as the prompt, and input options start on the next line of the table.</p> <p>If an option has a dependency, the dependency appears on same line as the option and applies only to that option.</p> <p>If both the prompt and the option have dependencies, they are cumulative between the prompt and the option and <i>and</i> is used to show multiple dependencies.</p>

Table 123 "Provisioning parameters for text-based IP Phones" (page 481) lists the provisioning parameters for the IP Phone 1110, IP Phone 1210, IP Phone 1220, and IP Phone 1230.

The parameters appear in order of appearance.

Table 123
Provisioning parameters for text-based IP Phones

Config menu option	Options or input	Description	Dependency
EAP mode	Disable MD5 PEAP TLS	EAP disabled MD5 encryption PEAP encryption TLS encryption	
ID 1	Up to 32 characters	EAP ID	EAP mode = MD5
ID 2	Up to 32 characters	EAP ID	EAP mode = MD5 of TLS
Password	Up to 32 characters	EAP password	EAP mode = MD5, PEAP, or TLS
Enable 802.1ab (LLDP)	0-No	LLDP not used	
	1-Yes	Enable LLDP	
DHCP	0-No	Static IP and Partial used	
	1-Yes	DHCP used	
Cached IP	0-No	Must receive response to assign IP Phone IP address	DHCP = 1

Config menu option	Options or input	Description	Dependency
	1-Yes	Last IP Phone IP address information received is used if DHCP server not reached	DHCP = 1
Set IP	IP address	IP Phone IP address	DCHP = No
Net mask	Subnet mask	IP Phone subnet mask	DHCP = No
Gateway	IP address	IP Phone gateway IP address	DCHP = No
DNS IP1	IP address	DNS server 1 IP address	
DNS IP2	IP address	DNS server 2 IP address	
CA Server	IP address	Certificates Server IP address	
Domain Name	4 to 12 characters	IP Phone domain name	
Hostname	4 to 12 characters	IP Phone host name	
S1 IP	IP address	TPS server 1 node IP address	
Port	1 to 5 digits	TPS server 1 port number	
S1 action	1 digit	TPS server 1 action value	
Retry	2 digits	TPS server 1 retry count	
S1 PK	16 hex characters	TPS server 1 PK string For example, 0 to 9 or A to F.	S1 action = 6
S2 IP	IP address	TPS server 2 node IP address	
Port	1 to 5 digits	TPS server 2 port number	
S2 action	1 digit	TPS server 2 action value	
Retry	2 digits	TPS server 2 retry count	

Config menu option	Options or input	Description	Dependency
S2 PK	16 hex characters	TPS server 2 PK string For example, 0 to 9 or A to F.	S2 action = 6
Cfg XAS	0-No	XAS disabled	
	1-Yes	XAS enabled	
XAS IP	IP address	AG server IP address	
Ntwk Port Speed	0-Auto	Auto sense	
	1-10 BT	Forced 10 BT	
	2-100 BT	Forced 100 BT	
Ntwk Port Duplex			Ntwk Port Speed = 10 BT or 100 BT
	0-Auto	Auto negotiate	
	1-Forced Full	Forced full duplex	
	2-Forced Half	Forced half duplex	
Enable Voice 802.1Q	0-No	802.1Q not used	
	1-Yes	802.1Q header and features used	
Voice VLAN			802.1Q = 1
	0-No		
	1-Yes		
VLAN Cfg			Voice VLAN = 1
	0-Auto	Automatically obtains VLAN ID using DHCP or the 802.1ab data switch.	
	1-Man	1 to 4094	Voice VLAN = 1
LLDP-MED			VLAN = 1 and 802.1Q = 1
	0-No		
	1-Yes	VLAN ID is configured automatically to the value received in the Network Policy TLV.	
LLDP VLAN			VLAN = 1 and 802.1Q = 1
	0-No		

Config menu option	Options or input	Description	Dependency
	1-Yes	VLAN ID is configured automatically to the value received in the VLAN NAME TLV.	
DHCP			VLAN = 1 and DHCP = 1
	0-No		
	1-Yes	VLAN ID is configured automatically to a value received from the DHCP server.	
VLANFILTER			VLAN = 1
	0-No	Process all frames	
	1-Yes	Filter frames without Voice VLAN tag	
Ctrl pBits			802.1Q = 1 If DataVLAN = No VLAN, then packets sent with VLAN ID 0.
	0-7	Force signalling related priority bits to chosen value	
	8-Au	Use value from received LLDP Network Policy TLV or TPS, or default of 6	
Media pBits			802.1Q = 1
	0-7	Force signalling related priority bits to chosen value	
	8-Au	Use value from received LLDP Network Policy TLV or TPS or default of 6	
PC Port	0-Off	PC port disabled	
	1-On	PC port active	
Data 802.1Q			PC Port = 1
	0-No	802.1Q not used	
	1-Yes	802.1Q header and features used	

Config menu option	Options or input	Description	Dependency
Data VLAN			PC Port = 1
	0-No		
	1-Yes		
Data VLAN Cfg			Data 802.1Q = 1 or Data VLAN = 1 and PC Port =1
	0-Auto	VLAN ID is configured automatically to the value received in the VLAN NAME TLV.	
	1-Man		
Data VLAN ID	1 to 4094		Man = 1
Data pBits			PC Port = 1 or 802.1Q = 1
	0-7	Force all priority bits to chosen value	
	8-Au	Use value from received LLDP Network Policy TLV or default of 6	
PCUntagAll	0-No		
	1-Yes		
Enable Stickiness	checked		
	unchecked		
PSK SRTP	0-No	IP Phone does not try SRTP PSK	
	1-Yes	When non-SRTP USK call is set up, IP Phone tries to establish SRTP PSK call with far end	
GARP Ignore	0-No		
Provision	up to 40- character URL	URL for provisioning server	
Provision Zone ID	1 to 5 characters	IP Phone provisioning zone	

Config menu option	Options or input	Description	Dependency
Menu lock	Full lock Partial lock Unlock	Menu lock mode	
Contrast	0 to 15	Contrast value	
Brightness	2 to 32	Brightness value	
Backlight timer	0 to 6	Backlight timer values: 0 = 5 minutes 1 = 1 minute 2 = 5 minutes 3 = 10 minutes 4 = 15 minutes 5 = 30 minutes 6 = 1 hour	
Display DIM enabled	Yes	Screen dimmer	
	No		
Bold	Yes	Bold screen font	
	No		
Enable SSH	Yes	Enable SSH	
	No	Disable SSH	
SSH ID	4 to 12 characters	SSH user ID	SSH enabled
SSH PWD	4 to 12 characters	SSH user password	SSH enabled

Appendix

Manual provisioning of IP Phone 2007 and 1100 Series

Contents

This section contains the following topics:

- [“Introduction” \(page 487\)](#)
- [“Provision parameters” \(page 487\)](#)

Introduction

This section applies to the following graphic-based IP Phones

- IP Phone 2007
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

The IP Phone 1110 is a text-based IP Phone. For more information about manual provisioning of the IP Phone 1110, see [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).

Provision parameters

Use the Network Configuration menu item to configure IP Phone parameters. You can access the Network Configuration menu for text-based phone in one of the following ways:

- Press the 4 soft keys at the bottom of the display area in sequence from left to right when the IP Phone boots and the text Nortel appears in the display.
- Double-press the Services key. To make a menu selection, you can press the number associated with the menu item (for example, press

2 3 for Network Configuration) or you can use the navigation keys to scroll through the list of menu items.

For more information about provisioning parameters for the IP Phones, see ["Provisioning the IP Phones" \(page 447\)](#).

Use the keys in [Table 124 "Keys and descriptions" \(page 488\)](#) to provision the parameters for the graphic-based IP Phones.

Table 124
Keys and descriptions

Key	Description
[]	Check box, select or clear: Auto-checked, Manual-unchecked
Dial pad	Enter number of index to jump to option
Up	Enter number of index to jump to previous group
Down	Enter number of index to jump to the next group
Left	Go to previous item
Right	Go to next item
Enter	Select or clear the check box for item or group
Check for Auto	Context-sensitive
Uncheck for manual	Context-sensitive
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
Cancel	Cancel network configuration.
Clear	Clear an entire configuration entry

[Table 125 "Provisioning parameters legend" \(page 488\)](#) provides a legend for [Table 126 "Provisioning parameters for graphic-based IP Phones" \(page 489\)](#).

Table 125
Provisioning parameters legend

Configuration menu item	List each configuration parameter in the order it appears in the menu.
Options or input	List every choice available for the parameter and the minimum and maximum number of characters or digits allowed.

Description	Describe the option.
Dependency	<p>Show any dependency that controls when that option is enabled or can be used.</p> <p>If the prompt has a dependency, the dependency appears on the same line as the prompt, and input options start on the next line of the table.</p> <p>If an option has a dependency, the dependency appears on same line as the option and applies only to that option.</p> <p>If both the prompt and the option have dependencies, they are cumulative between the prompt and the option and <i>and</i> is used to show multiple dependencies.</p>

Table 126 "Provisioning parameters for graphic-based IP Phones" (page 489) lists the provisioning parameters for the IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, and IP Phone 2007.

The parameters appear in order of appearance.

Table 126
Provisioning parameters for graphic-based IP Phones

Config menu option	Options or input	Description	Dependency
EAP mode	Disable MD5 PEAP TLS	EAP disabled MD5 encryption PEAP encryption TLS encryption	
ID 1	4 to 8 characters	EAP ID	EAP mode = MD5
ID 2	4 to 8 characters	EAP ID	EAP mode = MD5 or TLS
Password	4 to 12 characters	EAP password	EAP mode = MD5, PEAP, or TLS
Enable 802.1ab (LLDP)	Checked	Enable LLDP	
	Unchecked	LLDP not used	
DHCP	Yes	DHCP used	
	No	Static IP and config used	
Set IP	IP address	IP Phone IP address	DCHP = No
Net mask	Subnet mask	IP Phone subnet mask	DHCP = No

Config menu option	Options or input	Description	Dependency
Gateway	IP address	IP Phone gateway IP address	DCHP = No
DNS IP1	IP address	DNS server 1 IP address	
DNS IP2	IP address	DNS server 2 IP address	
CA Server	IP address	Certificates Server IP address	
Domain Name	4 to 12 characters	IP Phone domain name	
Hostname	4 to 12 characters	IP Phone host name	
S1 IP	IP address	TPS server 1 node IP address	
Port	1 to 5 digits	TPS server 1 port number	
S1 action	1 digit	TPS server 1 action value	
Retry	2 digits	TPS server 1 retry count	
S1 PK	16 hex characters	TPS server 1 PK string For example, 0 to 9 or A to F.	S1 action = 6
S2 IP	IP address	TPS server 2 node IP address	
Port	1 to 5 digits	TPS server 2 port number	
S2 action	1 digit	TPS server 2 action value	S2 action = 6
Retry	2 digits	TPS server 2 retry count	
S2 PK	16 hex characters	TPS server 2 PK string For example, 0 to 9 or A to F.	
Ntwk Port Speed	Auto	Auto sense	
	10 BT	Forced 10 BT	
	100 BT	Forced 100 BT	

Config menu option	Options or input	Description	Dependency
Ntwk Port Duplex			Ntwk Port Speed = 10 BT or 100 BT
	Auto	Auto negotiate	
	Forced Full	Forced full duplex	
	Forced Half	Forced half duplex	
XAS IP	IP address	AG server IP address	
Graphical XAS	checked	Graphical XAS used	
	unchecked	Text XAS used	
XAS Port	1 to 5 digits	AG server port number	
Enable Voice 802.1Q	checked	802.1Q header and features used	
	unchecked	802.1Q not used	
Voice VLAN			Enable Voice 802.1Q checked
	No VLAN		
	DHCP	VLAN ID from DHCP Auto VLAN	and DHCP = Yes
	LLDP VLAN Name	VLAN ID from LLDP VLAN Name TLV	and Enable 802.1ab (LLDP) checked
	LLDP MED	VLAN ID from LLDP MED	and Enable 802.1ab (LLDP) checked
	Enter VLAN ID	VLAN ID entered 1 to 4094	
VLAN Filter			Enable Voice 802.1Q checked and VoiceVLAN configured
	checked	Filter frames without Voice VLAN tag	
	unchecked	Process all frames	
Ctrl Priority Bits			Enable Voice 802.1Q checked. If DataVLAN = No VLAN, then packets sent with VLAN ID 0.

Config menu option	Options or input	Description	Dependency
	Auto	Use value from received LLDP Network Policy TLV or TPS, or default of 6	
	0 to 7	Force signalling related priority bits to chosen value	
Media Priority Bits			Enable Voice 802.1Q checked. If DataVLAN = No VLAN, then packets sent with VLAN ID 0.
	Auto	Use value from received LLDP Network Policy TLV or TPS or default of 6	
	0 to 7	Force media related priority bits to chosen value	
Enable PC Port	checked	PC port active	
	unchecked	PC port disabled	
PC Port Speed	Auto	Auto sense	Enable PC Port checked
	10 BT	Forced 10 BT	
	100 BT	Forced 100 BT	
PC Port Duplex			Enable PC Port checked & PC Port Speed = 10 BT or 100 BT
	Auto	Autonegotiate	
	Force Full	Forced full duplex	
	Force Half	Forced half duplex	
Enable Data 802.1Q			Enable PC Port checked
	checked	802.1Q header and features used	
	unchecked	802.1Q not used	
Data VLAN			Enable PC Port checked & Enable Data 802.1Q checked
	No VLAN		

Config menu option	Options or input	Description	Dependency
	LLDP VLAN Name	VLAN ID from LLDP VLAN Name TLV	and Enable 802.1ab (LLDP) checked
	Enter VLAN ID	VLAN ID entered 1 to 4094	
Data Priority Bits			Enable PC Port checked and Enable Data 802.1Q checked. If DataVLAN = No VLAN, then packets sent with VLAN ID 0.
	Auto	Use value from received LLDP Network Policy TLV or default of 6	
	0 to 7	Force all priority bits to chosen value	
PC-Port Untag All			Enable PC Port checked and Enable Data 802.1Q checked
	checked		
	unchecked		
Enable Stickiness	checked		
	unchecked		
Cached IP			DHCP is checked
	checked	Last IP Phone IP address information received is used if DHCP server not reached	
	unchecked	Must receive response to assign IP Phone IP address	
Ignore GARP	checked		
	unchecked		
Enable SRTP PSK	checked	When non-SRTP USK call is set up, IP Phone tries to establish SRTP PSK call with far end	

Config menu option	Options or input	Description	Dependency
	unchecked	IP Phone does not try SRTP PSK	
Provision	up to 40 character URL	URL for provisioning server	
Provision Zone ID	1 to 5 characters	IP Phone provisioning zone	
Enable Bluetooth	Yes	Enables Bluetooth on the IP Phone (IP Phone 1140E and IP Phone 1150E only)	
	No	Disables Bluetooth on the IP Phone (IP Phone 1140E and IP Phone 1150E only)	
Bold	Yes	Bold screen font	
	No		
Enable SSH	Yes	Enable SSH	
	No	Disable SSH	
SSH ID	4 to 12 characters	SSH user ID	SSH enabled
SSH PWD	4 to 12 characters	SSH user password	SSH enabled

Appendix

Manual provisioning of IP Phone 2000 Series

Contents

This section contains the following topics:

- [“Introduction” \(page 495\)](#)
- [“Provision parameters” \(page 495\)](#)

Introduction

This section applies to the following IP Phones

- IP Phone 2001
- IP Phone 2002
- IP Phone 2004
- IP Audio Conference Phone 2033

The IP Phone 2007 is a graphic-based IP Phone. For more information about manual provisioning of the IP Phone 2007, see [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#).

Provision parameters

Use the Network Configuration menu item to configure IP Phone parameters. You can access the Network Configuration menu for text-based phone in one of the following ways:

- Press the 4 soft keys at the bottom of the display area in sequence from left to right when the IP Phone boots and the text Nortel appears in the display.
- Double-press the Services key. To make a menu selection, you can press the number associated with the menu item (for example, press

2 3 for Network Configuration) or you can use the navigation keys to scroll through the list of menu items.

Table 127
Keys and descriptions

Key	Description
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
Cancel	Cancel network configuration. The IP Phone reboots without saving changes.
Clear	Clear an entire configuration entry. The Clear key is not available on the IP Audio Conference Phone 2033.

Table 128 "Provisioning parameters legend" (page 496) provides a legend for Table 129 "Provisioning parameters for Phase II IP Phones" (page 497).

Table 128
Provisioning parameters legend

Configuration menu item	List each configuration parameter in the order it appears in the menu.
Options or input	List every choice available for the parameter and the minimum and maximum number of characters or digits allowed.
Description	Describe the option.
Dependency	Show any dependency that controls when that option is enabled or can be used. If the prompt has a dependency, the dependency appears on the same line as the prompt, and input options start on the next line of the table. If an option has a dependency, the dependency appears on same line as the option and applies only to that option. If both the prompt and the option have dependencies, they are cumulative between the prompt and the option and <i>and</i> is used to show multiple dependencies.

Provisioning the Phase II IP Phones

Table 129 "Provisioning parameters for Phase II IP Phones" (page 497) lists the provisioning parameters for the IP Phone 2001, IP Phone 2002, and IP Phone 2004.

The parameters appear in order of appearance.

Table 129
Provisioning parameters for Phase II IP Phones

Config menu option	Options or input	Description	Dependency
EAP Enable	1-Yes	EAP enabled	
	0-No	EAP disabled	
ID 1	4 to 8 characters	EAP ID	EAP = 1
ID 2	4 to 8 characters	EAP ID	EAP = 1
Password	4 to 12 characters	EAP password	EAP = 1
Enable 802.1ab (LLDP)	0-No	LLDP not used	
	1-Yes	Enable LLDP	
DHCP	0-No	Static IP and Partial used	
	1-Yes	DHCP used	
Cached IP	0-No	Must receive response to assign IP Phone IP address	DHCP = 1
	1-Yes	Last IP Phone IP address information received is used if DHCP server not reached	DHCP = 1
Set IP	IP address	IP Phone IP address	DCHP = No
Net mask	Subnet mask	IP Phone subnet mask	DHCP = No
Gateway	IP address	IP Phone gateway IP address	DCHP = No
S1 IP	IP address	TPS server 1 node IP address	
Port	1 to 5 digits	TPS server 1 port number	
S1 action	1 digit	TPS server 1 action value	
Retry	2 digits	TPS server 1 retry count	

Config menu option	Options or input	Description	Dependency
S1 PK	16 hex characters	TPS server 1 PK string For example, 0 to 9 or A to F.	S1 action = 6
S2 IP	IP address	TPS server 2 node IP address	
Port	1 to 5 digits	TPS server 2 port number	
S2 action	1 digit	TPS server 2 action value	
Retry	2 digits	TPS server 2 retry count	
S2 PK	16 hex characters	TPS server 2 PK string For example, 0 to 9 or A to F.	S2 action = 6
Cfg XAS	0-No	XAS disabled	
	1-Yes	XAS enabled	
XAS IP	IP address	AG server IP address	
Ntwk Port Speed	0-Auto	Auto sense	
	1-10 BT	Forced 10 BT	
	2-100 BT	Forced 100 BT	
Ntwk Port Duplex			Ntwk Port Speed = 10 BT or 100 BT
	0-Auto	Autonegotiate	
	1-Forced Full	Forced full duplex	
	2-Forced Half	Forced half duplex	
Enable Voice 802.1Q	0-No	802.1Q not used	
	1-Yes	802.1Q header and features used	
Voice VLAN			802.1Q = 1
	0-No		
	1-Yes		
VLAN Cfg			Voice VLAN = 1

Config menu option	Options or input	Description	Dependency
	0-Auto	Automatically obtains VLAN ID using DHCP or the 802.1ab data switch.	
	1-Man	1 to 4094	Voice VLAN = 1
LLDP-MED			VLAN = 1 and 802.1Q = 1
	0-No		
	1-Yes	VLAN ID is configured automatically to the value received in the Network Policy TLV.	
LLDP VLAN			VLAN = 1 and 802.1Q = 1
	0-No		
	1-Yes	VLAN ID is configured automatically to the value received in the VLAN NAME TLV.	
DHCP			VLAN = 1 and DHCP = 1
	0-No		
	1-Yes	VLAN ID is configured automatically to a value received from the DHCP server.	
VLANFILTER			VLAN = 1
	0-No	Process all frames	
	1-Yes	Filter frames without Voice VLAN tag	
Ctrl pBits			802.1Q = 1 If DataVLAN = No VLAN, then packets sent with VLAN ID 0.
	0-7	Force signalling related priority bits to chosen value	

Config menu option	Options or input	Description	Dependency
	8-Au	Use value from received LLDP Network Policy TLV or TPS, or default of 6	
Media pBits			802.1Q = 1
	0-7	Force signalling related priority bits to chosen value	
	8-Au	Use value from received LLDP Network Policy TLV or TPS or default of 6	
PC Port	0-Off	PC port disabled	
	1-On	PC port active	
Data 802.1Q			PC Port = 1
	0-No	802.1Q not used	
	1-Yes	802.1Q header and features used	
Data VLAN			PC Port = 1
	0-No		
	1-Yes		
Data VLAN Cfg			Data 802.1Q = 1 or Data VLAN = 1 and PC Port =1
	0-Auto	VLAN ID is configured automatically to the value received in the VLAN NAME TLV.	
	1-Man		
Data VLAN ID	1 to 4094		Man = 1
Data pBits			PC Port = 1 or 802.1Q = 1
	0-7	Force all priority bits to chosen value	
	8-Au	Use value from received LLDP Network Policy TLV or default of 6	

Config menu option	Options or input	Description	Dependency
PCUntagAll	0-No		
	1-Yes		
PSK SRTP	0-No	IP Phone does not try SRTP PSK	
	1-Yes	When non-SRTP USK call is set up, IP Phone tries to establish SRTP PSK call with far end	
GARP Ignore	0-No		
	1-Yes		
Bold	Yes	Bold screen font	
	No		

Provisioning the IP Audio Conference Phone 2033

[Table 130 "Provisioning parameters for IP Audio Conference Phone 2033" \(page 501\)](#) lists the provisioning parameters for the IP Audio Conference Phone 2033.

The parameters appear in order of appearance.

Table 130
Provisioning parameters for IP Audio Conference Phone 2033

Config menu option	Options or input	Description	Dependency
DHCP	Yes	DHCP used	
	No	Static IP and config used	
Set IP	IP address	IP Phone IP address	DCHP = No
Net mask	Subnet mask	IP Phone subnet mask	DHCP = No
Gateway	IP address	IP Phone gateway IP address	DCHP = No
TFTP Server IP	IP address	TFTP Server IP address	
S1 IP	IP address	TPS server 1 node IP address	
Port	1 to 5 digits	TPS server 1 port number	

Config menu option	Options or input	Description	Dependency
S1 action	1 digit	TPS server 1 action value	
Retry Count	2 digits	TPS server 1 retry count	
S2 IP	IP address	TPS server 2 node IP address	
Port	1 to 5 digits	TPS server 2 port number	
S2 action	1 digit	TPS server 2 action value	S2 action = 6
Retry Count	2 digits	TPS server 2 retry count	
VLAN	checked	802.1Q header and features used	
	unchecked	802.1Q not used	
VLAN	1 to 4094	VLAN ID	VLAN = 1
Cfg XAS	checked	XAS enabled	
	unchecked	XAS disabled	
XAS IP	IP address	AG server IP address	Cfg XAS = 1
EAP mode	Disable	EAP disabled	
	MD5	MD5 encryption	
ID 1	4 to 8 characters	EAP ID	EAP mode = MD5
ID 2	4 to 8 characters	EAP ID	EAP mode = MD5
Password	4 to 12 characters	EAP password	EAP mode = MD5
Cfg PK	1-N		
	1-Yes		
New PK	16 hex characters	TPS server 2 PK string For example, 0 to 9 or A to F.	
Duplex			
	Auto	Autonegotiate	
	Full	Forced full duplex	
Speed			Duplex = 1
	0-10 BT	Forced 10 BT	
	1-100 BT	Forced 100 BT	

Config menu option	Options or input	Description	Dependency
Bold	Yes	Bold screen font	
	No		

Appendix

Dynamic Host Configuration Protocol server configuration

Install a Windows NT 4 or Windows 2000 server

To set up the Windows NT 4 or Windows 2000 server, follow the instructions provided in the installation booklet. After completion, install the latest Service Pack and make sure the DHCP Manager is included.



WARNING

If installing a Windows NT 4 server with Service Pack 4 or later, follow the installation instructions included with the server hardware.

Configure a Windows NT 4 server with DHCP

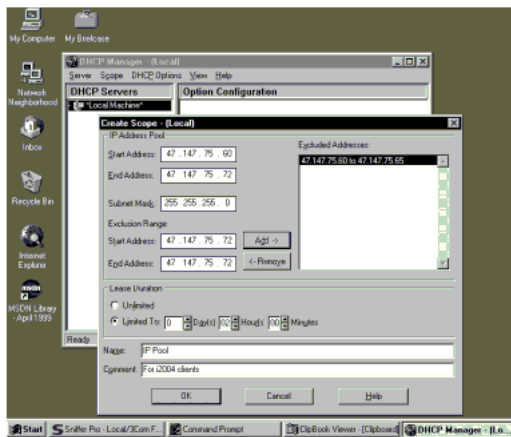
Configure a Windows NT 4 server with DHCP services using the DHCP Manager provided. Use the following procedure to launch the DHCP Manager.

Procedure 112

Launching the DHCP Manager In Windows NT 4

Step	Action
1	Click on the Windows Start button .
2	Select Programs > Administrative tools (Common) > DHCP Manager . The DHCP Manager window opens.
3	Double-click Local Machines in the left pane. The Create Scope - (Local) window opens. See Figure 81 "Define new scope" (page 506) .

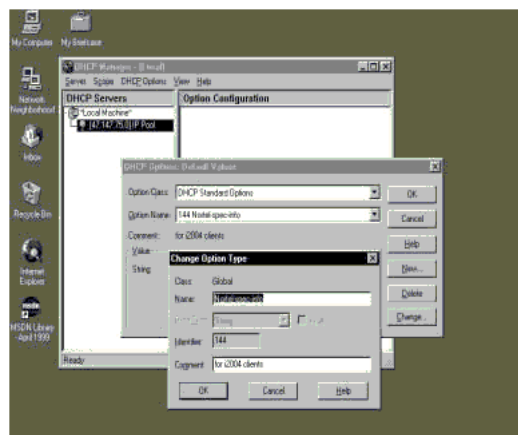
Figure 81
Define new scope



- 4 Create and then fill in the information. Click **OK** when finished.
- 5 In the **DHCP Manager - (Local)** window, highlight the scope that serves the IP Phones clients.
- 6 From the **DHCP Options** menu, select **Default Values**. The **DHCP Options - Default Values** window opens.
- 7 Click the **New** button. See [Figure 82 "Define the Nortel specific option"](#) (page 506).

The **Change Option Type** window opens.

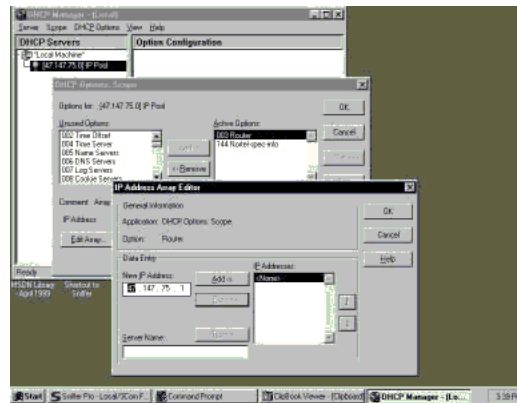
Figure 82
Define the Nortel specific option



- 8 Fill in the information and click **OK** when finished. Click **OK** again.
- 9 From the **DHCP Manager - (Local)** window, highlight the scope to which the DHCP options are to be added.

- 10 From the **DHCP Options** menu, select **Scope**. The **DHCP Options Scope** window opens.
- 11 Choose standard DHCP options from the left panel and click the **Add ->** button to add them to the right panel. See [Figure 83 "Add standard DHCP options to scope"](#) (page 507).

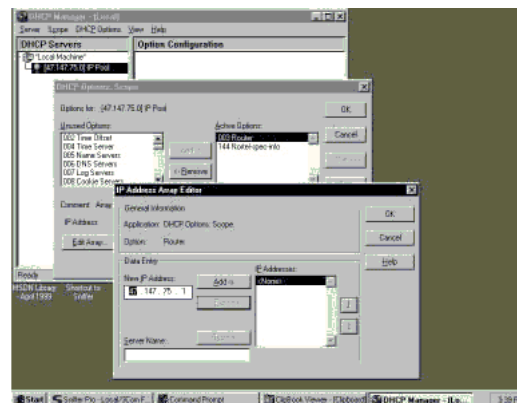
Figure 83
Add standard DHCP options to scope



- 12 Click the **Edit Array** button. The **IP Address Array Editor** window opens. Edit the default value and then click **OK**. Click **OK** again.
- 13 From the **DHCP Manager - (Local)** window, highlight the scope that needs to be activated.
- 14 From the **DHCP Options** menu, select **Scope**. The **DHCP Options Scope** window opens.
- 15 Click on the **Activate** button.

The light bulb next to the scope should turn yellow. See [Figure 84 "Activate the scope"](#) (page 507).

Figure 84
Activate the scope



For information about configuring DHCP Auto discovery, see “[DHCP Auto Discovery](#)” (page 428) .

--End--

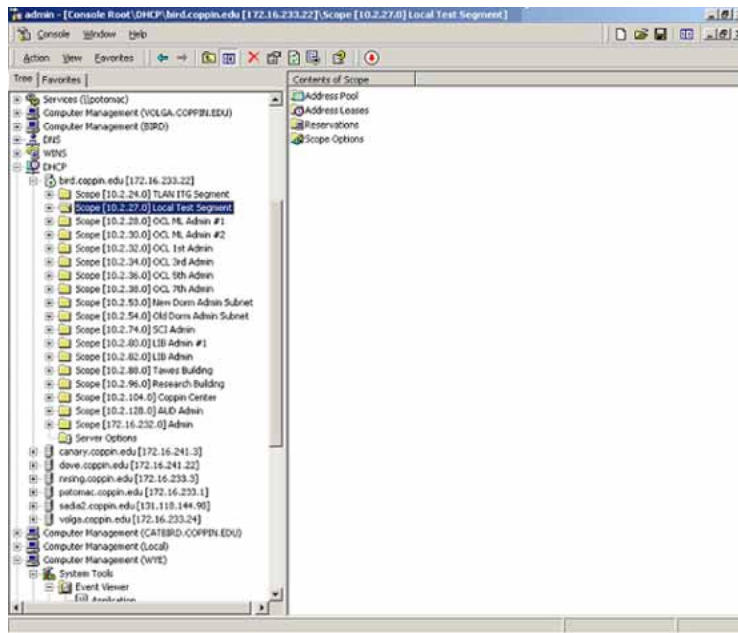
Configure a Windows 2000 server with DHCP

Configure a Windows 2000 server with DHCP services using the DHCP Manager. See [Procedure 113 “Launching the DHCP Manager in Windows 2000”](#) (page 508).

Procedure 113 Launching the DHCP Manager in Windows 2000

- | Step | Action |
|------|---|
| 1 | Click on the Windows Start button. Select Programs > Administrative Tools > DHCP . The administrative console window opens. See Figure 85 “Windows 2000 administration console” (page 508). |

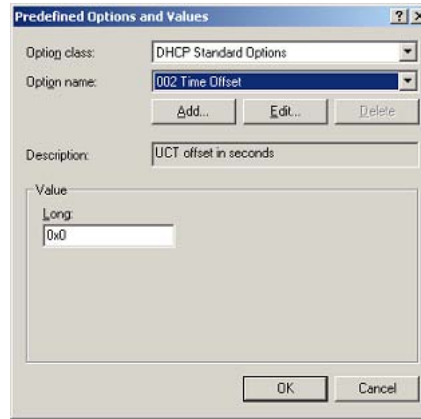
Figure 85
Windows 2000 administration console



- | | |
|---|--|
| 2 | Highlight DHCP and expand the DHCP option (if it is not already expanded). |
| 3 | Highlight the server and right-click to open the pop-up menu. Select Set Predefined Options from the menu. Do not go into the Vendor Specific settings. The Predefined Options and |

Values window opens. See [Figure 86 "Predefined Options and Values "](#) (page 509).

Figure 86
Predefined Options and Values



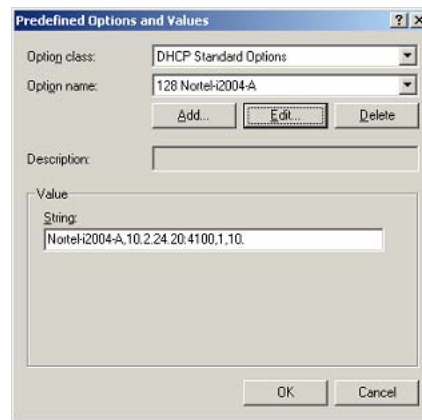
- 4 Click **Add**. The **Change Option Type** window opens. See [Figure 87 "Change Options Type"](#) (page 509).

Figure 87
Change Options Type



- 5 Enter the desired **Name**. For this example, the name of **Nortel-i2004-A** is entered.
- 6 Select **Code** 128.
- 7 Click **OK** to close the window. The **Predefined Options and Values** window reopens with the string **128 Nortel-i2004-A** entered in the **Option name** field. See [Figure 88 "Predefined Options and Values with data"](#) (page 510).

Figure 88
Predefined Options and Values with data



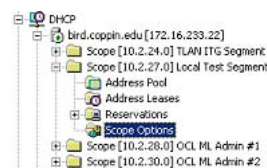
8 Under the **Value** area, enter the following string in the **String** field: **Nortel-i2004-A,x.x.x.x:4100,1,10**; using the following guidelines:

- The string is case-sensitive.
- Place a period at the end of the string.
- Commas are used as separators.
- Spaces are not allowed.
- x.x.x.x is the IP address of the IP Telephony node.
- If it is a BCM, replace the 4100 value with 7000.

9 Click **OK**.

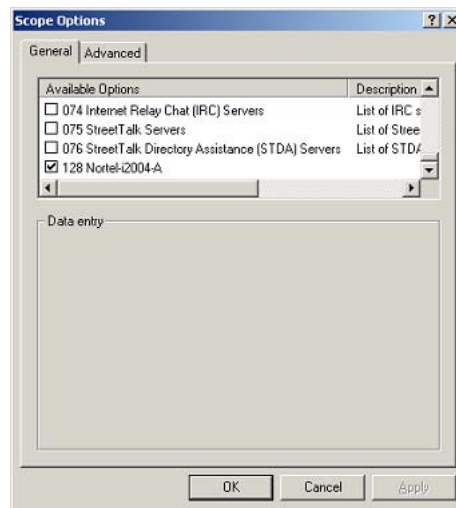
10 The Option Type must now be added to the applicable scopes. Click on the scope (**Scope [x.x.x.x] name**) to expand the scope, then click **Scope Options**. See [Figure 89 "Scope and Scope options"](#) (page 510).

Figure 89
Scope and Scope options



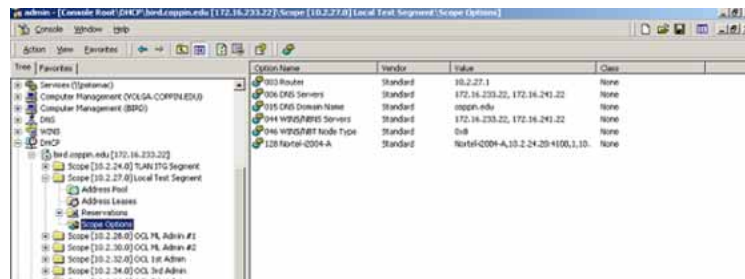
The **Scope Options** window opens. See [Figure 90 "Scope options"](#) (page 511).

Figure 90
Scope options



- 11 On the **General** tab, scroll to the bottom of the list and check the **128 Nortel-i2004-A** option.
- 12 Click **OK**. The Option Name and Value appear in the right pane of the administrative console window. See [Figure 91 "Options Name and Value in administrative console"](#) (page 511).

Figure 91
Options Name and Value in administrative console



For information about configuring DHCP Auto discovery, see ["DHCP Auto Discovery"](#) (page 428) .

--End--

Install ISC DHCP Server

To set up ISC's DHCP server, read the README file and follow the instructions on how to compile, make, and build the server. Once set up is complete, configure the server by following the description in the

**CAUTION**

Although, Windows NT 4 also has the Vendor Encapsulation Option (option code 43), do not use it to encode the Voice Gateway Media Card information needed by the IP Phones. Windows NT 4 enables only 16 bytes of data to be encapsulated, which is not enough to encode all the information needed.

Window NT 4's DHCP server transmits any user-defined option associated within a scope if the client requests it. It does not have the ability to distinguish among different types of clients, therefore it cannot make decisions based on this information. It is impossible to create a client-specific IP address pool/scope.

Configure ISC DHCP Server

To configure ISC's DHCP server, a text-based configuration process is used. Configuration is done by adding definitions and declarations in the `dhcpd.conf` file located at `/etc/`. Various "man" files are provided on how to configure the server, configure the lease system, use options and conditions, and run the server. Obtain the `dhcpd.conf.man5` file in the server directory and read it carefully. It provides explanations on relevant topics, as well as the location of other man files to read for additional information.

Configure ISC DHCP to work with the IP Phones

There is a particular format for encoding the Voice Gateway Media Card information. In addition to the configuration statements provided, other network and subnet declarations must also be included in the configuration file.

As indicated in the beginning of this section, read the main files and use <Example 1: Configuration files> to configure ISC's DHCP server to work with the IP Phones. Also, a copy of the configuration file used for this project is provided at the end of this section.

Use the following procedure to configure the ISC's DHCP to work with the IP Phones.

Procedure 114 Configuring ISC DHCP server

Step	Action
1	Configure the server to identify a client correctly as an IP Phone 2001, IP Phone 2002, IP Phone 2004, or IP Phone 2007. This is done using a match statement with a conditional if enclosed inside a class declaration, as follows:

```
class "i2004-clients"{
```



```
match if option vendor-class-identifier =
4e:6f:72:74:65:6c:2d:69:32:30:30:34:2d:41:00;}
```

The Hex string represents the text string "Nortel-i2004-A". If the vendor-class-identifier obtained from the client's DHCPDISCOVER message match this Hex-encoded string, then the server adds this client to the "i2004-clients" class. Once a client is classified as a member of a class, it must follow the rules of the class.

- 2 Declare a pool of IP addresses exclusively for the members of the "i2004-clients" class. The pool declaration is used to group a range of IP addresses together with options and parameters that apply only to the pool.
- 3 Restrict access to the pool. Use the **allow** or **deny** statement to include or exclude the members of a particular class. For example, the follow configuration code enables only members of "i2004-clients" to use this IP address pool:

```
pool{
allow members of "i2004-clients";
range 47.147.75.60 47.147.75.65;
option routers 47.147.75.1;

# Nortel special string
option vendor-encapsulated-options
80:3d:4e:6f:72:É; }
```

If a client is not a member of this class, it is not assigned an IP address from this pool, even if there were no other available IP addresses.

- 4 The DHCPOFFER from the ISC server must include the Voice Gateway Media Card information if the client is an IP Phone 2001, IP Phone 2002, IP Phone 2004, or IP Phone 2007. There are two methods to encode the necessary information for the IP Phone 2004 client:
 - a Use the **vendor-encapsulated-options** option (as in the previous example) to encode the information as a sub option.
 - b Define a **Site Specific option** to carry the necessary information. To define a site specific option:
 - give a declaration in the form of the name of the option, the option code, and the type of data it carries outside any pool or network declarations. For example:
option Nortel-specific-info code 144 = string;
 - replace the vendor-encapsulated option inside the pool statement with the definition,
option Nortel-specific-info = "Nortel É";

For information about configuring DHCP Auto discovery, see “DHCP Auto Discovery” (page 428) .

--End--

Example 1: Configuration file

The following format must be used for encoding the Voice Gateway Media Card information. In addition to the configuration statements provided, other network and subnet declarations must also be included in the configuration file. As mentioned in the beginning of this section, read the man files and use the following example as a guideline:

```
# File name:  dhcpd.conf
# Location:  /etc/
# Description:  Configuration file for ISC dhcpd server
# Author:  Cecilia Mok
# Date:  September 24, 1999
# Global option definitions common for all supported
# networks...
default-lease-time 300;
max-lease-time 7200;
option subnet-mask 255.255.255.0;
option broadcast-address 255.255.255.255;
# Defining Nortel-specific option for IP Phone 2004 client
option my-vendor-specific-info code 144 = string;
# Declaring a class for IP Phones type 2002, 2004, and 2007
# clients.
# Add new clients to the class if their Class Identifier
# match the special IP Phone 2004 ID string.
class "i2004-clients"
{
match if option vendor-class-identifier =
4e:6f:72:74:65:6c:2d:69:32:30:30:34:2d:41:00;
}
# Declaring another class for PC clients
class "pc-clients"
{}
# Declaring a shared network
# This is to accommodate two different subnets on the same
# physical network; see dhcpd.conf.man5 for more details
```

```

shared-network "myNetwork"
{
# Declaring subnet for current server
subnet 47.147.77.0 netmask 255.255.255.0
{}
# Declaring subnet for DHCP clients
subnet 47.147.75.0 netmask 255.255.255.0
{
# Pool addresses for i2004 clients
pool
{
allow members of "i2004-clients";
range 47.147.75.60 47.147.75.65;
option routers 47.147.75.1;
# Nortel special string
option Nortel-specific-info = "NortelÉ";
}
default-lease-time 180;
max-lease-time 300;
}

```

Finally, before starting the server, create a blank `dhcpd.leases` file in the `/etc/` directory, which is the same location as the `dhcpd.conf` file. To start the server, go to `/var/usr/sbin/` and type:

```
./dhcpd
```

To run in debug mode, type:

```
./dhcpd -d -f
```

Install and configure a Solaris 2 server

To set up the Solaris 2 server, consult the accompanying manual and online documentation. Use the following procedure to configure Solaris 2 with DHCP.

Procedure 115 Configuring a Solaris 2 server

Step	Action
1	Read the following man pages: <ul style="list-style-type: none"> • <code>dhcpconfig</code> • <code>dhcptab</code> • <code>in.dhcpd</code>

- 2 Collect information about the network such as subnet mask, router/Media Gateway and DNS server IP addresses as specified. Make sure this information is current.
- 3 Log on as `root` and invoke the interface by typing `dhcpcfg` at the prompt. A list of questions is presented and the administrator must supply answers that are then used to configure the DHCP server.

Solaris 2 uses a text-based interface for configuring DHCP services.

For information about configuring DHCP Auto discovery, see [“DHCP Auto Discovery” \(page 428\)](#) .

--End--

Use the following procedure to configure Solaris 2 servers to work with IP Phones.

Procedure 116 Configuring Solaris 2 to work with IP Phones

Step	Action
1	<p>Do one of the following:</p> <ul style="list-style-type: none"> • Create a symbol definition for defining a Site Specific option by typing the following in the <code>dhcptab</code> configuration table located at <code>/etc/default/dhcp</code>: <code>NI2004 s Site,128,ASCII,1,0</code> • Use the <code>dhtadm</code> configuration table management utility by typing the following command at the prompt: <code>dhtadm -A -s NI2004 -d 'Site,128,ASCII,1,0'</code> <p>Where: NI2004:symbol name s:identify definition as symbol Site:site specific option 128:option code ASCII:data type 1:granularity 0:no maximum size of granularity, that is, infinite</p>
2	<p>Create a Client Identifier macro by doing one of the following:</p> <ul style="list-style-type: none"> • entering the following: <code>Nortel-i2004-A m:NI2004="NortelE":</code> • Use the <code>dhtadm</code> command: <code>dhtadm -A -m Nortel-i2004-A -d ':NI2004="NortelE":'</code>

- 3 Invoke the DHCP services on the Solaris server by entering at the prompt.:

```
in.dhcpd,
```

Specify `-d` and/or `-v` options for debug mode.

--End--

Table 131 "DHCP tab table" (page 517) shows examples of the information.

Table 131
DHCP tab table

```
Locale          m  :UTCoffst=18000:
nbvws286        m
:Include=Locale:LeaseTim=150:LeaseNeg:DNSdmain=ca.nortel.com:/
                                DNSserv=47.108.128.216 47.211.192.8 47.80.12.69:
47.147.75.0     m  :NISdmain=bvwlab:NISservs=47.147.64.91:
47.147.64.0     m
:Broadcst=47.147.79.255:Subnet=255.255.240.0:MTU=1500:/
Router=47.147.64.1:NISdmain=bvwlab:NISservs=47.147.64.91:
#
NI2004          s  Site,128,ASCII,1,0
Nortel-i2004-A m:
NI2004="Nortel-i2004-A,47.147.75.31:4100,1,5;47.147.77.143:4100,1,5.":
```

Table 132
Network table

```
01006038760290 00 47.147.65.198 47.147.74.36 944600968
nbvws286
0100C04F662B6F 00 47.147.65.199 47.147.74.36 944600959 nbvws286
```


Appendix

Gratuitous Address Resolution Protocol Protection

Gratuitous Address Resolution Protocol (GARP) Protection prevents the IP Phone 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.

Appendix

Local Tools menu

Contents

This section contains the following topics:

- [“Introduction” \(page 521\)](#)
- [“Local Tools options” \(page 524\)](#)

Introduction

This section describes the Local Tools menu for the IP Phone 1110, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, IP Phone 2007, IP Phone 1210, IP Phone 1220, IP Phone 1230.

For more information about the IP Phone 2007 Local Tools menu, see [“Local Tools menu” \(page 105\)](#).

Local Tools menu password protection

You can lock the IP Phone local menu to prevent accidental or unwanted changes. When you lock the local menu, you are prompted to enter the fixed password 26567*738 (color*set) to access areas of the local menu.

When the full menu lock is active, you are prompted to enter the menu lock password whenever you double-press the Services key. When the partial menu lock is active you are prompted to enter the menu lock password whenever you access the 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.

You can control the local menu lock manually using the Local Menu, DHCP, or automatic provisioning features. The DHCP or automatic provisioning methods are only processed if the menu lock is configured to

"Auto Lock" in the Local Menu page. Select "Menu Lock Enable" on the Auto page to automatically select the Auto Lock mode or select the Auto Lock item from the Lock Menu.

Controlling the menu lock for IP Phone 2007

You can control the menu lock for the IP Phone 2007 in the following ways:

- Auto Config menu option—Tap the **Tools** icon on the display. Tap **Network Configuration** and then tap **Auto**. Select **Menu Lock Enable** to configure the menu lock to Auto Lock .
- Lock Menu option—Tap the **Tools** icon on the display. To enable the menu lock, select the **Enable Menu Lock** check box. From the Lock Options drop down list, select one of the following options
 - Secure Local Menu—You are prompted to enter the fixed password whenever the Services key is double-pressed.
 - Partial Secure Menu—You are prompted to enter the fixed password whenever you access the Local Diagnostics and the Network Configuration sub menus.
 - Auto Lock—If the DHCP or automatic provisioning parameters are configured to enable partial or full menu lock then you are prompted to enter the fixed password as described above.

The manual parameters configured in the Lock Menu sub menu override the configuration received from the DHCP or automatic provisioning features.

Controlling the menu lock for other IP Phones

You can control the menu lock for other IP Phones in the following ways:

- Menu lock option—double-press the **Services** key to access the Local Tools menu. Press 3 on the dial pad to access the Network Configuration menu and then press the **Auto** soft key. Select **Menu Lock Enable** to configure the menu lock to Auto Lock.
- Lock menu option—double-press the Services key to access the Local Tools menu. Press 4 on the dialpad to access the Lock menu. After you enter the fixed password, enter one of the following lock menu item numbers or use the Up or Down navigation keys to scroll and highlight one of the following Lock Menu options.
 - 1. Full Menu Lock
 - 2. Partial Menu Lock
 - 3. Disable Menu Lock

- 4. Auto Lock
- 5. Lock Now

The manual parameters configured in the Lock Menu sub menu override the configuration received from the DHCP or automatic provisioning features.

Configuring Secure Local Menu using Network provisioning

With DHCP, you can use the SECUREMENU, PARTSECURE, or menu lock parameters to enable the menu lock. Alternatively, you can use the menu lock item in any of the provisioning files.

If the IP Phone is configured for Auto Lock, the IP Phone processes any of the menu lock configuration items when they are received using DHCP or a provisioning file. The menu lock items are ignored if the IP Phone is configured to one of the manual menu lock modes.

For more information about configuring DHCP, see [“Dynamic Host Configuration Protocol” \(page 405\)](#).

For more information about the provisioning file, see [“Provisioning the IP Phones” \(page 447\)](#).

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.

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 92 "Local Tools menu options" \(page 525\)](#).

For information about the Local Tools menu for the IP Phone 1110, Phone 1210, IP Phone 1220, and IP Phone 1230, see [Figure 93 "Local Tools menu" \(page 529\)](#).

Local Tools menu for IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E

shows the options in the Local Tools menu for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E.

[Figure 92 "Local Tools menu options" \(page 525\)](#) shows the options in the Local Tools menu for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E.

Figure 92
Local Tools menu options

1. Preferences
 1. Display Settings
 2. Languages...
 3. Bluetooth Setup
2. Local Diagnostics
 1. IP Set&DHCP Information
 2. Network Diagnostics Tools
 3. Ethernet Statistics
 4. IP Network Statistics
 5. USB Devices
3. Network Configuration
4. Lock Menu
 1. Full Menu Lock
 2. Partial Menu Lock
 3. Disable Menu Lock
 4. Auto Lock
 5. Lock Now

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. Headsets
- 4. 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.

Note: Hebrew can only be configured on the Call Server.

3. Headsets

Use this item to select an active headset, to set the headset operational mode, and to control settings for the Nortel Mobile Headset Adapter.

4. 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 **3. Bluetooth Setup** dialog box.

The **4. 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 [“Headset support” \(page 581\)](#).

Local Diagnostics

For information about Local Diagnostics, see [“IP Phone diagnostic utilities” \(page 531\)](#).

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 [“Provisioning the IP Phones” \(page 447\)](#) and [“Manual provisioning of IP Phone 2007 and 1100 Series” \(page 487\)](#).

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. Full Menu Lock
- 2. Partial Menu Lock
- 3. Disable Menu Lock
- 4. Auto Lock
- 5. Lock Now

1. Full Menu Lock

When this option is selected, you are prompted to enter the fixed password whenever the **Services** key is double-pressed.

2. Partial Menu Lock

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. Disable Menu Lock

When this option is selected, the Lock Menu is disabled.

4. Auto Lock

The IP Phone follows the menu lock configuration received from the Full DHCP string during DHCP configuration

- 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, see [“Local Tools menu password protection”](#) (page 521).

5. Lock Now

The Lock Now item immediately exits the Tools menu, closes any open Tools menu pages, and locks the **Tools** menu.

Procedure 117 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 118 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 for IP Phone 1110, IP Phone 1210, IP Phone 1220, and IP Phone 1230

This section shows the Local Tools menu for the IP Phone 1110, IP Phone 1210, IP Phone 1220, and IP Phone 1230.

ATTENTION

Only the IP Phone 1110 supports the Backlight Timer option.

Figure 93
Local Tools menu

1. Preferences
 1. Contrast
 2. Language
 3. Backlight Timer
2. Local Diagnostics
 1. IP Set&DHCP Information
 2. Network Diagnostics Tools
 3. Ethernet Statistics
 4. IP Network Statistics
3. Network Configuration
4. Lock Menu
 1. Full Menu Lock
 2. Partial Menu Lock
 3. Disable Menu Lock
 4. Auto Lock
 5. Lock Now

Preferences

The Preferences submenu offers the following choices

- 1. Contrast
- 2. Language
- 3. Backlight Timer (available only on the IP Phone 1110)

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

This item displays on the IP Phone 1110 only.

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 [“IP Phone diagnostic utilities” \(page 531\)](#).

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 [“Provisioning the IP Phones” \(page 447\)](#) and [“Manual provisioning of IP Phone 1110 and 1200 Series” \(page 479\)](#).

Lock Menu

For information about the Lock Menu item, see [“Lock Menu” \(page 527\)](#).

Appendix

IP Phone diagnostic utilities

Contents

This section contains the following topics:

- [“Introduction” \(page 531\)](#)
- [“Text-based diagnostic utilities” \(page 531\)](#)
- [“Graphic-based diagnostics utilities” \(page 562\)](#)

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, IP Phone 1110, IP Phone 1210, IP Phone 1220, and IP Phone 1230 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, IP Audio Conference Phone 2033,, IP Phone 1210, IP Phone 1220, and IP Phone 1230, see [“Network diagnostic utilities” \(page 532\)](#).

The IP Phone 2007, 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” \(page 562\)](#). For information about Local Diagnostics for the IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, see [“Local Diagnostics ” \(page 568\)](#).

Text-based diagnostic utilities

Network diagnostic utilities are accessible on IP Phone 2001, IP Phone 2002, IP Phone 2004, IP Audio Conference Phone 2033, IP Phone 1110, IP Phone 1210, IP Phone 1220, and IP Phone 1230 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” \(page 559\)](#).

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 133 "Network Diagnostic Utilities availability" \(page 532\)](#) 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 133 "Network Diagnostic Utilities availability" \(page 532\)](#) lists the Network Diagnostic Utilities available on the IP Phone in different states.

Table 133
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
UNISlim/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
Supplicant Status	N/A	N/A	Yes	Yes
Supplicant Authentication Status	N/A	N/A	Yes	Yes

Table 133
Network Diagnostic Utilities availability (cont'd.)

Function module	Before IP Address assignment	After IP Address assignment, unregistered - Local Mode	Registered (TPS) - Remote Mode	Call in progress (TPS)
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 133 "Network Diagnostic Utilities availability" \(page 532\)](#)). This menu is controlled by the firmware on the IP phone.

Use [Procedure 119 “Accessing the Network Diagnostic Tools menu in Local mode” \(page 535\)](#) to access the Network Diagnostic Tools in Local mode.

Procedure 119
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 120
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 94 "PING data display page" (page 547) . 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 121
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 95 "TraceRoute data display screen" (page 547).
	Tip: Press the Tracert soft key again to stop the route tracing.
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 122
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 96 "Ethernet Statistics data display page" (page 548).
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 123
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 97 "IP Networking Statistics data display screen"](#) (page 549).
- 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 124
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 98 "DHCP information data display page" (page 550). 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 125 "Accessing the Diagnostics submenu in Remote Mode"](#) (page 538) to access the **Diagnostics** submenu in Remote Mode:

Procedure 125
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: <ul style="list-style-type: none">• 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 126
Accessing Diagnostic Tools in Remote mode

Step	Action
1	Select Diagnostic Tools from the Diagnostics submenu.
2	Do one of the following <ul style="list-style-type: none">• 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 101 "Ping data display page" (page 553))
- TraceRoute (see Figure 102 "Tracert data display screen" (page 553))

--End--

Ping

The following items are available on the **Ping** submenu in Remote mode

- IP Addr
- Nr of Pings
- Ping!
- Last ping

Procedure 127 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. Tip: To edit the IP address, use the dialpad and 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 Ping submenu.

--End--

Procedure 128
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 <ul style="list-style-type: none">• 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 129
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 130
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 131 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. <p>Tip: To edit the IP address, use 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 TraceRoute submenu.
--End--	

Procedure 132 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. <p>Tip: Use the dialpad and the Delete and Clear soft keys to enter the number of Hops.</p>

- 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 133 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 134 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 135 “Browsing Ethernet Statistics” \(page 543\)](#) to access the **EtherStats** submenu item in Remote mode.

Procedure 135
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 103 "Ethernet statistics data display screen" (page 554). • Press the Cancel soft key to return to the Diagnostics submenu.
--End--	

Procedure 136
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 137
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 138 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 <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 139 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. <ul style="list-style-type: none">• 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 140 "Browsing IP Statistics" \(page 545\)](#) to access the **IP Stats** submenu item in Remote mode.

Procedure 140
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 <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 data display results. See Figure 104 "IP Networking statistics data display screen" (page 555).• Press the Cancel soft key to return to the Diagnostics submenu.

--End--

RUDP Statistics

Use [Procedure 141 "Browsing RUDP Statistics" \(page 545\)](#) to access the **RUDP Stats** submenu item in Remote mode.

Procedure 141
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 <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 data display results. See Figure 105 "RUDP statistics data display page" (page 555).• Press the Cancel soft key to return to the Diagnostics submenu.

--End--

QoS Statistics

Use [Procedure 142 "Browsing Quality of Service Statistics" \(page 546\)](#) to access the **QoS Stats** submenu item in Remote mode.

Procedure 142 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 106 "QoS statistics data display page" (page 556).• 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, IP Phone 1210, IP Phone 1220 and 3 lines of data are displayed at a time on IP Phone 2004, and IP Phone 1230. 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 94 "PING data display page" \(page 547\)](#) illustrates the data displayed from the **Ping** diagnostic tool.

Figure 94
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 94 "PING data display page" \(page 547\)](#),

- PacketTx = packets sent
- PacketRx = packets received

TraceRoute

[Figure 95 "TraceRoute data display screen" \(page 547\)](#) illustrates the data displayed from the **TraceRoute** diagnostic tool. Browse through the last 30 items by pressing the **Navigation** keys.

Figure 95
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 95 "TraceRoute data display screen" \(page 547\)](#),

- xxx: = Time To Live (TTL):Round Trip Time1, Round Trip Time2, Round Trip Time3
- IP: = IP address

Ethernet Statistics

Figure 96 "Ethernet Statistics data display page" (page 548) illustrates the data displayed from the **Ethernet Statistics** submenu item.

Figure 96
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 96 "Ethernet Statistics data display page" (page 548),

- 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 97 "IP Networking Statistics data display screen" (page 549) illustrates the data displayed from the **IP Networking Statistics** submenu item.

Figure 97
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 97 "IP Networking Statistics data display screen" (page 549),

- 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 98 "DHCP information data display page" (page 550) illustrates the data displayed from the **DHCP Statistics** submenu item.

Figure 98
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:
xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxx.....
12.Servers'Information:
  SN:xxx.xxx.xxx.xxx
  Port:xxxx Act:xxx
  Retries:xxx FailOver:xxx
```

In [Figure 98 "DHCP information data display page"](#) (page 550),

- 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 99 "UNIStim/RUDP statistics data display screen (TPS)" (page 551) shows the data displayed from the **UNIStim/RUDP statistics** submenu item.

Figure 99
UNIStim/RUDP statistics data display screen (TPS)

```
1.MessageTx:xxxxxxxxxxxxx
2.MessageRX:xxxxxxxxxxxxx
3.Retries:xxxxxxxxxxxxx
4.UpTime:xxx/xx/xx/xx
```

In Figure 99 "UNIStim/RUDP statistics data display screen (TPS)" (page 551),

- 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 100 "RTP/RTCP statistics data display page" (page 552) shows the data displayed from the **RTP/RTCP statistics** submenu item.

Figure 100
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 100 "RTP/RTCP statistics data display page" \(page 552\)](#),

- 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 101 "Ping data display page" \(page 553\)](#) shows the data displayed from the **Ping** Diagnostic Tool.

Figure 101
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 101 "Ping data display page" \(page 553\)](#),

- Packet TX = packets sent
- Packet Rx = packets received
- RTT - Round Trip Time (for Min RTT, Avg RTT, and Max RTT)

TraceRoute

[Figure 102 "Tracert data display screen" \(page 553\)](#) shows the data displayed from the **Tracert** Diagnostic tool.

Figure 102
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 102 "Tracert data display screen" \(page 553\)](#),

- Hopxxx = the Hop number
- xxx = Round Trip Time1, Round Trip Time2, Round Trip Time3
- IP: = IP address

Ethernet Statistics

Figure 103 "Ethernet statistics data display screen" (page 554) shows the data displayed from the **EtherStats** submenu item.

Figure 103
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 103 "Ethernet statistics data display screen" (page 554),

- 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 "Full Duplex " (page 382).

IP Networking Statistics

Figure 104 "IP Networking statistics data display screen" (page 555) shows the data displayed from the **IP Stats** submenu item.

Figure 104
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 104 "IP Networking statistics data display screen" \(page 555\)](#),

- 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 105 "RUDP statistics data display page" \(page 555\)](#) shows the data displayed from the **RUDP Stats** submenu item.

Figure 105
RUDP statistics data display page

```
1.MessageTx:xxxxxxxxxxxxx
2.MessageRx:xxxxxxxxxxxxx
3.Retries:xxxxxxxxxxxxx
4.UpTime:xxx/xx/xx/xx
```

In [Figure 105 "RUDP statistics data display page" \(page 555\)](#),

- 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 106 "QoS statistics data display page" (page 556) shows the data displayed from the **QoS Stats** menu item.

Figure 106
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 106 "QoS statistics data display page" (page 556),

- 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 UNISim 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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

For information about accessing NAT information from an IP Phone, see [“Set IP Information” \(page 558\)](#).

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 *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

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” \(page 558\)](#).

- Ethernet Information

For further information about the Ethernet Information menu option, see [“Ethernet Information” \(page 559\)](#)

- Server Information

For further information about the Server Information menu option, see [“Server Information” \(page 559\)](#)

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 134 "IDU command printout in LD 32 for IP Phone with a NAT" \(page 560\)](#)). 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 135 "IDU command printout in LD 32 for IP Phone without a NAT" \(page 561\)](#)).

For detailed information, see *Software Input Output Reference-Maintenance* (NN43001-711).

[Table 134 "IDU command printout in LD 32 for IP Phone with a NAT" \(page 560\)](#) and [Table 135 "IDU command printout in LD 32 for IP Phone without a NAT" \(page 561\)](#) provide the output format of the IDU commands in LD 32.

[Table 134 "IDU command printout in LD 32 for IP Phone with a NAT" \(page 560\)](#) provides the output format of the IDU commands in LD 32 for an IP Phone with a NAT.

Table 134
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, IP Phone 1220, IP Phone 1220, IP Phone 1230

Table 134
IDU command printout in LD 32 for IP Phone with a NAT (cont'd.)

Item	Description
ISET MAC ADR	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	XXXXXXXX

Table 135 "IDU command printout in LD 32 for IP Phone without a NAT" (page 561) provides the output format of the IDU commands in LD 32 for an IP Phone without a NAT.

Table 135
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, IP Phone 1220, IP Phone 1220, IP Phone 1230
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 134 "IDU command printout in LD 32 for IP Phone with a NAT" (page 560) or Table 135 "IDU command printout in LD 32 for IP Phone without a NAT" (page 561), 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” \(page 562\)](#). For information about diagnostic utilities for the IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E, see [“Local Diagnostics ” \(page 568\)](#).

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
- USB Devices
- Advanced Diag Tools

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 143 “Using Network Diagnostic Tools” \(page 562\)](#) to access Network Diagnostic Tools.

Procedure 143 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 144 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

- 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 145
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
	<ul style="list-style-type: none"> • 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 146 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 <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 • 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--

The **USB Devices** tool provides information about 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, such as USB mice, USB keyboards, and USB wireless headsets. The display shows the descriptive text string received from the USB device.

ATTENTION

The IP Phone USB Port available power is limited to 100mA. If USB devices connected to this port require more than 100mA an externally powered USB hub is required.

Procedure 147
Using the USB Devices tool

Step	Action
1	Tap the Tools icon.
2	Tap the Local Diagnostics soft key.
3	Tap the USB Devices soft key.
4	Tap the Exit soft key to return to the Local Diagnostics menu.

--End--

The **Advanced Diag Tools** are available to the Nortel support organization to configure the auto recovery function and remote access.

Local Diagnostics

This section describes the Local Diagnostics for the IP Phone 1120E, IP Phone 1140E, IP Phone 1110, and IP Phone 1150E. [Figure 107 "Local Diagnostics menu" \(page 568\)](#) 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
- 6. Advanced Diag Tools

Figure 107
Local Diagnostics menu



1. IP Set and DHCP Information

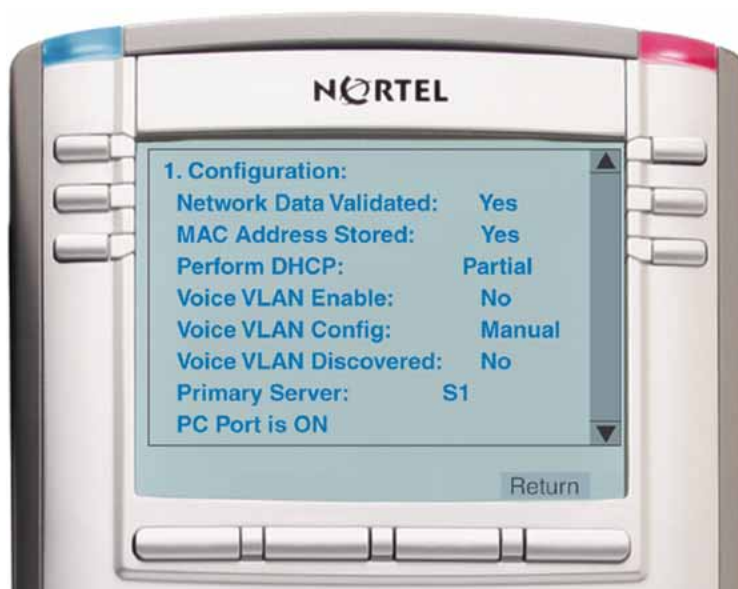
Use [Procedure 148 "Using the IP Set and DHCP Information tool" \(page 569\)](#) to use the IP Set&DHCP Information tool.

Procedure 148
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 108 "IP Set and Information screen" (page 570) shows IP Set & DHCP Information screen.

Figure 108
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 149 "Using Network Diagnostic Tools"](#) (page 570) to access Network Diagnostic Tools.

Procedure 149 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 109 "Network Diagnostic Tools screen" (page 571) shows the Network Diagnostic Tools screen.

Figure 109
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 150 “Using Ethernet Statistics tool” \(page 573\)](#) to use the Ethernet Statistics menu.

Procedure 150 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	<p>Press the Select soft key.</p> <p>You can press the Return soft key exit the menu to return to the Local Diagnostics submenu.</p> <p>The screen displays Reset, NIport/PCport, and Return soft keys. The NIport/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.</p> <p>When NIport appears on the second soft key label, the following statistics are displayed</p> <ul style="list-style-type: none"> • Link Status • Duplex Mode • Network Speed (10 Mb, 100 Mb, or 1 G) • AutoSense/Negotiate <ul style="list-style-type: none"> — 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 110 "Ethernet Statistics display screen" \(page 575\)](#) shows Ethernet Statistics display screen.

Figure 110
Ethernet Statistics display screen



- 6 To reset the PCPort statistics to 0, tap the **Reset** soft key.

--End--

4. IP Network Statistics

Use [Procedure 151 "Using the IP Network Statistics tool"](#) (page 575) to use the Network Statistics tool.

Procedure 151 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 111 "IP Networks Statistics screen" (page 576) shows IP Networks Statistics screen.

Figure 111
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, such as USB mice, USB keyboards, and USB wireless headsets. The display shows the descriptive text string received from the USB device.

ATTENTION

The IP Phone USB Port available power is limited to 100mA. If USB devices connected to this port require more than 100mA an externally powered USB hub is required.

Procedure 152 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--

6. Advanced Diag Tools

The Advanced Diag Tools are available to the Nortel support organization to configure the auto recovery function and remote access.

Appendix

Bluetooth and Wireless Fidelity interference

Bluetooth is a wireless communication technology that is especially appropriate for cable replacement, but is not a personal mobility technology. The IP Phone 1140E and IP Phone 1150E are Class 3 Bluetooth devices. This means the Bluetooth works up to 10 meters. However, audio performance in a Bluetooth headset suffers if you walk away from the phone. After 10 meters, the link drops.

Both Bluetooth and Wireless Fidelity (WiFi) wireless protocols operate in the 2.40 Industrial, Scientific and Medical (ISM) Radio Frequency (RF) band. Bluetooth and WiFi wireless communications can interfere with each other. Interference can occur between Bluetooth and WiFi wireless communications, which results in lowered data throughput. Bluetooth utilizes a frequency hopping mechanism so that it does not stick in a fixed channel like WiFi does and the master and slave devices keep hopping synchronously during whole connecting time. However, occasionally Bluetooth devices can hop into a channel, which other WiFi devices occupy and can encounter corrupted packet at that hop. The Bluetooth headset (audio-oriented) devices are more susceptible to radio interference than other data-oriented devices because Synchronous Connection-Oriented Link (SCO) data do not re-transmit in the Bluetooth protocol. When an audio packet is corrupted or lost, you can hear crackling and popping noise due to the missing data. This is evident when you listen to dial tones or other continuous audio tones. During regular speech, this effect is less perceptible.

The Bluetooth and WiFi interference is a normal part of network operation. If Bluetooth and WiFi must coexist, the following mitigation techniques can produce a more satisfactory user experience when WiFi and Bluetooth operate simultaneously.

- The IP Phone 1140E and IP Phone 1150E can transmit at up to 0 decibels (dBm). The IP Phone Bluetooth receivers can handle an

interference that is on channel at 11 decibels (dB) less than the desired signal. That is, the required signal-to-noise level is 11 dB.

For example, assume no loss exists in the antenna design, at 1 meter away the power drops to -40 dBm. If the environment shows activity throughout the band at -51dBm, performance of the Bluetooth headset is optimal only within 1 meter of the IP Phone 1140E due to the required Signal-to-Noise ratio of 11 dB. However, this calculation is based on an ideal scenario.

- Due to FCC regulations, Bluetooth is required to hop amongst at least 40 of the 80 available channels in the 2.4 GHz band. Hence, Bluetooth performance is optimized if approximately half of the 2.4 GHz band possess low levels of WiFi activity. Low levels of WiFi activity is determined by the desired performance versus distance of the Bluetooth headsets.

Clients operate on the channels along with wireless access point (WAP). Therefore, the interference zone can be up to twice the WAP range. The interference levels subside on a per-channel basis only when a user device is not nearby.

Appendix

Headset support

Introduction

This section describes the following headset types

- “Wired headsets” (page 581)
- “Wireless headsets” (page 581)
- “Bluetooth wireless technology” (page 581)

Wired headsets

Wired headsets provide acceptable audio performance for Phase II IP Phone 2002, Phase II IP Phone 2004, IP Phone 2007, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, IP Phone 1210, IP Phone 1220, and IP Phone 1230.

Wireless headsets

The IP Phone 1150E supports wireless headsets.

Bluetooth wireless technology

Bluetooth wireless technology is supported on the IP Phone 1140E and the IP Phone 1150E.

On the IP Phone 1150E, only the Agent port supports Bluetooth wireless technology.

The IP Phone contains both hardware and software support for Bluetooth wireless technology enabled headsets.

Supported Bluetooth wireless technology headsets

Plantronics Voyager 510 Bluetooth wireless technology headset provides acceptable audio performance for IP Phone.

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” \(page 582\)](#).
Use [Procedure 153 “Configure the Bluetooth wireless technology administration setting” \(page 582\)](#) to configure the Bluetooth wireless technology through the **Local Tools > Network Configuration** submenu.
- Automatic provisioning configuration—you can use the "bt" parameter to centrally configure Bluetooth wireless technology on the IP Phone. For more information, see [“Provisioning the IP Phones” \(page 447\)](#).

If you enable Bluetooth wireless technology and password protection for the Local Tools menu on your IP Phone you can double-press the Headset key to access the Bluetooth Setup 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 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 automatic provisioning is not used.

Procedure 153

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 **4. Bluetooth Setup** 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 [“Local Tools menu” \(page 521\)](#).

Pairing your headset

Use [Procedure 154 “Pairing the Bluetooth wireless technology headset with your IP Phone” \(page 583\)](#) to pair the Bluetooth wireless technology headset with your IP Phone.

Procedure 154

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 4. Bluetooth Setup dialog box. The Enable Bluetooth check box is highlighted.

- If the 4. Bluetooth Setup 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 on the *Enable Bluetooth* item to indicate that Bluetooth wireless technology is activated. The message *Bluetooth Enabled* 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.
 - a Press the **Right** navigation key twice to highlight the **Search** button, displayed next to the Search Devices item.
 - b Press the **Enter** key.
The message *Searching...* is displayed.
 - c If the search is successful, a list of Bluetooth wireless technology headsets appears in the Found: box.
 - d Choose one of the following
 - If the search is successful, proceed to step 6.
 - If the search is not successful, the message *Search completed. No device found* 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 "Use Bluetooth Headset" item switches between the wired headset and the Bluetooth headset. If you select the "Use Bluetooth Headset" check box,

the Bluetooth headset provides the audio. If you clear the "Use Bluetooth Headset" check box, the wired headset provides the audio.

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 155 "Switching between a wired headset and wireless headset" \(page 587\)](#) to switch between a wired headset and a wireless headset.

Procedure 155
Switching between a wired headset and wireless headset

Step	Action
1	Double-press the Headset key to open the 4. Bluetooth Setup dialog box.
2	Press the Left/Right navigation key to select the Use Bluetooth 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 156 "Unpairing a wireless headset" \(page 588\)](#) to unpair the Bluetooth wireless technology headset.

Procedure 156
Unpairing a wireless headset

Step	Action
1	Double-press the Headset key to open the 4. Bluetooth Setup 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--

Universal Serial Bus audio

The Universal Serial Bus (USB) audio feature provides support for USB wireless headsets, Nortel Mobile USB Headset Adapter (MHA), and Analog Terminal Adapter (ATA).

The following IP Phones support USB audio feature:

- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E

USB wireless headsets

The USB Audio feature provides Human Interface Device (HID) support for the following USB wireless headsets:

- GN NetCom 9330 wireless headset
- Plantronics CS50-USB wireless headset
- Nortel Mobile USB Headset Adapter

MHA

The MHA enables you to speak and hear callers and also provides call control features, such as answer a call and place a call.

ATA

ATA is a USB adapter that enables you to use analog terminals instead of headsets. For support, go to www.algosolutions.com.

Configure the headsets

You configure the headsets on the Headsets page. To access the headsets page, select **Local Tools > Preferences > Headsets**.

The Headsets page provides the following options:

- Active Headset Device
- Enable HID Commands
- Headset Type
- Backlight

Active Headset Device

The Active Headset Device option provides a list of headset devices.

Enable HID Commands

The Enable HID Commands option controls the following headset operational modes:

- GenericMode1
- GenericMode2

GenericMode1

GenericMode1 provides full HID support for Plantronics CS50-USB, GN-Netcom 9330, MHA, and ATA and only standard HID support for other headsets.

GenericMode2

GenericMode2 provides audio only support for all devices including the supported headsets.

Headset Type

The Headset Type option provides a list of headsets in which the MHA supports. The MHA supports 11 headsets. Nortel Mobile Kit is the default selection.

Headset Type and Backlight enable only when an MHA is attached. For all other headsets, these items appear dimmed.

Activate USB Audio

To activate USB Audio, you must select USB as the active headset. Use the following procedure to activate USB audio.

Activate USB Audio

Step	Action
1	Double press the Services key to access the Local Tools menu.
2	Press 1. Preferences or use the Up/Down navigation keys to scroll and highlight the Preferences option.
3	Press 3. Headsets or use the Up/Down navigation keys to scroll and highlight the Headsets option. The Headsets page opens.
4	Select USB from the Active Headset Device list.
5	Press Apply .

--End--

Appendix

Language enhancement

Contents

This section contains the following topics:

- [“Description” \(page 591\)](#)
- [“Expansion Module for IP Phone 1100 Series font support” \(page 592\)](#)

Description

To support languages with complex fonts, CS 1000 includes 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 [“TFTP Server” \(page 593\)](#).

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

TFTP Server

Contents

This section contains the following topics:

- “Introduction” (page 593)
- “TFTP Server planning” (page 593)
- “Updating IP Phones firmware” (page 595)
- “Downloading and configuring fonts” (page 601)

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)
- Weird Solutions 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.

The latest IP Phone firmware files and configuration files are found on the Nortel Web site. To obtain firmware files and configuration files, go to www.nortel.com/downloadingcontent. You must unzip the files before you upload the files to the TFTP Server. The configuration zip file contains configuration files (.cfg) for each IP Phone type and a README text file (.txt), which contains instructions to set up the TFTP Server and to modify the configuration file correctly so that the IP Phone downloads the firmware.

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 157 “Updating the IP Phones firmware” \(page 595\)](#) 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, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, IP Phone 1150E, IP Phone 1210, IP Phone 1220, and IP Phone 1230, see [Procedure 158 “Updating the firmware” \(page 597\)](#).

ATTENTION

Nortel recommends that the user ends an active call before performing firmware upgrade. Otherwise results may be unpredictable.

Procedure 157 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 firmware

This section describes the firmware upgrade process for the following IP Phones:

- IP Phone 2007
- IP Phone 1110
- IP Phone 1120E
- IP Phone 1140E
- IP Phone 1150E
- IP Phone 1210
- IP Phone 1220
- IP Phone 1230
- IP Audio Conference Phone 2033

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 2007, IP Phone 1110, IP Phone 1120E, IP Phone 1140E, and IP Phone 1150E require the following files:

- i2007.cfg
0625Cxx.bin
- 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 136 "Fields in the TFTP configuration file" (page 597) 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 136
Fields in the TFTP configuration file

Field Name	Field Value	Descriptions
[FW]		Section header for 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 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 158 "Updating the firmware" \(page 597\)](#) to upgrade the firmware for the IP Phone 1110, IP Phone 1120E, IP 1140E, and IP Phone 1150E, IP Phone 1210, IP Phone 1220, IP Phone 1230 using automatic TFTP download during bootup.

Procedure 158
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” \(page 598\)](#).
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, 1210.cfg, 1220.cfg, and 1230.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 159 “Upgrading the firmware using BootC” \(page 599\)](#) to upgrade the firmware using BootC.

Procedure 159
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: <div style="border: 1px solid black; padding: 10px; text-align: center; margin: 10px 0;"> 11x0 IP Phone Manual Configuration Nortel </div> <p>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.</p>
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: <i>TFTP Dwnld? (0-No, 1-Yes):0</i> , <ul style="list-style-type: none"> • Press soft key 2 (BKSpace) to clear the 0 (No). • Press 1 on the dialpad, then press soft key 1 (OK).
6	When prompted: <i>TFTP IP xxx.xxx.xxx.xxx</i> , <ul style="list-style-type: none"> • 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) use the same TFTP Server configuration file method as the IP Phone 1120E, IP Phone 1140E, and the IP Phone 1150E.

[Table 137 "Fields in the TFTP configuration file for the Expansion Module" \(page 600\)](#) 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 137
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.

Table 137
Fields in the TFTP configuration file for the Expansion Module (cont'd.)

Field Name	Field Value	Descriptions
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 138 "Fields in the TFTP configuration file for downloadable fonts" \(page 601\)](#) 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 138
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.

Table 138
Fields in the TFTP configuration file for downloadable fonts (cont'd.)

Field Name	Field Value	Description
	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: xx...xx = 10 hex bytes defining the Unicode ranges for a font in the same format as the IT Character Set Report.

Figure 112
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.lng
```

For information about downloading the font file from the Nortel Web site, see *Signaling Server IP Line Applications Fundamentals* (NN43001-125).

Procedure 160
Downloading a font file

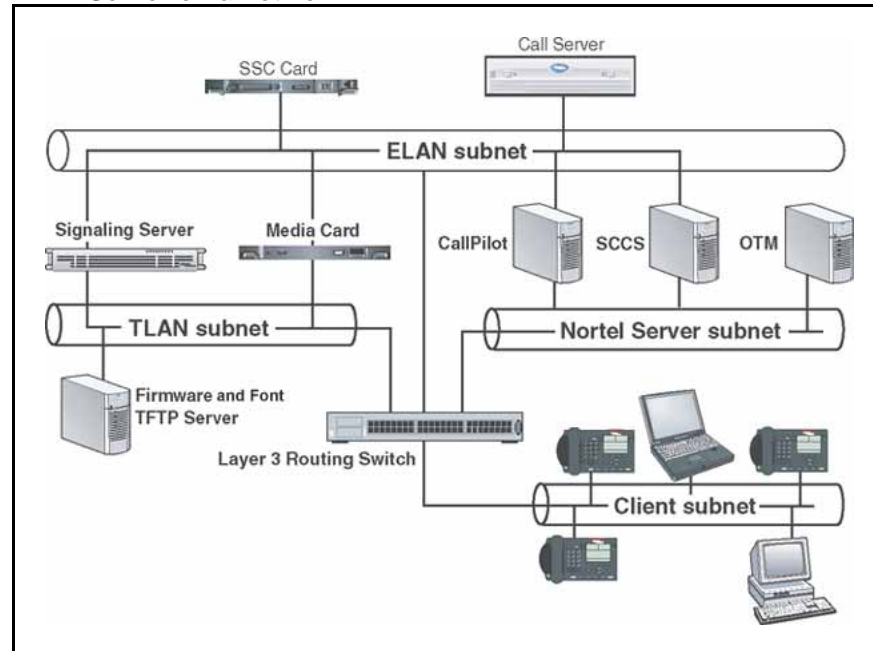
Step	Action
1	The version number is compared to the version number of the file (for example, chinese.ccc) in the file system, if it exists. See Figure 112 "Sample of the font configuration file" (page 603) .
2	If the file does not exist in the file system, or if the version is older than the VERSION 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 113
TFTP Server on a network



Appendix

IP Phone context-sensitive soft keys

Table 139 "IP Phone context-sensitive soft keys" (page 605) 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.

The IP Phone 1230 uses keys 27 to 30 for the extra four dedicated keys.

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* (NN43001-106).

Table 139
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

Table 139
IP Phone context-sensitive soft keys (cont'd.)

Key number	Response	Description
Key 21	PRK	Call Park key
Key 22	NUL	Removes function or feature from key
	RNP	Ringing 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
	SSC	System Speed Call Controller
Key 24	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 Call features

Table 140 "IP Phone supported call features" (page 607) shows a list of supported call features for the IP Phones.

Table 140
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

Table 140
IP Phone supported call features (cont'd.)

Feature	Description
CWT	Call Waiting The IP Phone 2001, IP Audio Conference Phone 2033, IP Phone 1110, and IP Phone 1210 do not support 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

Table 140
IP Phone supported call features (cont'd.)

Feature	Description
OVR	Override
PRK	Call Park
PRS	Privacy Release
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

Appendix

FLEXnet licensing error codes

Table 141 "FLEXnet licensing error codes" (page 611) describes FLEXnet licensing error codes for the IP Softphone 2050 only.

Table 141
FLEXnet licensing error codes

Error code	Description
-1	Cannot find license file.
-2	Invalid license file syntax.
-3	No license server system for this feature.
-4	Licensed number of users already reached.
-5	No such feature exists.
-6	No TCP/IP port number in license file and FLEXnet Licensing service does not exist. (pre-v6 only)
-7	No socket connection to license server manager service.
-8	Invalid (inconsistent) license key or signature. The license key/signature and data for the feature do not match. This usually happens when a license file has been altered.
-9	Invalid host. The hostid of this system does not match the hostid specified in the license file.
-10	Feature has expired.
-11	Invalid date format in license file.
-12	Invalid returned data from license server system.
-13	No SERVER lines in license file.
-14	Cannot find SERVER host name in network database. The lookup for the host name on the SERVER line in the license file failed. This often happens when NIS or DNS or the hosts file is incorrect. Workaround: Use IP address (e.g., 123.456.789.123) instead of host name.

Error code	Description
-15	Cannot connect to license server system. The server (lmgrd) has not been started yet, or the wrong port@host or license file is being used, or the TCP/IP port or host name in the license file has been changed.
-16	Cannot read data from license server system.
-17	Cannot write data to license server system.
-18	License server system does not support this feature.
-19	Error in select system call.
-21	License file does not support this version.
-22	Feature checkin failure detected at license server system.
-23	License server system temporarily busy (new server connecting).
-24	Users are queued for this feature.
-25	License server system does not support this version of this feature.
-26	Request for more licenses than this feature supports.
-29	Cannot find ethernet device.
-30	Cannot read license file.
-31	Feature start date is in the future.
-32	No such attribute.
-33	Bad encryption handshake with vendor daemon.
-34	Clock difference too large between client and license server system.
-35	In the queue for this feature.
-36	Feature database corrupted in vendor daemon.
-37	Duplicate selection mismatch for this feature. Obsolete with v8.0+ vendor daemon.
-38	User/host on EXCLUDE list for feature.
-39	User/host not on INCLUDE list for feature.
-40	Cannot allocate dynamic memory.
-41	Feature was never checked out.
-42	Invalid parameter.
-47	Clock setting check not available in vendor daemon.
-52	Vendor daemon did not respond within timeout interval.
-53	Checkout request rejected by vendor-defined checkout filter.
-54	No FEATURESET line in license file.
-55	Incorrect FEATURESET line in license file.
-56	Cannot compute FEATURESET data from license file.
-57	socket() call failed.

Error code	Description
-59	Message checksum failure.
-60	License server system message checksum failure.
-61	Cannot read license file data from license server system.
-62	Network software (TCP/IP) not available.
-63	You are not a license administrator.
-64	Imremove request before the minimum Imremove interval.
-67	No licenses available to borrow.
-68	License BORROW support not enabled.
-69	FLOAT_OK can't run standalone on license server system.
-71	Invalid TZ environment variable.
-73	Local checkout filter rejected request.
-74	Attempt to read beyond end of license file path.
-75	SYS\$SETIMR call failed (VMS).
-76	Internal FLEXnet Licensing error-please report to Macrovision Corporation.
-77	Bad version number must be floating-point number with no letters.
-82	Invalid PACKAGE line in license file.
-83	FLEXnet Licensing version of client newer than server.
-84	USER_BASED license has no specified users - see license server system log.
-85	License server system doesn't support this request.
-87	Checkout exceeds MAX specified in options file.
-88	System clock has been set back.
-89	This platform not authorized by license.
-90	Future license file format or misspelling in license file. The file was issued for a later version of FLEXnet Licensing than this program understands.
-91	Encryption seeds are non-unique.
-92	Feature removed during Imreread, or wrong SERVER line hostid.
-93	This feature is available in a different license pool. This is a warning condition. The server has pooled one or more INCREMENT lines into a single pool, and the request was made on an INCREMENT line that has been pooled.
-94	Attempt to generate license with incompatible attributes.
-95	Network connect to THIS_HOST failed. Change this_host on the SERVER line in the license file to the actual host name.
-96	License server machine is down or not responding. See the system administrator about starting the server, or make sure that you're referring to the right host (see LM_LICENSE_FILE environment variable).

Error code	Description
-97	The desired vendor daemon is down. 1) Check the Imgrd log file, or 2) Try Imrread.
-98	This FEATURE line can't be converted to decimal format.
-99	The decimal format license is typed incorrectly.
-100	Cannot remove a linger license.
-101	All licenses are reserved for others. The system administrator has reserved all the licenses for others. Reservations are made in the options file. The server must be restarted for options file changes to take effect.
-102	A FLEXid borrow error occurred.
-103	Terminal Server remote client not allowed.
-104	Cannot borrow that long.
-106	License server system out of network connections. The vendor daemon can't handle any more users. See the debug log for further information.
-110	Cannot read dongle: check dongle or driver. Either the dongle is unattached, or the necessary software driver for this dongle type is not installed.
-112	Missing dongle driver. In order to read the FLEXid hostid, the correct driver must be installed. These drivers are available from your software vendor.
-114	SIGN= keyword required, but missing from license certificate. You need to obtain a SIGN= version of this license from your vendor.
-115	Error in Public Key package.
-116	TRL not supported for this platform.
-117	BORROW failed.
-118	BORROW period expired.
-119	Imdown and Imrread must be run on license server machine.
-120	Cannot Imdown the server when licenses are borrowed.
-121	FLOAT_OK requires exactly one FLEXid hostid.
-122	Unable to delete local borrow info.
-123	Returning a borrowed license early is not supported. Contact the vendor for further details.
-124	Error returning borrowed license.
-125	A PACKAGE component must be specified.
-126	Composite hostid not initialized.
-127	A item needed for the composite hostid is missing or invalid.
-128	Error, borrowed license doesn't match any known server license.
-135	Error enabling the event log.
-136	Event logging is disabled.

Error code	Description
-137	Error writing to the event log.
-139	Communications timeout.
-140	Bad message command.
-141	Error writing to socket. Peer has closed socket.
-142	Error, cannot generate version specific license tied to a single hostid, which is composite.
-143	Version-specific signatures are not supported for uncounted licenses.
-144	License template contains redundant signature specifiers.
-145	Bad V71_LK signature.
-146	Bad V71_SIGN signature.
-147	Bad V80_LK signature.
-148	Bad V80_SIGN signature.
-149	Bad V81_LK signature.
-150	Bad V81_SIGN signature.
-151	Bad V81_SIGN2 signature.
-152	Bad V84_LK signature.
-153	Bad V84_SIGN signature.
-154	Bad V84_SIGN2 signature.
-155	License key required but missing from the license certificate. The application requires a license key in the license certificate. You need to obtain a license key version of this certificate from your vendor.
-156	Invalid signature specified with the AUTH= keyword.
-500	Invalid server port number.
-501	Invalid value in license where an integer was expected.
-502	Invalid value supplied for count.
-503	Invalid hostid supplied in license.
-504	Invalid hostid type supplied.
-505	Bad feature line syntax.
-506	Internal FLEXnet Licensing error.
-507	Bad date format in license file.
-508	Bad SERVER line.
-509	Bad license string.
-510	Server's feature doesn't authenticate on client side.
-511	No license checked out.
-512	License already checked out.

Error code	Description
-513	Error list returned.
-514	No certicom module available.
-515	Wrong or incomplete certicom module.
-516	SIGN or SIGN2 required in license certificate.
-517	Feature object has no license sources.
-518	An Identical license is already checked out on this license source.
-519	This license has an asynchronously-queued checkout pending.
-521	Library for native hostid couldn't be loaded.
-522	Already connected to another vendor daemon.
-523	No such user, host, or display.
-524	Shutdown of license server system failed.
-525	Shutdown failed - already connected to license server system.
-526	Invalid license source string.
-527	Log file switch error.

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