Meridian 1 and Succession Communication Server for Enterprise 1000

Internet Terminals

Description

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March 2002

Standard 1.00. This document is the first issue of the Internet Terminals Description guide. This guide includes information on the i2004 Internet telephone and the i2050 Software Phone.

Contents

About this document

This document applies to Meridian 1 and Succession Communication Server for Enterprise (CSE) 1000 systems and describes the i2004 Internet telephone and the i2050 Software Phone.

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

i2004 Internet telephone

Contents

This section contains information on the following topics:

Overview

This chapter explains how to install the i2004 Internet telephone and how to perform some maintenance tasks.

The following procedures are contained within this chapter:

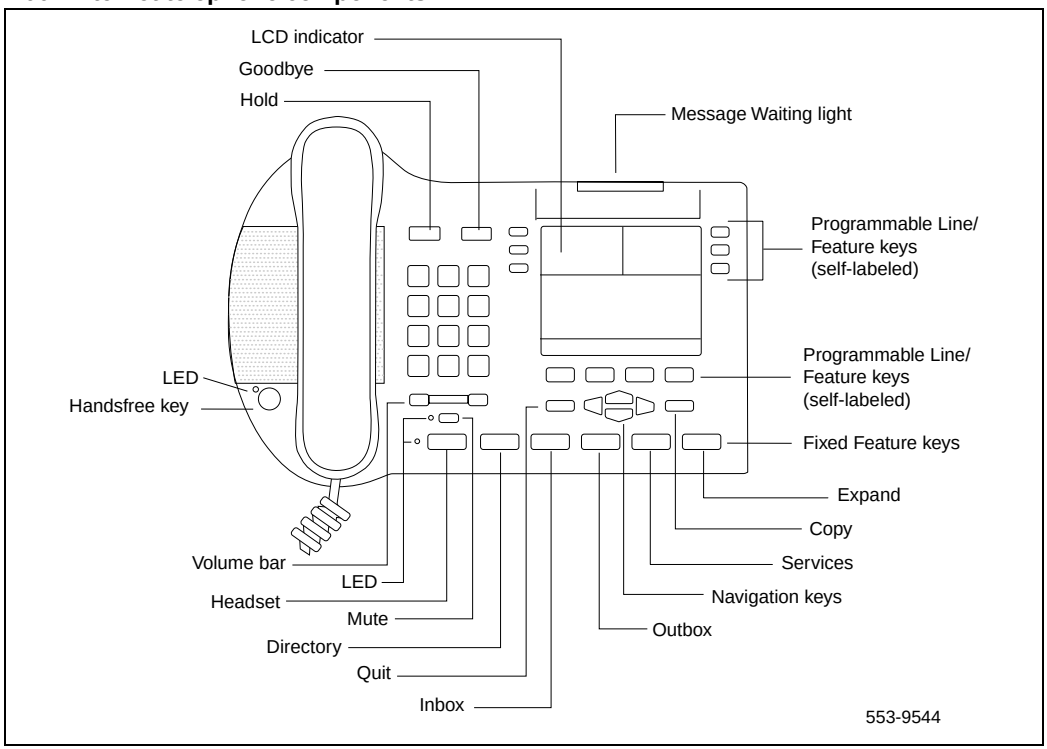
- Procedure 1, “Pre-installation checklist” on page 16.
- Procedure 2, “Manual first-time installation of the i2004 Internet telephone” on page 17.
- Procedure 3, “Automatic first-time installation of the i2004 Internet telephone” on page 20.
- Procedure 4, “Changing the TN of an existing i2004 Internet telephone” on page 21.
- Procedure 5, “Replacing an i2004 Internet telephone” on page 21.
- Procedure 6, “Taking an i2004 Internet telephone out of service” on page 22.

i2004 Internet telephone description

The i2004 Internet telephone connects directly to the LAN through an Ethernet connection and brings voice and data to the desktop environment.

The i2004 Internet telephone translates voice into data packets for transport using Internet Protocol. A Dynamic Host Configuration Protocol (DHCP) server can be used to provide information that enables the i2004 Internet telephone network connection, and connection to the Internet Telephony Gateway (ITG) Line card. The i2004 Internet telephone uses the customer’s IP network to communicate with the ITG Line card server. Figure 1 on page 11 identifies the i2004 Internet telephone feature keys and other components.

Figure 1
i2004 Internet telephone components



Supported features

The i2004 Internet telephone supports the Meridian 1 and Succession CSE 1000 digital telephone features available on the M2000 series telephones. The features include:

- Multi-line capability
- Six self-labeled programmable line and feature keys. One must be the DN key.
- Six icon-labeled fixed feature keys
- Four self-labeled programmable feature keys that provide access to multiple features

- Handsfree with LED (i2004 Internet telephone only)
- Dual purpose LED indicator: Message waiting (solid), Incoming call (flashing)
- Navigation keys (up and down, left and right)
- Direct connect headset port

Self-labeled keys

The line and feature keys are self-labeled. Once the phone is configured within the system, the line and feature key labels are automatically presented to the user through the display.

Self-labeled keys are also delivered on the i2004 Internet telephone. This feature is further simplified on the i2004 Internet telephones because it is not necessary to physically connect the telephone back to a specific hardware port on a line card.

ACD feature set

The i2004 Internet telephone supports the ACD feature set of Meridian 1 and Succession CSE 1000.

- There are 12 feature keys that can be configured for ACD functionality. Six of the feature keys are physical keys on the telephone. To access the six other feature keys, press one of the six dedicated keys, then press the Outbox (SHIFT) key.
- The headset does not support the ACD Walkaway feature. If the headset in unplugged, ACD Walkaway is not invoked.

Features not currently supported

The following features are not currently supported in the i2004 Internet telephone:

- Personal Directory
- Call Log and Redial List
- Expansion Modules
- Support of accessory modules

- User customizable feature keys
- Live Dial pad
- Group Listening
- Set-to-Set messaging
- Hot desking
- Context sensitive soft keys

i2004 Internet telephone dedicated keys

Table 1 on page 13 describes the specific telephone assignment functions. Use Overlay 11 to program keys 16-26 on the i2004 Internet telephone.

Note: If you attempt to configure anything other than the permitted response, the system generates an error code.

Table 1
i2004 Internet telephone dedicated keys (Part 1 of 2)

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	3-party conference key
	A06	6-party conference key
	NUL	Removes function or feature from key
Key 19	CFW	Call Forward key
	NUL	Removes function or feature from key
Key 20	RGA	Ring Again key
	NUL	Removes function or feature from key

Table 1
i2004 Internet telephone dedicated keys (Part 2 of 2)

Prompt	Response	Description
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

i2004 Internet telephone components list

Table 2 on page 15 lists the i2004 Internet telephone package components.

Table 2
i2004 Internet telephone package components

Component	Code
i2004 Internet telephone Boxed Package. Contains a 2.3 m (7 ft.) Ethernet cable, i2004 Installation Guide, Power Transformer, Telephone Handset, Telephone Handset Cord, Telephone Footstand.	NTEX00BA B0253074
i2004 Internet telephone Boxed Package. Contains a 2.3 m (7 ft.) Ethernet cable, i2004 Installation Guide, Telephone Handset, Telephone Handset Cord, Telephone Footstand.	NTEX00BB
a 2.3 m (7 ft.) Ethernet cable, Category 5	A0648375
Telephone Footstand	P0886045
Telephone Handset Cord	A0788682
Telephone Handset	A0788874
Power Transformer (117/120 VAC 50/60 Hz) (North America)	A0619627
Power transformer AC to AC, direct plug-in, 8W, 230 VAC, 50/60 Hz, to 16 VAC at 500mA (Europe)	A0619635
Power transformer 2 prong wall plug, direct plug in AC to AC, 8W 240 VAC, 50 Hz to 16 VAC/500m (Australia and New Zealand)	A0647042
Power transformer 3 prong AC to AC, direct plug-in, 8W, 240 VAC, 50 Hz, to 16 VAC/500m (United Kingdom and Ireland)	A0656598
Power Transformer AC to AC, direct plug-in, 8W,100 VAC, 50 Hz, to 16 VAC at 500 mA (Japan)	A0828858

Before you begin

Procedure 1
Pre-installation checklist

1 Make sure you have one NTEX00BA i2004 Internet telephone Boxed Package for each i2004 Internet telephone. The package contains:

- NTEX00AA i2004 Internet telephone
- A0648375 2.3m (7 foot) Ethernet cable, Category 5
- PO910803 i2004 Quick Reference Card
- A0619627 Power Transformer (117/120 Vac 50/60 Hz)
- A0788874 Telephone Handset (Ethergray)
- A0788682 Telephone Handset Cord (Ethergray)
- P0886045 Telephone footstand

2 To install and configure an i2004 Internet telephone, the host Succession CSE 1000 must be installed with the ITG Line cards, and the ITG Line cards must be running the i2004 Internet telephone application. A DHCP server and DHCP relay agents, if required, must also have been installed, configured and running.

3 Make sure you have the following:

- A three-port switch if you are sharing your existing desktop Ethernet connection with your PC.
- A power supply (local or closet) appropriate for the voltage in your area.

4 You must be familiar with the three configuration modes that you will be prompted to choose from as you proceed through the installation of your i2004 Internet telephone:

- Manually configured static IP address: available IP address for static assignment of i2004 Internet telephone. Your IP Network Administrator provides this address.
- Partial DHCP mode: works with standard DHCP server
- Full DHCP mode: requires special configuration of the DHCP server to recognize the i2004 Internet telephone

Note 1: If you chose Partial or Manual configuration mode, you have to configure Connect Server parameters.

Note 2: The IP address for Connect Servers (S1 and S2), Node ID and VTN must be provided by System Administrator.

Note 3: Refer to *Internet Telephony Gateway Line: Description, Installation, and Operation* (553-3001-204) for more DHCP information.

End of Procedure

Manual first-time i2004 Internet telephone installation

To install and configure an i2004 Internet telephone, you must first install an ITG Line card in the system.

Procedure 2
Manual first-time installation of the i2004 Internet telephone

1 Configure a virtual loop on the system using LD 97.

2 Configure the i2004 Internet telephone on the system using LD 11.

3 Connect the i2004 Internet telephone components:

- **a.** Connect one end of the handset cord to the handset jack on the back of the telephone identified with a handset icon.
- **b.** Connect the other end of the handset cord to the handset.
- **c.** Connect one end of the CAT-5 line cable to the Ethernet jack on the back of the telephone. The other end plugs into the IP voice network (Ethernet), using an RJ45 connector.

CAUTION

Do not plug your i2004 Internet telephone into an ISDN connection. Severe damage can result. Consult your system administrator to ensure that you are plugging your telephone into a 10/100BaseT Ethernet jack.

d. Plug the AC Power adapter into the connection on the back of the telephone. Be sure to thread the cord around the strain relief, retaining hook and channel provided for a secure power connection.

e. Plug the AC power adapter into the nearest power outlet. Check your i2004 Internet telephone User Guide for country-specific parameters.

4 Secure the telephone footstand to the base of the telephone. Use the angle adjustment grip on the top back of the telephone to adjust the position. T.

CAUTION

Before plugging in your i2004 Internet telephone, read the following important timing information:

There are only four seconds between plugging in the i2004's power transformer and the appearance of the Nortel Networks logo on the display. When you see the logo, you have one second to respond by pressing the four feature keys at the bottom of the display in sequence from left to right. If you miss the one second response time, the i2004 will start trying to locate the connect server. You will have to wait until it is finished, and then begin the power up sequence again.

5 Power-up the i2004 Internet telephone.

6 When the Nortel Networks logo appears on the display, immediately press the four feature keys at the bottom of the display in sequence from left to right.

7 At the prompt "DHCP Yes/No?", enter "**No'** for manual configuration.

8 Enter a valid i2004 Internet telephone IP address, subnet mask, and router IP address (Gateway) for the i2004 Internet telephone on the LAN segment to which it is connected.

9 Enter the Node IP address of the ITG i2004 Line node at the S1 IP prompt. Continue entering the following information for the S1 server:

- S1 Port: 4100
- S1 Action: 1
- S1 retry count: 10

10 You are now prompted for S2 information. Enter the same IP address, port number, action and retry count as for connect server 1 (above).

11 The i2004 Internet telephone searches for the connect server. When the connection is complete, enter the Internet Telephone Installer Password, the Node ID, and the TN or VTN.

12 The i2004 Internet telephone begins the firmware download. This takes several minutes. When complete, the i2004 Internet telephone resets itself.

13 The Succession CSE 1000 logo, date and time appears on the top line of the display when the manual configuration is complete. Self-labelling feature keys also appear.

14 Check for dial tone and the correct DN above the display. Manual configuration is complete.

End of Procedure

Automatic first-time installation of an i2004 Internet telephone

Automatic configuration of the i2004 Internet telephone client requires an i2004 Internet telephone-aware DHCP server. DHCP allows the dynamic allocation of IP addresses to different clients.

The Nortel Networks i2004 Internet telephone can act as a DHCP client. As part of the startup routine, the i2004 Internet telephone can request automatic network and local configuration parameters from a DHCP server. The DHCP server responds to the request and supplies information.

Network configuration parameter requests include:

- IP address of the i2004 Internet telephone
- Subnet mask for the i2004 Internet telephone IP address
- Default gateway for the i2004 Internet telephone LAN segment

Local configuration parameter requests include:

- A connect server port number
- A command (UNIStim Hello)

- IP address of the ITG Line node. The ITG Line card acts as a TFTP server to download the most recent version of the i2004 Internet telephone firmware, if required. The Active Leader gives the IP address of the Terminal Proxy Server (TPS) through which the i2004 Internet telephone registers with the Succession CSE 1000.
- Number of retries for the primary and secondary connects Server (S1/S2).

Procedure 3
Automatic first-time installation of the i2004 Internet telephone

1 Configure a virtual loop on the Succession CSE 1000 using LD 97.

2 Configure the i2004 Internet telephone on Succession CSE 1000 using LD 11.

3 Follow the steps in “Manual first-time installation of the i2004 Internet telephone” on page 17 to install the footstand, Ethernet cable, power transformer, handset, handset cord.

4 Power up the i2004 Internet telephone.

5 Connect the i2004 Internet telephone to the LAN using the supplied Ethernet cable. The i2004 Internet telephone automatically proceeds through its DHCP sequence.

6 The i2004 Internet telephone prompts you for an Internet Telephone Installer Password, a node number, and a TN. Enter the password, node number, and TN on the keypad.

7 Automatic i2004 Internet telephone configuration is complete.
If the TN has not been previously configured on Succession CSE 1000 or an invalid TN is used, a message is displayed on the screen of the i2004 Internet telephone indicating "Invalid TN."

End of Procedure

i2004 Internet telephone power cycle description

The power cycle is similar to the initial installation. The i2004 Internet telephone saves its firmware, IP parameters, Node Number and TN in memory. As the i2004 Internet telephone proceeds through a start-up sequence it does not need to re-enter the IP parameters if they were manually entered. It does not need to reacquire firmware or prompt the user for Node Number and TN.

Reinstall an i2004 Internet telephone

You can reuse an existing, previously-configured i2004 Internet telephone on the same Succession CSE 1000. For example, the i2004 Internet telephone can be assigned to a new user (new TN) or to an existing user who moved to a new subnet.

Change the TN of an existing i2004 Internet telephone

Procedure 4
Changing the TN of an existing i2004 Internet telephone

1 Power cycle the i2004 Internet telephone.

2 During the reboot sequence of a previously-configured i2004 Internet telephone, the i2004 Internet telephone displays the existing node number and TN for approximately five seconds.

3 Press the "Clear" softkey during the five-second period. The existing node and TN will be cleared.

4 The i2004 Internet telephone prompts the user for new Node Number and TN information.

End of Procedure

Replace an i2004 Internet telephone

Procedure 5
Replacing an i2004 Internet telephone

1 Use the Manual or Automatic first-time installation procedures, Procedures 2 and 3, described in this chapter to install and configure the i2004 Internet telephone.

2 Enter the same TN and Node Number as the i2004 Internet telephone you replaced. Succession CSE 1000 ITG gateway associates the new i2004 Internet telephone with the existing TN.

End of Procedure

Remove an i2004 Internet telephone from service

Procedure 6
Taking an i2004 Internet telephone out of service

1. Disconnect the i2004 Internet telephone from the network or turn the power off.
2. If the i2004 Internet telephone was automatically configured, the DHCP lease will expire and the IP address returns to the available pool.
3. In Overlay 11, OUT the TN.

End of Procedure

i2004 Internet telephone maintenance and diagnostics

In the i2004 Internet telephone, there are two kinds of TNs to consider:

- A physical TN, which represents a physical unit of the ITG Line card
- A virtual TN, which is configured on a virtual superloop and represents an i2004 Internet telephone

Physical TNs, which are seen as card units, are managed using existing Overlay 32 commands.

Virtual TNs are configured on virtual superloops. Virtual TNs are already provided by the Succession CSE 1000 for phantom loops NPR665. Overlay 32 supports STAT, DISU, ENLU and IDU commands on an i2004 Internet telephone Virtual TN. All other commands lead to the new NPR047 message.

The IDU command for Internet telephones provides information, such as TN, TN ID, NT code, color code, release code and serial number, as well as the IP address of the i2004 Internet telephone and the IP address of the ITG Line card to which the set has registered for signaling purposes. The serial number is the last three bytes of the i2004 Internet telephone's MAC address, printed in hexadecimal format.

The system requests the info from the telephone and can be used to test the end-to-end IP connectivity of the i2004 Internet telephone. The output format of the IDU command in LD 32 is shown in Table 3 on page 23. This format only applies for i2004 Internet telephone Virtual TNs.

The IDU command can respond with one of the following:

- Prints the i2004 Internet telephone IP address and the ITG Line card address, and generates an NPR0503 message.
- The i2004 Internet telephone is not registered with the call server and an NPR0048 message is generated.
- The i2004 Internet telephone is registered, but the call server is not responding, and generates an NPR0503 message.

Table 3
IDU command printout in LD 32

Item	Description
ISET TN:	l s c u
TN ID CODE:	I2004
NT CODE:	xxxxxx
COLOR CODE:	xx
RLS CODE:	xx
SER NUM:	xxxxxxx
SET IP ADR:	xxx.xxx.xxx.xxx
TPS IP ADR:	xxx.xxx.xxx.xxx

Table 4
LD 32 Available Maintenance Commands for the i2004 Internet telephone

Prompt	Response	Description
STAT l s c u STAT c u	UNEQ IDLE REGISTERED IDLE UNREGISTERED. BUSY, DSBL REGISTERED DSBL UNREGISTERED	Display the i2004 state. UNEQ, IDLE, BUSY and DSBL have the usual meaning. IDLE and DSBL state are preceded by the following information: • UNREGISTERED identifies an i2004 Internet telephone that is configured in the system but that has not yet registered. • REGISTERED identifies an i2004 Internet telephone that has registered.
DISU l s c u DISU c u	OK	Change the i2004 Internet telephone state to DSBL. UNREGISTERED/REGISTERED state is not modified.
ENLU l s c u ENLU c u	OK	Change the i2004 Internet telephone state to IDLE. UNREGISTERED/REGISTERED state is not modified.
IDU l s c u IDU c u	Displays the TN number, device code, NT code, color code, release code, last three bytes of MAC address. Displays the IP address for i2004 Internet telephones and the Terminal Proxy Server.	Displays selected i2004 Internet telephone information.

Lamp audit and keep-alive function

The Succession CSE 1000 Lamp Audit function provides a continuous source of heartbeat messages to ensure the i2004 Internet telephone is powered and the IP connection is working. Since there is a reliable UDP connection from the Succession CSE 1000 core through to the i2004 Internet telephone, any failure of the i2004 Internet telephone, the ITG Line card or the IP connection is detected.

You can run Network Signaling diagnostics as part of the midnight routines with LD 30.

When the ITG Line card detects the i2004 Internet telephone has been disconnected, the ITG Line card logs the event and sends an UNREGISTER message to the Succession CSE 1000 for that i2004 Internet telephone.

When the system call server detects a loss of connection with the ITG Line card, Succession CSE 1000 logs a message and UNREGISTERS all of the i2004 Internet telephones and gateway channels associated with that ITG Line card.

i2050 Software Phone

Contents

The following are the topics in this section:

References

- *Internet Telephony Gateway Line: Description, Installation, and Operation* (553-3001-204)

i2050 Software Phone description

The i2050 Software Phone is a Windows-based application that enables voice to make your computer a powerful tool. The i2050 Software Phone provides most of the attributes and features of the i2004 Internet telephone.

The i2050 Software Phone operates on PCs running Windows 98, Windows 98 SE, or Windows 2000 Professional.

The i2050 Software Phone supports the following attributes:

- traditional telephony features such as Call Origination, Call Termination, Conference, Transfer, Hold, and Message Waiting Indication
- dedicated Hold, Release, Answer, Volume, Mute, Navigation and Message Waiting Indication keys
- macro functions for programming lengthy dialing patterns
- powerful directory capabilities: locally stored on the PC or linked to external directories such as LDAP, Microsoft Outlook, and ACT! contact management software
- Network access and Dynamic Host Configuration Protocol (DHCP) configurable services (automatic configuration of call server location using DHCP)
- Nortel Networks Universal Serial Bus (USB) Headset Kit for the speech path
- user-selectable ringer that allows the PC speakers or the headset to ring for incoming calls
- provides "one-click" direct dialing from various windows and applications
- reduced number of wires to the desktop by eliminating the need for telephony wires
- online help with full index search capabilities

System components

The i2050 Software Phone requires the installation of an Internet Telephony Gateway (ITG) Line card installed on your system. The i2050 Software Phone is composed of an external Universal Serial Bus headset adapter (USB Headset Kit) and a software application installed on the PC of the user.

i2050 Software Phone components list

Table 5 on page 29 lists the i2050 Software Phone package components.

Table 5
i2050 Software Phone package components

Component	Code
i2050 Software Phone application software CD	NTD83AA
USB Headset Kit	NTEX14AA

Internet Telephony Gateway Line card

The Internet Telephony Gateway (ITG) Line application supports the i2050 Software Phone by providing a communication gateway between the IP data network and the Meridian 1 or Succession CSE 1000. Installation of the ITG Line card on your system is required in order to use the i2050 Software Phone.

For more information on the ITG Line application, refer to *Internet Telephony Gateway Line: Description, Installation, and Operation* (553-3001-204).

USB Headset Kit

The USB Headset Kit (NTEX14) ensures a consistent voice quality and loss plan for the i2050 Software Phone.

The USB Headset Kit provides a controlled high-quality audio environment, including:

- absolute and predictable loss and level plan implementation which is necessary to meet TIA-810, FCC part 68 and its international equivalents, as well as the ADA requirements for the hearing impaired

- compliance with version 1.1 of the USB Device Specification and Windows Plug & Play specifications
- simple installation using standard Windows drivers (requires no additional software or drivers)
- support on Windows 98, Windows 98SE, and Windows 2000 Professional
- in-use lamp connector with in-use control provided by polarity insensitive isolated contact closure

The USB Headset Kit auto-configures in the supported Windows operating system. No specific software is supplied with it or is required.

i2050 Software Phone application

The i2050 Software Phone is a Voice over IP (VoIP) application that allows users to communicate over a LAN and WAN from their PCs. It combines the Meridian 1 or Succession Communication Server for Enterprise 1000 Server with PC resident directory capabilities.

The application is composed of the following components:

- a Configuration Utility - used to configure the software phone
- the i2050 Software Phone - the actual software phone user interface
- Nortel Networks i2050 QoS Service

[Windows 2000 Professional]

The i2050 Software Phone has the following functionality:

- Support for 802.1 Q, and DiffServ (operating system dependant)
- Automatic configuration of call server location using Dynamic Host Configuration Protocol (DHCP)
- Features and services are provided by the network (such as call features, calling line identification, and voice mail)
- Intuitive and flexible interface including:
  - slide-out trays to provide access to frequently used features and services

  - — retracted trays to provide a smaller interface with full operational capabilities for a single line
  - — viewable line status
  - — ten-item lists for quick dial access from both the main and system tray interface
  - — user-customizable interface and directories
  - — multilingual capabilities (English, French, or other local language)
  - — programmable macro functions for lengthy dialing patterns
  - — hotkeys map the computer keyboard to application buttons
- Windows system tray operation, that allows the user to receive and place calls without interrupting other work
- Directory application which provides "one-click" direct dialing, access to a variety of directory types, and quick dial lists
- Online help
- User-selectable ringing device to alert the user to incoming calls through the speakers when the headset is not being worn
- Supports G.711, G.729A and G.729AB codecs for operation at a variety of network connection speeds

i2050 Software Phone Graphical User Interface

The i2050 Software Phone appears on the desktop as follows:

- The Primary User Interface is shown in Figure 2 on page 35. This default presentation is with the operational trays retracted. In this mode the user can operate most features available from the i2050 Software Phone. Calls can be answered or made by pressing the green Answer button. In this mode the call server selects the line to answer or engage. The user can also hang-up, hold, retrieve from hold, mute, adjust volume and access network services such as voice mail. Within the Primary User Interface the computer keyboard provides hotkeys (in parentheses) for:
  - — answer (Enter)
  - — release (F12)

— hold (F5)

— softkeys/interactive keys (F1-F4)

— alphabetic keys map to numbers as per dial-pad mapping shown in Figure 5 on page 38

— arrow keys map to navigation keys

Graphical User Interface Components

Applications Menu

Clicking on the Applications menu icon (top left hand corner) gives access to the Configuration Utility which is used to configure the i2050 Software Phone.

Message Lamp

The Message Lamp turns ON to indicate that a message has been left for the user. This lamp flashes when there is an incoming call.

Exit

The Exit closes the Call Control window, but does not disconnect your computer from the server so you can still receive telephone calls. The i2050 Software Phone application remains running in the background.

Soft Keys

Four additional soft-labeled keys on the i2050 Software Phone set support a specific subset of the Succession CSE 1000 key features.

Programmable DN/Feature Keys

Six DN /feature keys on the i2050 Software Phone support up to 12 DNs or features (by using the Shift key feature). These are only displayed on the Combo and Lines Tray displays.

Information Display Area

The information display area is an LED which can contain 4 lines of text, up to a maximum of 24 characters for each line. The display area consists of two areas:

- Info Line
- Info Window

Info Line

The Info Line is the first (top) line of display text. The left ten-character area shows **Meridian** or **Succession** as the call server type.The right part of the Info Line shows the current time and date.

Info window

The Info Window display is a 3x24 LED 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 3x24 characters, a scroll icon indicator is activated to indicate to the user to use the scroll keys to view the second line of the display.

Softkey Label Display

The i2050 Software Phone display has a character line that shows labels for the four soft keys. Each label is six characters plus an icon. If the icon is off, the label contains seven characters.

Navigation Keys

If the scroll icon is shown on the display, then the UP and DOWN navigation keys are operational for scrolling the text line of the display. Otherwise the UP, DOWN, RIGHT, LEFT navigation keys are used for other various functions depending on the active application.

Answer Key

To answer a call or make a call, the ANSWER key is pressed. Calls can also be answered or made by pressing a DN key in the Lines or Combo trays.

Keypad Dialing Keys

The numeric keypad mimics a regular phone’s dialpad. It appears in the Number Pad Tray and Combo Tray displays.

Release Key

To terminate an active call, press the RELEASE key. Use the RELEASE key for disconnecting the headset calls. The RELEASE key is only applicable to active calls.

Hold Key

The user can put an active call on hold by pressing the HOLD key. The feature key label for the held line displays a flashing icon to indicate the call hold status. The user can return to the call by pressing the DN key that corresponds to the feature key for the line on hold.

Mute Key and Indicator

During a call, the user can press the MUTE key to mute the headset's microphone (transmit path). When the transmit audio is muted, the mute indicator flashes. To turn off muting, the user must press the MUTE key a second time.

Network Directory Key

The DIRECTORY key is a fixed feature key that provides access to the directory options.

Message or Inbox

The MESSAGE key is a fixed feature key that is pressed to access the user's voice messages.

Shift Key

The SHIFT key is used to shift between two feature key pages.

Services Key

The SERVICES key is used to connect to applications (services) located on a server. In this release, the SERVICES key is used to gain access to the set option menu items, such as language selection or date format.

Expand Key

No operation is associated with this key in this release.

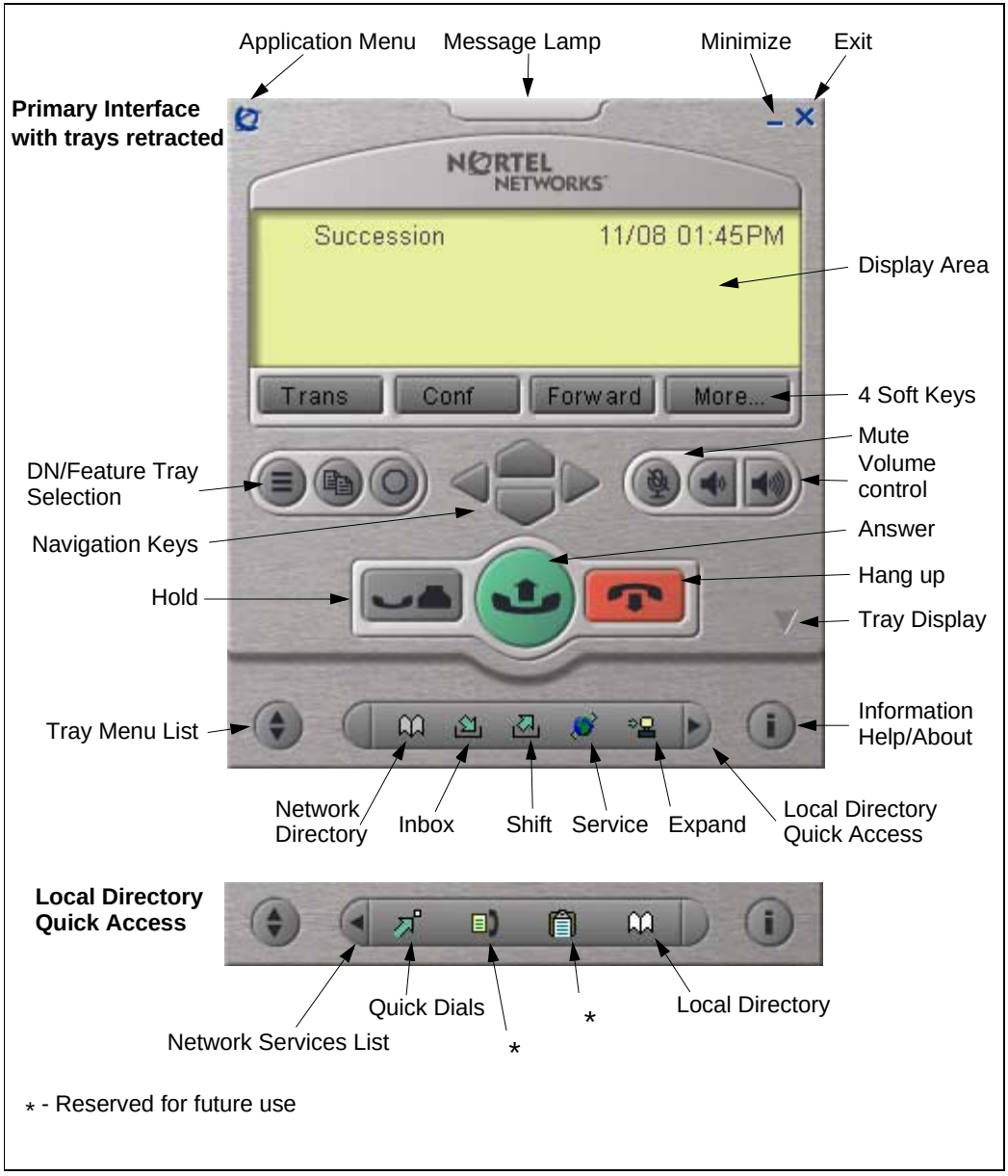
Quit

This key is only used to quit from the option menu.

Copy

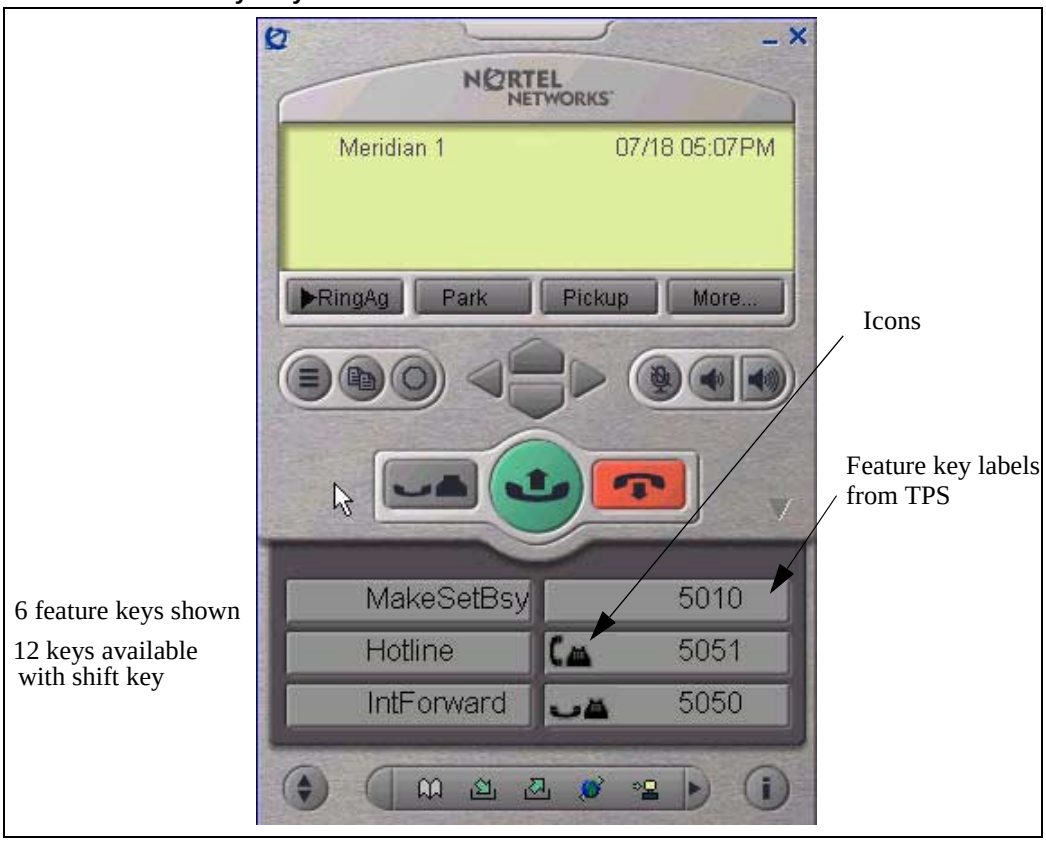
This key is defined for applications and features and not used in this release.

Figure 2
i2050 Primary User Interface



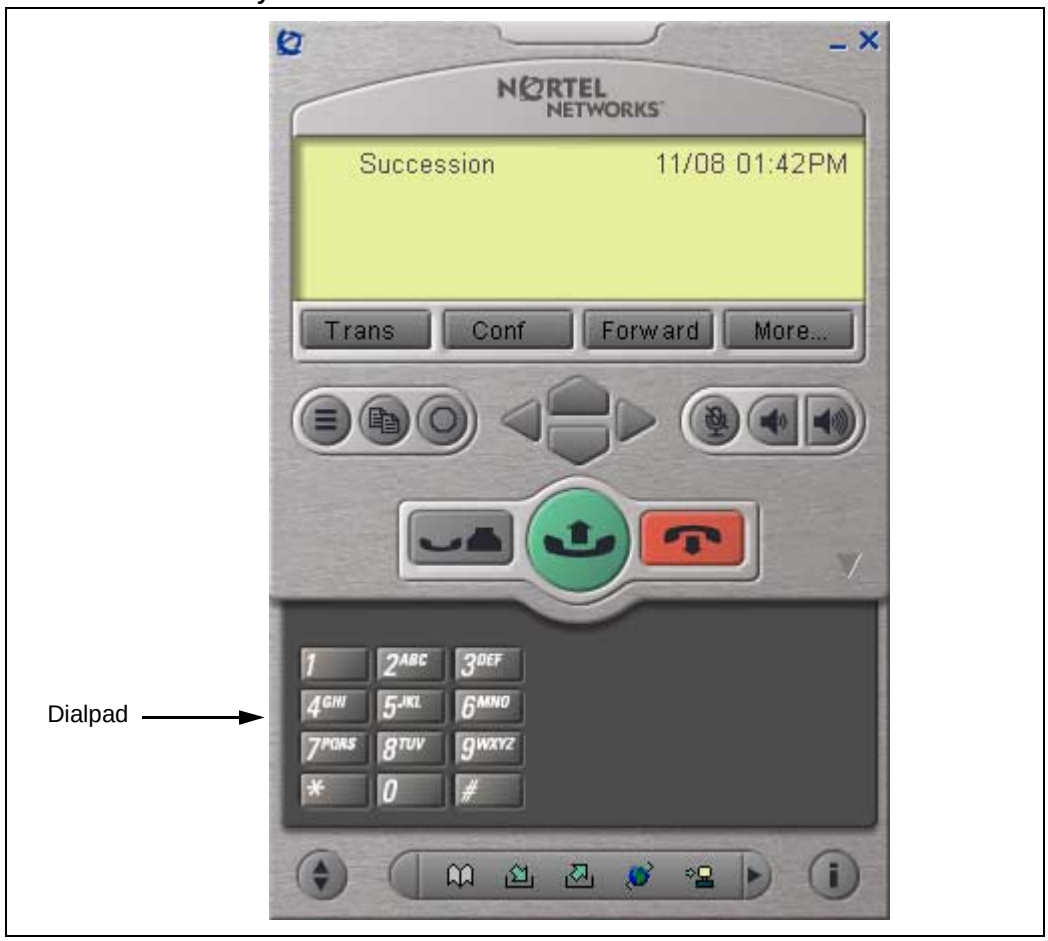
- The DN/Feature Key Tray shown in Figure 3 on page 36 displays up to six DN or feature keys provisioned for the set by the call server. The status of each key is illustrated by text or a graphic icon, such as idle, ringing, or connected. The keys are labeled by the Terminal Proxy Server (TPS).

Figure 3
i2050 DN/Feature Key Tray



- The Number Pad Tray shown in Figure 4 on page 37 provides a graphic keypad to use with a mouse for dialing numbers. In all tray selections numbers can also be dialed by using the computer keyboard.

Figure 4
i2050 Number Pad Tray



- The Combo Tray shown in Figure 5 on page 38 combines the DN/Feature Key Tray and the Number Pad tray. The feature keys will indicate the following states:

— Idle: as shown in Figure 5 on page 38

— Ringing: long flashing red bar on the upper left corner of the key, as shown in Figure 6 on page 39

— Hold: medium winking yellow bar as shown in Figure 7 on page 40

— Off-hook (Dialing/Answer): short solid green bar as shown in Figure 8 on page 41

Figure 5
i2050 Combo Tray

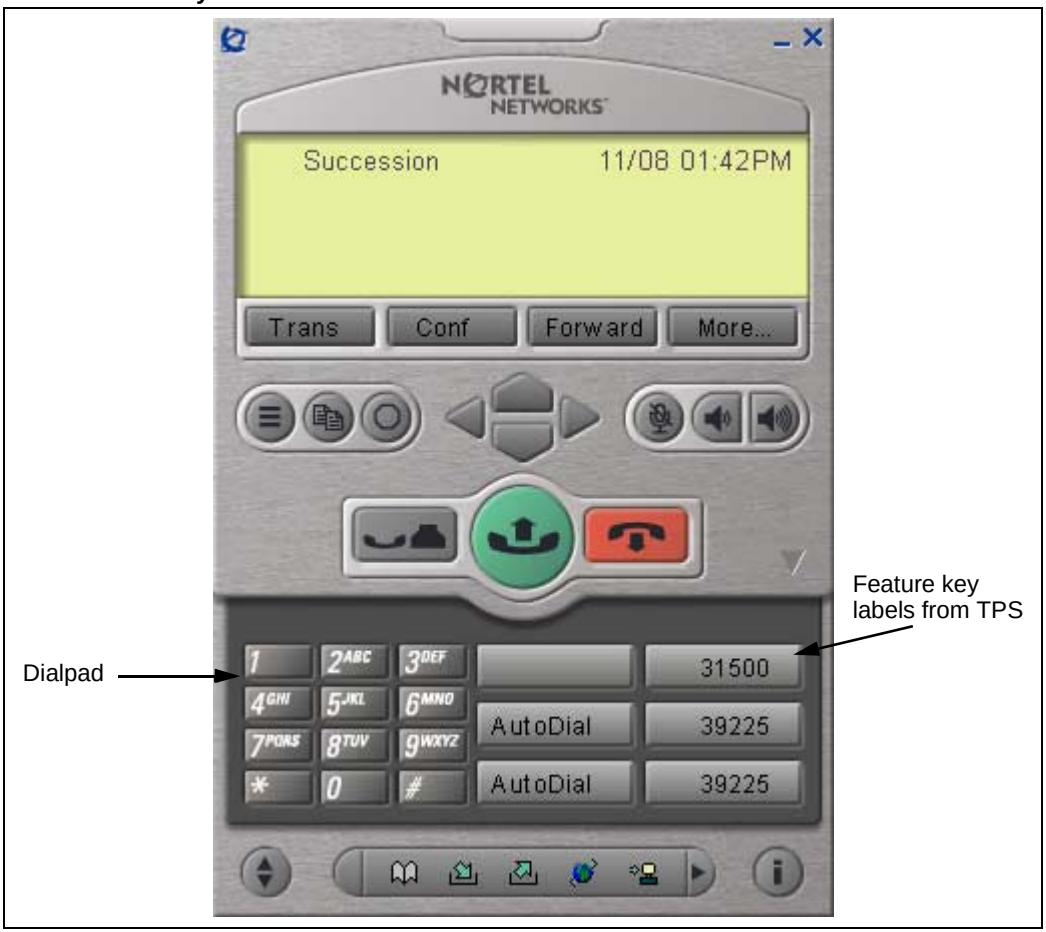


Figure 6
Feature Key indicating ringing with flashing red bar

Figure 7
Feature Key indicating hold with flashing yellow bar

Figure 8
Feature Key indicating Off-hook (Dialing/Answer) with solid green bar

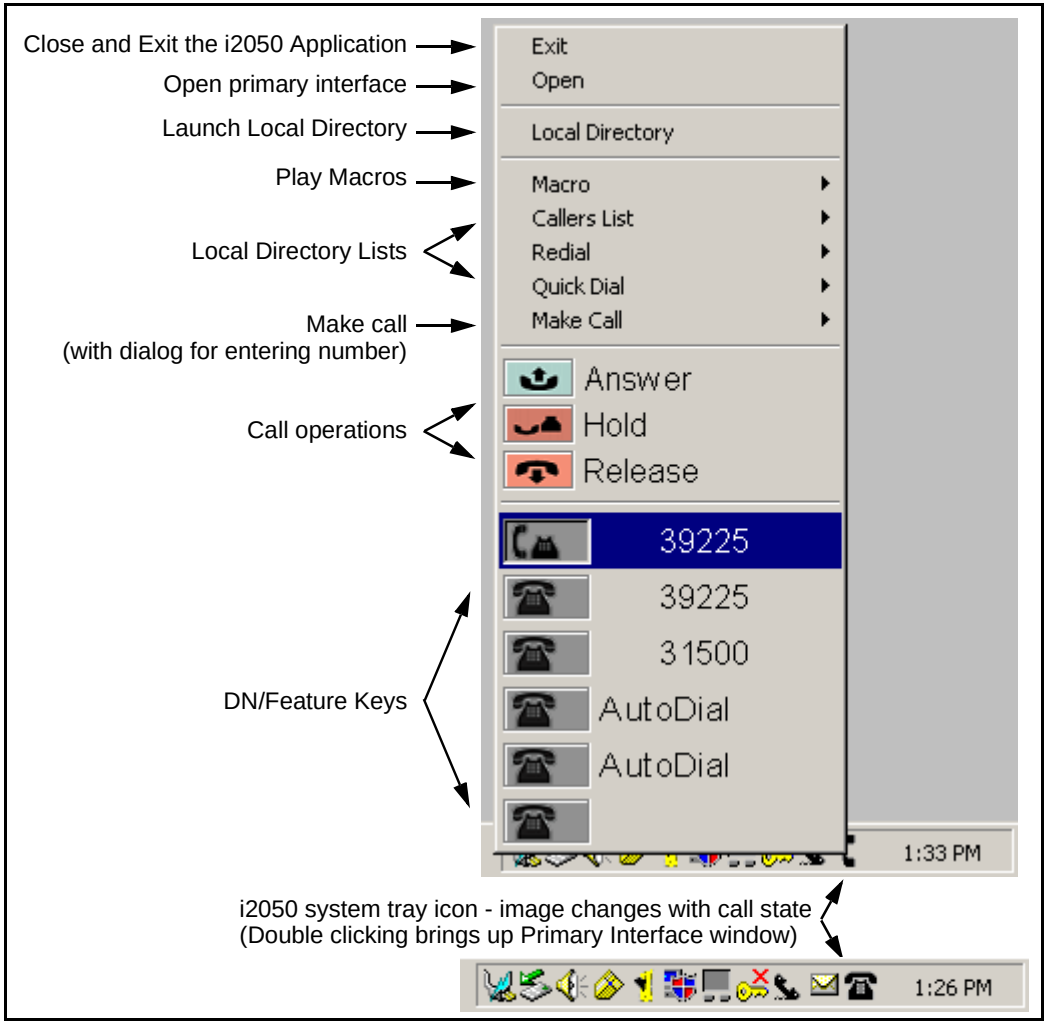
- The Local Directory Quick Access Trays shown in Figure 9 on page 42 maintains lists of quick dials, redials and callers. Ten items in the lists can be viewed and dialed directly from the Primary User Interface using Quick Access Trays.

Figure 9
i2050 Local Directory Quick Access Tray

* - Reserved for future use

There is also a System Tray Interface shown in Figure 10 on page 43 which provides fast access to most of the application's functionality. The user can answer a call from the system tray without launching the Primary User Interface.

Figure 10
System Tray Interface



The System Tray Interface displays the current six DN/Feature keys. These keys are visible on the application's DN/Feature key tray or Combo tray if the application is on the desktop. The Make Call menu item also displays the current six DN/Feature keys.

i2050 Software Phone dedicated keys

Table 6 on page 44 describes the specific telephone assignment functions you can program for Keys 16-26 on the i2050 Software Phones using Overlay 11.

Note: If you attempt to configure anything other than the permitted response, the system generates an error code.

Table 6
i2050 Software Phone dedicated keys (Part 1 of 2)

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	3-party conference key
	A06	6-party conference key
	NUL	Removes function or feature from key
Key 19	CFW	Call Forward key
	NUL	Removes function or feature from key
Key 20	RGA	Ring Again key
	NUL	Removes function or feature from key
Key 21	PRK	Call Park key
	NUL	Removes function or feature from key
Key 22	RNP	Ringing Number pickup key
	NUL	Removes function or feature from key

Table 6
i2050 Software Phone dedicated keys (Part 2 of 2)

Prompt	Response	Description
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

Key number assignments

The i2050 Software Phone has 6 keys which are used to present 12 feature keys, with 6 on each feature key page. The keys are numbered 0 - 11. The Shift key is used to toggle between two feature pages, 0 - 5 and 6 - 11.

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 14 supported features are: A03, A06, CFW, CHG, CPN, PRK, PRS, RGA, RPN, SCU, SCC, SSU, SSC, and TRN.

Language support

The i2050 Software Phone is affected by the following three language controls:

- Operating system language

- i2050 Software Phone language selection - sets language displayed in the help screens and in the menus. The language selection of the i2050 Software Phone is done from the Application menu or during installation.
- TPS language selection - sets the language in the display area. The language in the display areas is selected from the Services > Options menu. In normal operation, the language chosen from the i2050 Software Phone's language setup matches the language chosen from the Services > Options menu. Otherwise the softkey labels and feature prompts will appear in a different language than the help text and menu items on the i2050 Software Phone application. The user must ensure that the appropriate language is chosen. The languages supported are summarized in Table 7 on page 46.

Table 7
Language support

TPS Supports (display)	i2050 Software Phone Supports
English	English - US
French	French - Euro
Spanish	Spanish - Euro
Portuguese	Portuguese
Danish	Danish
Dutch	Dutch
German	German
Italian	Italian
Norwegian	Norwegian
Swedish	Swedish
Finish	English - UK
Polish	French - Canadian
Czech	Spanish - Latin American
Hungarian	
Japanese	

Operating parameters

- A Universal Serial Bus (USB) port is required on the PC.

- The minimum recommended system hardware for the i2050 Software Phone application is a Pentium Pro 200 MHz with 64 Mbytes RAM (Windows 98, Windows 98 SE) or 128 Mbytes RAM (Windows 2000 Professional).
- For i2050 Software Phones, the software version upgrade must be done manually by the technician at the PC. The ITG Line card does not download any software to the i2050 Software Phone. The isetShow command on the ITG Line card displays the current version of any registered i2050 Software Phones.
- The i2050 Software Phone can have a maximum of 22 features plus DNs configured. These are the 10 predefined soft keys, the predefined Message key, and the 12 programmable feature / DN keys. If the soft keys and Message keys are not used for those features they cannot be used for any other features.
- The i2050 Software Phone does not have an ACD Supervisor headset jack. Agent walkaway is not supported.
- An i2050 Software Phone does not register against a TN configured for any other type of Internet telephone.
- Soundcard audio is only supported for incoming call notification. Nortel Networks only supports the USB Headset Kit for the speechpath.
- The i2050 Software Phone application does not currently support Japanese, Latin American Portuguese, or PRC (simplified Chinese) languages for the help screens and skin text. See “Language support” on page 45 for an explanation of which parts of the displayed text this affects.
- The i2050 Software Phone is only supported by Nortel Networks when used on a PC running Windows 98, Windows 98SE, and Windows 2000 Professional. The minimum recommended system hardware is:
  - Pentium Pro 200 MHz with 64 Mbytes RAM (Windows 98 and Windows 98 SE)
  - Pentium Pro 200 MHz with 128 Mbytes RAM (Windows 2000 Professional)

- Five menu options available on the i2004 Internet telephone are not required on the i2050 Software Phone. The options are not required on the i2050 due to the lack of an LED and availability of existing PC control options. The five options excluded from the i2050 are:
  - volume adjustment
  - contrast adjustment
  - display diagnostics
  - key click
  - On-hook default path
- The i2050 Software Phone does not support user control over the key click.

Feature implementation

Note: An Internet Telephony Gateway (ITG) Line card must be installed in the system in order to configure the i2050.

The following steps are necessary for installing an i2050 Software Phone:

1 Install the ITG cards. ITG Line 2.2 or later must be running on the ITG card.

2 Configure a Virtual loop on the call server, using Overlay 97

3 Configure the i2050 in OVL 11 with TYPE I2050

4 Install the USB Headset Kit

5 Install the i2050 Software Phone

6 Run the i2050 Configuration Utility

LD 11 – Configure the i2050 Software Phone.

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	i2050	Type of data block
TN:	c u	Terminal number
DES:	x...x	ODAS telephone designator
CUST:	xx	Customer number
...		
ZONE:	0-255	Zone number
FDN:	x...x	Flexible CFNA DN
...		
CLS:	aaa	Class of service HFA - Digital Telephone Handsfree Allowed is default for i2050 to enable the USB interface

Feature operation

i2050 Software Phone options menu

The Options functions are used to control user-specific operating parameters of the i2050 Software Phone. The i2050 Software Phone's Services Options main menu consists of the following persistent items:

- Language
- Ring Type
- Time and Date Format

- Call Timer
- Set Information

Note: These items remain the same through installs and uninstalls.

To change any of the options the user must:

- Click the Services key. The Telephone Options menu appears in the information area. The four soft keys are labeled with Select … … Cancel
- Use the Up/Down navigation keys to scroll up or down the menu. When the required option is highlighted, use the Select softkey to select it.
- When an option is selected, the user can change its setting by pressing the instructed Software Phone key. To exit from the selected option and go back to the Options main menu, the user presses the Cancel softkey.
- If a call is presented while the user is manipulating an option, the set rings and the DN key flashes. However the screen display is not updated with Caller ID. The programming text is not disturbed.
- The user can originate a call using Autodial or Last Number Redial while manipulating the options, however the display is not updated with dialed digits or the Caller ID and the dialpad is intercepted by the Options function.
- While active in the Options function, the user can press the Quit key at any time to exit the application. Any settings that are not saved at that time are lost.

Language

To select the display language of the i2050 Software Phone, the user highlights the Language option from the Telephone Options menu and presses the Select softkey. The user is then presented with a sub-list of supported languages. The user can select the language desired and press the Select softkey to change the language. When finished, the user can press the Exit softkey to return to the Telephone Options main menu. See “Language support” on page 45 for more information.

Time and date format

To change the time and date display format of the i2050 Software Phone, the user highlights the Time and Date Format option from the Options main menu and presses the Select softkey. A list of different format types is displayed. The user can highlight the format and press the Select softkey to change the format. When finished, the user can press the Exit softkey to return to the Options main menu and the changed format is saved. The displayed time and date is sent from the TPS to the i2050 Software Phone, and therefore can vary from the time set on the PC.

Time of Day

Because of the geographic independence that an IP connection provides, it is possible that an i2050 is not in the same time zone as its host call server. The current time and date mechanism within the call server assumes that all of its peripheral devices are in the same time zone. The time displayed on the i2050 is always the time known by the internal clock of the system.

Call timer enable

The Call Timer option allows the user to control the automatic timing of an established call locally at the i2050 Software Phone. The call timer can be toggled between Enable and Disable mode. To enable or disable the call timer, the user highlights the Call Timer option from the Option main menu and presses the Select softkey. The current setting of the Call Timer is displayed and the user can press the Change softkey to toggle the mode. When finished, the user can press the Cancel softkey to return to the Options List menu and the selected mode is saved.

Ring type

To change the ringer tone of a set, the user highlights the Ring Type option from the Options main menu and presses the Select softkey. The user is presented with a sub-list of various ring types. In this sub-list, the user can highlight the ring type desired and press the Select softkey to change it, or press the Play softkey to test the ring type. When finished, the user can press the Cancel softkey to return to the main menu and the changed ring type is saved.

Set information

This option item is used to display set-specific information, including: set IP address, hardware ID of i2050, current firmware version, TN, Node ID, Node IP address and the specific ITG Line card the i2050 is registered on.

Mute Key Operation

Press the Mute key to toggle between muted and unmuted. When in the muted state the Mute key flashes. When in the muted state, all audio input from the headset is muted. Pressing the Mute key turns off the audio path for the transmit direction, so the far end will not receive audio packets from a muted i2050 Software Phone.

Open an audio stream to change the status od the LED. If a muted call is hung up, or if the conference or transfer button is pushed, the mute feature and LED automatically turns off. When in the muted state, the muted key flashes.

Answer Button Operation

Pressing the Answer button causes the i2050 Software Phone to go off hook so that a call can be initiated or answered. Pressing this button connects the audio path to the USB headset. The headset can only be controlled by the Answer button or Feature keys and the local volume control. The headset cannot be controlled by any Call Server software features.

Volume Controls – Headset, Ringer

The volume can be controlled independently for the ringer and headset and the setting stored locally on the PC. When the application is on hook and is idle or ringing, operating the volume Up/Down buttons causes the volume of the ringer to be modified. Operating the volume Up/Down buttons when the set is in the headset mode causes the volume levels to change respectively. When the volume level is changed a small bar graph with a label displayed indicates the volume level change.

Call Features

This section describes the call features that are available on the IP phones and how they are activated. The i2050 Software Phone supports any combination of features and DN types up to a maximum of 12 assigned to the programmable keys plus the 10 predefined features assigned to the soft keys. See “i2050 Default Softkey Features” on page 53.

The key labels are downloaded from the Call Server; therefore, changes made in the call server configuration are reflected immediately in the labelling of the key. DN keys are labeled with the DN number (without the ESN location code).

The message waiting lamp indicates a message. The lamp also indicates alerting. The Message Waiting Key (MWK) is configured on the Message application key and cannot be configured on any other key.

Soft label key features

The four soft-labeled programmable feature keys which appear physically on the i2050 Software Phone can be used to provide up to ten features. Table 8 on page 53 shows the default softkey features layout.

Table 8
i2050 Default Softkey Features

Key Number	Default Feature	Comments
Key 17	TRN (transfer)	
Key 18	AO6 (6-party conference)	alternate: AO3 (3-party conference)
Key 19	CFW (call forward)	
Key 20	RGA (ring again)	
Key 21	PRK (call park)	
Key 22	RNP (ringing number pickup)	
Key 23	(reserved for speed dial)	configure speed call: SCU/SCC/SSU/SSC
Key 24	PRS (privacy release)	
Key 25	CHG (charge account)	
Key 26	CPN (calling party number)	
Key 27 -31	reserved	

If a feature requires a feature package which is not present for the Call Server installation, that feature does not appear within the default configuration for the i2050 Software Phone. Also, if one of the key 17-26 features depends on a Class of Service that is not present for the particular set, the feature does not appear in the configuration of the i2050 Software Phone.

Feature AO6 is the default feature for key number 18. The technician can manually re-configure key number 18 as AO3 instead of AO6 through Overlay 11.

Key 23 has no default feature configuration. The speed dial features require custom data which is not available during the default configuration process. Key 23 can be manually configured as SCU, SCC, SSU or SSC (all speed dial features).

The technician can remove any of the features provided on keys 17-26 by manually reconfiguring the key number as NUL. This is done using Overlay 11.

Appearance of ten soft label keys

Under feature-rich conditions, when all required packages and Class of Service are present, all ten features on keys 17-26 are provided on the i2050 Software Phone. Table 9 on page 54 shows how the maximum configuration appears on the set as four layers. Layer 1 is visible when the set is idle. The user navigates through the circular stack by using the More... key.

Table 9
Soft label keys layout

Layer 1:	**Trans**	**Conf**	**Forward**	**More...**
Layer 2:	**Ring Again**	**Park**	**Pickup**	**More...**
Layer 3:	**SCU**	**PrivRls**	**Charge**	**More...**
Layer 4:	**CParty**			**More...**

Appearance of fewer than ten soft label keys.

The typical Internet Telephone can have less than ten soft label feature keys due to restrictions such as, feature restriction or the removal of a feature key. Here is one example:

Table 10
Typical soft label keys configuration

Layer 1:	**Trans**	**Conf**	**Forward**	**More...**
Layer 2:	**SCU**	**PrivRls**		**More...**

When less than four soft label feature keys are configured, they can appear as a single layer, with no More... key.

Table 11
Four or less soft label key features

Layer 1:	**Trans**	**Conf**	**Forward**	**SCU**

Unused keys

Some keys are not used in the implementation of the i2050 Software Phone. Activating an unused key does not cause any response on the telephone, nor are there any messages sent to the Call Server.

Soft labeling

When a DN key or Autodial is configured on an i2050 Software Phone, the default label shown on the set for that line appearance is the DN number or Autodial number.

When a call processing feature is configured on an i2050 Software Phone, the default label shown on the set is a predetermined string. Soft labels for programmable feature keys are shown at the bottom of the display and have a maximum length of seven characters. Soft labels for programmable DN or feature keys at the top of the set have a maximum length of 10 characters.

In this release, the i2050 Software Phone does not provide user-specified labeling of the soft keys since the text is sent from the TPS.

Registration

When you add an i2050 Software Phone to the network, the i2050 can, depending on the Configuration Toll settings, connect to a pre-defined IP address or can request an IP address from a DHCP server. The i2050 Software Phone then contacts the Connect Server which instructs the i2050 Software Phone to display a message on its display screen requesting the customer's node number and TN.

After the customer enters this information, the i2050 Software Phone contacts the Node Master which selects a TPS with sufficient capacity to register the i2050 Software Phone. The i2050 Software Phone contacts the chosen TPS, and if the i2050 Software Phone is valid, registers it with the Meridian 1 or Succession CSE 1000 system. The registration information is then saved to the i2050 Software Phone.

Loss Plan

The USB Headset Kit provides the i2050 Software Phone with a fixed loss plan compliant with the TIA-810 specification. If other headsets or audio devices are used, the loss plan is unknown and undefined. Nortel Networks only supports the resolution of audio problems for the USB Headset Kit.

Echo Cancellation

Echo can be generated electrically wherever there is an impedance mismatch, or generated acoustically by feedback from a speaker or ear piece to a microphone. Any echo that is ultimately returned to the IP phone is more noticeable to the listener because of the additional delay introduced by the IP connection.

The ITG Line card has echo cancellers included as part of its function that cancel echo generated on the TDM side of the gateway. Whenever there is audio going through the ITG Line card the echo cancellers are enabled.

The i2050 Software Phone has no echo canceller, so a slight echo from acoustic coupling on the headset could occur in some call situations.

Set Concentration

The ITG Line card supports the same concentration of i2050 Software Phones as i2004 Internet telephones; a mixture of these can exist on an ITG Line card up to the current maximum of a total of 96 devices registered. The i2050 Software Phone uses the same UNIStim messaging for registration, call setup and teardown, and therefore imposes the same real-time impact on the ITG Line card.

Clock Synchronization

Buffer underruns and overruns can occur since there is no sample clock 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 ITG Line card.

Jitter Buffer

The jitter buffer of the i2050 Software Phone is configurable. It can either be set by using the default value sent from the TPS (that is, the value configured in OTM) or it can be set directly in the Configuration Utility. It is recommended that the default value be used.

The jitter buffer has a desired size and a maximum allowable size. If the jitter 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 under run and over run result in a discontinuity in the audio.

For codecs which 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 network's DiffServ code point all contribute to the end-to-end QoS.

However, the i2050 Software Phone is an application within the context of the PC's OS, such that the OS has an effect on how flexible is the support of the i2050 of these items. The DSP functionality (such as codec packetization) implemented in DSP hardware on the i2050 Software Phone and ITG Line card runs as part of the application code on the PC's 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 Configuration Utility. The fewer buffers used reduces the audio path delay but increases the chances of dropouts and choppy speech depending on the speed and utilization of the PC's CPU.

DiffSERV (DSCP)

The i2050 Software Phone uses DSCP settings assigned by the TPS. The i2050 Software Phone supports DSCP on Window 98, Windows 98 SE, and Windows 2000 Professional.

802.1Q

The i2050 Software Phone uses 802.1Q settings assigned by the TPS. The i2050 supports 802.1Q on Windows 2000 Professional. This requires the installation of Nortel Networks i2050 QoS Service. Administrators can install this service from the CD-ROM. The DSCP values assigned from TPS 802.1Q operation can be enabled or disabled from the QoS tab in the Configuration Utility.

Codec

The i2050 Software Phone provides the following codecs:

- G.711 provides the highest quality (if the network facilities can handle the packet flow) since there is no compression
- G.729A is ranked best; it has 8:1 compression but no voice activity detection
- G.729AB is the same as G.729A but with voice activity detection enabled; while this provides the lowest average network bandwidth utilization, in some call environments the speech quality will suffer due to clipping of the beginning of words.

Frame size

The i2050 Software Phone supports the range of frame sizes shown below.

- G.711-64 A-law and µlaw: 10-960 – 10 ms increments
- G.729A: 10-960 – 10 ms frames
- G.729AB: 10-960 – 10 ms frames

Installation

The call server side of the configuration process is identical to the steps performed for the i2004 Internet telephone:

- Install the ITG Line cards. The ITG Line 2.2 application must be running on the ITG Line card.
- Configure a Virtual loop on the call server, using Overlay 97.
- Configure the i2050 Software Phone in OVL 11 with TYPE I2050.

The remainder of this section explains the installation and configuration processes performed at the PC.

Install the USB Headset Kit

Installing the USB Headset Kit first allows the i2050 Software Phone application to show it as an audio device option during the installation of the application. If the USB Headset Kit is installed after the i2050 software application, you can still choose it as the audio device from the Configuration Utility.

Procedure 7
Install the USB Headset Kit

1 Connect the coiled lower cord to the headset cord with the Quick Disconnect connector. Ensure the Quick Disconnect is securely fastened.

2 Connect the headset cord to the RJ9 jack on the adaptor.

3 Connect the USB cable to the headset adaptor and to one of the USB jacks on the back of your PC or USB hub.

———————— ***End of Procedure*** ————————

The first time the headset adapter is plugged in, there will be a delay while Windows configures the device and locates appropriate driver software. During the installation you may be prompted to supply the original Windows CD-ROM so that Windows can locate the required drivers.

Install the i2050 Software Phone

Running Installer

Procedure 8
Install the i2050 Software Phone on your PC:

1 Insert the CD-ROM disk into the CD-ROM drive of your PC.

Note: Installation should proceed automatically. If it does not, then continue with step 2. Otherwise go directly to Step 5.

2 Double-click the My Computer icon.

3 Double-click the CD icon.

4 Double-click the Setup icon.

5 Follow the prompts that appear on the screen.

6 Run the i2050 Configuration Utility to assign a server address, select sound devices, and select a server type.

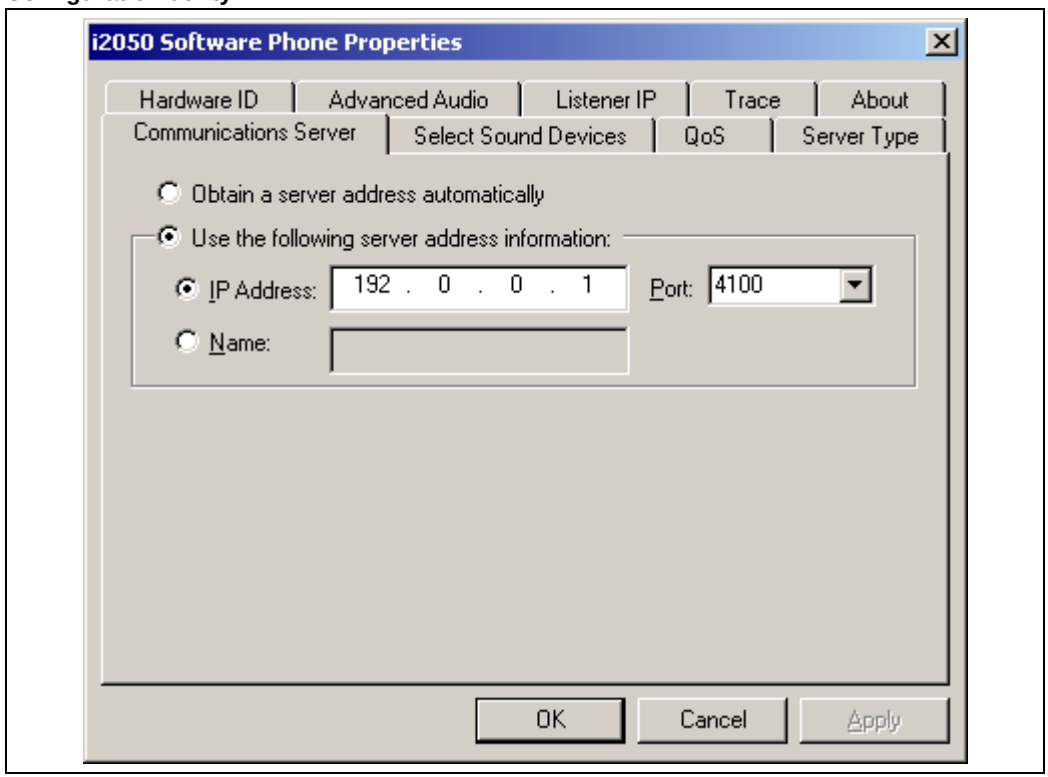
End of Procedure

Installation will place the i2050 Software Phone in the Windows Start menu at *Start>Programs>Nortel Networks>i2050 Software Phone.* The Configuration Utility will be placed in the Windows Control Panel.

Running the Configuration Utility

Figure 11 on page 61 shows the opening screen of the Configuration Utility. The utility has a series of tabs across the top which give access to various configuration parameters. The following sections cover each tab and any necessary settings.

Figure 11
Configuration utility



Standard Configuration Items

Communications Server

A summary of all of the required parameters and the method of acquisition is given in Table 12 on page 61. Information on how to set each of the parameters follows.

Table 12
IP telephone IP parameters (Part 1 of 2)

Parameter	Method of Acquisition
IP Address	Configured for the PC either manually or retrieved using DHCP.

Table 12
IP telephone IP parameters (Part 2 of 2)

Parameter	Method of Acquisition
Net Mask	Configured for the PC either manually or retrieved using DHCP.
Router Address	Configured for the PC either manually or retrieved using DHCP.
Initial Server Address (Primary and Secondary)	Configured in the Communication Server tab of the Configuration Utility.
UserID (Node ID, Node Password and TN)	Manually entered for the first time configuration. Retrieved from storage for subsequent registrations.

The i2050 Software Phone uses the PC's IP address, net mask, and router address. When the i2050 Software Phone is launched and DHCP use is configured, it does a DHCP request on its own. It only looks for custom values like the Server 1 address. The Nortel application-specific strings are entered into the DHCP tables as per the i2050 Software Phone values in the format defined for the specific DHCP server.

If the DHCP server itself is changed or rebooted, the general values (like the PC's IP address) are only refreshed when the PC is rebooted - the DHCP server is responsible for tracking/learning what's happening to IP address leases. If the DHCP extended parameters (for example, Server 1 address) are modified, the i2050 Software Phone application must be restarted.

The Node ID and TN must always be manually entered at the i2050's screen during the first-time registration process. If a non-null password was configured for the node, the user must enter the password correctly before going to the TN-entering screen.

Refer to Figure 11 on page 61. If your site uses DHCP to configure Internet Telephones, select "Obtain a server address automatically". This is the default method of locating the Communications Server. If DHCP is used, no further configuration is required. The application does its own DHCP request to retrieve the ITG Line Node's IP address information.

If you choose to manually configure the Communications Server address, select “Use the following server address information” and enter the ITG Line Node’s IP address. In the Port box select Meridian 1 or CSE1000 depending on your system type. This sets the Port to 4100. Obtain the IP address from the IP network administrator.

Select Sound Devices

This tab selects the PC’s audio device for the microphone, speaker and alerting tones. See Figure 12 on page 64.

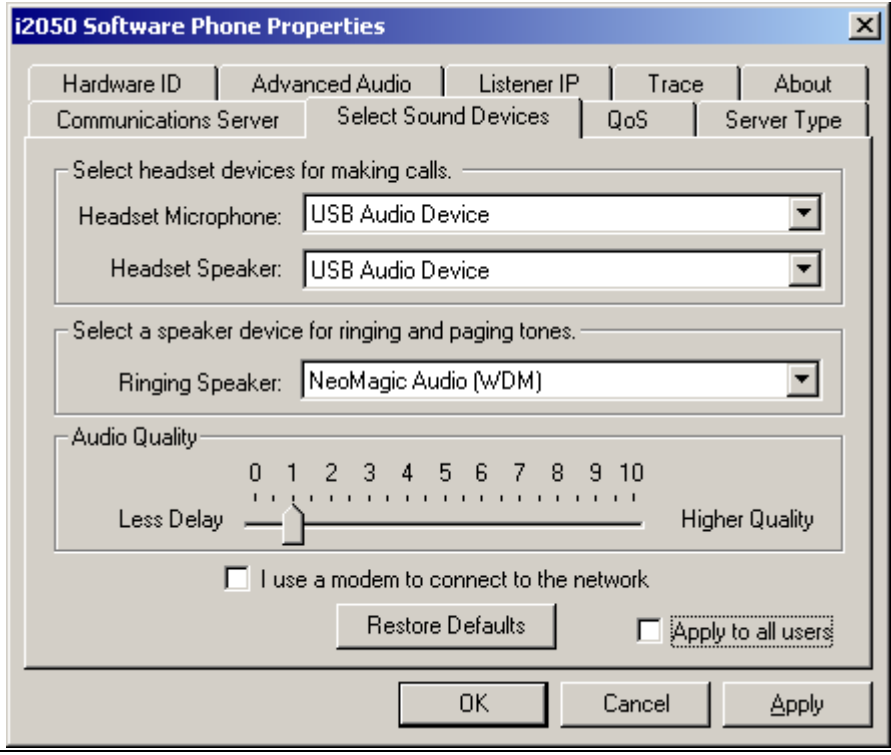
Select headset device for making calls

The drop-down menus list recognized audio devices for the headset’s microphone and speaker. Select the USB Audio Device to choose the Nortel Networks USB Headset Kit headset.

Select a speaker device for ringing and paging tones

You can select a different speaker as a ringing device. This allows call-alerting tones to be played over the PC speaker rather than on the headset, so that you can hear the ringing phone when you have taken the headset off.

Figure 12
Select Sound Devices tab



Audio Quality

This slider allows the user to choose the balance between low delay or higher quality audio. The slider adjusts the number of buffers between the PC's audio device and the i2050 application. Less delay is achieved by reducing the number of buffers; however, this increases chances the buffers can run out, resulting in poorer audio quality. The Less Delay setting requires the PC's CPU to give attention to the application more frequently and should only be chosen on newer PCs with fast CPUs. Choosing Higher Quality increases the number of buffers, making buffer under-/overruns less likely, but increasing the end-to-end delay. If choppy or broken speech is heard, try moving the slider to Higher Quality to see if that eliminates the problem.

When a modem is used to connect to the network

This box has no effect because the core CPU controls the codec selection and notifies the i2050 Software Phone which one to use.

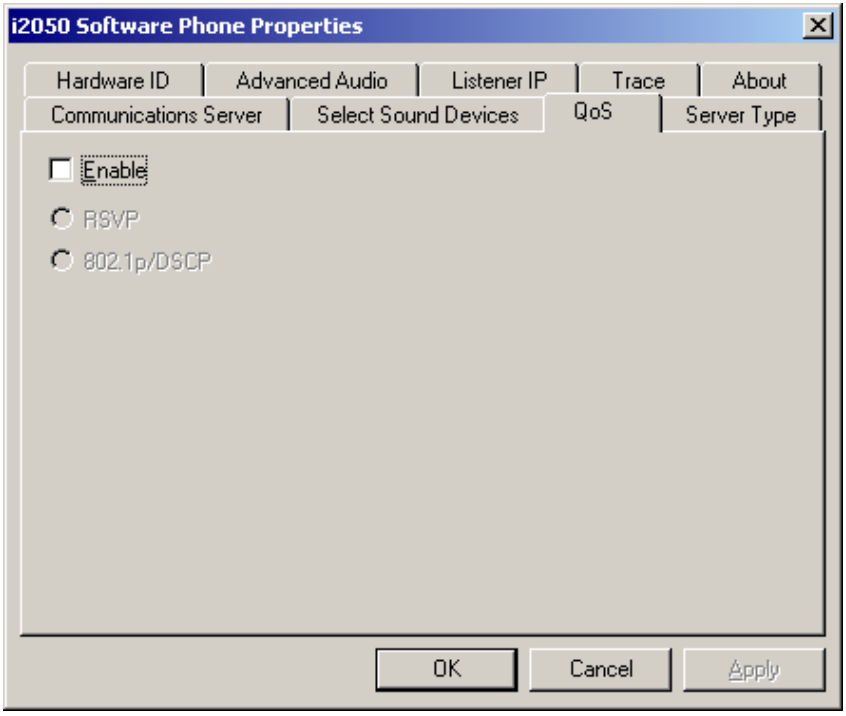
QoS

Refer to Table 13 on page 66. Check the Enable box if the i2050 Software Phone is in a QoS-enabled network. When checked, the i2050 uses the DSCP values configured at the operating system level. If left unchecked, 0 is put in the DSCP field in outgoing packets.

Not all operating systems permit assignment of all QoS settings. The Configuration Utility allows only settings applicable to specific operating systems to be assigned. The only possible assignments in Windows 2000 Professional are 802.1Q and DiffServ.

Note: Administrator privileges are required to set 802.1Q and DiffServ.

Figure 13
QoS tab



Prerequisites for Windows 2000 Professional 802.1Q/DiffServ:

To enable QoS on Windows 2000 Professional the administrator must install the QoS Packet Scheduler.

- Open the Windows Network Properties and click on "Install...".
- Next in the "Select Network Component Type" dialogue, highlight "Service" and click on "Add...".
- Then in "Select Network Service" dialogue, highlight "QoS Packet Scheduler" and click on "OK".

  Note: The Windows 2000 Professional CD-ROM may be required.

QoS registry settings assigned by the Configuration Utility

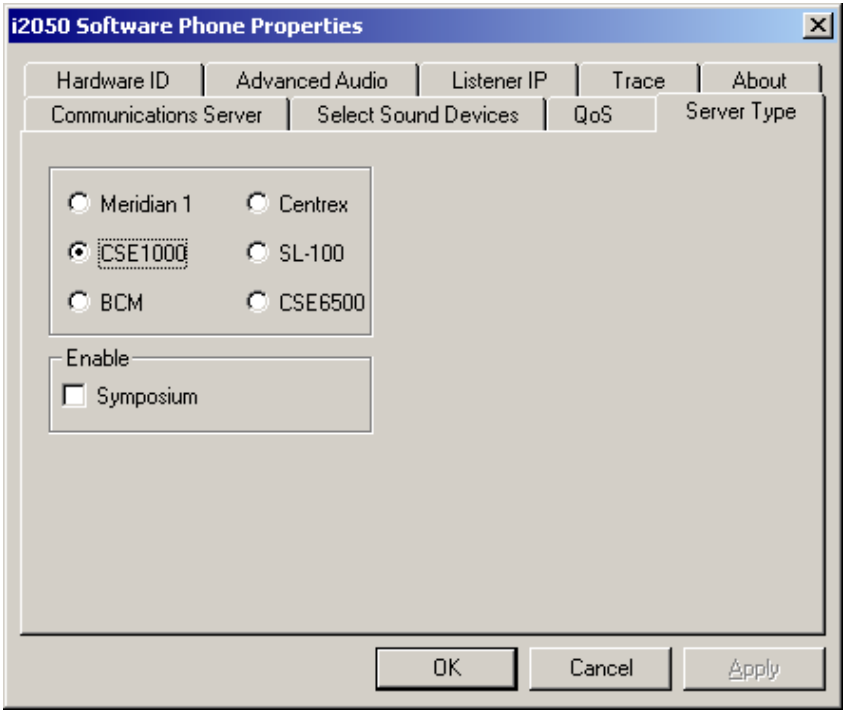
- 802.1Q and DiffServ on Windows 2000 Professional - Windows 2000 Professional requires a system-wide registry key setting to enable QoS capabilities. This value can only be created and modified with Administrator privileges. The key is:
  HKEY_LOCAL_MACHINE/SYSTEM/CurrentControlSet/Services/Qossp/EnablePriorityBoost
  The entry is a DWORD value and its values are:
  - value 0 - indicates do not enable QoS (default value which is equivalent to the absence of the key)
  - value 1 - indicates enable QoS

Qossp and Qossp/EnablePriorityBoost are not created by default at installation time. This is a system-wide registry setting that affects other applications and OS components. It is only in effect if the Windows packet scheduler is installed.

Server Type

Select CSE1000 for the Server Type (see Figure 14 on page 68). If the i2050 Software Phone is used in an ACD agent environment, check the Symposium box for ACD Hookswitch Enable.

Figure 14
Server Type tab



Advanced Options

The remaining tabs provide for more advanced settings. Changing the default selections in these tabs is usually not required.

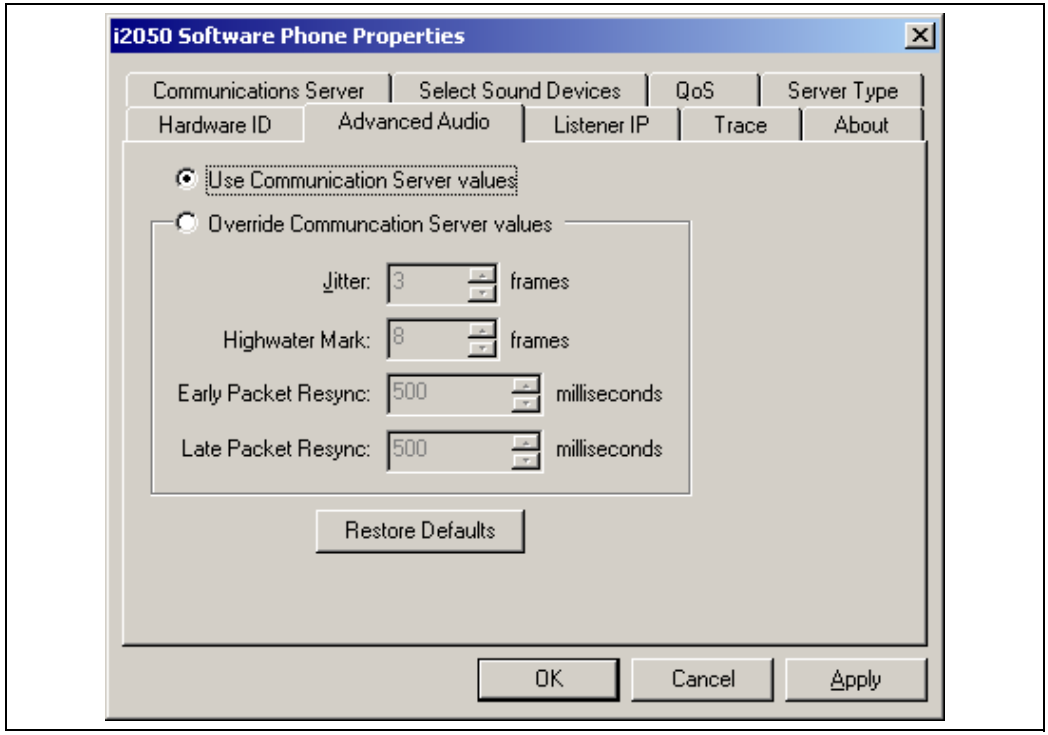
Hardware ID

The Hardware ID is sent to the TPS to uniquely identify this i2050 Software Phone, a large portion of which is the PC NIC card's MAC address, which must not be changed.

Advanced Audio

Under normal circumstances, the radio button for “Use Communication Server values” should be selected (refer to Figure 15 on page 69). This uses the jitter buffer parameters sent from the TPS. This can be overridden by selecting “Override Communication Server values” and setting the jitter buffer as desired. This is not recommended.

Figure 15
Advanced Audio Tab



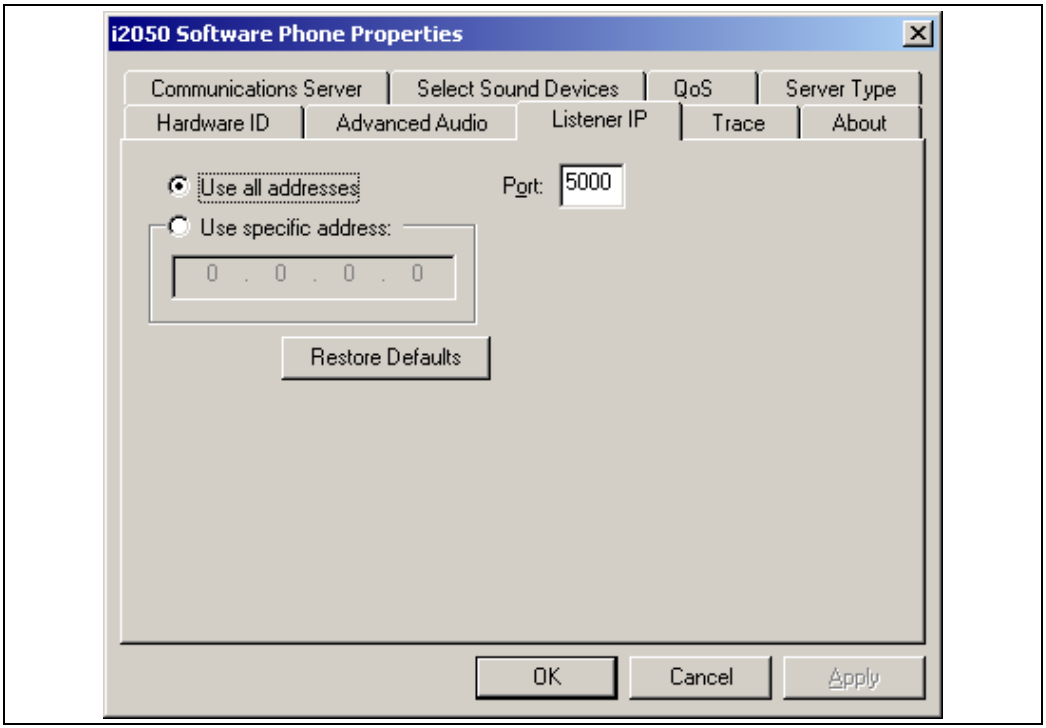
Listener IP

The Listener IP screen (shown in Figure 16 on page 70) is intended for expert users only. This screen identifies the IP addresses and ports where the i2050 Software Phone is listening for traffic from the Communications Server. You can use this screen to override the port assignments when there is a conflicting application on the computer.

The attributes on the screen that can be configured are:

- Use all addresses (default) - The i2050 Software Phone listens to the IP addresses on all of the network interface cards on the PC for traffic from the Communications Server. This is the normal mode of operation.
- Use specific address - Using a specific address is useful in cases where there is more than one Ethernet card and an application conflict exists.
- Port - This value can require adjustment if another application on the computer is using the same port. The two applications can co-exist by moving the port or IP address that the i2050 Software Phone is listening to. 4100 is the port address the i2050 Software Phone uses to communicate from the PC.

Figure 16
Listener IP tab



Trace

This option is for expert level debugging. The check box is disabled by default and must be left off.

Running the application for the first time

The i2050 application is started by:

- Select Start>Programs>Nortel Networks>i2050 Software Phone.
- Click on the desktop shortcut (if one was created during the installation).
- Automatic startup sequence.

  Note: If you want to have the i2050 Software Phone start automatically when the machine boots up, place a shortcut to the application in the Startup folder

When an i2050 Software Phone is started for the first time and connects to the network, it needs to execute a start-up sequence. The elements of the start-up sequence are:

- Get the IP parameters.
- Find a gateway server, and authenticate the user.

As the i2050 Software Phone registers with the ITG card,

- If a non-null node password is enabled, it prompts for a node number and password. Enter the node number and password using the keyboard or numeric keypad. After the password is verified, enter the TN of the i2050 Software Phone. See *Internet Telephony Gateway Line: Description, Installation, and Operation* (553-3001-204) for more on 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.

The i2050 is now configured and can be used.

Changing the TN of an Existing i2050 Software Phone

This step is required for a new user of this application.

Procedure 9
Changing the TN of an existing i2050

1 Exit the i2050 Software Phone application.

2 Restart the i2050 Software Phone application.

3 If the node password is not configured, or is configured but disabled, go to Step 4.

If the node password is configured and enabled for the node, go to Step 5.

4 During the application startup, the i2050 Software Phone registers again with the TPS and the i2050 displays the existing node number and TN for a period of approximately five seconds. Go to Step 6.

5 If the password is configured and enabled for the node, the node number and password prompt is displayed for a period of approximately five seconds; enter the correct password within this five-second period.

6 If the user activates the "Clear" softkey during the five-second period, the existing node and TN will be cleared and the user will be prompted for new parameters.

End of Procedure

Removing an i2050 Software Phone from service

Procedure 10
Remove an i2050 from service

1 Exit the i2050 Software Phone application.

2 Uninstall the i2050 Software Phone application from the PC by removing it through Windows Add/Remove Programs.

3 In Overlay 11, OUT the TN.

End of Procedure

Specifications

Contents

This section contains information on the following topics:

Reference list

The following are the references in this section:

- *Internet Telephony Gateway Line: Description, Installation, and Operation* (553-3001-204)

Power requirements

i2004 Internet telephone power requirements

The i2004 Internet telephone is powered by a 16 V ac, 500 mA from a local transformer. Line voltage is different for each country. The i2004 Internet telephone also accommodates a 48 V dc supply. Power is applied by a “barrel” connector.

The NTEX00BA ships with a 117/120 VAC transformer for North America. The NTEX00BB does not include a transformer. You must order a country-specific transformer.

Environmental specifications

Table 13 on page 74 shows the environmental specifications of the i2004 Internet telephone.

Table 13
i2004 Internet telephone—environmental specifications

Parameter	Specifications
Operating temperature	-20° to +50° C, ambient
Operating humidity	+30° / 95% RH (29 g/m3 mean absolute humidity)
Storage temperature	–40° to +70° C

Internet telephone IP address requirements

Each Internet Telephone requires an IP address, subnet masks, and default IP gateway (router) for the Internet Telephone LAN segment. See *Internet Telephony Gateway Line: Description, Installation, and Operation* (553-3001-204) for detailed information on Internet Telephone network address requirements and related network parameters.

Meridian 1 and Succession Communication Server for Enterprise 1000

Internet Terminals

Description

Information is subject to change without notice. Nortel Networks reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the limits of a Class A digital device pursuant to Part 15 of the FCC rules and the radio interference regulations of Industry Canada. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
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