555-8421-210

Reach Line Card

Installation and Administration Guide

Product release 1.3 Standard 2.1 October 2001

NORTEL NETWORKS

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Publication history

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This is the Standard 2.1 issue of the *Reach Line Card Installation and Administration Guide.* This issue adds support for Remote Office 911x series units and Meridian Digital Telephone IP Adapter (internal and external).

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Preface

About this document

In this preface

About this guide

The *Reach Line Card Installation and Administration Guide* (NTP 555-8421-210) is for telecom and data network managers and administrators who plan, install, and manage corporate telecommunications and data networks. This guide contains the following information:

- a detailed description of the Reach Line Card (RLC)
- procedures necessary to properly install, configure, and manage the RLC in a host PBX
- necessary configuration for the host PBX
- troubleshooting procedures for addressing possible problems

This guide assumes that you are familiar with the following:

- basic telecommunications terminology
- basic networking terminology
- PC terminology and operation (specifically, Windows 95, Windows 98, or Windows NT 4.0)
- Nortel Networks PBX terminology, functionality, and administration

How to use this guide

This guide provides step by step procedures for installing, configuring, and managing the RLC as a part of your Nortel Networks remote services network. Review this guide before beginning RLC installation and configuration.

When you are ready to begin, follow the steps for planning, installing, and configuring your hardware in the order that they are presented in this guide. This helps you to achieve a successful, trouble-free installation.

Product overview

Nortel Networks is pleased to announce the Reach Line Card (RLC). The *Reach Line Card Installation and Administration Guide* provides information on how to configure and maintain your RLC.

A standard RLC works with multiple remote service options to provide Meridian 1, MSL-100, or Succession Communication Server for Enterprise 1000 PBX functionality to telephones at one or more remote sites. These sites can be any distance from the host PBX. The RLC is compatible with Remote Office 911x series and 9150 units, and Meridian Digital Telephone Internal and External IP Adapter units.

Currently, only Meridian 1 and Succession Communication Server for Enterprise 1000 PBXs support Remote Office 911x series and Meridian Digital Telephone IP Adapters. MSL-100 PBXs do not support Remote Office 911x series or Meridian Digital Telephone IP Adapters at Remote Office Product release 1.3.

An RLC does not require external components at the host PBX location. Simply install the RLC in place of a standard Nortel Networks Extended Digital Line Card (XDLC) and configure it as if it served locally connected telephones. Channels that you do not need for remote service telephones can connect to local telephones. In this way, all channels of the RLC can provide service to your corporate telecommunications network.

To identify and locate documentation for the other elements of your Meridian network, refer to “Related information products” on page xxii.

Skills you need

Knowledge of, or experience with, the following PC concepts as appropriate to your network is helpful when administering the RLC:

- Microsoft Windows
- software installation
- network configuration

Nortel Networks product knowledge

Knowledge of, or experience with, the following Nortel Networks products and concepts:

- basic administration of a Meridian 1, MSL-100, or Succession Communication Server for Enterprise 1000 PBX (telephone set and XDLC configuration)
- characteristics and principles of XDLC operation
- PBX data calls

Telecommunications knowledge

Knowledge of, or experience with, the following aspects of telecommunications:

- digital telephone set configuration
- ISDN PRI configuration
- trunk configuration
- PBX configuration
- PBX maintenance (SDI operation)
- knowledge of RS-232 signaling

Data networking knowledge

Knowledge of, or experience with, the following aspects of data networking:

- data link (Layer 2 of the OSI model)
  — IP protocol
  — routing
- network (Layer 3 of the OSI model)
  — addressing
  — traffic analysis and provisioning
  — configuration
- Voice over IP concepts

Conventions used in this guide

This section describes the symbols and text conventions used in this guide.

Precautionary messages

Note: A “Note” describes the secondary results of procedures or commands, or special conditions where you must use a procedure or command.

ATTENTION!

Provides information essential to the completion of a task.

CAUTION

Risk of data loss or equipment damage

Cautions you against unsafe practices or potential hazards, such as equipment damage, service interruption, or loss of data.

Instructions for selecting menu options

To simplify the instructions for selecting menu options, this guide abbreviates the selection path. For example, if you must choose Telnet from the Logon Unit menu, under the Connect menu, this guide uses the following style:

From the menu, choose Connect → Logon Unit → Telnet.

Instructions for displaying property sheets

To simplify the procedures for accessing property sheets throughout this guide, the instructions for displaying a particular property sheet are summarized in a “Getting there” statement.

The procedure for displaying the screen that you need depends on if you are:

- performing an online configuration (connected to a node by Telnet)
- performing an offline configuration (not connected to a node)

Example

Getting there RLC → Configuration Manager → IP Configuration

The long instruction for this example is shown below.

1 Do the following:

IF	THEN
you are performing an offline configuration	select the device type as described in “Selecting the device type for offline configuration” on page 125.
you are performing an online configuration	connect to, and then log on to the node as described in “Logging on to a unit” on page 126.

2 In the left pane, click on the plus sign **(+)** beside Configuration Manager to expand the node list.

3 Click on **IP Configuration**.

Result: The IP Configuration property sheet for the RLC displays in the right pane.

PBX Terminology

Throughout this guide, the term “host PBX” refers to any of the following Nortel Networks PBX platforms:

- Meridian 1
- MSL-100
- Succession Communication Server for Enterprise 1000

Related information products

This section lists sources for additional information related to the RLC. You can order printed documentation and the CD-ROM from your Nortel Networks distributor.

You can also download the documentation in Portable Document Format (PDF) from the Nortel Networks website. To locate these documents, click on the Customer Support, Documentation, and North America links at the following website:

www.nortelnetworks.com

Note: The information available on the website may supersede the information provided on the CD-ROM.

For further details, refer to *Remote Office and RLC Release Notes* (NTP 555-8421-102).

Printed documents

The following documents provide additional information on the RLC and other elements of a Remote Office system:

Remote Office Network Engineering Guidelines (NTP 555-8421-103)

The *Engineering Guidelines,* written for the installer/administrator, describe how a Remote Office system integrates with existing telecommunications and data networks. This document helps you to ensure that your networks are prepared for Remote Office.

Remote Office and RLC Release Notes (NTP 555-8421-102)

The *Release Notes,* written for the installer/administrator, describe the features and known problems for the different elements of a Remote Office system. This document contains information pertaining to the Reach Line Card (RLC), the Remote Office 9150 unit, Remote Office 911x series units, and Meridian Digital Telephone IP Adapter units.

Remote Office 9150 Installation and Administration Guide (NTP 555-8421-215)

The *Remote Office 9150 Installation and Administration Guide,* written for the installer/administrator, describes how to install, configure, and manage the Remote Office 9150 unit.

Remote Office 911x Series Installation and Administration Guide (NTP 555-8421-220)

The *Remote Office 911x Series Installation and Administration Guide,* written for the installer/administrator, describes how to install, configure, and manage Remote Office 911x series units.

Meridian Digital Telephone IP Adapter Installation and Administration Guide (NTP 555-8421-211)

The *Meridian Digital Telephone IP Adapter Installation and Administration Guide,* written for the installer/administrator, describes how to install, configure, and manage Meridian Digital Telephone IP Adapter units.

CD-ROM

A Remote Office Product CD-ROM is available containing the documentation in Portable Document Format (PDF), firmware, and Configuration Manager software.

Chapter 1

RLC description

In this chapter

Product introduction

The RLC emulates a standard Extended Digital Line Card (XDLC) and provides Private Branch Exchange (PBX) functionality for telephones at remote locations. The RLC supports up to 20 remote devices (with a limit of four Remote Office 9150 units for a single RLC). The total number of simultaneous telephone calls cannot exceed the total number of RLC ports in the host PBX. The RLC supports the following devices:

- Remote Office 9110
- Remote Office 9115
- Remote Office 9150
- Meridian Digital Telephone Internal IP Adapter
- Meridian Digital Telephone External IP Adapter

You can configure each port on the RLC as if telephones were locally connected to a standard XDLC. Existing digital trunks (PRI) or an integrated 10BaseT Ethernet interface (Voice over IP) carry voice and signaling traffic as packets.

You can upload RLC firmware through a customer-provided trivial file transfer protocol (TFTP) server installed on the administration PC, through a 10BaseT Ethernet connection.

Physical features

The 16-port version of the RLC (NTDR68xx) provides service for up to 16 telephones. At the host location, install a 16-port RLC in an IPE shelf of the host PBX, or the Option 11 cabinet of a Meridian 1 PBX.

The 32-port version of the RLC (NTDR70xx or NTDR71xx) provides service for up to 32 telephones. At the host location, install a 32-port RLC in an IPE shelf of the host PBX, or the Option 11 cabinet of a Meridian 1 PBX.

PBX hardware compatibility

The following sections list the RLC's PBX requirements.

Meridian 1

The RLC is compatible with the following Meridian 1 systems:

- Meridian 1 Option 11, 11(C), 11(C) Mini, 11(E), 51(C), 61(C), 71(C), and 81(C)

  The RLC is compatible with the 11(C)-mini with the following limitations:

  — The 16-port RLC is supported in slots 1—3 in the main chassis.

  — The 16-port RLC is supported in slots 7—10 in the expander chassis.

  — The 32-port RLC is supported in slots 1 or 2 in the main chassis, with a maximum of one RLC.

  — The 32-port RLC is supported in slots 7, 8, or 9 in the expander chassis, with a maximum of two RLCs.

  Note: Since the 32-port RLC requires two backplane connections, it cannot be assigned to slot 10, because this slot provides only one backplane connection.

- Older Meridian 1 systems that are upgraded with IPE modules

Note: NT8D37AA IPE cabinets utilize split-slot wiring. If you have one of these cabinets, your RLC can only reside in slots 0, 4, 8, and 12 without rewiring the cabinet.

To use any other slot, you need to rewire part of the IPE backplane using cable NT8D81AA (A0359946). Refer to the *Meridian 1 System Installation and Maintenance Manual* (NTP 553-3001-210) for details.

MSL-100

The RLC's required packages for MSL-100 PBXs are as follows:

- X11 packages 0 and 121 contain all the four required Classes of Service.

  — Package Number 0 (Basic Call Processing Package) includes FLXA,VCE, and WTA.

  — Package Number 121 (Station Camp-on) includes CPTA.

- The following four feature sets of Release 25.30 include both packages:
  — NTSK11CQ: Option 11C General Business Feature Set
  — NTSK11DQ: Option 11C Enhanced Business Feature Set
  — NTSK11EQ: Option 11C Enterprise Business Feature Set
  — NTSK11FQ: Option 11C nas/vns Feature Set

Succession Communication Server for Enterprise 1000

To obtain the RLC requirements for Succession Communication Server for Enterprise 1000 PBXs, contact your Nortel Networks distributor.

IPE vs. Option 11

You can purchase 32-port RLCs for both IPE shelves and Option 11 cabinets. Because the dimensions of card slots in IPE shelves and Option 11 cabinets differ slightly, Nortel Networks offers two varieties of the 32-port RLC. Each variety has its own order code, as outlined in the following table:

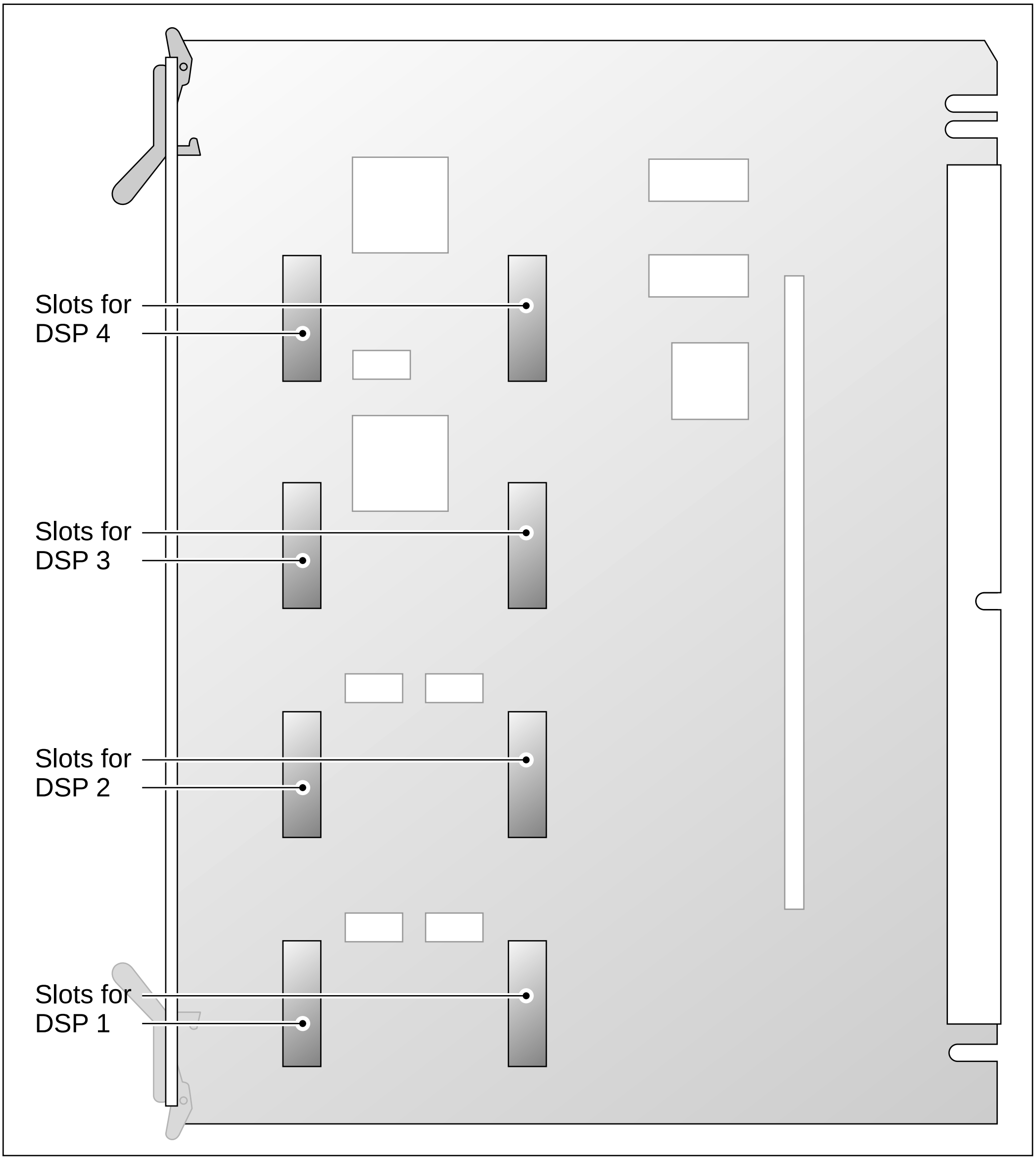
Destination	Order code
IPE shelf	NTDR70xx
Option 11 cabinet	NTDR71xx

Regardless of order code, the motherboard of the 32-port RLC is the same circuit pack that is used for the 16-port RLC. The illustration on page 5 shows the circuit pack. The RLC motherboard conforms to the Common Features Specification for IPE line cards.

PBX software compatibility

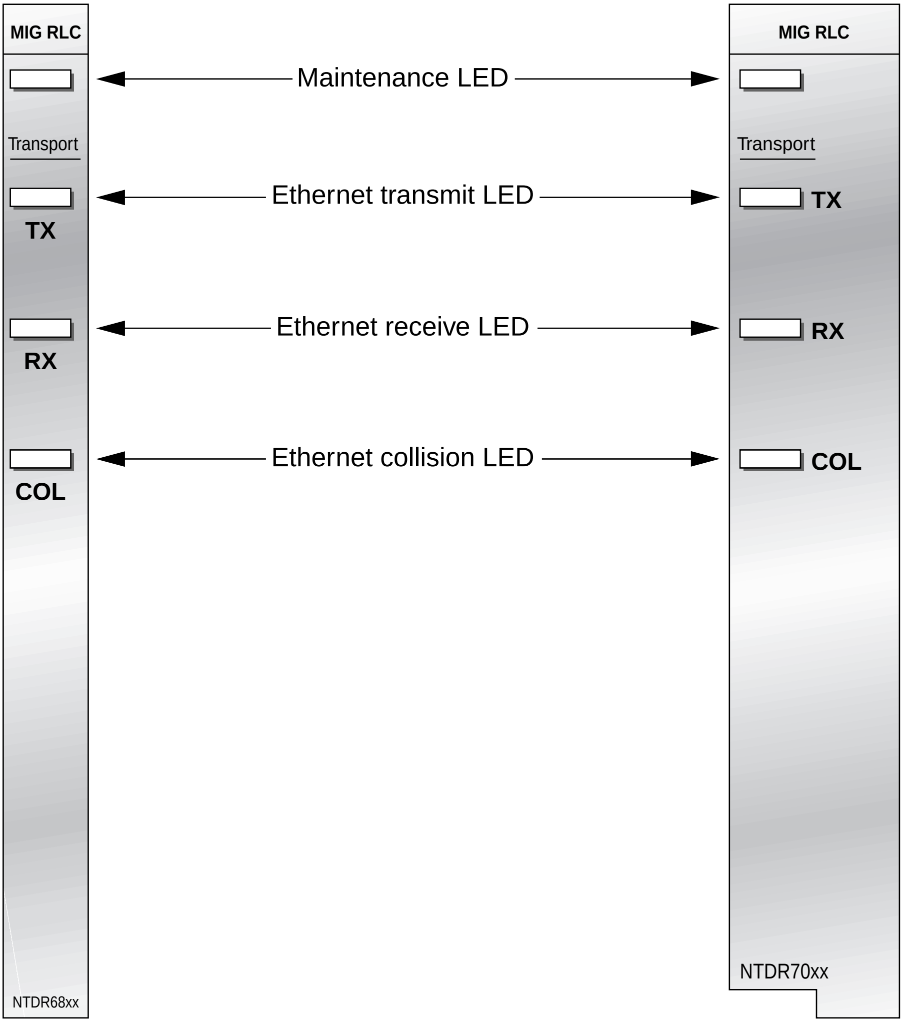
The RLC is compatible with Meridian 1 software Release 23 or higher.

RLC motherboard



G101387

RLC faceplates: 16-port and 32-port



Note: The IPE version of the double-wide faceplate is pictured here. If the RLC is installed in an Option 11 cabinet, the order code on the faceplate is NTDR71xx.

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LED indicators

The red Maintenance LED on the faceplate indicates the basic health of the RLC, as with all other IPE line cards. Under normal conditions, the Maintenance LED lights under firmware control at power up and blinks three times after a successful self-test. This LED remains lit until the host PBX enables the RLC, then it goes out. If the host PBX disables the RLC, the Maintenance LED comes on and stays on.

Other characteristics of the Maintenance LED include:

- If the Maintenance LED comes back on after the RLC passes its self-test, ensure that the card is enabled. (Refer to the host PBX documentation for the correct procedure.) If the RLC is enabled and the Maintenance LED remains on, there is a problem at the host PBX.
- If the Maintenance LED blinks repeatedly at one-second intervals, reseat the card at the host PBX by lifting the ejector tabs outward and pulling the RLC toward yourself. This action breaks the connection between the line card and the backplane.

  After breaking this connection, reinsert the card completely into its slot. If the RLC still does not complete a successful self-test, it must be replaced.

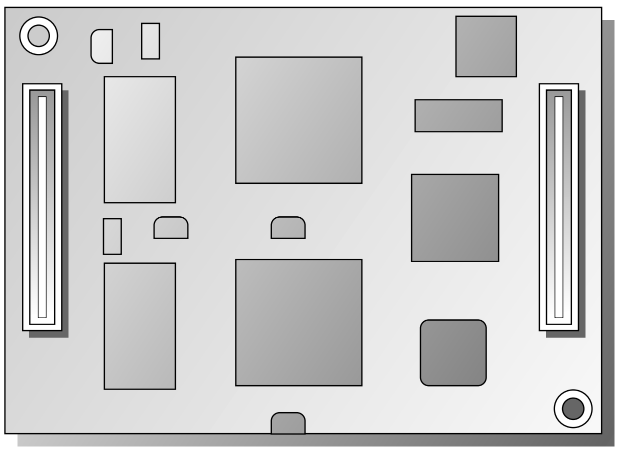
Three other faceplate LEDs monitor transmit activity, receive activity, and collisions on the RLC’s Ethernet interface. The illustration on page 6 shows the 16- and 32-port RLC faceplates with the function of each LED labeled.

DSP application modules (NTDR73xx)

The RLC's on-board digital signal processor (DSP) resources provide voice processing for up to eight simultaneous telephone calls. Each DSP application module provides an additional eight channels of packet voice processing. To extend your system's voice processing capacity, you can add up to four DSP application modules. The illustration on page 5 shows the locations of DSP expansion slot pairings on the RLC. For help in determining the number of DSP application modules you need to increase your system's call-processing capabilities to the desired level, refer to "Installing DSP application modules" on page 72, and the RLC "System expansion worksheet" on page 293.

The following illustration shows a DSP application module. One DSP application module holds two DSP devices:

Remote Office DSP module (NTDR73xx)



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RLC cables

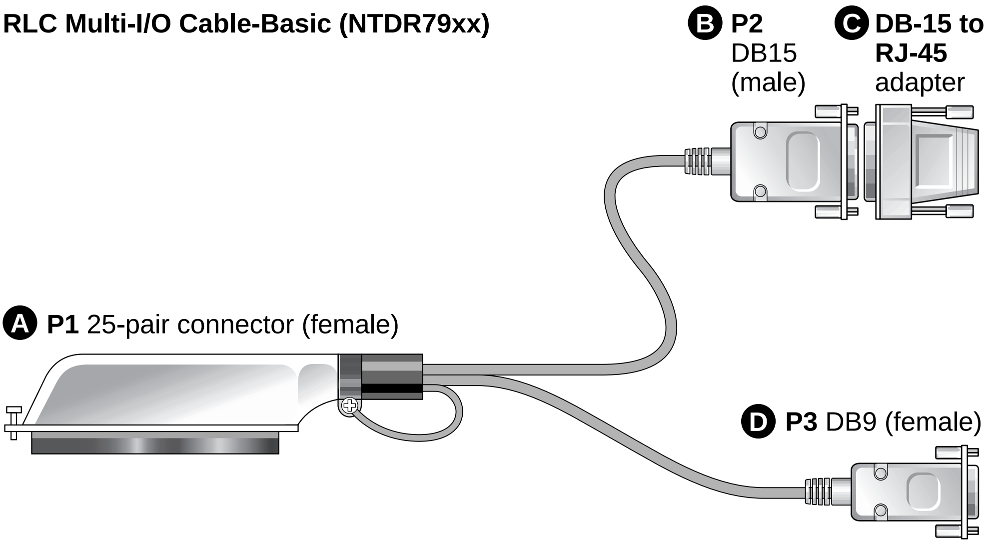
RLC cables connect at the I/O panel of the shelf or cabinet in the host PBX. Nortel Networks offers two cables that enable users to add the RLC to a variety of existing network configurations.

RLC Multi-I/O cable–Basic (NTDR79xx)

The Basic cable provides 10BaseT connectivity to the corporate LAN for Voice over IP (VoIP) and administration access, and RS-232 connection for serial port administration.

Note: The RLC supports only 10BaseT Ethernet speeds.

RLC Multi-I/O Cable-Basic (NTDR79xx)



- A To RLC slot on PBX's I/O panel
- B To customer LAN (CLAN)
- C Between P2 and a CAT5 data cable to an Ethernet hub
- D Serial port to admin PC

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The following table describes the RLC Multi-I/O cable–Basic:

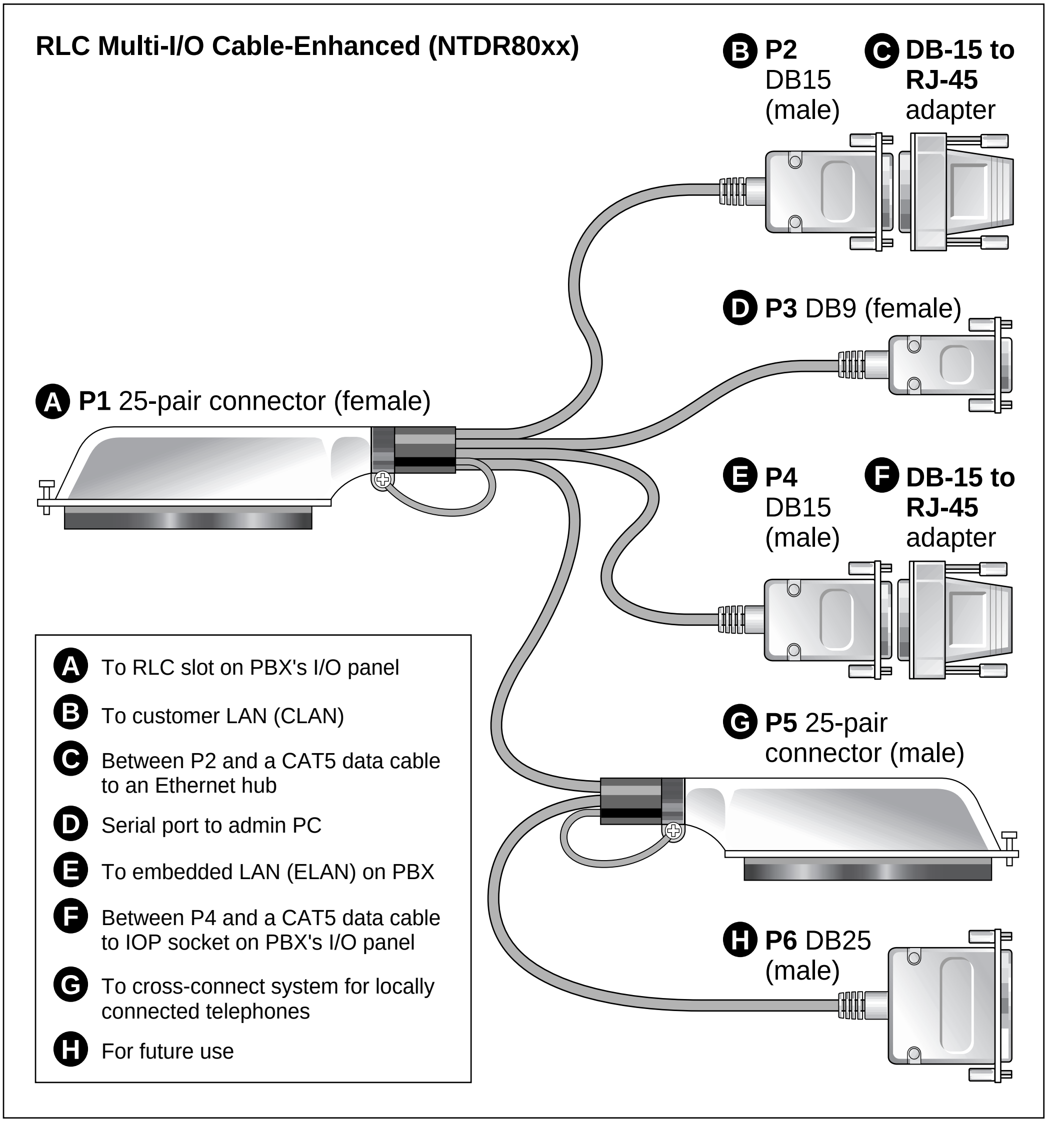
The connector labeled	is a	that transmits	and connects to the
P1	25-pair connector (female)	all signals	I/O panel.
Note: If you are using a 32-port RLC, insert **P1** into the socket for the first of the two card slots occupied by the RLC.			
P2	DB-15 connector (male)	10BaseT signaling	CLAN Ethernet (customer LAN on the network).
Note: P2 requires a DB-15 to RJ-45 converter (part number 301-00001-01, shipped with the cable).			
P3	DB-9 connector (female)	RS-232 signaling	serial port to admin PC for administration and maintenance.

The length of this cable, from the termination end of P1 to the termination end of any other plug, is 0.6 meters (2 feet).

RLC Multi-I/O cable–Enhanced (NTDR80xx)

The RLC Multi-I/O cable–Enhanced allows you to use the RLC's complete functionality. In addition to the connectivity supplied by the RLC Multi-I/O cable–Basic (refer to page 9), the RLC Multi-I/O cable–Enhanced adds connectivity to the host PBX's internal (or embedded) Ethernet for switch maintenance. With the Enhanced cable you can also service locally connected telephones through RLC ports not used for remote service purposes.

Note: The RLC supports only 10BaseT Ethernet speeds.



G101390

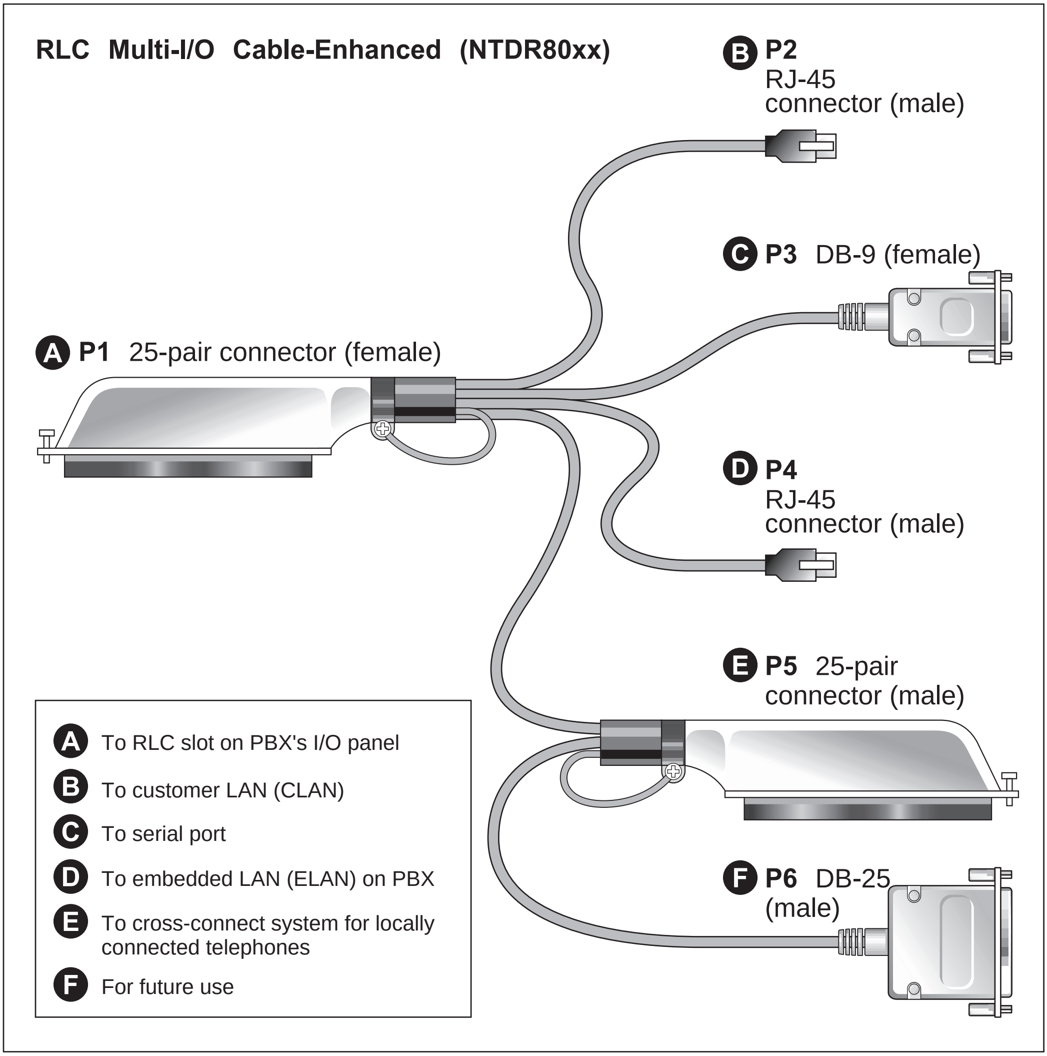
The following table describes the RLC Multi-I/O cable–Enhanced:

The connector labeled	is a	that transmits	and connects to the
P1	female 25-pair connector	all signals	I/O panel.
Note: If you are using a 32-port RLC, insert **P1** into the socket for the first of the two card slots occupied by the RLC.			
P2	male DB-15 connector	10BaseT signaling	CLAN Ethernet (customer LAN on the network).
Note: P2 requires an RJ-45 Male to Female converter (already installed).			
P3	female DB-9 connector	RS-232 signaling	serial port to admin PC for administration and maintenance.
P4	male DB-15 connector	10BaseT signaling	ELAN Ethernet (host PBX's embedded LAN).
Note: P4 requires an RJ-45 Male to Female converter (already installed).			
P5	male 25-pair connector	TCM signaling	cross-connect to local telephones.
P6 is reserved for future use.			

The length of this cable, from the termination end of P1 to the termination end of any other plug, is 0.6 meters (2 feet).

Installations outside North America

RLC installations outside North America that use the RLC Multi-I/O cable–Enhanced require the cable shown in the following illustration:



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Remote unit capacity on RLCs

One RLC supports a maximum of 20 Remote Office 911x series units or Meridian Digital Telephone Internal or External IP Adapter units.

Note: This scenario requires a 32-port RLC with no other Remote Office units connected to it.

One RLC supports a maximum of four Remote Office 9150 units when there are no other Remote Office units connected to the RLC.

Note: This scenario requires either a 16- or a 32-port RLC with no other Remote Office units connected to it.

One RLC can also support combinations of Remote Office 911x series, Remote Office 9150, and Meridian Digital Telephone IP Adapters. To learn about the conditions that allow you to combine these units on a single RLC, refer to the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103). To locate this document, click on the Customer Support, Documentation, and North America links at the following website:

www.nortelnetworks.com

Operational characteristics

The RLC provides a number of unique features that distinguish it from other remote service products.

These features include:

- adjustable quality of service using QoS Transitioning Technology
- port sharing options
- multiple security levels
- packet voice processing
- dial-up trunking
- bandwidth allocation
- Meridian telephone equipment compatibility

Adjustable quality of service using QoS Transitioning Technology

Nortel Networks' patented QoS Transitioning Technology monitors the quality of service (QoS) level on the internet protocol (IP) portions of your Remote Office system. This feature detects poor voice QoS when it occurs. The QoS level is a user-oriented metric that takes one of ten settings. Using Configuration Manager, you can select an acceptable transition threshold from among the ten predefined settings to identify the limits of acceptable voice QoS.

Configuring QoS Transitioning Technology to provide satisfactory results requires a detailed understanding of traffic on your IP network. For guidance on evaluating and adjusting your network's QoS, refer to the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103). Refer to page 14 for instructions on obtaining this document.

Quality of service on shared networks

High volumes of data packets can cause QoS problems for voice traffic on shared networks. Configuring the router to send voice packets ahead of data packets (prioritizing voice packets) can address some QoS concerns. For further details, refer to "Prioritizing voice traffic over shared networks" on page 161.

Port sharing options

The RLC allows you to take maximum advantage of your host PBX's port resources regardless of what time it is or who is working. Dynamic port pooling and multi-user ports allow more than one person or station to use the same port on the host PBX. Dynamic port pooling and multi-user ports allow for more flexible, less restrictive use of the corporate telecommunications network.

Dynamic port pooling

Dynamic port pooling allows multiple users or stations to time-share the same port on the host PBX. No correlation exists between a user or station and the TN or DN on the host PBX when no one is registered.

When users share ports in a dynamic pool register, they receive the next available port in the pool regardless of that port's TN or DN. Users register by entering the Registration SPRE (Special Prefix) code on their telephone keypad. Refer to the Installation and Administration Guide for your specific Remote Office unit for details.

Note: If there are no available ports in the pool when a user tries to register, that user hears a fast busy signal.

When users press the primary DN key on their digital telephone set to place an outgoing call, they receive the DN assigned to them at registration. While registered, users also receive all calls placed to that DN. When users are ready to release their ports on the host PBX, they enter the deregistration SPRE code. This allows registering users to access that port.

Multi-user ports

Like dynamic port pooling, multi-user ports also allow multiple users or stations to time-share ports on the host PBX. With a multi-user port, however, there *is* a specific correlation between the user or physical station and the TN or DN on the host PBX. The host PBX blocks users configured to a multi-user port from accessing that port if another configured user is currently registered to the port. Multi-user ports are available only to users specifically configured to the ports.

While multiple users in a dynamic port pool can be active at the same time, only one user can be active on a multi-user port.

You can configure a multi-user port to allow one user to access the same port from multiple locations. This feature can give one person access the same port from both the corporate office and the home office. Refer to the Installation and Administration Guide for your specific Remote Office unit for details.

Multiple security levels

The RLC allows you to choose from three levels of protection from unauthorized access to your host PBX through the Remote Office system. Select one of the following security levels to regulate usage of corporate telecommunications resources:

- Level 1, no security

  When you set RLC security to security level 1, the RLC allows all calls to route through the host PBX, regardless of source.

  Note: Level 1 is the RLC’s default security level.

- Level 2, caller ID security

  When you set RLC security to security level 2, the RLC does the following:

  a. It compares the caller ID of the incoming call against the caller IDs configured for this remote unit.

  b. It denies PBX access to this call if the caller ID does not match any of those in this unit's List of Caller IDs.

  For the required steps to configure security level 2 on your RLC, refer to “Remote Connection Configuration” on page 171.

  Note: Level 2 security is not applicable when using Remote Office 911x series units with the RLC.

- Level 3, provisioned security

  When security is set to level 3, depending on the unit that initiated the call, the following call verification occurs:

  a. If a remote unit calls the RLC, the RLC compares its Inbound security ID with this remote unit’s Outbound security ID. If they match, the RLC accepts the call, otherwise, it rejects the call.

  b. If the RLC calls a remote unit, the remote unit compares its Inbound security ID with the RLC's Outbound security ID. If they match, the remote unit accepts the call, otherwise, it rejects the call.

For the steps required to configure security level 3 on your RLC, refer to "Remote Connection Configuration" on page 171.

Security configuration applies to all ports of a Remote Office unit. That is, all ports on one Remote Office 9150 unit have the protection of the same security level.

Packet voice processing

All connections to the host PBX support the following features:

Voice compression

The RLC supports G.711, G.726, and G.729A voice compression standards. You can configure different ports with different voice compression algorithms. This feature allows you to configure different voice QoS for different users.

Note: Remote Office 911x units only support G.729A compression in Public Switched Telephone (PSTN) mode. They support G.711 and G.729A in VoIP mode.

Voice jitter attenuation buffer

The RLC's dynamic voice jitter attenuation buffer compensates for the uneven arrival of voice packets at their destinations over a given period of time across data networks. This buffer collects packets that arrive unevenly and relays them evenly.

Packet-loss handling techniques

The RLC uses packet-loss handling techniques to accommodate missing packets or packets that arrive too late to be processed into the real-time voice stream.

Silence suppression algorithm

To save bandwidth, a silence suppression algorithm prevents packet transmission during periods when Voice Activity Detection (VAD) determines that there is no voice data present. The receiving end inserts comfort noise to assure the user that the line is still active.

Echo cancellation

The RLC performs echo cancellation in accordance with ITU G.168, and cancels echo with a tail length of up to 32 milliseconds (32 ms).

Dial-up trunking

The RLC supports digital trunks for connections to the Remote Office units. The RLC shares the host PBX's digital trunks (ISDN PRI) for a PSTN connection to the Remote Office unit.

QoS Transitioning Technology

The RLC supports PSTN interfaces for local calling when used in Voice over IP (VoIP) mode. In this way, it also supports QoS Transitioning Technology.

For a further explanation of QoS transition functions, refer to "Adjustable quality of service using QoS Transitioning Technology" on page 15. For exact configuration procedures, refer to "Configuring Quality of Service" on page 182.

Bandwidth utilization

The voice compression algorithm that you choose when configuring DSP resources determines the bandwidth utilization of the RLC. The RLC currently supports the following compression algorithms with the Remote Office devices indicated in the table below:

The compression algorithm	uses a compressed bit rate of	on the following Remote Office devices:
G.711	64 Kbps	9150
G.726	32 Kbps	9150
G.729A	8 Kbps	911x, 9150, Meridian Digital Telephone IP Adapter

Dynamic trunk bandwidth allocation

In PSTN mode, the RLC dynamically allocates available trunk bandwidth to maximize bandwidth use. That is, as the RLC initiates calls and bandwidth requirements increase, the RLC establishes additional trunk connections for Remote Office 9150 units.

Call on-demand

The RLC supports full call on-demand (COD) functionality. This includes minimum call duration and idle timers that you can configure according to your service provider’s fee structure. COD refers to the way that the RLC handles host trunk connections. In the COD mode of operation, the RLC does not establish a host connection until the user places a call to a host DN. The COD connection stays active until the minimum call duration timer expires. The RLC then closes the host connection, if idle. If another user initiates a call to the host before the timer expires, the RLC resets the timer to track the last call established. There is a single timer for each Remote Office 9150 or 911x unit.

Timers

The RLC has two timers to help manage PSTN costs.

- Minimum call duration timer

  Most PSTN tariffs specify the minimum length of time that providers can charge users for opening a connection, regardless of the call duration. This length of time determines the minimum call charges listed on long-distance telephone bills.

  Remote Office 9110, 9115, and 9150 units use the minimum call duration timer in PSTN mode only. This timer specifies the minimum length of time that each PSTN call to the host PBX remains open, regardless of telephone activity. You can configure the timer on the RLC to drop the connection just before the beginning of the next charge period, when the cost of the call increases. (Refer to Example 1 on page 21.)

- Idle timer

  Remote Office 9110, 9115, and 9150 units also use the idle timer in PSTN mode only. This timer identifies the maximum length of time a PSTN connection must remain idle before the RLC closes the connection.

  An idle connection exists when no voice connections (voice paths) remain open and when no data paths exist. Users at the remote site create data paths when they press keys on their digital telephones. Signaling passing from the host PBX to the digital telephone also creates data paths.

  If anyone at the remote site places another call within 60 seconds, the RLC resets the idle timer and uses the existing PSTN connection for the new call. This eliminates the need to open a new PSTN connection and incur unnecessary long distance charges. (Refer to Example 2 on page 21.)

The minimum call duration and idle timers work together to control PSTN long distance charges. The following examples describe what happens when the minimum call duration timer is set to 59 seconds and the idle timer is set to 60 seconds.

Example 1
After a 20-second call, the minimum call duration timer still has 39 seconds remaining. If no one else at the remote site places a call, the RLC drops the PSTN connection when the timer reaches 59 seconds. In this example, the minimum call duration timer expires before the RLC initiates the idle timer.

- After the minimum call timer, PSTN signaling with no digital telephone activity keeps the primary PSTN connection up for no longer than two idle timers.
- Every PSTN connection remains active for at least the length of the minimum call timer.
- Additional trunks and circuit-only trunks active longer than the minimum call timer remain active for an additional idle timer duration. This is the case only if no additional bandwidth requests come to the host PBX.

Example 2
After a 65-second call, the idle timer starts. If no one at the remote site places a call during the next 60 seconds, the RLC drops the PSTN connection. Since the PSTN call exceeds 59 seconds, the minimum call duration timer expires before activity ceased. At the conclusion of the call, the RLC initiates the idle timer to prevent unnecessary charges.

DN priority

The RLC provides multiple priority levels for Remote Office 9150 unit users:

- PSTN only
- high
- normal
- IP only

If you configure this feature, you must also configure an amount of bandwidth to save for the High priority DNs. You must also identify the privileged DNs through Configuration Manager. This information does not apply to Remote Office 911x series or Meridian Digital Telephone IP Adapters.

The RLC uses the *priority reserved* bandwidth for high priority DNs. When only bandwidth for *high* priority DNs remains on the network, users dialing out on *normal* priority DNs hear a fast busy signal. For details on configuring DN priority, refer to “RLC port configuration” on page 162.

Online/Offline table

You can configure the RLC to establish or terminate host connections at specified times of the day. This feature limits excessive connection charges for idle host connections. For details on configuring the Online/Offline table, refer to “Online/Offline table configuration” on page 189.

Bandwidth allocation

Configuration Manager provides options for you to allocate PSTN bandwidth for Remote Office 9150 stations. This does not apply to Remote Office 911x series or Meridian Digital Telephone IP Adapters.

- Priority reserved bandwidth

You can reserve bandwidth for certain DNs that need prioritized access to Remote Office channels. You can configure high priority DNs on the RLC Port Configuration property sheet. These DNs consume Priority Reserved Bandwidth before using unreserved bandwidth.

- Extra bandwidth

Configuration Manager allows you to reserve a certain amount of bandwidth for accessing a remote unit. When the amount of bandwidth available falls below the level that you configure, the RLC opens additional B-channels to the remote unit.

Meridian digital telephone hardware compatibility

The RLC is compatible with the following Meridian digital telephone equipment:

Models		Modules
■ M2006[i]	■ M3310	■ add-on modules[iii]
■ M2008D	■ M3820	■ key-expansion modules
■ M2008HFD	■ M3901[i, ii]	
■ M2216D	■ M3902	
■ M2616D	■ M3903	
■ M2616CT	■ M3904	
■ M3110[i]	■ M3905	

i. Remote Office 911x units and Meridian Digital Telephone IP Adapters do not support M2006, M3110, or M3901 telephones.
ii. On the host PBX, you must configure M3901 telephones as M3902 telephones for proper operation with Remote Office 911x units or Meridian Digital Telephone IP Adapters
iii. Add-on modules include key based add-on modules (KBAs) and display-based add-on modules (DBAs) for M39xx sets.

Footstand

Installation of a Remote Office 9110 unit or a Meridian Digital Telephone Internal IP Adapter unit requires an ATA/MCA footstand. Meridian Modular Telephones (M2000 series) with a date code of May 6, 1998 or later come equipped with the required footstand. Contact your Nortel Networks distributor to obtain the necessary footstand if your telephone has an earlier date code.

Data channel adapters

The Remote Office 9150 unit supports the following types of data channel adapters:

- Analog Telephone Adapters (ATAs)

  Note: The Remote Office systems using ATAs do not support modems.

- Meridian Communication Adapters (MCAs)

Note: MCAs use the secondary data channel of the TCM telephone interface and require a full 64 Kbps of bandwidth. If you have a 56 Kbps connection, ensure that this connection provides multiple B-channels. Refer to “Understanding port relationships” on page 105 for information about port assignment for data channel adapters.

A 16-port RLC handles up to four data channel adapters. A 32-port RLC handles up to seven data channel adapters.

Note: Remote Office 911x units and Meridian Digital Telephone IP Adapters do not support data channel adapters.

Nortel Networks CTI and ACD applications

The RLC operates with all Nortel Networks computer telephony interface (CTI) and automatic call distribution (ACD) applications.

How the RLC works

When a call comes through the host PBX to a user at a remote location, the RLC makes a connection to the appropriate remote unit. The host PBX completes the call. If the RLC cannot establish a connection, the call rings until the host PBX forwards it to voice-mail.

Initiate outgoing calls by either picking up your telephone’s handset or pressing a line appearance key. There are two types of appearance keys:

- host call appearance keys, used to place calls to the host site
- local call appearance keys, used to place calls to another station at the branch office, or to place and receive calls through the local PSTN

Details of the outgoing call process appear in the diagrams and procedures on pages 27–31.

RLC processing modes

The RLC processes calls for a Remote Office network in one of two modes:

- host-controlled
- locally controlled

Host-controlled calls

When you place a call to someone at your host site, or when someone at your host site calls you, the call is processed in host-controlled mode. The RLC routes such calls through the host PBX. Details of host-controlled call processing for the Remote Office 9150 unit appear in the diagrams and procedures on pages 27–30.

Locally controlled calls

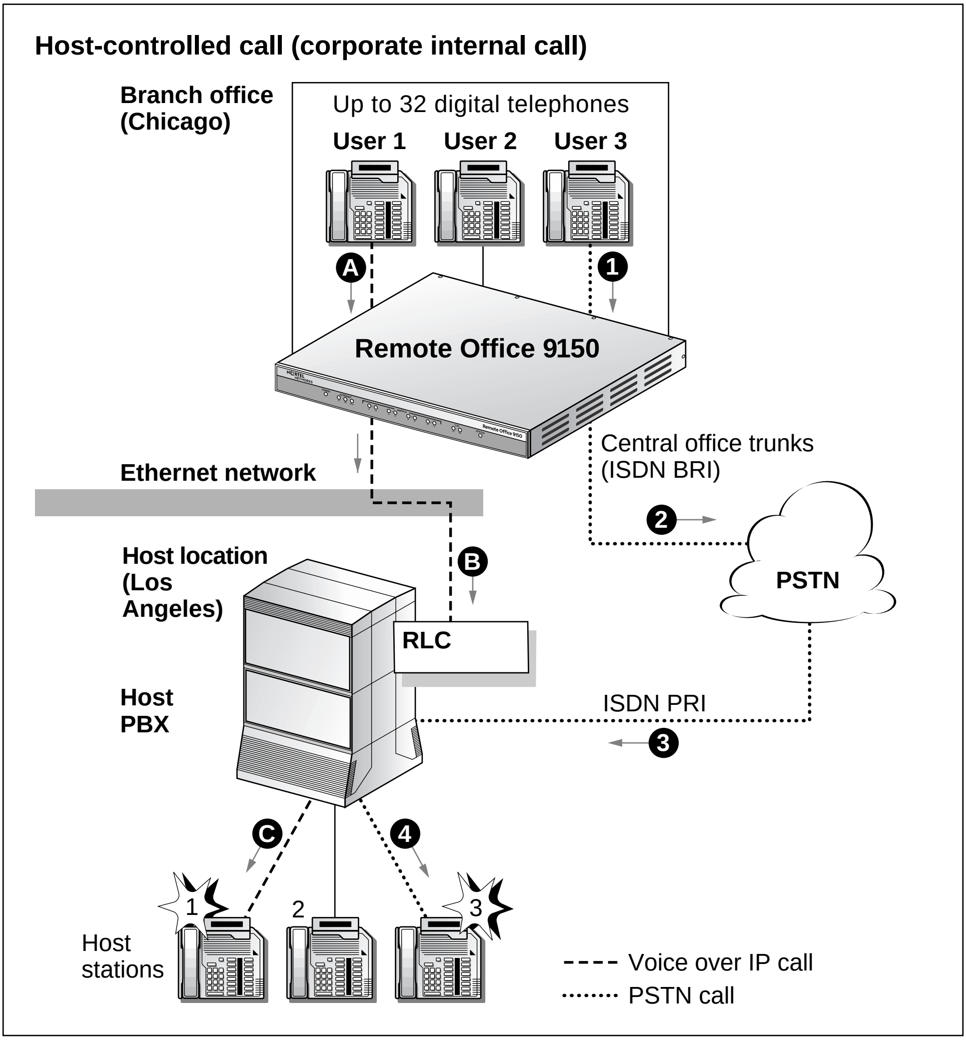
There are three types of locally controlled calls:

- A Remote Office 9150 unit user begins a call by pressing one of the local calling keys. The user then dials the DN of another local calling key. The Remote Office 9150 unit processes this call.
- A Remote Office 9150 unit user begins a call by pressing one of the local calling keys. The user then dials a local trunk access code. The local PSTN processes this call. Refer to the diagram on page 31.
- A Remote Office 911x series user begins a call by pressing a key configured as a local calling key. The user then dials a local telephone number. The local PSTN processes this call. Refer to the diagram on page 37.

The host PBX is not involved in any of the call scenarios above. These scenarios describe calls processed in the locally controlled mode.

9150 call scenario 1: Host-controlled mode—internal corporate call

The following diagram shows how the Remote Office system routes a host-controlled call from a Remote Office 9150 unit to the corporate office.



G101392

The network that routes the host-controlled call is transparent to the user. Both VoIP and PSTN calls present the same dialing requirement, as described on page 28.

Voice over IP network call

1 Remote Office 9150 user 1 presses the host call appearance key (item A).

Result: Remote Office 9150 user 1 hears a dial tone. This indicates a successful connection to the RLC over the IP network.

2 Remote Office 9150 user 1 dials a telephone number (such as the extension number of host station 1).

Result: The Remote Office 9150 unit sends the dialed digits as packets across the Ethernet network to the RLC (item B). The RLC converts the packets to the format required by the host PBX. The host PBX then converts the data to voice and routes the call to host station 1 (item C).

PSTN call

1 Remote Office 9150 user 3 presses the host call appearance key (item 1).

Result: Remote Office 9150 user 3 hears a dial tone. This indicates a successful connection to the RLC over the PSTN.

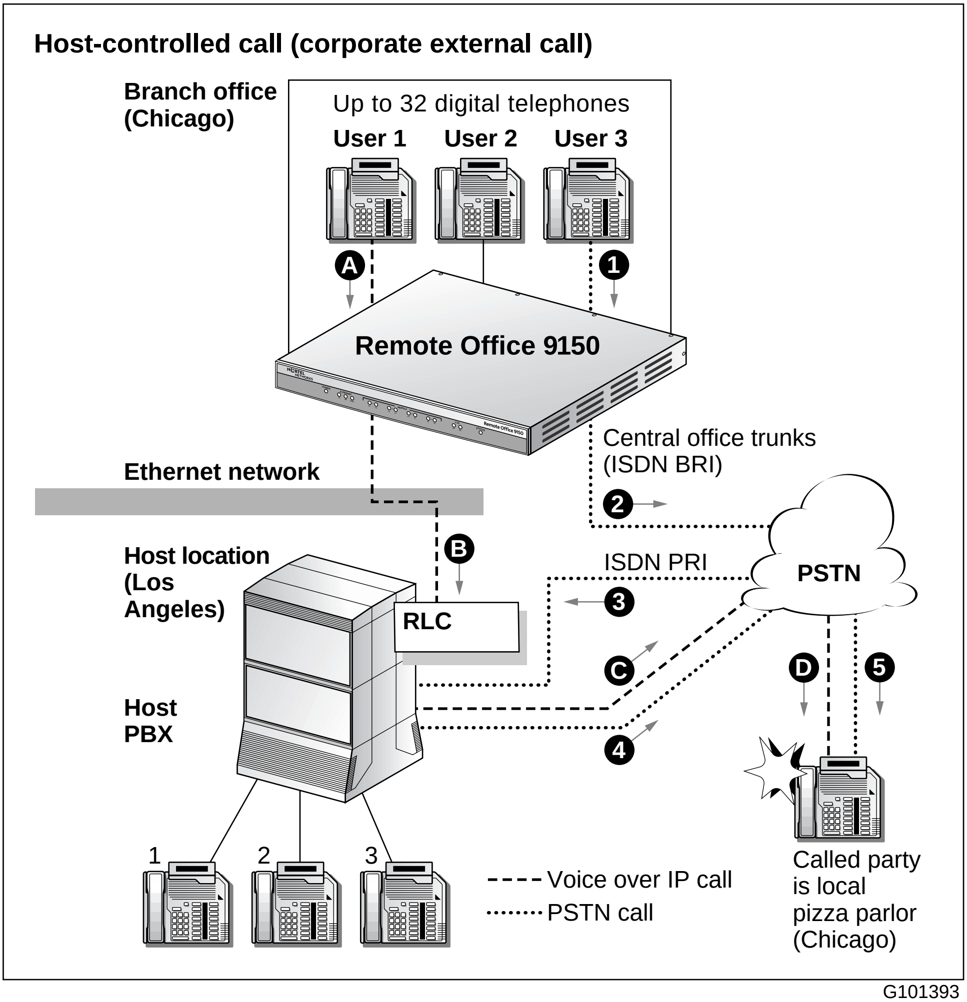
2 Remote Office 9150 user 3 dials the telephone number, such as the extension number of host station 3.

Result: The Remote Office 9150 unit sends the dialed digits across ISDN BRI through the PSTN, through the host PBX to host station 3 (items 2, 3, & 4).

Note: Item notations in parentheses refer to circled markers in the diagram on page 27.

9150 call scenario 2: Host-controlled mode—external corporate call

The following diagram also shows how a Remote Office system routes a host-controlled call from a Remote Office 9150 unit. In 9150 call scenario 2, the call routes to a party outside the organization.



The network that routes the host-controlled call is transparent to the user. Both VoIP and PSTN calls present the same dialing requirement, as described on page 30.

Voice over IP network call

1 Remote Office 9150 user 1 presses the host call appearance key (item A).

Result: Remote Office 9150 user 1 hears a dial tone. This indicates a successful connection to the RLC over the IP network (item B).

2 Remote Office 9150 user 1 dials the external telephone number.

Result: The Remote Office 9150 unit sends the dialed digits as packets across the Ethernet network. The RLC converts the packets to the format required by the host PBX. The host PBX then converts the data to voice and routes the call through the PSTN to the called party (items C & D).

PSTN call

1 Remote Office 9150 user 3 presses the host call appearance key (item 1).

Result: Remote Office 9150 user 3 hears a dial tone. This indicates a successful connection to the RLC over the PSTN (items 2 & 3).

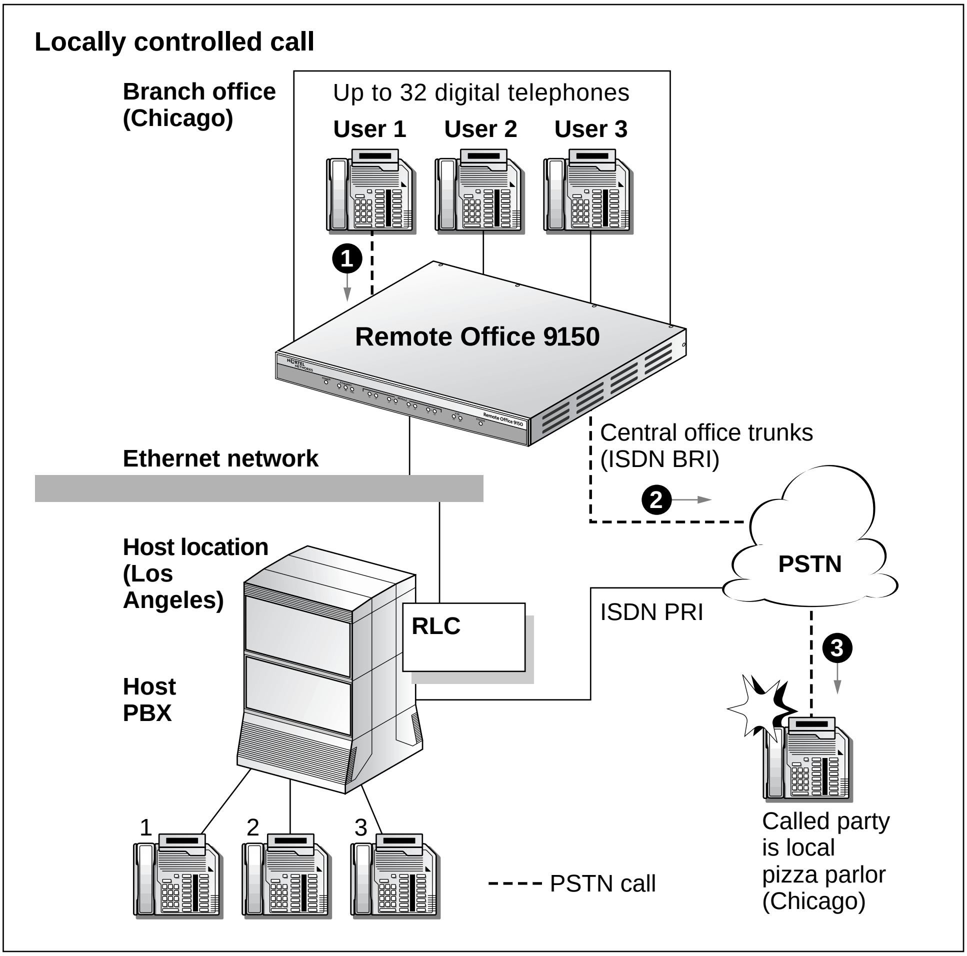
2 Remote Office 9150 user 3 dials the external telephone number.

Result: The Remote Office 9150 unit sends the dialed digits across ISDN BRI through the PSTN, through the host PBX to the called party (items 4 & 5).

Note: Item notations in parentheses refer to circled markers in the diagram on page 29.

9150 call scenario 3: Locally controlled mode—local call

The following diagram shows how a Remote Office system routes a call within your local area.



G101394

Local call

1 Remote Office 9150 User 1 presses the local call appearance key and hears a dial tone from the Remote Office 9150 unit (item 1).

2 Remote Office 9150 User 1 then dials a trunk access code and hears a PSTN dial tone from the Central Office (item 2).

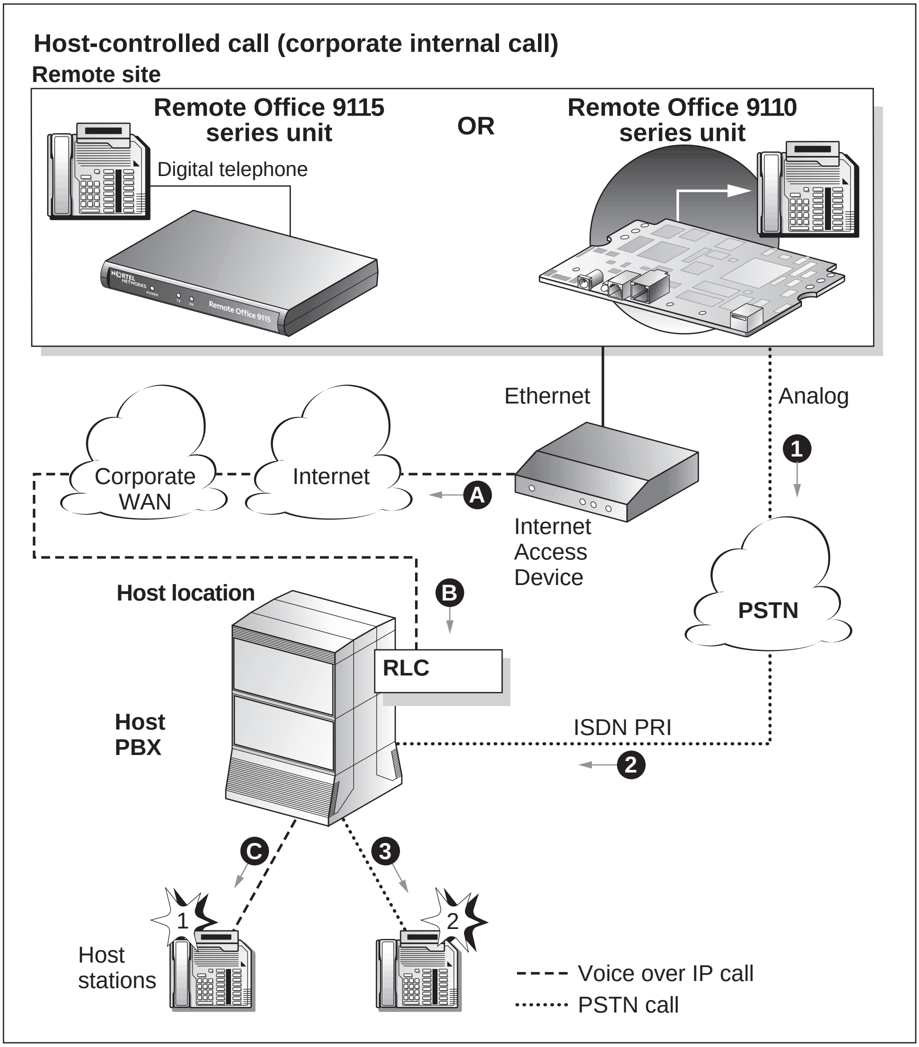
3 Remote Office 9150 User 1 dials the telephone number (the pizza parlor in this example). The dialed digits travel across the ISDN BRI connection through the PSTN to the called party (item 3).

Note: Item notations in parentheses refer to circled markers in the diagram on page 31.

For details about how the Remote Office system routes calls from Remote Office 911x series units, refer to pages 33 through 37.

911x call scenario 1: host-controlled—corporate internal call

The following diagram shows how the Remote Office system routes a host-controlled call from a Remote Office 911x unit to the corporate office.



G019

The network that routes the host-controlled call is transparent to the user. Both VoIP and PSTN calls present the same dialing requirement, as described on page 34.

Voice over IP network call

1 The Remote Office 911x user lifts the handset (item A).

Result: The Remote Office 911x user hears a dial tone. This indicates a successful connection to the RLC over the IP network (item B).

2 The Remote Office 911x user dials a telephone number, such as the extension number of host station 1.

Result: The Remote Office 911x unit sends the dialed digits as packets through the IP network to the Ethernet network or Corporate WAN to the RLC. The RLC converts the packets to the format required by the host PBX.

3 The host PBX then converts the data to voice and routes the call to host station 1 (item C).

PSTN call

1 The Remote Office 911x user lifts the handset.

Result: The Remote Office 911x user hears a dial tone. This indicates a successful connection to the RLC over the PSTN (item 1).

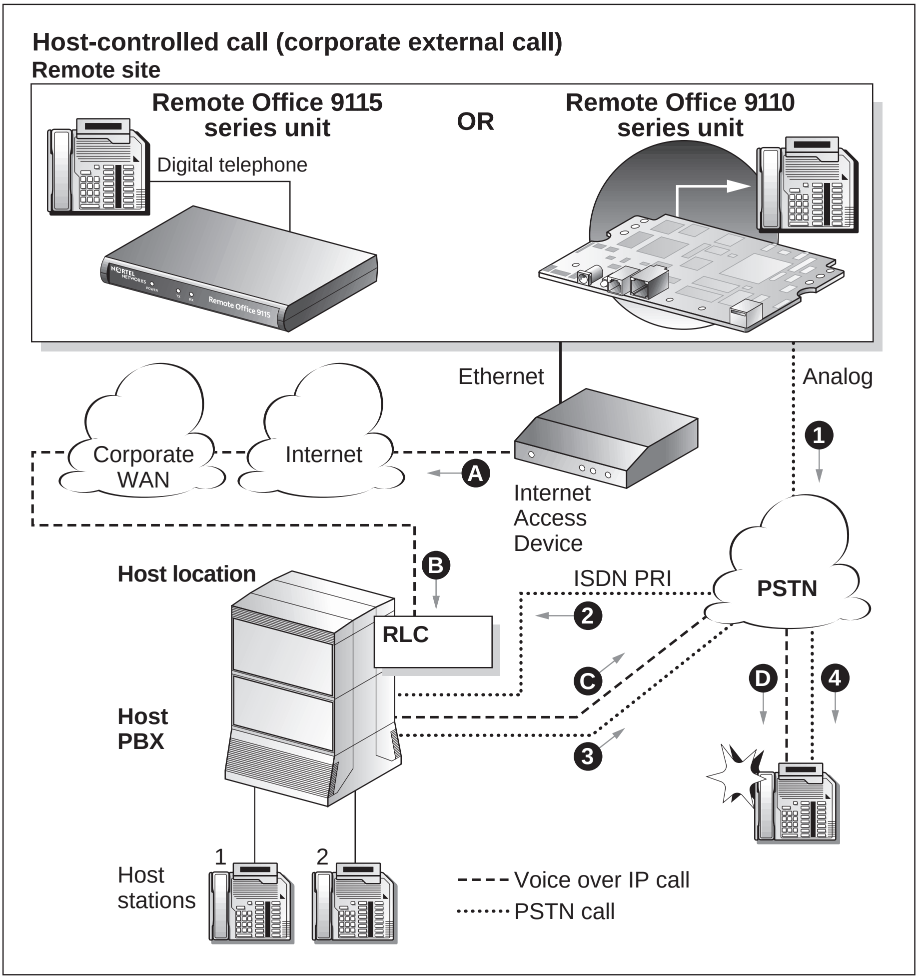
2 The Remote Office 911x user dials a telephone number, such as the extension number of host station 2.

Result: The Remote Office 911x unit sends the dialed digits across the PSTN through the host PBX (item 2) to host station 2 (item 3).

Note: Item notations in parentheses refer to circled markers in the diagram on page 33.

911x call scenario 2: host-controlled—corporate external call

The following diagram also shows how a Remote Office system routes a host-controlled call from a Remote Office 911x series unit. In 911x call scenario 2, the call routes to a party outside the organization.



G020

The network that routes the host-controlled call is transparent to the user. Both VoIP and PSTN calls present the same dialing requirement, as described on page 36.

Voice over IP network call

1 The Remote Office 911x user lifts the handset (item A).

Result: The Remote Office 911x user hears a dial tone. This indicates a successful connection to the RLC over the IP network and the corporate WAN (item B).

2 The Remote Office 911x user dials the external telephone number.

Result: The Remote Office 911x series unit sends the dialed digits as packets across the Ethernet network. The packets go through the IP network and the corporate WAN, to the RLC. The RLC converts the packets to the format required by the host PBX. The host PBX then converts the data to voice and routes the call through the PSTN to the called party (items C & D).

PSTN call

1 The Remote Office 911x user lifts the handset (item 1).

Result: The Remote Office 911x user hears a dial tone. This indicates a successful connection to the host PBX over the PSTN (item 2).

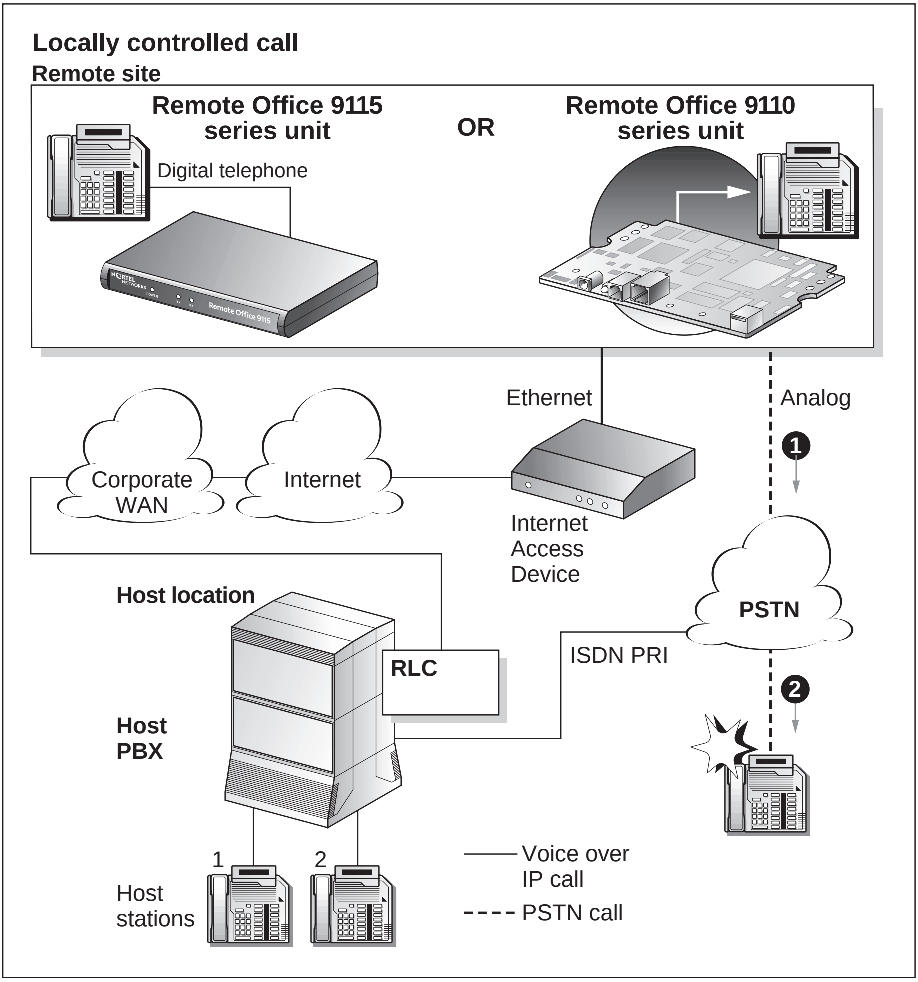
2 The Remote Office 911x user dials the external telephone number.

Result: The Remote Office 911x series unit sends the dialed digits across an analog line through the PSTN, through the host PBX to the called party (items 3 & 4).

Note: Item notations in parentheses refer to circled markers in the diagram on page 35.

911x call scenario 3: locally controlled mode—local call

The diagram below shows how a call is routed when placing a call within your local area using a Remote Office 911x series unit.



G021

Local call

1

IF the Remote Office 911x unit is	THEN the Remote Office 911x user
offline, or not connected to the host PBX,	lifts the handset.
online, or connected to the host PBX,	presses the local calling key

Result: The Remote Office 911x user hears a PSTN dial tone from the Central Office (item 1).

2 The Remote Office 911x user dials the external telephone number.

3 The dialed digits travel across the PSTN to the called party (item 2).

Note: Item notations in parentheses refer to circled markers in the diagram on page 37.

Environmental requirements

The RLC withstands the following environmental conditions without any performance degradation or damage.

Note: In this section, the phrase *short term* means 72 consecutive hours with a maximum of 360 hours per year. The temperature ratings are for the environment of the circuit and not the total system.

Operating temperature	
Normal	+10 to 45 °C
Short Term	0 to +55 °C
Operating humidity	
Normal	10% to 95% (noncondensing)
Short Term	5% to 95% (noncondensing)
Storage	
Temperature	-50 to +70 °C
Humidity	5% to 95% RH (noncondensing)

Power requirements

This section lists characteristics of the recommended power supplies for the Remote Office 9150 unit, the Remote Office 911x series units, and the Meridian Digital Telephone IP Adapter units.

9150 units

Input specifications for the Remote Office 9150 unit are as follows:

Characteristics	Rating
voltage	85 - 264 VAC
frequency	47 - 63 Hz
current	3.20A maximum, 115 VAC (North American installations) 1.80A maximum 230 VAC (non-North American installations)

Output specifications for the Remote Office 9150 unit are as follows:

Characteristic	Rating
Output 1 voltage	5VDC +/-5%
Output 1 current	10.0A maximum
Output 2 voltage	24VDC +/-5%
Output 2 current	3.0A maximum
maximum power	110W

Remote Office 911x series and Meridian Digital Telephone IP Adapter units

Input specifications for the Remote Office 911x series units, including the Meridian Digital Telephone IP Adapter units, are as follows:

Characteristic	Rating
voltage	90 - 264 VAC
frequency	47 - 63 Hz
current	0.4A maximum

Output specifications for the Remote Office 911x series units, including the Meridian Digital Telephone IP Adapter units, are as follows:

Characteristic	Rating
voltage	24 VDC +/-5%
current	0.62A maximum
power	15W maximum

Chapter 2

Planning for RLC installation

In this chapter

Preinstallation preparation

To prepare a site for installation, consider the environment, structural and electrical factors, and other site-specific limitations. For more information on site-preparation from an equipment standpoint, refer to the following documents:

- *Meridian 1 Installation and Planning* (NTP 553-3001-120)
- *Meridian 1 System Engineering* (NTP 553-3001-151)
- *Meridian 1 Power Engineering* (NTP 553-3001-152)
- *Meridian SL-100 Intelligent Peripheral Equipment-IPE* (NTP 555-4001-129)
- *Succession Communication Server for Enterprise 1000 Planning and Installation Guide* (NTP 553-3023-210)

Planning for your remote service needs

Plan for your remote service needs by determining the total number of simultaneous remote service telephone calls you want to support on your network. This number tells you how many RLC ports that you need.

RLC requirements

Once you have determined the total number of RLC ports that you need in your remote service network, you can determine the number and size of RLCs needed at your host site.

Every 16 remote service ports in your network requires one card slot in the host PBX and 16 ports on an RLC. If you want your network to support more than 16 remote service ports, you need at least one 32-port RLC.

The following table gives a summary of how to choose the correct size RLC for your specific remote service needs.

IF the number of remote-service ports in your network is	THEN you need
under 17,	a 16-port RLC.
between 17 and 32,	a 32-port RLC.
over 32,	to consult with your Nortel Networks distributor to determine the most cost-effective combination of 16- and 32-port RLCs.

DSP requirements

The total number of simultaneous telephone calls that you want to support also determines the number of DSP application modules that you need.

- Both 16- and 32-port RLCs come equipped with enough built-in DSP resources to provide non-blocking service for up to 8 simultaneous calls.
- Each remote telephone call to the host PBX requires one DSP channel.
- Each DSP application module has eight channels that provide eight additional voice paths between host and remote sites.

The following sample configurations illustrate the capacities of a few common RLC–DSP combinations:

1. The basic 16-port RLC ships with eight built-in DSP channels. With no hardware changes, the 16-port RLC supports up to 16 users, allowing up to eight simultaneous calls.
2. When you add one DSP application module to the 16-port RLC, the line card now holds 16 DSP channels. This combination supports up to 16 users, allowing up to 16 simultaneous calls.
3. The basic 32-port RLC ships with eight built-in DSP channels. With no hardware changes, the 32-port RLC supports up to 32 users, allowing up to eight simultaneous calls.
4. When you add three DSP application modules to the 32-port RLC, the line card has 32 DSP channels. This combination supports up to 32 users, allowing up to 32 simultaneous calls.

Note: When you add data channel adapters (MCAs and ATAs) to a remote site, that site's DSP channel usage increases. Every remote call, whether from a telephone, MCA, or ATA, requires a DSP channel.

Each DSP device configured with the 911x DSP load supports up to four modem channels.

Installation planning

Make an outline of cable routing between the I/O panel of the shelf where the RLC resides and the following components of your Remote Office system:

- your PBX's serial port
- the I/O-panel connection to the IOP (input-output port) card for access to your PBX's internal Ethernet, or ELAN
- the cross-connect device to the local telephones using the RLC ports not providing remote services

Note: The RLC operates properly without the last two connections listed above. These two connections are available only with the RLC Multi-I/O cable–Enhanced. Refer to page 10 for more information on this cable.

Deployment planning

Include the configuration settings for each station at each remote site and for each port at the host site in your deployment plan. Use Appendix A, "Planning forms", on page 275 to help with this task.

Before you can configure the system with Configuration Manager, you must configure PBX voice and data ports for each RLC port. See "Configuring remote and network ports" on page 106.

Checklists

Use the RLC Installation Checklist on page 48 as a guide to ensure complete RLC installation and configuration.

Planning forms

Appendix A, “Planning forms”, contains the following forms for you to record and store your configuration plans:

- Reach Line Card
- Connection Information—32 ports
- Online/Offline Table Configuration
- System expansion worksheet

Refer to “Related information products” on page xxii for information on accessing these forms online.

Taking inventory

After you unpack and visually inspect the equipment, verify that you have all the equipment at the site before beginning installation. Check the equipment you received against the shipping documents. Report any shortages to your Nortel Networks customer support representative immediately.

Installation checklist

When you are preparing to install your Meridian system, use the checklist on following pages to ensure that you complete all the required processes properly.

RLC Installation Checklist

Page 1 of 6

Use this checklist to ensure completion of all installation tasks.

Check	Task	For details, refer to
1. Planning		
❐	Check the Remote Office web site for the latest Release Notes with last-minute product updates.	the *Remote Office and RLC Release Notes* (NTP 555-8421-102) at the following address: **www.nortelnetworks.com**
❐	Ensure that you have the latest firmware and software.	the *Remote Office and RLC Release Notes* (NTP 555-8421-102). This document ships with Remote Office equipment. You can obtain additional copies online at the following address: **www.nortelnetworks.com**
❐	Ensure that your PBX platform and software release support the RLC.	"PBX hardware and software compatibility".
❐	Ensure that a slot is available on the PBX IPE shelf or Option 11 cabinet for each RLC. Order additional shelves if necessary.	your Nortel Networks distributor.
❐	To route calls over the IP network, the PSTN, or both, determine what you must do to implement these call routing methods.	"Deployment options".

RLC Installation Checklist

Page 2 of 6

Check	Task	For details, refer to
❒	If you want to use the IP network to route calls, evaluate the IP network to determine if the network infrastructure can support voice traffic.	■ your data network administrator ■ the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103) You can obtain this document online at the following address: **www.nortelnetworks.com**
❒	Plan the installation and cabling of RLCs.	Chapter 2, “Planning for installation”.
❒	Decide on the administration PC setup.	“Administration PC”.
❒	Obtain the cables that you need to establish the needed connections to the network.	“Reach Line Card cables”.
❒	Gather the configuration information (network addresses, connection numbers, online/offline schedule, QoS thresholds, and so on).	■ “Deployment options” ■ Appendix A, “Planning forms”
❒	Plan RLC port assignments.	“Connection Information—16 ports” or “Connection Information—32 ports”, depending on your RLC.
2. PBX configuration		
❒ ❒	Configure the PBX to recognize each RLC as an XDLC. Verify that the PBX recognizes each RLC as an XDLC.	documentation for your PBX.

RLC Installation Checklist

Page 3 of 6

Check	Task	For details, refer to
❐	If you want to use the PSTN to route calls, ensure that ISDN BRI or PRI trunks are installed and configured on the PBX for voice and data.	configuration on your PBX.
❐	Ensure that there is sufficient capacity on the trunks for the extra traffic involved in remote service operations.	configuration on your PBX and the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103). You can obtain this document online at the following address: **www.nortelnetworks.com**
❐ ❐	Configure a voice port (or data port for MCA) on the PBX for each remote user. (These ports are associated with Remote ports on the RLC.) Configure a data port (or voice port for 911x modem) on the PBX for each remote unit connection. (These ports are associated with Network ports on the RLC.)	documentation for your PBX.
3. Hardware and software installation		
❐	Install DSP application modules on the RLC, if required.	"Installing DSP application modules".
❐	Install and cable each RLC.	▪ "To install a RLC" ▪ "To cable a RLC"

RLC Installation Checklist

Page 4 of 6

Check	Task	For details, refer to
❐	Install the software from the product CD-ROM or download the software from the Nortel Networks web site.	“Installing the software”.
4. RLC configuration		
❐	Configure the IP address, subnet mask, and default gateway on the RLC.	“Using the Configuration Wizard to perform initial configuration”.
❐	If you want to use the PBX’s administration terminal to administer the RLC, configure the IP address and subnet mask of the RLC’s ELAN port.	“IP Configuration”.
❐	Configure the following items, as required, to create the communication paths between the RLC and the remote unit: ■ IP network: remote unit’s IP address ■ PSTN: remote unit’s telephone number ■ security level and, if required, security identifier	■ “Using the Configuration Wizard to perform initial configuration” ■ “To configure remote connection settings”
❐	Configure a Remote port on the RLC for each user. **Note:** The process of creating the PSTN communication path with the Configuration Wizard creates a Network port for each remote unit.	Chapter 6, “Configuring the Reach Line Card”.

RLC Installation Checklist

Page 5 of 6

Check	Task	For details, refer to
❐	Configure an Online/Offline Schedule for each remote unit, if required.	“Configuring an online/offline table”. **Note:** A blank online/offline schedule can be found in the Online/ Offline Table section of Configuration Manger.
5. Remote unit configuration		
❐	Ensure that the remote unit is configured with the information it needs to establish connections with the RLC.	the *Installation and Administration Guide* for the remote unit.
❐	Ensure that a station is configured for each remote user.	the *Remote Office 9150 Installation and Administration Guide* (NTP 555-8421-215), or the *Remote Office 911x Series Installation and Administration Guide* (NTP 555-8421-220), depending on remote site equipment.
6. Network configuration		
❐	Configure network devices ▪ so that voice traffic is not constrained or congested ▪ to maximize network efficiency for Voice over IP service	▪ your data network administrator ▪ the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103) You can obtain this document online at the following address: **www.nortelnetworks.com**

RLC Installation Checklist

Page 6 of 6

Check	Task	For details, refer to
  ❒ ❒	Ensure that voice calls can be sent or received over the following: ■ IP network ■ PSTN	■ your data network administrator ■ your telecom network administrator
❒ ❒	Ensure that processing of voice and data traffic over the IP network performs as expected. Adjust QoS transitioning settings, if required.	■ your data network administrator ■ your telecom network administrator ■ the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103) You can obtain this document online at the following address: **www.nortelnetworks.com**
7. Testing		
❒	PING the RLC to ensure that it is recognized as a device on the network.	“Testing the connections”.
❒	Ensure that calls can be made and received on each RLC port.	“Testing the connections”.
8. Administration		
❒	Plan for administration training and technical support.	■ Chapter 7, “Administration” ■ Chapter 8, “Troubleshooting”

Note: The RLC and Configuration Manager software are Year 2000 compliant.

System resources management

The RLC offers the following methods to manage system resources:

- QoS Transitioning Technology
- Host connection management
  — Configurable trunk connection accessibility (permanent or on-demand)
  — Call timers for managing of on-demand trunks
- Online/offline scheduling
- Configurable security

QoS Transitioning Technology

Traffic congestion often results in poor voice quality or lost connections on IP networks. For a description of the RLC's QoS Transitioning Technology, refer to "Adjustable quality of service using QoS Transitioning Technology" on page 15.

For detailed information on configuring QoS Transitioning Technology thresholds, refer to "Configuring Quality of Service" on page 182.

Host connection management

Manage connections to the host PBX in the following three ways:

- Configure an Online/Offline table for the remote site to determine when it can and cannot place or receive calls through the host PBX.
- Define a trunk connection as permanent or on-demand so that it is one of the following:
  — Always connected (permanent)
  — Connected when bandwidth required (on-demand)
- Define minimum call duration and idle timers to address call-establishment and PSTN charges, if the trunk connection is defined as on-demand.

Call-on-demand

The RLC supports full call-on-demand (COD) capability. In COD mode, the RLC does not establish a connection to the remote site until the remote unit places a call to a host DN. For further information on the RLC’s COD functionality, see “Call on-demand” on page 20.

Online/offline schedule

You can configure an online/offline schedule on the RLC to control when remote sites can place and receive calls through the host PBX.

Note: Online/offline schedules configured for Remote Office 9150 units affect all users connected to that unit.

Configure offline entries for the following situations:

- to restrict remote users from placing or receiving calls at certain times, such as during evenings and weekends
- to eliminate unwanted telephone access charges by preventing remote sites from staying online permanently

When the RLC processes an offline entry, it instructs the remote site to go offline for a certain number of hours and minutes. That number is the difference between the offline entry being processed and the next online entry.

For example, suppose you configure an offline entry for 6:00 p.m. and the next online entry for 9:00 a.m. the next day. When the RLC processes the 6:00 p.m. entry, it instructs the remote site to go offline for 15 hours.

When going offline, the system activates a timer at the remote site. When the timer expires (in the example above, at 9:00 a.m.), the remote site initiates a “going online” request to the host PBX. If the RLC successfully receives the request, the remote site and its telephones go online.

Changing the online/offline mode

You can put the remote site into online or offline mode at any time. Simply dial one of two special prefix (SPRE) codes at any remote site telephone set. Configure the online SPRE and offline SPRE codes through Configuration Manager. These codes must not conflict with the dialing plans used at the host PBX. See “9150 System Configuration” in the *Remote Office 9150 Installation and Administration Guide* (NTP 555-8421-215), for information on configuring SPRE codes.

Configurable security

Security settings apply to the RLC on a remote unit basis. Enter this information through Configuration Manager. Refer to “Remote Connection Configuration” on page 171.

The RLC offers three levels of security. For a detailed description of the RLC’s variable the security levels, refer to “Multiple security levels” on page 17.

Data network security

The RLC does not provide for data network security. To provide security on the data network, implement security on the data network devices.

System security

Two layers of security protect the RLC and its remote sites:

- Local password

  You must enter the local password when starting Configuration Manager software. If the person attempting to use Configuration Manager does not have the password, the Remote Office system blocks that person from accessing any Remote Office nodes.

- Node password

  Users must enter the node password before Configuration Manager displays the configuration of the logged-on node and allows modification of that configuration.

ATTENTION! Nortel Networks recommends that users retain the factory-set password until the system is up and running smoothly.

Lost or forgotten passwords

If you lose or forget your RLC or Configuration Manager password, contact your Nortel Networks supplier for assistance.

Network considerations

When you implement an RLC-based remote service system, consider the ways that the new equipment effects your current telecommunications and data networks.

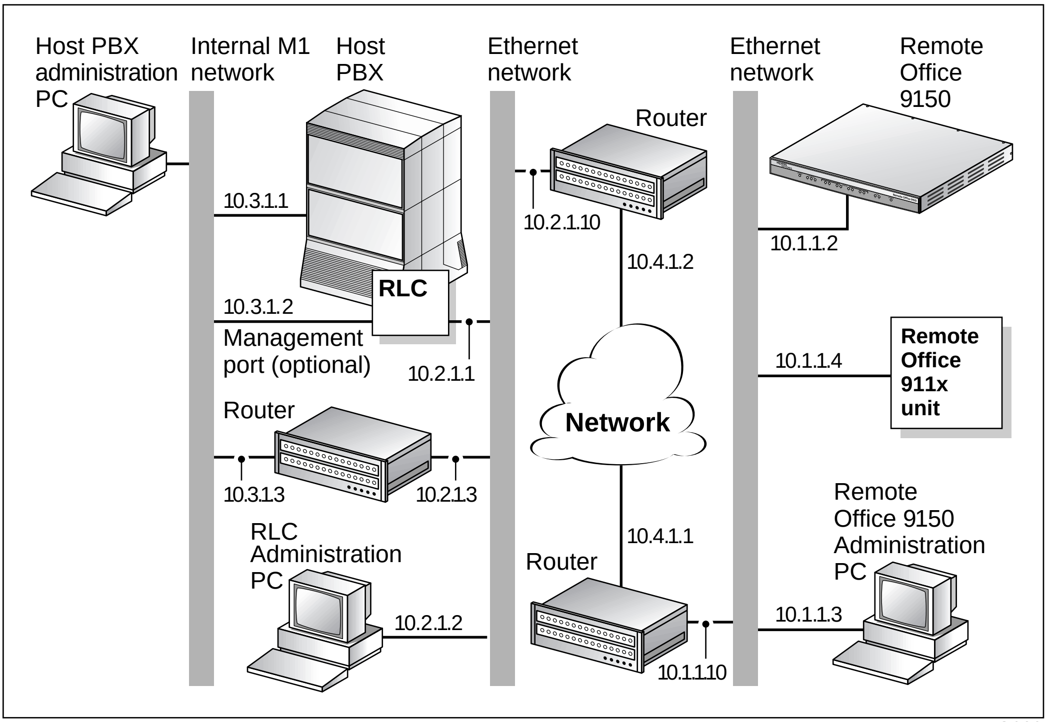
IP addressing and routing

To place and receive calls over the IP network, the RLC must have:

- A physical connection to the IP network
- A unique IP address and subnet mask

Network diagram

The following diagram shows the RLC's position in an IP network.



G029

Quality of service

The routers used on your IP network must handle voice traffic while introducing little or no congestion and few delays into the network. Network congestion or excessive delay adversely effects voice quality.

Trunks and dialing plans

To obtain an outside line on the local PSTN, users dial local trunk-access SPRE codes. The SPRE codes configured for remote sites must not conflict with the dialing plans used by the host PBX. Conflicts result in end-users not being able to place outgoing calls through the local PSTN.

Call blocking

The voice processing capacity of a remote system depends on the number of DSP application and trunk interface modules installed at the host and remote sites. Voice processing capacity defines the number of calls that can be active simultaneously and the amount of bandwidth the site can access.

Reducing call blocking in PSTN mode

Remote Office 9150 units use ISDN BRI trunks in PSTN mode. To reduce call blocking in the PSTN mode at the host location, you must increase the number of trunks available to the RLC.

Reducing call blocking in Voice over IP mode

One DSP application module provides the ability to support eight simultaneous Remote Office calls. To reduce call blocking for Voice over Internet Protocol (VoIP) calls, increase the number of DSP resources in your system. Do this at the host (RLC) site and, if the remote unit is a Remote Office 9150 unit, at the remote site. You can install up to four DSP application modules on a Remote Office 9150 unit and up to four DSP application modules on an RLC.

Calculating system requirements

For help in determining how many DSP application modules you need to install to reduce or eliminate call blocking, refer to “DSP requirements” on page 45 and the RLC System expansion worksheet on page 293.

Administration PC

Install the Windows-based RLC administration software on a PC in the Remote Office network. This section describes options for connecting an administration PC to the RLC. It also describes the hardware and software requirements of the administration software.

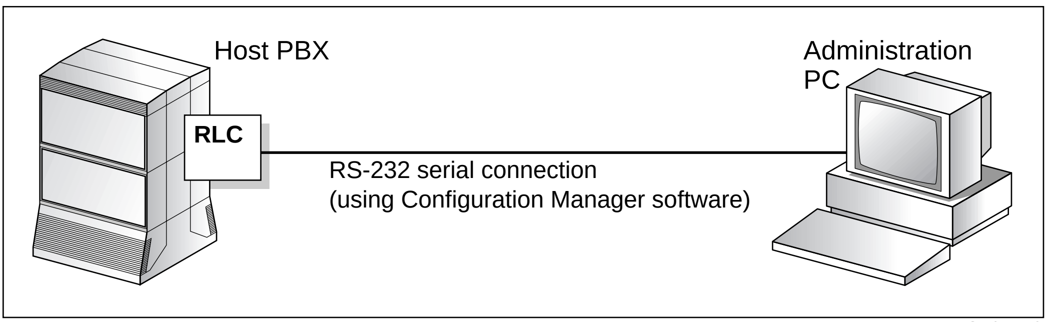
Connection options

The RLC product includes the Configuration Manager software that enables you to configure, administer, and upgrade the RLC. Perform these tasks over one of the following connections:

- RS-232 serial connection
- 10BaseT Ethernet connection

Serial connection

Use the serial connection when you first install and configure the RLC. You must establish a serial connection to the RLC, as shown in the illustration below, to enter the IP interface information.



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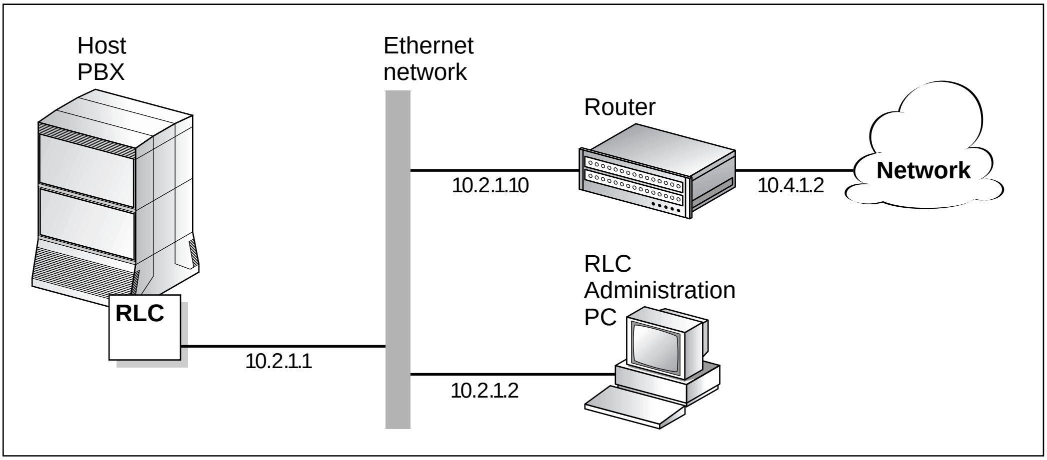
You can continue using the serial connection for ongoing administration of the RLC if you prefer.

Ethernet connection

Configure the RLC's IP interface information to allow calls to be routed between the RLC and remote units. This also allows RLC administration to take place over the IP network from a remote location.

Remote administration of the RLC means you can install the administration PC in a location different from that of the RLC.



G031

Administering multiple nodes

If you are responsible for administering the RLC on the host PBX and one or more remote units, you can access the RLC and the remote unit from anywhere on the network.

Windows PC requirements

To use Configuration Manager, the administration PC must:

- be an IBM-compatible PC
- use a Windows 95, 98, or NT operating system with the Microsoft TCP/IP networking component installed
- be equipped with a CD-ROM drive
- be equipped with a 10BaseT Ethernet interface card
- have an available COM port if you wish to use the RS-232 serial port to establish a direct serial connection
- be equipped with a pointing device, such as a mouse
- use Microsoft's IP stack
- have 32 MBytes of RAM for Windows 95 and 98, or 64 MBytes of RAM for Windows NT
- have 48 MBytes of available storage for Windows 95 and 98, or 64 MBytes of available storage for Windows NT

Trivial File Transfer Protocol server

Firmware upgrades and configuration uploads require that the administration PC have a TFTP server application installed. The administrator must know the TFTP server's IP address in the network. In other words, the IP address of the administration PC.

You can use any TFTP server application. These applications are available free of charge on the Internet.

Year 2000 compliance

The RLC and Configuration Manager software are Year 2000 compliant. However, ensure the administration PC is Year 2000 compliant by verifying that the Windows operating system meets the compliance requirement listed in the following table:

Operating system	Year 2000 compliance requirement
Windows 95	Version 95b
Windows 98	OK as is
Windows NT Workstation	Service Pack 5

Meridian Administration Tools and Configuration Manager

Nortel Networks does not guarantee that Meridian Administration Tools (MAT) and the Remote Office Configuration Manager can operate simultaneously on the same administration PC. Simultaneous running of these two applications has not been tested and is, therefore, not supported.

Planning for future growth

The RLC can change as your telecommunication needs change or grow. When determining remote port needs for your network, it is important to consider the number of users and estimated growth at each site in the network.

Adding DSP modules

The RLC ships with enough built-in DSP resources to support up to eight simultaneous telephone calls without the addition of any DSP application modules. For information on increasing the voice processing capability of the RLC, see “DSP requirements” on page 45.

For help determining how many DSP application modules you need to meet your call-processing expectations, see the “System expansion worksheet” on page 293. For instructions on installing additional DSP modules, see “Installing DSP application modules” on page 72.

Deployment options

You can install and configure the RLC on the host PBX and remote units at remote sites with the following network capabilities:

- only the IP network (Voice over IP)
- only the PSTN (for example, ISDN BRI trunks)
- both networks (required for QoS Transitioning Technology functionality)

If you choose not to use both networks initially, this section suggests how you can gradually phase-in Voice over IP and QoS Transitioning Technology functionality.

ATTENTION! Even if you plan to route calls over the PSTN only, you must assign an IP address and IP gateway to the RLC and remote units to allow remote administration.

Port and station assignment

Regardless of which network you use initially to route calls, you must plan RLC port and remote site user station assignments. Assign a single user to each RLC port, unless you are using the RLC's port sharing functionality (refer to "Port sharing options" on page 16). Use the following forms to plan port and station assignment:

- "Reach Line Card Connection Information—16 ports" on page 278
- "Reach Line Card Connection Information—32 ports" on page 283

Implementing PSTN mode

In a scenario involving the PSTN mode only, the PSTN processes all incoming and outgoing calls as follows:

IF the call is to or from the	THEN the call is in
host PBX,	host-controlled mode.
other PSTN customers,	local-controlled mode.

To implement PSTN mode, you must complete the following steps:

1 Determine how many simultaneous calls you want to process over the PSTN.

Note: Include all single-user Remote Office 911x series and Meridian Digital Telephone IP Adapter sites along with all multi-user Remote Office 9150 sites that use the same RLC in this calculation.

If the remote unit is a Remote Office 911x series unit, configure the appropriate number of DSP resources on the RLC for 911x use. For the necessary procedure, refer to Chapter 6.

2 Arrange for PSTN lines to each remote site if these lines are not already present.

3 Install up to four DSP application modules on the RLC to increase voice processing capability if needed.

Note: RLCs do not ship with DSP application modules installed.

4 Install ISDN BRI trunk interface and DSP application modules on each Remote Office 9150 unit if needed. Install up to four ISDN BRI modules and up to three DSP application modules.

Note: Remote Office 9150 units do not ship with trunk interface modules or DSP application modules installed.

5 Obtain the telephone number of the RLC port that the remote unit is assigned to. Configure this telephone number on the remote unit—the remote unit uses it to establish connections with the RLC.

6 For each remote unit, obtain the information for each PSTN line from the remote unit's telephone service provider. Configure this information on the remote unit to establish the trunk interface with the PSTN.

Note: For Remote Office 9150 units, remember to get this information for each ISDN BRI line.

7 Identify the telephone number assigned to the remote unit. Configure this telephone number on the RLC—the RLC uses it to establish connections with the remote site.

Implementing Voice over IP mode

In Voice over IP (VoIP) mode, the system processes all incoming and outgoing calls across the IP network through the host PBX. The system routes calls made to external parties to the PSTN using host PBX trunks. Calls processed through the host PBX are referred to as *host-controlled calls*.

Note: Local PSTN calls at Remote Office 9150 sites require access to ISDN BRI lines and the installation of ISDN BRI application modules in the Remote Office 9150 unit. Local PSTN calls made at Remote Office 9110 and Remote Office 9115 sites use analog, POTS lines. All calls not routed through the host PBX, whether ISDN or POTS, are referred to as *locally controlled calls.*

To implement VoIP mode for host-controlled calls:

1 Determine how many simultaneous calls you want to process. This helps you to determine how many DSP application modules to install on the RLC. To do this, complete the RLC System expansion worksheet on page 293.

2 Install DSP application modules on the RLC, if needed.

3 Obtain the IP address assigned to the remote unit. Configure this IP address on the RLC—the RLC uses it to establish connections with the remote unit.

4 Obtain the IP address assigned to the RLC. Configure this IP address on the remote unit—the remote unit uses it to establish connections with the RLC.

5 Run this stage with a small number of users at first. Before applying VoIP mode to your entire remote network, you must ensure that one of the following is true:

- Your IP network can handle the addition of remote network traffic.
- You can identify the kinds of configuration adjustments you need to make to the IP network so that it can handle the additional traffic.

When you are satisfied with the IP network performance, continue with QoS Transitioning Technology implementation.

Implementing Quality of Service Transitioning Technology

To implement the QoS Transitioning Technology, you must understand characteristics of your IP network, such as:

- when the network experiences busy times
- how much traffic the network processes (during normal and busy traffic periods)
- how to evaluate and adjust your network's QoS

Consult with your data network administrator. Refer also to the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103). Refer to "Related information products" on page xxii for information on obtaining this document.

Once you understand this information, determine the QoS settings that you want, then configure them on each RLC port. For instructions, refer to "Configuring Quality of Service" on page 182.

If IP mode is not the first stage in your network implementation, run this stage with a minimal number of users until you are sure that QoS on your IP network is acceptable. When you are satisfied with QoS transitioning performance, deploy the capability to the entire network.

If you are configuring QoS Transitioning Technology for Remote Office 911x series units, on the RLC you must configure at least one DSP device with the DSP load "911X". Each DSP device configured with the DSP load "911X" supports four modem channels.

Chapter 3

Installing the RLC

In this chapter

General safety

This section describes general safety guidelines recommended by Nortel Networks, and tools needed for installation. Follow the safety guidelines and recommendations in this chapter whenever you perform installation or maintenance tasks on the RLC.

CAUTION

Risk of data loss or equipment damage
Electrostatic discharge (ESD) effects the performance and decreases the useful life of system components. It can seriously damage component parts, such as RLCs and DSP application modules.

Precautionary messages

This guide provides warnings related to hardware installation and handling, such as the preceding caution. For a description of these warnings, refer to “Conventions used in this guide” on page xx.

Required tools for hardware installation

Items needed for hardware installation include the following:

- antistatic ESD wrist strap (recommended)
- phillips-head screwdriver
- slot-head screwdriver
- pen or pencil for
  — noting cable lengths
  — labeling cables
- cable-tie wraps
- cable identification labels
- tape measure

Required tools for software installation or upgrade

Items needed for software installation or upgrade include the following:

- *Remote Office Product CD-ROM*
- network connection to the Nortel Networks website for obtaining upgrade files

Installing DSP application modules

Install DSP application modules (NTDR73xx) in the expansion slots on your RLC. This increases the number of simultaneous ports, and telephone lines, that you can use at remote sites. To add DSP application modules to your RLC, follow these procedures:

1 Determine the number of DSP application modules that meets your needs using the System expansion worksheet on page 293.

2 Install DSP application modules using the procedure on page 73.

Determining how many DSP application modules to add

To determine the number of DSP application modules your RLC needs, refer to the System expansion worksheet on page 293. For more information on how DSP application modules fit into your Remote Office system, refer to “DSP requirements” on page 45.

After receiving the DSP application modules from Nortel Networks, install them according to the procedure found under “Installing DSP application modules” on page 73.

Handling DSP application modules

Before beginning the installation and configuration process, review “General safety” on page 70. Follow the safety precautions and warnings found there to protect your investment in your telecommunications network.

CAUTION

Risk of data loss or equipment damage
Be certain you are properly grounded before handling DSP application modules or the RLC.

Installing DSP application modules

To install DSP application modules:

1 Clear a flat, static-free work area with sufficient space to hold your RLC and DSP application modules.

2 Place the DSP application modules in the work area.

Note: Keep the DSP application modules in their antistatic bags.

3 Move the RLC from the host PBX to the work area.

4 Remove a DSP application module from its antistatic bag, holding it by its edges, with the insertion tabs facing down.

5 Insert the tabs into a pair of expansion slots on the RLC. (Refer to the illustration on page 5 for location of expansion slots.) The tabs snap into place when fully inserted. Visually inspect each tab to make sure that there is no gap and that the tab is fully inserted.

Identifying the cables

Cable your RLC according to the needs of your system. The following table identifies the cables available from Nortel Networks according to the connectivity provided by each.

IF you use the	THEN you can connect to
RLC Multi-I/O cable–Basic (NTDR79xx),	■ the PSTN. ■ the Voice over Internet Protocol (VoIP) network.
RLC Multi-I/O cable–Enhanced (NTDR80xx),	■ the PSTN. ■ the Voice over Internet Protocol (VoIP) network. ■ locally connected telephones.

Pin-out tables for these cables are located in Appendix C, “Pin-out tables for RLC Multi-I/O cables”.

RLC Multi-I/O cable–Basic (NTDR79xx)

The RLC Multi-I/O cable–Basic provides three connections. Any number of RLCs in any card slot can use the Basic cable.

The following table outlines the connections provided by the RLC Multi-I/O cable–Basic.

<table>
<tr><th>The connector labeled</th><th>is a</th><th>that transmits</th><th>and connects to the</th></tr>
<tr><td>P1</td><td>25-pair connector (female)</td><td>all signals</td><td>I/O panel.</td></tr>
<tr><td colspan="4">Note: For a 32-port RLC, insert P1 into the socket for the first card slot occupied by the RLC.</td></tr>
<tr><td>P2</td><td>DB-15 connector (male)</td><td>10BaseT signaling</td><td>CLAN Ethernet (customer LAN on the network).</td></tr>
<tr><td colspan="4">Note: P2 requires a DB-15 to RJ-45 converter (shipped with the cable).</td></tr>
<tr><td>P3</td><td>DB-9 connector (female)</td><td>RS-232 signaling</td><td>serial port to admin PC for administration and maintenance.</td></tr>
</table>

Refer to page 9 for an illustration of the RLC Multi-I/O cable–Basic.

RLC Multi-I/O cable–Enhanced (NTDR80xx)

The RLC Multi-I/O cable–Enhanced provides six connections. You can purchase the RLC Multi-I/O cable–Enhanced separately from Nortel Networks.

Note: Special rules apply if using more than one RLC Multi-I/O cable–Enhanced in one Option 11 cabinet. For further details, contact your Nortel Network distributor.

The following table describes the connectors of the RLC Multi-I/O cable–Enhanced:

The connector labeled	is a	that transmits	and connects to the
P1	female 25-pair connector	all signals	I/O panel.
Note: If you are using a 32-port RLC, insert **P1** into the socket for the first of the two card slots occupied by the RLC.			
P2	male DB-15 connector	10BaseT signaling	CLAN Ethernet (customer LAN on the network).
Note: In North America, P2 requires a DB-15 to RJ-45 converter (shipped with the cable). Outside North America this plug is a female RJ-45 connector.			
P3	female DB-9 connector	RS-232 signaling	serial port to admin PC for administration and maintenance.
P4	male DB-15 connector	10BaseT signaling	ELAN Ethernet (host PBX’s embedded LAN).
Note: In North America, P4 requires a DB-15 to RJ-45 converter (shipped with the cable). Outside North America this plug is a female RJ-45 connector.			
P5	male 25-pair connector	TCM signaling	cross-connect to local telephones.
P6	male DB-25	(For future use.)	

Notes:

- Refer to page 11 for an illustration of the RLC Multi-I/O cable–Enhanced.
- The illustration on page 13 shows the RLC Multi-I/O cable–Enhanced used in installations outside North America.

Installing the Reach Line Card

The process of installing the Reach Line Card (RLC) involves:

- preparing the switch
- placing the RLC into its slot
- connecting the cables to the RLC

In systems with multiple RLCs, the process is the same for each one.

Preparing for installation

Configure the RLC's slot as if it were to hold an Extended Digital Line Card (XDLC). Refer to the documentation specific to your PBX for the exact procedures.

Split-slot wiring

If you use a NT8D37AA IPE cabinet, refer to the important note concerning the wiring of these cabinets on page 3.

Installing an RLC

To install an RLC:

1 Insert the RLC into its card slot.

Ensure that the tips of the ejector tabs are inside the front edges of the shelf when the card is fully inserted.

2 Lock the RLC into position by pushing the handles toward one another until they touch the faceplate.

If you meet with inappropriate resistance, stop and reposition the card.

Refer to "LED indicators" on page 7 for the sequence of events that signify a successful RLC installation.

3 Verify that the host PBX recognizes the presence of the RLC. (Refer to the documentation specific to your PBX for exact procedures.)

Connecting the cables to an RLC

To connect the cables for an RLC:

1 Plug **P1** of the RLC Multi-I/O cable (Basic or Enhanced), the female 25-pair connector, into the 25-pair shelf connector associated with the slot occupied by the RLC.

Note: If you are connecting the cables to a 32-channel RLC, use the shelf connector associated with the first of the two slots occupied by the RLC.

IF installing the	THEN proceed to
RLC Multi-I/O cable–Basic,	step 2.
RLC Multi-I/O cable–Enhanced in North America,	step 2.
RLC Multi-I/O cable–Enhanced in a location other than North America,	step 3.

2 Plug **P2**, the male DB-15 connector (if using the Enhanced cable, this is the first male DB-15 connector), into a DB-15 to RJ-45 adapter (NT7R93CA).

Note: The RLC Multi-I/O cable–Enhanced ships with this adapter. This adapter is not an active transceiver.

a. Plug one end of a *shielded* (to meet CISPR B requirements) CAT 5 data cable of sufficient length to reach your Ethernet hub into the other side of the DB15 to RJ45 adapter connected to P2.

b. Plug the other end of the CAT5 data cable into your Ethernet hub.

c. Proceed to step 4.

3 Plug **P2**, the male DB-45 connector into a female RJ-45 connector at one end of a *shielded* (to meet CISPR B requirements) CAT 5 data cable of sufficient length to reach your Ethernet hub.

a. Plug the other end of the CAT5 data cable into your Ethernet hub.

4 Plug **P3**, the female DB-9 connector of the RLC Multi-I/O cable (Basic or Enhanced), into the Remote Office administration PC.

IF installing the	THEN proceed to
RLC Multi-I/O cable–Basic,	“Verifying the installation” on page 81.
RLC Multi-I/O cable–Enhanced in North America,	step 5.
RLC Multi-I/O cable–Enhanced in a location other than North America,	step 6.

5 Plug **P4**, the second male DB-15 connector of the RLC Multi-I/O cable–Enhanced, into a DB15 to RJ45 adapter (NT7R93CA).

Note: The RLC Multi-I/O cable–Enhanced ships with this adapter. This adapter is not an active transceiver.

a. Plug one end of a *shielded* (to meet CISPR B requirements) CAT 5 data cable of sufficient length to reach your Ethernet hub into the other side of the DB15 to RJ45 adapter connected to P2.

b. Plug the other end of the CAT5 data cable into your Ethernet hub.

c. Proceed to “Verifying the installation” on page 81.

6 Plug **P5**, the second 25-pair connector, into the cross-connect device serving the local telephones that you want to attach to RLC ports not needed for remote service purposes.

7 P6 is reserved for future use.

Verifying the installation

Once you have finished installing your RLC and connecting the cables, verify that you have completed these procedures properly according to the indications discussed below.

Indications of proper installation

An RLC automatically performs a self-test when inserted into its card slot. A successful self-test indicates proper installation. The Maintenance LED confirms a successful self-test by:

- blinking three times
- turning off (when enabled by the switch)
- remaining off (if enabled by the switch)

Note: Refer to "LED indicators" on page 7 for a further explanation of LED behavior at startup.

Indications of proper cable connections

The ability to successfully log on to the RLC using Configuration Manager software indicates proper cable connections at the RLC. To perform this task, install the software first (refer to page 82). Once this task is completed, continue with "Starting Configuration Manager" on page 84.

Confirm the cable connections before attempting the troubleshooting procedures.

Note: If the RLC cables are properly connected and you still cannot log on, refer to Chapter 8, "Troubleshooting".

Configuration Manager software installation

Use Configuration Manager software to configure and administer the RLC. This software arrives on the CD provided in the package. You must install this software on the administration PC to configure and administer the RLC and the Remote Office system.

What's next?

After you install the software on the administration PC, start Configuration Manager and run the Configuration Wizard. The Configuration Wizard allows you to perform initial configuration quickly and easily.

For instructions, refer to "Using the Configuration Wizard to perform initial configuration" on page 83.

Note: Leave DLL files installed by the Configuration Manager InstallShield in the Windows system directory. Do not move these files to any other directory.

Using the Configuration Wizard to perform initial configuration

The Configuration Wizard option in Configuration Manager allows you to configure the minimum information needed for establishing communications between the RLC at the host site and the following remote-site products:

- Remote Office 9110
- Remote Office 9115
- Remote Office 9150
- Meridian Digital Telephone Internal IP Adapter
- Meridian Digital Telephone External IP Adapter

The Configuration Wizard provides only a subset of the full configuration settings available in Configuration Manager. However, by using the Configuration Wizard, the RLC can be up and running within 10 minutes.

You can use the Configuration Wizard in offline mode or while connected and logged on to the RLC (online mode).

What you can configure with the Configuration Wizard

The Configuration Wizard allows you to configure the following elements:

- the RLC's IP address, subnet mask, and default gateway

  This information must be valid for your IP network.

  Note: If you do not plan to use the IP network to route calls, you must still enter this information for administration purposes. If you do not have an IP network in place, the procedure on page 89 provides sample information.
- for voice over IP capability:

  — the IP addresses for each remote unit connected to the RLC
- for PSTN capability:

  — the RLC port used for connection to the remote unit

  — the telephone number of the remote unit

Ensure that you have this information ready before you begin.

ATTENTION

If, after completing configuration with the Configuration Wizard, you want to modify any settings, you must use Configuration Manager.

Starting Configuration Manager

To start Configuration Manager:

1 Click on Start → Programs → Remote Office → Configuration Manager.

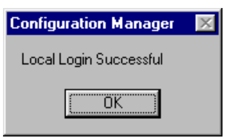
Result: Configuration Manager opens and displays the Local User Authentication dialog box, similar to the following, prompting you for the login name and password:

2 Enter **admin** in the Login Name field.

3 Enter **root** in the Password field.

4 Click on the **OK** button.

Result: The Configuration Manager dialog box displays informing you of a successful log on.



5 Click on the **OK** button.

Result: The Configuration Manager dialog box disappears.

6 Do one of the following:

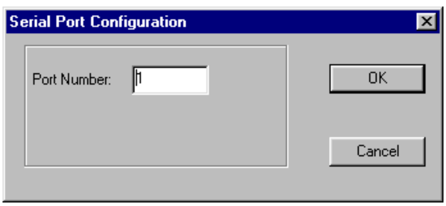
IF you want to perform an	**THEN**
offline configuration,	■ Choose View › Device Type › RLC. ■ Continue with “Performing configuration with the Configuration Wizard” on page 88.
online configuration,	continue with “Establishing a serial connection”, below.

Establishing a serial connection

To establish a serial connection:

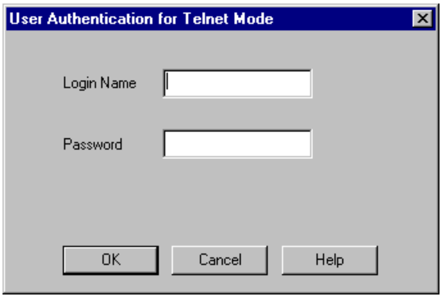
1 From the Menu Bar, choose Connect → Logon Unit → Serial.

Result: The Serial Port Configuration dialog box displays, similar to the following:



2 Enter the COM port number the unit is connected to in the Port Number field, and then click on the **OK** button.

Result: The User Authentication for Telnet Mode dialog box displays, similar to the following:



3 Enter **guest** in the Login Name field.

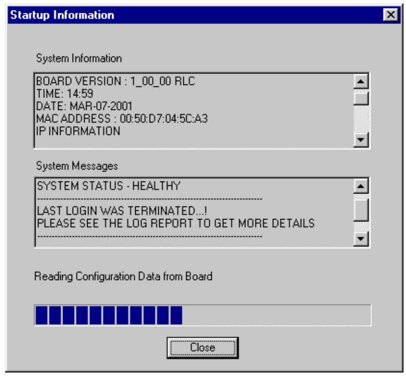
4 Enter the default password, **guest123**, in the Password field.

Note: Nortel Networks recommends that you do not change the password until your system is up and running.

Result: Configuration Manager initiates a connection attempt and displays the following message:

`Trying Connection`

IF the logon attempt	THEN
failed,	the following message displays: `10060 SERIAL CONNECTION FAILED` Go back to step 1.

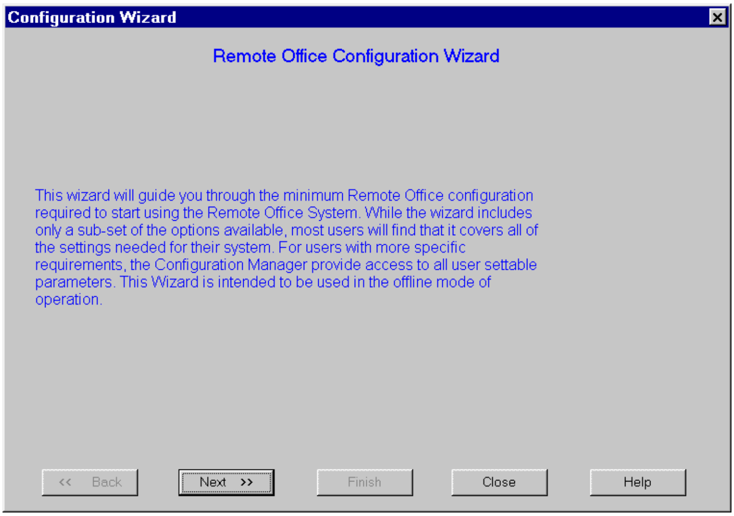
IF the logon attempt	THEN
is successful,	the User Logged In dialog box displays. Click on the **OK** button. **Result:** The Startup Information dialog box displays, similar to following:  Messages similar to the following appear above the progress bar at the bottom of the dialog box: ■ Reading Hardware Information ■ Reading DSP Load Data ■ Reading Configuration Data These messages indicate that Configuration Manager is obtaining the unit's configuration information from Flash memory. Click on the **Close** button.

Performing configuration with the Configuration Wizard

To perform configuration with the Configuration Wizard:

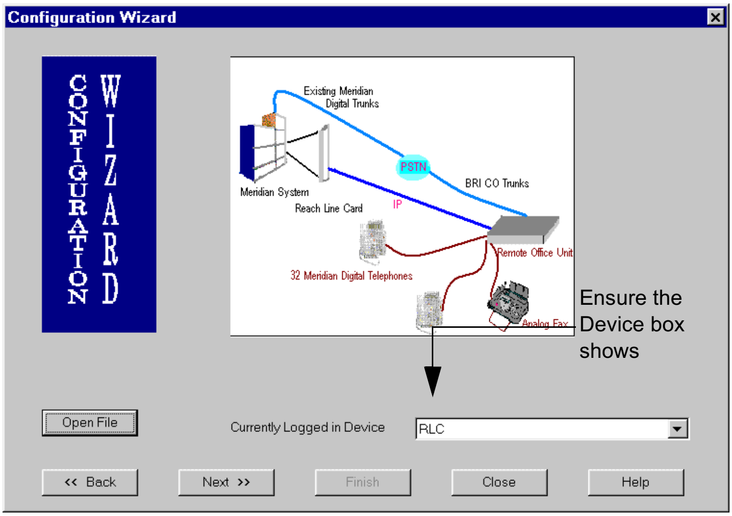
1 From the Menu Bar, choose Configuration Wizard.

Result: The Configuration Wizard screen displays, similar to the following:



2 After reviewing the message, click on the **Next** button.

Result: The Configuration Wizard screen displays, similar to the following:



3 Verify that the Currently Logged in Device drop down box shows RLC. If it does not show RLC, select RLC from the drop down list.

4 Click on the **Next** button.

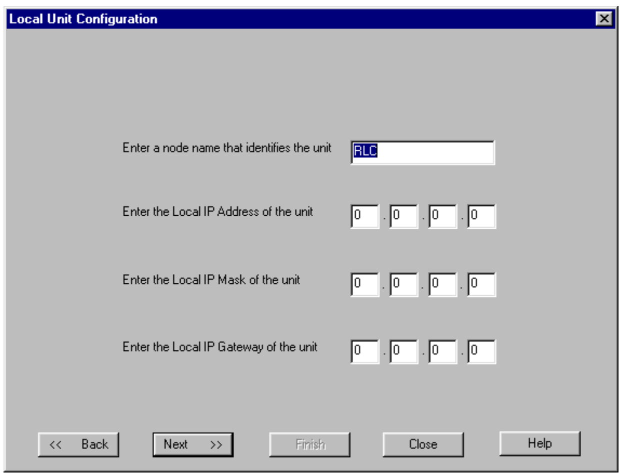
Result: The Local Unit Configuration dialog box displays. A completed example is shown on page 90.

5 Complete the fields in this dialog box as described in the following table:

Field	Description
Enter a node name that identifies the unit	Enter a name to describe the RLC you are configuring.
Enter the local IP Address of the unit	Enter the IP address assigned to the RLC. **Note:** The system requires that you enter an IP address. If you are using PSTN only, enter the following: **1.2.3.4**.

Field	Description
Enter the Local IP Mask of the unit	Enter the subnet mask. **Note:** The system requires that you enter an IP address. If you are using PSTN only, enter the following: **255.255.0.0**.
Enter the Local IP Gateway of the unit	Enter the IP address of the gateway between the RLC and the network. **Note:** The system requires that you enter an IP address. If you are using the PSTN only, enter **1.2.3.5.** as both the IP address on the administration PC and gateway on the RLC.

The following is a completed example:



The IP information allows you to administer the RLC from any location on the

6 Click on the **Next** button.

Result: The Set the Remote Unit information dialog box displays. A completed example is shown on page 93.

7 Complete the fields on this screen as described in the following table:

Field	**Description**
Set the Number of Remote Units	Enter the number of remote units you plan to connect to this RLC.
Set the Unit Number of the Remote unit	Enter the number that uniquely identifies the remote unit record you are configuring. **Note:** You must give each unit that is connected to the same RLC a unique unit record number. Do not confuse this number with the unit ID (described below).
Wish to Enable IP Voice Connection to Remote	■ Click on the **Yes** option button if using the IP network to route calls. Then, enter the remote unit's IP address. ■ Click on the **No** option button if not using the IP network. Configuration Manager dims the IP Address boxes.

<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Wish to Enable PSTN Voice Connection to Remote</td><td>

Click on the Yes option button if using the PSTN to route calls. Then complete the following steps:
<ol type="a">
Enter the number of the RLC port that you want to dedicate for connections to this remote unit.

Note: The port must be a PBX data port.
Enter the telephone number that you must dial to connect to the remote unit.

The telephone number can include the following digits or characters: 0 through 9, #, *, comma (,), period (.), and dash (-).

Trunk access digit delimiter: “#” (pound/number sign)
Caller ID separator and 1/2 second delay: “,” (comma)
Caller ID separator: “.” (period)
null separator: “-” (dash)

Refer to “Configuring 10-digit ISDN numbers” on page 175 for more information.
Click on the No option button if not using the PSTN. The PSTN Voice Connection boxes are dimmed.

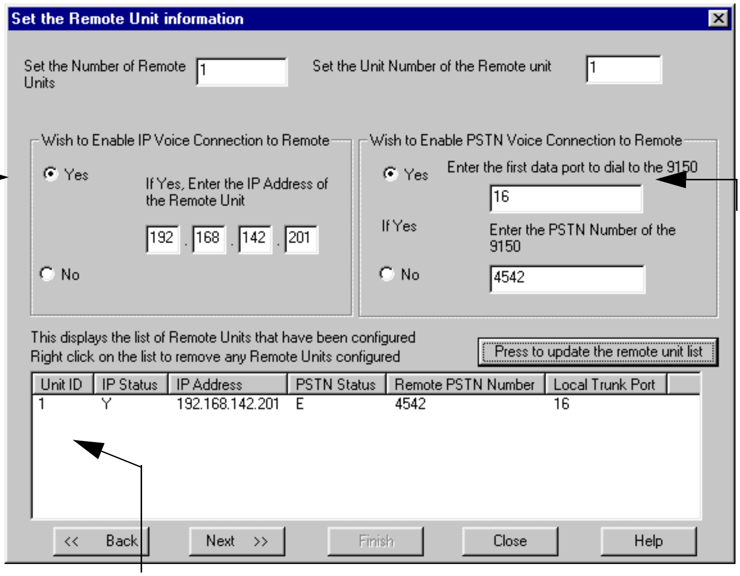
</td></tr>
</table>

8 Click on the **Press to update the remote unit list** button.

Result: The information entered for this remote unit appears in the list of configured remote units in the lower half of the Set the Remote Unit information dialog box.

The following is a completed example:

Click on the **Yes** option button to allow voice calls over IP, then enter the remote unit's IP address.



Click on the **Yes** option button to allow voice calls over the PSTN, then enter the remote unit's phone

This table allows you to configure connections for more than one remote unit.

9 Repeat steps 7 and 8 for each remote unit you need to configure.

10 Click on the **Next** button.

Result: The following screen displays:

11 Do one of the following:

IF you are performing an	THEN
offline configuration,	**1** Click on the **Save to File** button. **Result:** Configuration Manager prompts you to specify the directory path and file name for the configuration file. **2** Specify the directory path and file name for this configuration. **Note:** The file name automatically defaults to the name you entered as the node name. **3** Ensure the Files of type box shows Text File (*.TXT). **4** Click on the **Save** button to complete the Save to File. **Result:** The file is saved, then you are asked if you want to configure another board. If you do, click on the **Yes** button and continue with step 3 on page 89. **5** You can open the information in this file in Configuration Manager, then send and save the file in the RLC's flash memory at another time. For instructions, refer to "Working with configuration files" on page 132.

IF you are performing an	THEN
online configuration,	**1** Choose Upload/Download → Save to Flash from the Menu Bar. **Result:** Configuration Manager writes the information entered to the flash memory of the RLC you are configuring. If successful, Configuration Manager displays the following message: `Data Sent Successfully` **Note:** Nortel Networks recommends that you also save the configuration to a file. For instructions on how to do this with Configuration Manager, refer to the documentation for your unit. **2** Restart the RLC.

What's next?

Now that you have configured the minimum information required for network connectivity, perform the following tasks:

- test the network connections.

  For instructions, refer to "Testing the connections" on page 96.
- perform additional configuration, if needed.

  For instructions, refer to Chapter 6, "Configuring the RLC".

Testing the connections

Use the following methods to test the connections to the RLC:

1. Check your system's host-site connections to ensure basic PSTN and IP Network connectivity.
2. Perform a PING test. To perform this test, the following must be true:
   - The RLC must be physically connected to the IP network.
   - A link LED must be on.
   - You must be physically connected to the network.
   - You must be logged on to Configuration Manager.

Check host site connections

When testing the connections in your remote services network, you must first confirm that the equipment is connected properly at the host site.

Telephone network connections

Check the following points in your telephone network connection:

- Confirm that the proper connections are made for the digital telephones at the cross-connect system in your corporate switch room.
- Confirm that the RJ11 plug of the telephone wire leading to the digital telephone is properly and securely seated in the RJ11 jack in the wall.
- Confirm that the RJ11 plug at the other end of the telephone wire is properly and securely seated in the RJ11 jack at the base of the digital telephone.

If you are using the RLC Multi-I/O cable–Enhanced, check the following points, in addition to the items listed above:

- Confirm that the 25-pair connector of Plug 5 and the 25-pair connector of a cable leading to your cross-connect are properly and securely joined.
- Confirm that the 25-pair connector at the other end of the cable mentioned in the previous step is properly and securely joined to the 25-pair socket of the cross-connect.

- Confirm that the cable leading from the RLC to the cross-connect is in good condition, end-to-end.

Ethernet connection

Check the following points in your Ethernet connection:

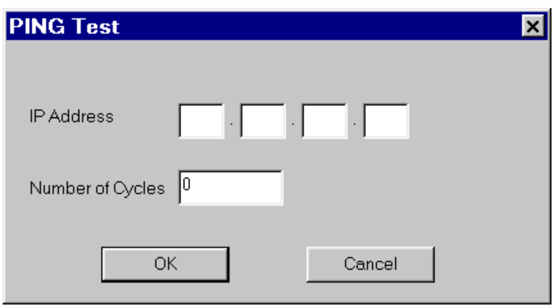
- Confirm that the DB15–RJ45 adapter at Plug 2 of the RLC Multi-I/O cable–Enhanced is properly and securely joined to Plug 2.
- Confirm that the RJ45 plug of a CAT5 data cable leading to your Ethernet hub is properly and securely seated in the RJ45 socket of the DB15–RJ45 adapter mentioned in the previous step.
- Confirm that the other end of the CAT5 data cable mentioned in the previous step is properly and securely seated in the appropriate Ethernet hub socket.
- Confirm that the CAT5 data cable leading to your Ethernet network's data router is properly and securely seated in the appropriate Ethernet hub socket.
- Confirm that the CAT5 data cable leading from your Ethernet hub is properly and securely seated in the appropriate socket of the data router mentioned in the previous step.

Performing a Configuration Manager PING

To perform a Configuration Manager PING:

1. From the menu, choose Tests → Ping.

   Result: The PING Test dialog box appears.



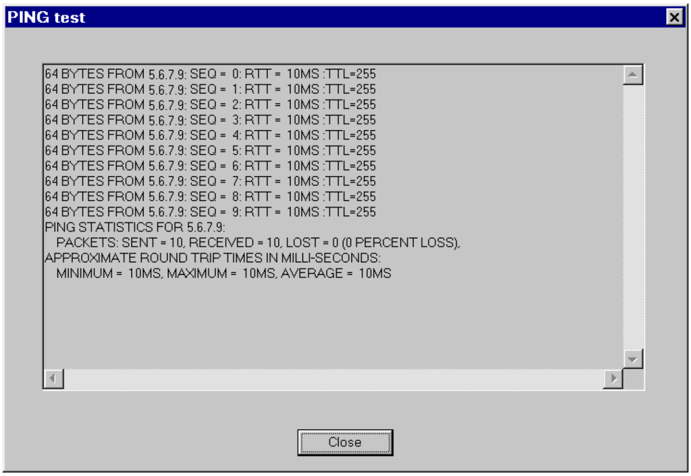
2. Enter the IP Address of the unit you want to ping.

3 In the Number of Cycles field, enter the number of times you want to ping the unit.

Note: The number must be in the range of 1 to 100.

4 Click on the **OK** button.

Result: The PING test results screen appears, showing the PING results. The following is an example of a successful PING.



5 Click on the **Close** button.

Result: The PING test screen closes.

Unsuccessful PING options

If the PING was unsuccessful:

1 Ensure you have entered the IP address, subnet mask, and default gateway correctly.

2 PING the gateway to see if it responds.

3 Contact your data network administrator if the PING still does not work.

What’s next?

Once you have confirmed that the RLC can be recognized on the network, you can begin to configure it. Nortel Networks recommends that you also change the passwords for logging on to both Configuration Manager and the RLC.

For a description of Configuration Manager, refer to “What is Configuration Manager?” on page 120. To change passwords, refer to “Changing the administration password” on page 198.

Chapter 4

Configuring the host PBX for the RLC

In this chapter

Configuring the host trunk for a Remote Office 9150 unit

Remote Office 9150 units require an end-to-end digital connection. Tell your service provider which type of ISDN connection (PRI or BRI) that you need for your remote service equipment. Nortel Networks recommends ISDN PRI trunks for connecting the CO to the host PBX. Tell your service provider the parameters to configure on the trunk according to the features that you want on the devices at your remote location. For more information on Remote Office trunk configuration, refer to the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103). To locate this document, click on the Customer Support, Documentation, and North America links at the following website:

www.nortelnetworks.com

ISDN PRI configuration

ISDN PRI trunks transport Remote Office 9150 unit calls between the host PBX and the PSTN. To ensure full functionality for all remote sites served by each RLC, ask your service provider to configure the following elements on each trunk:

- two-way voice and two-way data capability
- caller ID
- end-to-end digital circuitry, no analog segments (confirm this with both long-distance and local service providers)
- non-blocking configuration (ensure that configuration will not block remote site traffic)
- 56K or 64K clear channel, according to your equipment

ISDN BRI configuration

Some locations require ISDN BRI service from the host PBX (the host trunk connection) instead of PRI for geographical reasons. ISDN BRI configuration is identical to ISDN PRI configuration. Verify this with your service provider. For information about ordering BRI service, refer to the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103). For information on how to obtain this document, refer to “Related information products” on page xxii.

Note: In North America, an ISDN BRI line can only be ordered as a subscriber line and is not a valid trunk option.

Configuring an RLC slot

For the host PBX to communicate properly with RLCs, you must configure each RLC slot as an Extended Digital Line Card (XDLC) slot. Refer to the documentation for your PBX to complete this procedure.

Understanding port relationships

This section focuses on the relationship between the two principle RLC ports in a system using the PSTN:

- remote ports
- network ports

ATTENTION This section is critical to your understanding the operation of the Reach Line Card.

Functionality provided by the various port types

You can configure ports on the RLC as one of the following:

- a remote port

  Remote ports support digital telephones on remote units for host-controlled calls. The PBX features and DNs assigned to the RLC ports are the PBX features and DNs available to the remote telephones.

- a network port

  Network ports place and receive PSTN calls to and from remote devices. Network ports require only the most basic configuration on the host PBX that allows this port to place and receive calls of the appropriate type for the particular remote unit. RLC network ports do not use PBX features such as conference or call forward.

  When Quality of Service on the IP network degrades, QoS Transitioning Technology opens PSTN connections using paths provided by the network ports. Refer to “Configuring Quality of Service” on page 182 for information on configuring QoS thresholds.

- a local TCM port

  Local TCM ports support local telephones connected at the host PBX.

Configuring remote and network ports

Observe the following rules when configuring remote and network ports for Remote Office systems.

General

Basic Remote Office configuration starts with the guidelines listed in this section.

- Configure one remote port for each remote device, such as a digital telephone or a fax machine, that you want the RLC to support.
- Configure at least one network port for each Remote Office unit that you want to support with the RLC.

Note: Each network port provides up to 64K of PSTN bandwidth between the RLC and the Remote Office 9150 unit. To provide 256K of bandwidth between the RLC and a Remote Office 9150 unit, configure four network ports. For the specific procedure to configure remote and network ports, refer to the documentation for your PBX.

At your PBX administration terminal, configure voice ports to the appropriate RLC remote ports supporting remote digital sets using any of the following:

- Remote Office 9150 units
- Remote Office 911x units
- Meridian Digital Telephone Internal IP Adapters
- Meridian Digital Telephone External IP Adapter
- Analog Telephone Adapters (ATAs)

Note: Remote Office 911x units do not support ATAs.

RLCs

One 16-port RLC supports a maximum of four Remote Office 9150 units, 16 Remote Office 911x series units, or 16 Meridian Digital Telephone IP Adapter units.

One 32-port RLC supports a maximum of four Remote Office 9150 units, 20 Remote Office 911x series units, or 20 Meridian Digital Telephone IP Adapter units.

Remote Office 9150 units

Every port on a single Remote Office 9150 unit must be served by the same RLC.

Remote Office 911x series units and Meridian Digital Telephone IP Adapter units

Associate every Remote Office 911x unit or Meridian Digital Telephone IP Adapter unit with one port on an RLC.

Refer to your PBX documentation for the exact procedures and a complete list of possible settings for voice and data ports.

Remote port configuration

Configure each remote port on the host PBX according to the device connected to it at the remote site. If that device is a telephone, configure the port with all the features (for example, voice mail and call transfer) that you want.

- On the host PBX, configure ports for all remote service digital telephones as voice ports.
- On the host PBX, configure ports for all remote service MCA data adapters supported by the RLC as data ports (Remote Office 9150 units only).
- If you have enough data ports available on your Remote Office 9150 unit, configure ATA data adapters supported by the RLC as data ports on the host PBX. If you do not have enough data ports available, you can set up ATAs on voice ports on the host PBX.

Note: Remote Office 911x series units do not support data adapters.

Fax relay support

You can use the following compression algorithms for fax transmission:

- G.711

  If you select G.711, then faxes are transmitted at 64 Kbps. In this mode, the fax protocol is not interpreted. Therefore, all non-standard fax features are supported regardless of the manufacturer.

- G.729/Fax

  If you select G.729/Fax, then the fax protocol is interpreted, and the fax modem is demodulated in an attempt to reduce the amount of bandwidth that is consumed. In this mode, the fax transmission is restricted automatically to 9.6 Kbps. The G.729/Fax algorithm provides more bandwidth efficiency at the expense of greater protocol-sensitivity and potentially lower fax speeds.

Note: Error Correction Mode (ECM) is automatically disabled during fax relay.

Configuration for fax relay support

On the host PBX, you must configure the TN associated with any remote analog ports (ATA or the Remote Office 9150 unit analog port) as a voice port.

Do this by ensuring that the remote ATA devices, or the Remote Office analog port, map to an ATA port on the RLC. ATA ports were introduced in Release 22 of Meridian system software. The ATA appears in the data port range, but the class of service treats the TN as a voice TN.

You can map remote analog ports (that appear in the voice port range on any supported release of Meridian software) to non-ATA voice ports on the RLC.

PBX

Configure the host PBX as follows:

1 Program the data TN for a digital set.

   a. If you have a telephone programmed against the voice TN, then the data TN telephone type must be the same as the voice TN telephone type. For example, if the telephone on voice TN 6 15 is a 2616 then the fax data TN 6 31 should be programmed as 2616.

   b. Set DTAO = MCA

   c. Set the DN of the fax machine or ATA on Key 0 of the data TN.

2 After programming the data TN, go back in again to change the CLS. Do one of the following:

- If the system software includes package 186, program an ATA by adding CLS=FLXA VCE CPTD.
- If you do not have package 186 then, add CLS =FLXA VCE.

3 Enable the TN in LD 32.

RLC

Configure the corresponding ports on the RLC as follows:

1 Access Configuration Manager → RLC → RLC Port Configuration.

2 On the RLC port that matches the ATA port, configure the compression, priority and usage. This port should also be configured as a remote port, not a network port.

3 Click on the **OK** button on the RLC Port Configuration window, send to unit, save configuration to Flash and reboot the unit.

Note: When you save configuration changes to Flash, the system suspends new call processing for approximately 30 seconds.

Note: If you intended to use a fax on the ATA device, or you are programming the 9150 fax port, the G.729/Fax compression is recommended.

Remote Office 9150 unit

Configure the Remote Office 9150 unit as follows:

1 For the Remote Office 9150 fax port, do the following:

a. Access Configuration Manager → 9150 → 9150 Port Configuration.

b. Map port 64 on the Remote Office 9150 unit to the data port on the RLC.

c. For an ATA adapter, map the 9150 port that is 16 ports above the telephone that house the ATA adapter. For example, if the telephone housing the ATA is on the Remote Office 9150 unit and is wired to port 0, then the ATA is configured on the Remote Office 9150 unit port 16).

d. Map the ATA port to the RLC data port configured on the host PBX.

2 Verify that any other unused Remote Office 9150 port that has the same RLC port number as the Fax or ATA is configured as Local.

For example, if the RLC data port 31 (mapped to 9150 port 64) is being used for fax, make sure the Remote Office 9150 unit port 31 is set to local only. This prevents any possibility of port contention occurring at the host side.

Also, make sure that the telephone type for the ATA port is selected as ATA not as a digital set.

3 For LOCAL 9150 access only from the Remote Office 9150 unit, configure the ATA port Local Call Key1 to Key Number 0.

4 If the port is configured for local and remote, verify that Forward Busy/No Answer is disabled.

5 Click on the **OK** button on the 9150 Port Configuration window, then click on the **Send** button.

6 From the Upload/Download menu option, select Save to Flash.

Note: When you save configuration changes to Flash, the system suspends new call processing for approximately 30 seconds.

7 Reboot the unit.

Network port configuration

Configure the RLC network ports that are connected to Remote Office 9150 units as MCA data adapters with the first line able to place and receive data calls. Configure the 911x network ports on the RLC as voice ports with flexible voice/data allowed. To configure data ports, refer to “Sample configuration files” on page 299.

- If the RLC and its remote units connect only through the IP network, you do not need to configure network ports for the RLC. The RLC and remote units use an IP path to communicate with one another.
- If your system uses both the IP and PSTN connections to route calls, configure a sufficient number of network ports for the RLC to handle the anticipated traffic between the remote units and the host PBX.
- If you are configuring a Remote Office 911x series unit, only the Remote Office 9115 module supports Meridian Communication Adapters (MCAs). Remote Office 9115 units support MCAs only to allow CTI control of the digital telephone when operating in transparent mode.
- Remote Office 911x series units do not support Analog Telephone Adapters (ATAs).

For further details, refer to the section on LD 11 in the *Meridian 1 X11 I/O Guide* (NTP 553-3001-400).

Meridian 1 network port configuration for a Remote Office 9150 unit

To support a Remote Office 9150 unit on a Meridian 1, you must configure the RLC network port as follows:

- Class of Service: DTA, FLXD
- DTAO prompt must be configured as MCA
- BRI CLS should include: VCE DTA
- TSP should set: USID = 0

Note: For MSL-100, similar configuration rules apply. For configuration requirements, refer to “MSL-100 configuration requirements” on page 113.

Meridian 1 network port configuration for a Remote Office 911x series unit

To support a Remote Office 911x series unit on a Meridian 1, you must configure the RLC network port using the same procedure as described for PBX configuration for ATA. Refer to “PBX” on page 108 for details.

Note: For MSL-100, similar configuration rules apply. For configuration requirements, refer to “MSL-100 configuration requirements” on page 113.

RLC and Remote Office 9150 unit connection paths

The RLC network ports (used to connect to the Remote Office 9150 units) carry HDLC-framed data. You must configure these ports so that they can transparently pass this data.

Any port you configure as a data port on the Meridian 1 can be an RLC network port.

If the Meridian 1, instead of a PSTN or PTT, provides the Remote Office 9150 unit’s ISDN number, you must configure the line on the host PBX (LD 27 on the Meridian 1) as follows:

1. Set B1CT to VCE and DTA.
2. Set B2CT to VCE and DTA.
3. Set USID to 0.

PBX trunks and RLC network ports

When using the Remote Office unit with PSTN connectivity, the PBX trunks must provide data capability. To make sure that the PBX is ready for data calls, complete the following outlined checkpoints:

1 Use the PRT command in LD20 on the PBX to print out the Network Port TNs that have been provisioned against the RLC slot. Make note of the TGAR and NCOS values.

Note: For specific printing instructions, refer to your PBX documentation.

2 Print out the PBX Route Data Block (RDB) in LD 21. For each PRI:

a. Review the TARG values. If the values match the Network Port TGAR, calls are NOT allowed through the PRI.

b. Review the trunk capability at the DSEL prompt. It should be “Voice or Data” (VOD) or “Data Only” (DTA).

c. Check that the ICOG prompt is Incoming and Outgoing (IAO).

Note: If you make changes to the DSEL, or the ICOG prompt, make sure that the central office is configured likewise, that is to say, changing the DSEL from VCE to VOD can be ineffective because the CO still rejects data calls.

3 Print out the PBX trunk time slot configuration information in LD 22 CEQU. Ensure that there are an adequate number of time slots provisioned with data capability. Here is an example of the printout:

```
(data omitted)

DLOP NUM DCH FRM LCMT YALM TRSH

TRK  001  24  D4  AMI  DG2  00 <-- DTI trunks
     012  24  D4  AMI  DG2  00
PRI  003  24 ESF  B8S  FDL  00 <-- PRI trunks - voice or data
     051  00 ESF  B8S  FDL  00
```

A DCH setting of 0 indicates that 0 time slots are usable for data call capability. You should have 24 by default.

Note: The above example displays the North American default values.

4 If the RLC is dialing to the Remote Office unit, and the number being dialed is using the PBX routing (for example. 9 or 6 access code), you need to make sure that the call is presented to the PRI trunk and not a standard CO trunk.

Verify that the Network Port TN NCOS has the capability to access the PRI. One way to ensure that the PRI is accessed is to use the Trunk Access code (ACOD) which was printed in step 2.

You can modify the RLC Remote Connection PSTN information to use the ACOD to directly access the trunk. For example, set the Remote Connection number to be #8002#5551212, assuming that 8002 is the trunk ACOD and you are placing a local call.

How the remote and network ports work together

RLCs configured as PSTN-only, or in QoS transition situations, route voice traffic through the PSTN. a call placed to voice port 0 can be relayed to a Remote Office 9150 unit configured as PSTN-only. For this call, the RLC calls the Remote Office 9150 unit using the dedicated network port for that unit. Each network port on a Remote Office 9150 unit supports up to eight simultaneous calls using G.729 (8 Kbps) compression. For Remote Office 911x units, each network port supports only one call, regardless of compression.

MSL-100 configuration requirements

This section describes the MSL-100 PBX configuration that is needed to support the Remote Office 9150 unit.

Note: You must configure the Meridian unit operating behind an MSL-100 PBX using Meridian 1 key numbering.

M2000 telephone set key numbering

The key numbering convention for M2000 series telephones on the Remote Office 9150 unit is different from the key numbering convention on the MSL-100 PBX.

On the Remote Office 9150 unit, keys are numbered from 0 through 15, whereas on the MSL-100 PBX, keys are numbered from 1 through 16. Refer to the following figure for a comparison:

M2616

15	16	——	8	7
14	15	——	7	6
13	14	——	6	5
12	13	——	5	4
11	12	——	4	3
10	11	——	3	2
9	10	——	2	1
8	9	——	1	0
M1	MSL-100		MSL-100	M1

M0200 option on telephone set

M0200 must be assigned to the M2616 telephone set configuration on the MSL-100 PBX. Without this option, the M2616 telephone set does not function properly.

Port configuration

The port numbering on the RLC is different from the port numbering on the MSL-100 PBX. Refer to “RLC and MSL-100 port numbering comparison” below.

RLC and MSL-100 port numbering comparison

Port type	RLC port numbering	MSL-100 port numbering
Voice ports	0–15 and 32–47	Even-numbered ports
Data ports	16–31 and 48–63	Odd-numbered ports

RLC and MSL-100 port mapping

The following table identifies the port mapping between the RLC and the MSL-100:

16-port RLC				32-port RLC			
RLC voice ports	IPE voice ports	RLC data ports	IPE data ports	RLC voice ports	IPE voice ports	RLC data ports	IPE data ports
0	0	16	1	32	0	48	1
1	2	17	3	33	2	49	3
2	4	18	5	34	4	50	5
3	6	19	7	35	6	51	7
4	8	20	9	36	8	52	9
5	10	21	11	37	10	53	11
6	12	22	13	38	12	54	13
7	14	23	15	39	14	55	15
8	16	24	17	40	16	56	17
9	18	25	19	41	18	57	19
10	20	26	21	42	20	58	21
11	22	27	23	43	22	59	23
12	24	28	25	44	24	60	25
13	26	29	27	45	26	61	27
14	28	30	29	46	28	62	29
15	30	31	31	47	30	63	31

Sample datafill for network ports

For ISDN BRI connectivity and QoS transitioning functionality, each 64 Kbps trunk requires a dedicated data port on the RLC. On the MSL-100, you must configure this data port as a Meridian Communications Adapter (MCA) and datafill it as a 64K synchronous adapter. The following is an example of the SERVORD command used to provision a synchronous MCA adapter:

```
NEW $ 2386152 MCA MTL1 0 12 214 Y MCA N S 64000 I N N N N N 0
HAYES $ HOST 20 2 01 03 $

>QLEN  2386152
LEN:     HOST  20 2 01 03
TYPE: SINGLE PARTY LINE
SNPA: 214
DIRECTORY NUMBER:     2386152
LINE CLASS CODE:  MCA
CUSTGRP:            MTL1  SUBGRP: 0  NCOS: 12  RING: Y
DATA UNIT PROFILE:
CLASSDU: MCA       IDLETO: 0  DOWNLOAD: N
CONFIG:  DTE                  DTEIF: RS232C
SYNCHRO: S   DATARATE: 64000  CLOCKSRC: I
DUPLEX:  F                    KBDTYP: HAYES
HOTLINE: N   VLL: N   V.25: N   HDLC: N   RTS: N
DPOPTS:
CARDCODE:  DR68AA GND: N  PADGRP: NPDGP  BNV: NL MNO: Y
PM NODE NUMBER     :    105
PM TERMINAL NUMBER :    36
OPTIONS: NDC

KEY     FEATURE
NONE
```

M39xx Release 2 telephones with MCAs

When configuring RLCs for Quality of Service (QoS) transition, you must configure a data port as a Meridian Communications Adapter (MCA).

A patch is required for MSL-100 sites using only M39xx Release 2 telephones and PBX software versions MSL14 or earlier to allow QoS transition. This is due to the fact that MSL-100 PBXs using software version MSL14 or earlier and configured for only M39xx Release 2 telephones do not recognize MCAs.

The patch numbers are:

- JDT01.xxx
- JDT04.xxx

where xxx denotes the PBX version number.

Contact your Nortel Networks distributor to receive the patch.

Chapter 5

Using Configuration Manager

In this chapter

What is Configuration Manager?

Configuration Manager is a Windows-based software application that you install on your PC. Configuration Manager allows you to configure, administer, and upgrade the RLC. These tasks can be performed over either of the following connection types:

- 10BaseT Ethernet
- RS-232 serial

The CD shipped in the RLC package includes the Configuration Manager software. You can obtain the CD from your Nortel Networks distributor or click on the Customer Support and Software Distribution links at the following website:

www.nortelnetworks.com

Windows PC requirements

For the required characteristics of the Meridian administration PC, refer to “Windows PC requirements” on page 62.

Installing Configuration Manager

To install the Configuration Manager software on your administration PC, refer to “Configuration Manager software installation” on page 82.

Updating Configuration Manager

To update the Configuration Manager software, click on the Customer Support and Software Distribution links at the following website:

www.nortelnetworks.com

Save the software to the local hard drive on your administration PC.

To complete the installation, refer to “Configuration Manager software installation” on page 82.

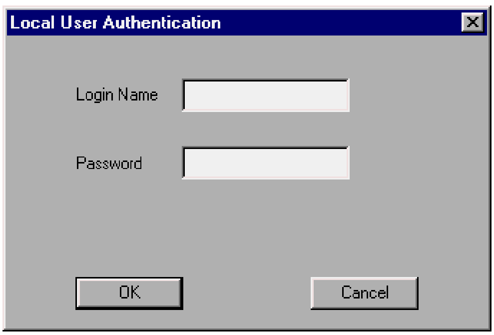
Starting and viewing Configuration Manager

The Configuration Manager software application is best viewed when your monitor settings are configured as 1024 by 768 pixels using Small Fonts at 96 dpi. If you use larger fonts, some fields and buttons might be hidden. You must use the horizontal and vertical scroll bars to view the hidden fields or buttons. For instructions on changing your display settings, refer to the Windows online help on your PC.

To start and log on to a Configuration Manager session:

1. From the Menu Bar, choose Start → Programs → Remote Office → Configuration Manager.

   Result: Configuration Manager opens and prompts you for the logon name and password.

2. Enter **admin** in the Login Name box.
3. Enter **root** in the Password box.

   Note: This is the default password. You can change the password after installation, though Nortel Networks recommends that you do not change the password until your Remote Office system is up and running.

4. Click on the **OK** button.

   Result: The system informs you of a successful logon. In the event of an unsuccessful logon, the system informs you of the need to re-enter the information.

5 Click on the **OK** button.

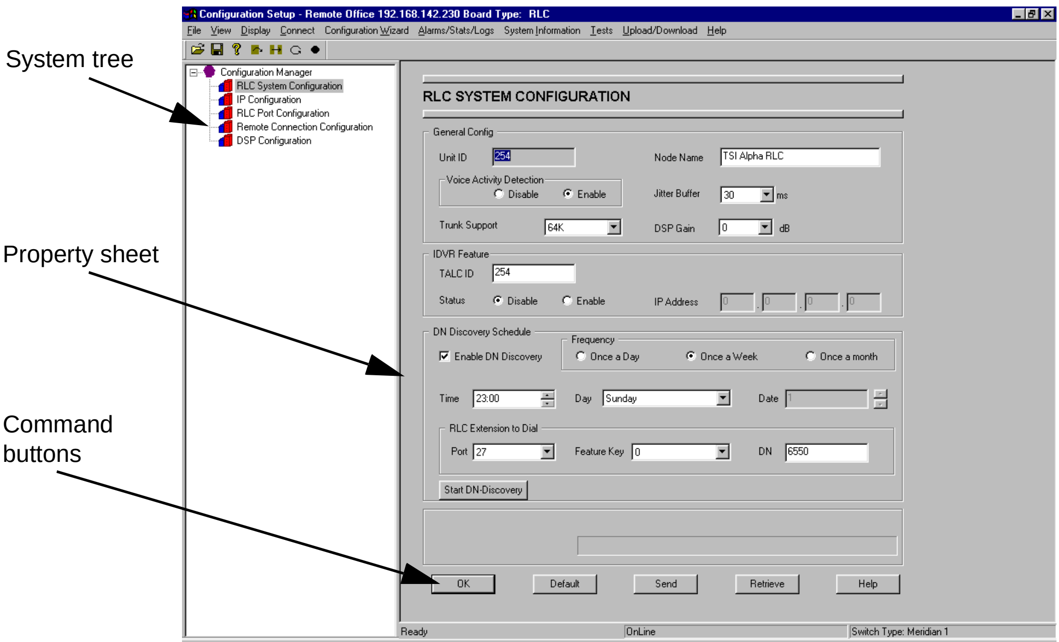
Result: The logon status dialog box disappears.

6 Proceed as follows:

To perform an	Refer to
online configuration	“Logging on to a unit” on page 136.
offline configuration	“Selecting the device type for offline configuration” on page 135.

System tree

The left pane of Configuration Manager lists the property sheets you can access. To expand the list of all the property sheets associated with the logged-on or selected remote device, click on the plus **(+)** sign. (To hide the list, click on the minus **(-)** sign.) With the System Tree expanded, click on a configuration to display the associated property sheet in the right pane, similar to the following:



To hide the system tree, choose View → Tree Bar from the Menu Bar. The screen redraws itself showing only the right pane and displaying the selected property sheet. To display the system tree again, choose View → Tree Bar.

Property sheets

When you are logged on to a particular Remote Office node (that is, a Remote Office 911x series unit, a Meridian Digital Telephone IP Adapter unit, a Remote Office 9150 unit, or an RLC), Configuration Manager displays a system tree specific to the logged-on unit.

Note: When working with a Meridian Digital Telephone IP Adapter unit in Configuration Manager, use Remote Office 911x property sheets.

When you click an item in the system tree, the associated property sheet appears in the right pane. For instructions on selecting a device type when not logged on, refer to “Selecting the device type for offline configuration” on page 135.

Command buttons

The following buttons appear on every property sheet listed in the first level of the Remote Office Configuration Manager system tree (left pane):

- OK

  Click on this button to accept any changes you have made to the displayed property sheet. This command stores these values in a temporary file on your PC until you are ready to update the unit’s Flash memory. For more details, refer to “OK” on page 127.
- Default

  Click on this button to insert default values into every field in the displayed property sheet.
- Send

  Click on this button to update the buffer of the unit you are logged on to with the values currently on the displayed property sheet. For more details, refer to “Send” on page 128.

- Retrieve

  Click on this button to display the saved configuration value for every field on the displayed property sheet from the unit's local buffer, containing the last sent data. For more details, refer to "Retrieve" on page 129.

- Help

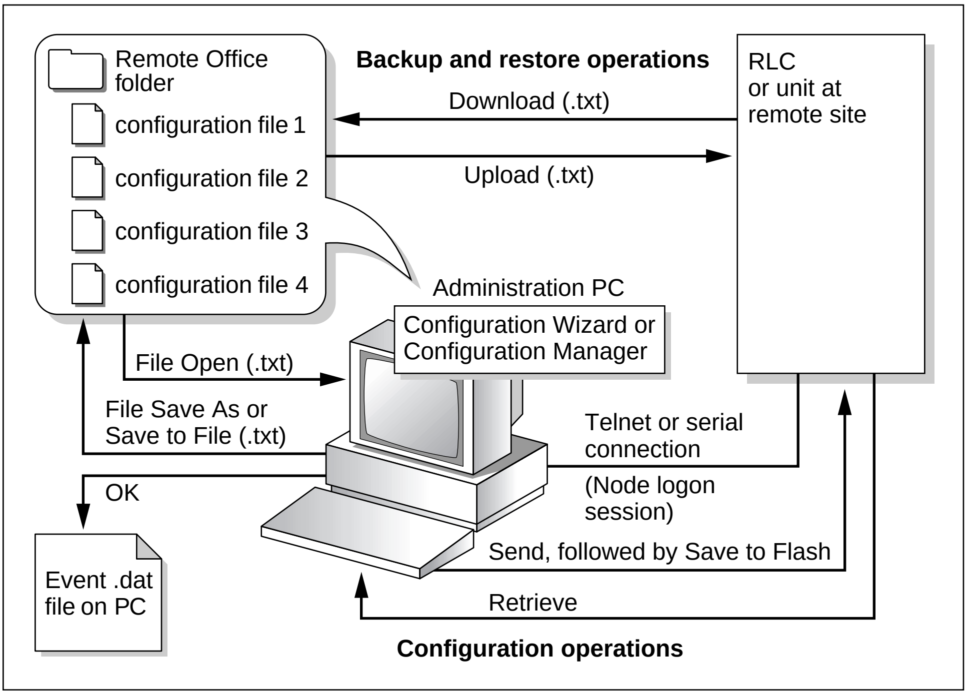
  Click on this button to view online Help for the displayed property sheet.

Configuration files description

This section describes configuration files and the ways that you can work with them.

Configuration Manager: file operations diagram

The following diagram shows how configuration information is stored. A detailed description of each file type and operation follows.



G030

Types of files

You can work with three types of files in Configuration Manager. Each file is identified by one of the file name extensions described in the following table.

<table>
<tr><th>File name</th><th>File type</th><th>When it is created and used</th></tr>
<tr><td>▪ event.dat</td><td>Log file</td><td>The log (event.dat) file records all activities (and messages associated with those activities) that you perform while running Configuration Manager, such as:
▪ logging on to Configuration Manager
▪ logging on to a unit (by serial or Telnet connection)
▪ logging off from a unit
▪ performing configuration changes
▪ performing firmware upgrades
This file can be very useful when troubleshooting system problems. Technical support personnel may ask for this file.</td></tr>
<tr><td>▪ *.txt</td><td>Text</td><td>The text (.txt) file is created when you do one of the following:
▪ click on the Save to File button while running the Configuration Wizard.
▪ click on File → Save As while working in Configuration Manager.
▪ choose Upload/Download → Download Configuration to save a unit's configuration in a text file on the administration PC.</td></tr>
<tr><td>▪ *.upg</td><td>Upgrade</td><td>Use the upgrade (.upg) file when performing firmware upgrades. For more details, refer to “Performing a firmware upgrade” on page 248.</td></tr>
</table>

Configuration Manager: file operations description

The following table describes each operation shown in the "Configuration Manager: file operations diagram" on page 125.

Operation	Description
OK	When you click on the OK button, the following occurs: ■ Configuration Manager checks any changes you made for errors that, if found, produce an error dialog box. Make the necessary changes, and then click on the **OK** button again. **Note:** You must click on the OK button after making changes to a property sheet. For Configuration Manager to be able to save your information, you must first click on the OK button to accept the changes. After clicking on the OK button**,** you can send the changes to the logged on unit's buffer using a Send or Send All command. You can now update the Flash memory of the logged on unit by performing an Upload/Download → Save to Flash operation from the Menu Bar. For more details, refer to "Send" on page 128. **Note:** If you do not click on the OK button on a property sheet before displaying another property sheet, you lose all of the changes made on the first property sheet. To regain lost changes, you must reenter them.
File → Open	When you choose File → Open from the Menu Bar, you can open a previously saved configuration file. This is useful for preparing and storing configuration files in a central location before they are deployed to remote locations in the network. **Note:** To open a file, the file type must be text (.txt).

<table>
<tr><th>Operation</th><th>Description</th></tr>
<tr><td>File → Save As</td><td>When you choose File → Save As from the Menu Bar, Configuration Manager saves the unit's configuration to a file on your PC. You must specify the file name and directory location.

After saving the file, you can open and modify it at a later time.

Notes:
■ Configuration Manager saves the file as a text (.txt) file.
■ If you close Configuration Manager without choosing File → Save As, you lose all of the changes you made.</td></tr>
<tr><td>Send</td><td>When you click on the Send button, Configuration Manager sends any changes made on the displayed property sheet to the buffer of the logged-on unit. If the send is successful, the following message displays:

<code>Data Sent Successfully</code>

(It is recommended that you click on the OK button before clicking on the Send button.)

Note: You must choose Upload/Download → Save to Flash from the Menu Bar to save the changes to the unit's Flash memory. For more details, refer to "Save to Flash" on page 129.</td></tr>
<tr><td>Send All</td><td>When you choose Upload/Download → Send All on any property sheet, changes for all property sheets pertaining to the logged-on unit are sent to the buffer on the unit you are connected to. If the send is successful, the following message displays:

<code>Data Sent Successfully</code>

Note: You must choose Upload/Download → Save to Flash from the Menu Bar to save the changes to the unit's Flash memory. For more details, refer to "Save to Flash" on page 129.</td></tr>
</table>

Operation	Description
Retrieve	When you click Retrieve on a property sheet, the configuration stored in the buffer of the unit that you are connected to (the latest configuration information) displays in Configuration Manager. If the retrieval is successful, the following message displays: `Data Received Successfully`
Save to Flash	When you choose Upload/Download → Save to Flash from the Menu Bar, the information stored in the logged-on unit's buffer is saved to Flash memory. This prevents the configuration from being lost if the unit loses power. While in progress, the following message displays in the status bar at the bottom of the screen: `Save to Flash` When the Save to Flash is completed, the Data Stored to Flash dialog box displays. Some changes require a restart of the unit after saving the changes. If a restart is necessary, Configuration Manager prompts you to do so. **Notes:** ■ You must click on the **Send** button or choose Upload/ Download → Send All from the Menu Bar *before* you choose Upload/Download → Save to Flash. You should perform a Save to Flash as often as you think it is necessary, to keep your configuration information safe. ■ Do not ignore error messages in the Save to Flash process. If Save to Flash fails, retry uploading and saving to Flash. If the problem persists, check the file being uploaded and report the problem to Nortel Networks.

Operation	Description
Upload Configuration	When you choose Upload/Download → Upload Configuration from the Menu Bar, Configuration Manager uploads the configuration file you specify and writes the file to the buffer on the logged-on unit. Use this option if you need to restore or replace an entire configuration. You must choose Upload/Download → Save to Flash from the Menu Bar to save the changes in the unit's flash memory. If you do not perform the Save to Flash and a power loss occurs on the unit, you lose the changes. While in progress, the following message displays in the status bar at the bottom of the screen. `Save to Flash in Progress` When the Save to Flash is completed, the Data Stored to Flash dialog box displays. **Notes:** ■ To upload a configuration file, the file type must be text (.txt). ■ To perform a configuration upload over the IP network, a TFTP server application must be running on your PC. Uploads over the serial port are not supported. ■ Restart the unit after the Save to Flash operation. For instructions on how to restart the unit, refer to "Performing a system restart or shutdown" on page 143. ■ If the upload fails or aborts, confirm that you are uploading the correct file. If the problem persists, contact Nortel technical support for assistance.

Operation	Description
Download Configuration	When you choose Upload/Download → Download Configuration from the Menu Bar, Configuration Manager saves the configuration stored on the logged-on unit to a file on the PC. Use this option if you want to create a backup of the unit's configuration. **Notes:** ■ The downloaded file is saved as a text file (.txt). ■ If you make changes and do not save them, you lose those changes.

Working with configuration files

This section explains how to:

- create a configuration file (refer to page 133)
- open a configuration file in Configuration Manager (refer to page 133)
- perform a configuration upload (refer to page 134)
- perform a configuration download (refer to page 134)

When to use Configuration Manager file operations

You can use	When you are
OK, File → Open, and File → Save As	working in offline mode or connected and logged on to a unit. **Note:** When working in offline mode, you must save the configuration to a file. However, when you are logged on to a unit, the file save operation is optional. To save the configuration to Flash, first update the unit's local buffer by clicking on the Send button or choosing Upload/Download → Send All from the Menu Bar. Then, use Upload/Download → Save to Flash to complete the operation.
■ Send ■ Send All ■ Retrieve ■ Upload Configuration ■ Download Configuration	logged on to a unit.

Creating a configuration file on the PC

To create a configuration file on the PC:

1 Start Configuration Manager.

2 Make the required changes on each property sheet.

Note: You do not have to be logged on to a unit to make configuration changes. When you are not logged on to a unit, you can perform an *offline configuration.*

3 From the Menu Bar, choose File → Save As.

Result: The Save As dialog box displays.

4 Enter a descriptive name for the file.

The file name should identify the type of configuration it contains.

Example 1: If the file contains a basic configuration that is to be used for a specific type of unit, you can enter **template** as the file name.

Example 2: If the file contains a configuration that is unique to a specific unit, you can enter the unit's **name or number** as the file name.

5 Ensure that the Save as type drop down box shows text file (*.txt)

6 Specify the folder where you want to save the file.

7 Click on the **OK** button.

Result: The file is saved.

Note: Nortel strongly recommends that you do not manually edit this file.

Opening a configuration file

To open a configuration file:

1 Start Configuration Manager.

2 If you want to work in online mode, log on to the unit. Otherwise, ensure that you have selected the device type.

3 From the Menu Bar, choose File → Open.

Result: The Open dialog box displays.

4 Ensure the Files of type drop down box shows text files (*.txt).

5 Navigate to the folder containing the file you need.

6 Select the file, and then click on the **Open** button.

Result: The contents of the configuration file are loaded into Configuration Manager.

7 View the configuration details by clicking each item in the system tree to display the associated property sheet.

8 Make changes as necessary, then complete the following actions:

a. Save the file by choosing File → Save from the Menu Bar. If you want to change the file name, choose File → Save As from the Menu Bar.

b. Click on the **Send** button to update the unit, then choose Upload/ Download → Save to Flash from the Menu Bar.

Uploading a configuration to a unit

For complete instructions on uploading a configuration to a unit, refer to “Restoring the configuration” on page 203.

Downloading a configuration from a unit

For complete instructions on downloading a configuration to a unit, refer to “Creating a backup configuration file” on page 200.

Selecting the device type for offline configuration

If you are not logged on to a Remote Office unit (that is, an RLC, Remote Office 9150 unit, a Remote Office 911x series unit, or a Meridian Digital Telephone IP Adapter unit), then you must select the device type you want to work with. Configuration Manager reorganizes the system tree with the property sheets associated with that device type.

Note: When working with a Meridian Digital Telephone IP Adapter unit in Configuration Manager, use Remote Office 911x property sheets.

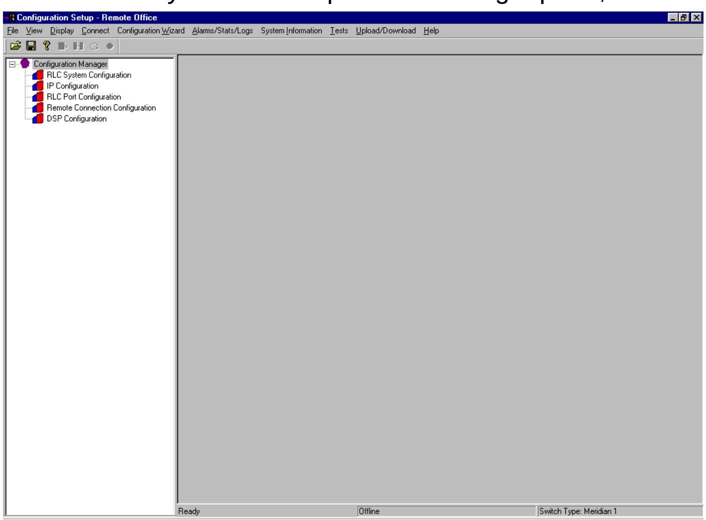
To select the device type for offline configuration:

1 Start Configuration Manager as described under "What is Configuration Manager?" on page 120.

2 From the Menu Bar, choose View → Device Type, and the type of device (for example, RLC, 9150, 911x).

3 Click on the plus **(+)** sign beside Configuration Manager in the left pane.

Result: The system tree expands in the right pane, similar to the following:

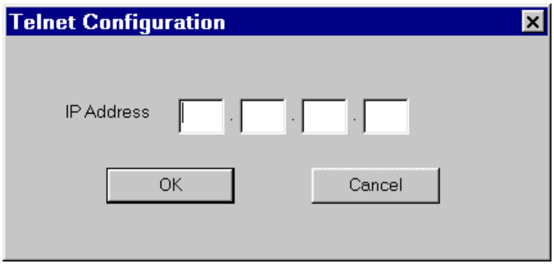


Logging on to a unit

To log on to a unit using Telnet:

1 From the Menu Bar, choose Connect → Logon Unit → Telnet.

Result: The Telnet Configuration dialog box displays, similar to the following:



2 Enter the IP Address of the unit you want to connect to.

3 Click on the **OK** button.

Result: If no one else logged on to the unit before you, and if IP connectivity exists to this unit, the User Authentication for Telnet Mode dialog box displays. It is similar to the User Authentication for Telnet Mode dialog box on page 137.

Default logon ID and password

The default logon ID is **guest**. You cannot change the logon ID.

The default password is **guest123**. The password can be changed and, therefore, can be different if this is not a first time installation. Nortel Networks recommends that you do not change the password until your Remote Office system is up and running smoothly.

Connection history

Configuration Manager maintains a record of past unit connections. You can select, and then connect to a unit from the history list that displays in the Connect menu.

Note: Upgrading the Configuration Manager software deletes the connection history list.

Auto logoff

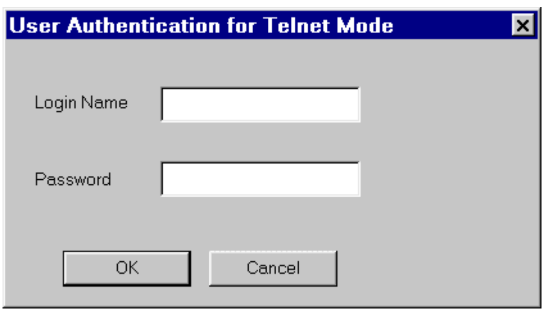
If the connection remains open with no activity for 15 minutes, then Configuration Manager automatically logs off the connection and the Session Timed Out message displays. This helps to secure the configuration in the event that you walk away from the administration PC while logged on to a unit.

Logging on to a unit using the connection history

To log on to a unit using the connection history:

1 From the Menu Bar, choose Connect → XXX.XXX.XXX.XXX (IP address of the unit you want to log on to).

Result: If no one else logged on to the unit before you and if IP connectivity exists to this unit, the User Authentication for Telnet Mode dialog box displays. It is similar to the following:

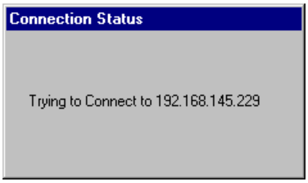


2 Enter your logon name in the Login Name field. If you have not yet customized this setting, refer to “Default logon ID and password” on page 136 for the default logon ID.

3 Enter your password in the Password field. If you have not yet customized this setting, refer to “Default logon ID and password” on page 136 for the default password.

4 Click on the **OK** button.

Result: Configuration Manager initiates a connection attempt. The Connection Status message box displays. It is similar to the following:



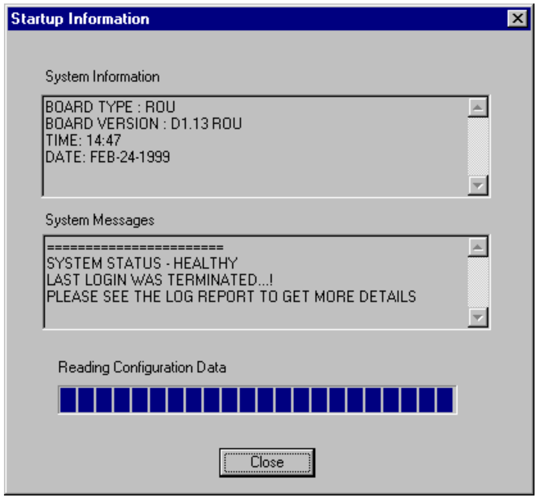
Note: The connection speed can be too fast for this message to be seen in a successful logon attempt.

If you do not enter any logon information, after two minutes Configuration Manager displays a reminder screen similar to the following:

Click on the **OK** button to return to Step 2 on page 137.

<table>
<tr><th>IF the logon attempt</th><th>THEN</th></tr>
<tr><td>fails,</td><td>a message box similar to the following displays:


Complete the following actions:
1 Click on the OK button.
2 Go back to Step 1 on page 137 to try again.</td></tr>
</table>

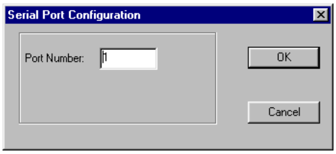
IF the logon attempt	THEN
succeeds,	the User Logged In dialog box displays. Click on the **OK** button. **Result:** The Startup Information dialog box displays. It is similar to the following:  Messages appear above the progress bar at the bottom of the dialog box, similar to the following: ■ Reading Hardware Information ■ Reading DSP Load Data ■ Reading Configuration Data These messages mean that Configuration Manager is obtaining the unit's configuration information from Flash memory. When initialization is complete, the `Configuration Data Read Successfully` message appears above the progress bar. Click on the **Close** button.

Logging on to a unit using the serial port

To log on to a unit using the serial port:

1 From the Menu Bar, choose Connect → Logon Unit → Serial.

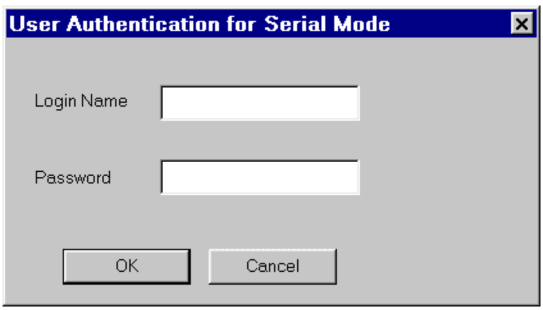
Result: The Serial Port Configuration dialog box appears, similar to the following:



2 Enter the COM port number the unit is connected to in the Port Number field.

3 Click on the **OK** button.

Result: If no one else logged on to the unit before and if your PC is connected with a serial cable to the RLC, the User Authentication for Serial Mode dialog box displays. It is similar to the following:



4 Enter your logon name in the Login Name field. Refer to “Default logon ID and password” on page 136 for the default logon ID if you have not yet customized this setting.

5 Enter your password in the Password field. Refer to “Default logon ID and password” on page 136 for the default password if you have not yet customized this setting.

6 Click on the **OK** button.

Result: The connection attempt is initiated. The following message might display:

```
Trying to Connect via Serial Port <port number>
```

IF the logon attempt	THEN
failed,	the following message displays: `SERIAL CONNECTION FAILED` Check the serial port connection and ensure it is good. Then, go back to step 1.
is successful,	the User Logged In dialog box displays. Click on the **OK** button. **Result:** The Startup Information dialog box displays. Messages appear above the progress bar at the bottom of the dialog box, similar to the following: ■ `Reading Hardware Information` ■ `Reading DSP Load Data` ■ `Reading Configuration Data` These messages mean that Configuration Manager is obtaining the unit's configuration information from flash memory. When initialization is complete, the Configuration Data Read Successfully message displays. Click on the **Close** button.

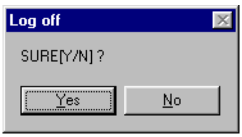
Logging off of the unit

When you are finished using Configuration Manager to make configuration changes, or to view logs and statistics, log off of the unit. Logging off secures the unit’s configuration.

To log off of the unit:

1 From the menu, choose Connect → Logoff Unit.

Result: The Log off dialog box displays, similar to the following:



2 Click on the **Yes** button.

Result: The Configuration Manager: User Logged off dialog box displays, similar to the following:

3 Click on the **OK** button.

Performing a system restart or shutdown

Configuration Manager allows you to perform a controlled system restart or shutdown.

When to perform a restart or shutdown

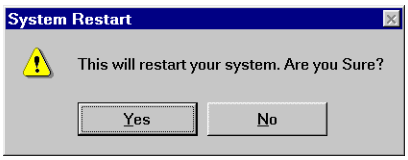
Configuration Manager informs you when you must perform a system restart. You can perform a shutdown when you need to power the system down.

Performing a system restart

To perform a system restart:

1 From the Menu Bar, choose Connect → System Reset → Restart.

Result: The System Restart dialog box displays, similar to the following:



2 Click on the **Yes** button.

Result: The status box displays.

The following message also displays in the status bar at the bottom of the screen:

```
Restarting the System
```

The status continues to show Online. When the system restart is complete, a dialog box displays informing you that the system restart was successful, and that you are logged off.

3 Click on the **OK** button.

Result: You are prompted to log back on using the previous connection method (Serial or Telnet).

Performing a system shutdown

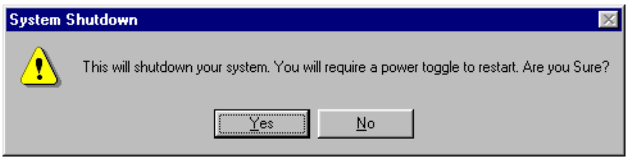
ATTENTION

Do not perform this procedure if you do not have physical access to the unit. To recover from the system shutdown, you must power off the unit, then turn it back on.

To perform a system shutdown:

1 Choose Connect → System Reset → Shutdown from the Menu Bar.

Result: The System Shutdown dialog box displays, similar to the following:



2 Click on the **Yes** button.

Result: Your logon session is disconnected, and the following message displays in the status bar at the bottom of the screen:

```
Shutting Down the System
```

The status shows Offline.

3 Turn the power on the Remote Office unit off.

Note: You must turn the power off before you can power the unit back up.

Closing Configuration Manager

When you have completed all of the configuration modifications you want to make, or are done viewing unit logs and statistics, log off and close the Configuration Manager application. This secures the configuration, preventing others from accessing it if you walk away from the administration PC while logged on to a unit. To close Configuration Manager:

CAUTION

Risk of configuration loss

If you close Configuration Manager without saving the changes you made to a file on your PC, or without updating the Flash memory of the unit you were working on, all changes are lost. You must reenter any changes you made.

1. Ensure that you have saved all configuration changes by doing one or more of the following:
   - From the Menu Bar, choose File → Save As, and then specify the name for the configuration file. The file is saved on the administration PC hard disk.
   - Update the Flash memory of the unit you are connected to, by doing one of the following:
     - Click on the **Send** button on any property sheet, then choose Upload/Download → Save to Flash from the Menu Bar.
     - Click on the **Send All** button on any property sheet, then choose Upload/Download → Save to Flash from the Menu Bar.
     - If you have saved the changes to a file, choose Upload/Download → Upload Configuration → Save to Flash from the Menu Bar. For instructions, refer to “Restoring the configuration” on page 203.
2. Log off by choosing Connect → Logoff Unit from the Menu Bar.
3. Choose File → Exit from the Menu Bar.

   Result: Configuration Manager closes.

Chapter 6

Configuring the RLC

In this chapter

Using the XConnect command for PBX maintenance from a remote site

This section shows you how to establish a connection to the host PBX’s serial data interface (SDI) port from a remote site. First, you must ensure that there is a straight-through serial connection from the RLC to the PBX’s SDI port. Then, you must log on to the RLC using Telnet. With these connections established, remote-site system administrators can perform PBX maintenance procedures.

Note: The terminal settings must be as follows: 9600 8 N 1 (9600 Baud, 8 data bits, No parity, 1 stop bit).

Getting there RLC → Configuration Manager

Connecting to the host PBX’s SDI port from a remote site

To connect to the host PBX’s SDI port from a remote site:

1. Log on to the RLC using Telnet.
2. Choose Connect → XConnect from the Menu Bar.

   Result: Configuration Manager warns you that if you continue, you will be logged off the logged-on unit after you end your SDI session.
3. Click on the **Yes** button.

   Result: Configuration Manager establishes the serial connection from the RLC to the host PBX’s SDI port and presents you with the XConnect log screen.
4. Conduct the required PBX maintenance activities.
5. Click on the **Close** button to end your PBX configuration session.

   Result: Configuration Manger closes the serial connection to the host PBX’s SDI port and logs you off of the RLC.

RLC system configuration

There are three categories on the RLC system configuration property sheet:

1. General Config–Identify this RLC within your remote network and address voice quality and signal strength issues at the remote site. In addition, this category allows you to configure Trunk Support according to the speed of your connection.
2. IDVR Feature–The Integrated Digital Voice Recorder (IDVR) is a TelStrat Int'l product. For information on configuring IDVR functionality, contact your TelStrat Int'l representative.
3. DN Discovery Schedule–Set the times when the RLC automatically determines the name and number assigned to the all line keys on each RLC remote port.

Voice Activity Detection

Enable Voice Activity Detection (VAD) to prevent packet transmission during periods when there is no voice data present. This can help you to save bandwidth. To enable VAD, click on the **Enable** option button under Voice Activity Detection.

If you are having difficulties with voice quality, see if silence suppression has an effect on the problem by disabling VAD. To disable VAD, click on the **Disable** option button under Voice Activity Detection.

Note: When using the bandwidth rules described in the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103), use the Peak Rate to calculate IP bandwidth overhead if VAD is disabled. Allocate additional bandwidth over the ISDN for PSTN connections between the RLC and the Remote Office 9150 unit, including QoS transition. When you enable VAD, the amount of bandwidth allocation is 120% of the normal rate. Therefore, if you use G.729, the bandwidth allocation is 9.6K instead of 8K. If you use G.726, the bandwidth allocation is 38.4K instead of 32K. If the available bandwidth over the PSTN is insufficient, the call is blocked and you receive a message indicating insufficient bandwidth.

Jitter Buffer target depth

The RLC's dynamic voice jitter attenuation buffer compensates for the uneven arrival of voice packets across data networks. This buffer collects packets that arrive unevenly and relays them evenly.

Select the size of the buffer in the Jitter Buffer drop down box. The valid options are 30, 60, and 90 milliseconds (ms).

Configure the jitter buffer according to the following guidelines when upgrading to Release 1.3:

- high-speed (>T1 connections) or LANs — leave at the default
- medium-speed (for example, fractional T1s with speeds of greater than 128K) — set to 60 milliseconds
- low-speed (64K or ISDN) or high-data environments — configure at 90 milliseconds. This is especially true if using G.711.

DN Discovery

Through DN Discovery, the RLC detects the PBX-configured name and number assigned to all line keys in its portion of the remote network.

Some of the characteristics of DN Discovery are:

- DN Discovery overrides the DN configuration for Local Call keys.
- Local SwitchOver and Bridge Ports require DN Discovery.
- The Remote Office 9150 unit also uses the discovered DNs to determine when it can switch calls locally.
- MADN appearances of the DN Discovery port ring periodically during DN Discovery.To avoid this, do not start DN Discovery more frequently than once per half-hour and add a unique SCR key for DN discovery.
- If Make Set Busy is active, DN Discovery fails and results in blank DN displays on M39xx sets. To avoid this, do not activate Make Set Busy for the port designated for DN Discovery.
- For DN Discovery to work using key 0 on the target port, no special Class of Service (CLS) is required. If the target key is key 1 or higher, TDD CLS is required.

- The target key must be an SCR or MCR key - not an ACD key.

DN Discovery configures the DNs for the local call keys based upon the first line key DN discovered in the PBX configuration of the RLC port. Therefore, the first line key DN must be unique on all sets.

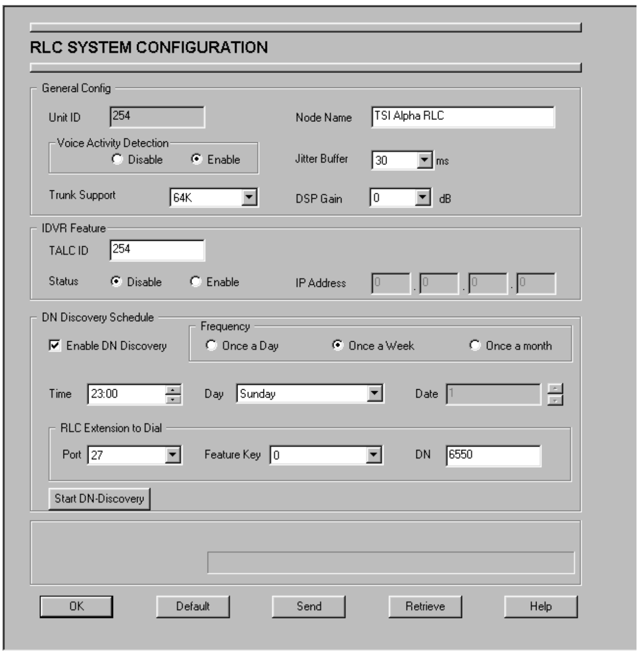
How it works

At the configured time and day, or date, the RLC performs DN Discovery. It places a call from the first of its ports configured as “Remote” on the RLC Port Configuration property sheet. This call routes to the DN in the “RLC extension to dial: DN” field on the RLC System Configuration property sheet.

The host PBX regularly provides updated keymaps of the remote station's feature keys to the RLC. For each feature key configured as a line key, the RLC places a call. For each call, the host PBX produces Calling Line Identification (CLID) information revealing the primary DN of the remote port the call is placed to.

Getting there RLC → Configuration Manager → RLC System Configuration

RLC System Configuration property sheet



Configuring the RLC system information

To configure the RLC system information:

1 Complete the fields as described in “RLC System Configuration field descriptions” on page 152.

2 Click on the **OK** button to save your settings to a temporary work file.

3 Click on the **Send** button to update the RLC with the new information.

Result: The RLC writes the changes to a temporary file on the administration PC.

Note: To save changes to the RLC’s flash memory, select Upload → Save to Flash from the Menu Bar.

RLC System Configuration field descriptions

Field	Description
Unit ID	The RLC’s Unit ID is 254 and cannot change. The remote units in a Remote Office system must have Unit IDs unique among those units connected to the same RLC. **Note:** This Unit ID must also be entered on the RLC Connection Configuration property sheet pertaining to each remote unit. With this information, the system creates the communication path between the remote unit and this RLC.
Node Name	Enter a descriptive name for this RLC.
Voice Activity Detection: Disable	Click on the **Disable** option button if you do not want the RLC to stop sending voice packets across the network when no one is speaking.
Voice Activity Detection: Enable	Click on the **Enable** option button if you want the RLC to stop sending voice packets across the network when no one is speaking.

Field	Description
Jitter Buffer	Select the length of time, in milliseconds (ms), that you want the RLC to collect unevenly arriving voice packets so that it can relay them evenly. This action works to lessen audible jitter.
Trunk Support	These option buttons allow you to configure the speed of your Remote Office connection. ■ Click on the **64K** option button if the speed of your Remote Office connection is 64 Kbps. ■ Click on the **56K** option button if the speed of your Remote Office connection is 56Kbps. ■ Click on the **Dynamic** option button if your Remote Office connection includes segments at 56Kbps and segments at 64Kbps.
DSP Gain	Select the number of decibels (dB) that you want to add to, or subtract from, the strength of the incoming signal before the DSP processes it. Valid options are: 9, 6, 3, 0, -3, -6, -9, -12, and -15. **Note:** Change this setting at the Host site to address a problem with signal strength at the remote site.
TALC ID **Status: Disable** **Status: Enable** **IP Address**	Refer to page 149 for information on the Integrated Digital Voice Recorder (IDVR).

Field	Description
Enable DN Discovery	■ Click in the **Enable DN Discovery** checkbox if you want the RLC to autodetect the PBX-configured name and number assigned to each line key for each remote port on the RLC. **Note:** For DN Discovery to work on any key other than key 0, you must enable TDD class of service on the host PBX. ■ Click on the **Disable DN Discovery** checkbox if you don't want the RLC to perform DN Discovery.
Frequency	Click on the option button that identifies how often DN discovery should be performed: ■ Once a Day ■ Once a Week ■ Once a month
Time	Specify the time when DN discovery should be performed.
Day	Select the day when DN discovery should be performed (if you selected "Once a Week" in the Frequency field).
Date	Specify the date when DN discovery should be performed (if you selected "Once a month" in the Frequency field).
RLC Extension to Dial	These fields allow you to configure one RLC port whose port number, feature key position, and DN are known. At the DN discovery time, each remote port on the RLC places a call to the DN in the RLC Extension to Dial field and the incoming CLID name and number is assigned to the calling port for use by the remote unit: ■ Port–This list box allows you to specify the remote site ■ Feature Key–This list box sets the feature key that initiates DN discovery ■ DN–This field displays the directory number to dial to access the remote unit

Field	Description
Start DN Discovery	Click on the **Start DN Discovery** button to perform an unscheduled DN Discovery.

Understanding the IP interface

To operate as a node on the IP network, the following elements must be configured on the RLC:

- an IP address
- a subnet mask
- the default gateway

These items provide the network connection between the RLC, an administration terminal, and the remote site to allow the following to take place:

- Voice traffic is routed over the IP network between the RLC and the remote site.
- An administrator can use a PC located anywhere on the network to connect with any RLC or Meridian unit on the network.

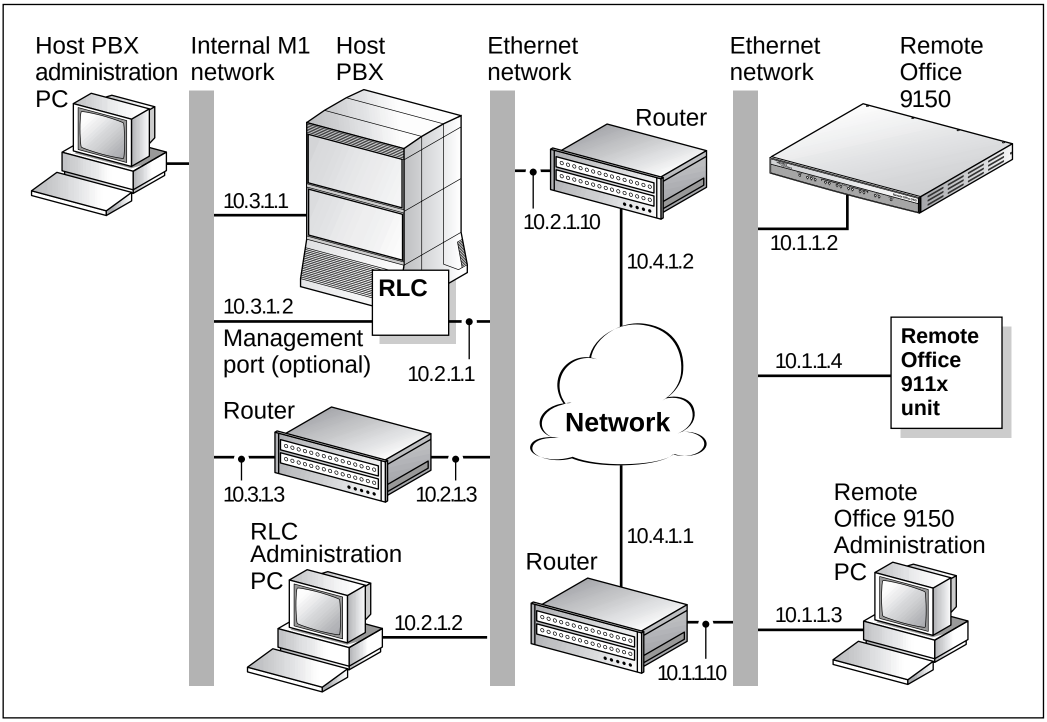
  Once connected, you can view or work with the system configuration.

  Note: To do this, the Configuration Manager software must be installed on that PC.

In addition to the IP address, subnet mask, and default gateway mentioned above, you can also assign an IP address to the management port on the RLC. Once you assign this IP address, you can use the PBX administration PC to log on to and administer the RLC through the host PBX’s internal network.

Reach Line Card position in your IP network

As discussed earlier in this guide, the RLC is connected to a hub on your IP network. The following diagram provides an example of what the setup and the IP configuration look like:



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IP Configuration

Configure the RLC’s IP connectivity on the IP Configuration property sheet. This section explains how to enter the following information:

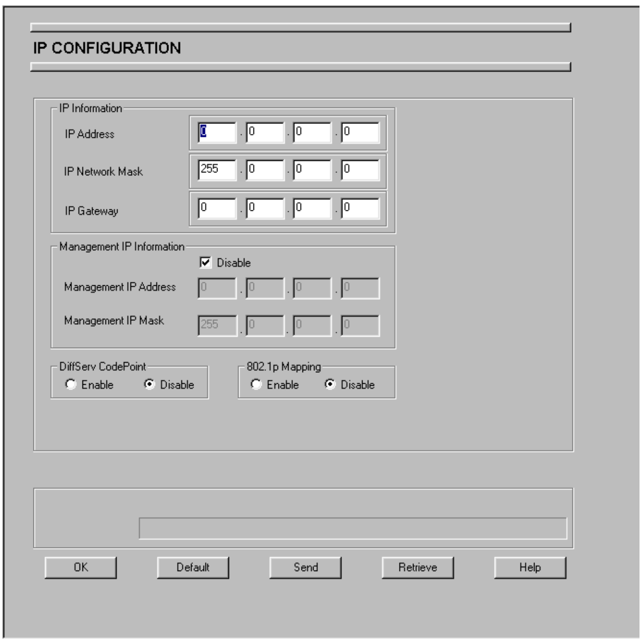
- the IP address, subnet mask, and default gateway for the primary RLC Ethernet port
- the IP address for the Management RLC Ethernet port used for PBX maintenance over Ethernet
- prioritization of voice packets on the IP network
- prioritization of voice packets on the LANs and WANS

For a description of each of these items, refer to “IP Configuration” on page 158.

Getting there

RLC → Configuration Manager → IP Configuration

IP Configuration property sheet



Configuring the IP addresses

To configure the IP addresses:

1 Enter the RLC's IP address in the IP Address fields.

Press the **Tab** key twice to move to the IP Network Mask row.

2 Enter the subnet mask in the IP Network Mask fields.

3 Enter the gateway's IP address in the IP Gateway fields.

IF you want to	THEN do the following steps.
establish the RLC on the host PBX's internal network	1 Click on the Management IP Information:Disable check box. **Result:** The check mark in the check box disappears and Configuration Manager enables the Management IP Address and Management IP Mask fields. 2 Proceed to step 3.
not establish the RLC on the host PBX's internal network	Proceed to step 5.

Note: The second Ethernet port of the RLC is only available with the RLC Multi-I/O cable–Enhanced.

3 Enter the IP address of the RLC's second Ethernet port in the Management IP Address fields.

4 Enter the subnet mask of the RLC's second Ethernet port in the Management IP Mask fields.

5 Click on the **OK** button.

6 Click on the **Send** button to update the RLC with the new information.

Result: Configuration Manager writes the changes to a temporary file on the administration PC.

Note: To save changes to the RLC's flash memory, select Upload → Save to Flash from the Menu Bar.

IP Configuration field descriptions

Field	Description
IP Address	Enter the IP address of the RLC.
IP Network Mask	Enter the IP network mask of the RLC.
IP Gateway	Enter the IP gateway of the RLC.
Management IP Information: Disable	■ Click in the **Enable** check box if you want to assign an IP address on the host PBX’s internal LAN to the RLC. ■ Click in the **Disable** check box if you do not want to assign an IP address on the host PBX’s internal LAN to the RLC. Since this is the default setting, you only need to do this after you have enabled management IP information. To assign the RLC an IP address on the host PBX’s internal LAN, click in this check box. **Result:** The check mark disappears and Configuration Manager enables the Management IP Address and Management IP Mask fields.
Management IP Address	Enter the IP address of the RLC on the host PBX’s internal LAN.
Management IP Mask	Enter the IP network mask of the host PBX if you do want remote units connected to this RLC to have the ability to configure PBX settings.
DiffServ CodePoint	■ Click on the **Enable** option button if you want to allow prioritization of voice packets sent from this RLC over WAN portions of the network. ■ Click on the **Disable** option button if you do not want to allow prioritization of voice packets sent from this RLC over WAN portions of the network.

Field	Description
802.1p mapping	■ Click on the **Enable** option button if you want to allow prioritization of voice packets sent from this RLC over LAN portions of the network. ■ Click on the **Disable** option button if you do not want to allow prioritization of voice packets sent from this RLC over LAN portions of the network.

Prioritizing voice traffic over shared networks

Prioritizing voice traffic on shared networks can improve QoS on LAN and WAN segments of the network that support prioritization. Achieving the desired QoS through prioritization over LAN connections requires you to enable 802.1p mapping. Achieving the desired QoS through prioritization over WAN connections requires you to enable the DiffServ Codepoint.

RLC port configuration

Ports on the RLC can be configured as one of the following ports:

- Remote ports provide host-PBX access to a remote user station. Configure at least one Remote port for each remote unit (Remote Office 9150, 9115, 9110 unit, or Meridian Digital Telephone IP Adapter) and for each Bridge port configured on a Remote Office 9150 unit.

  Note: Bridge ports, configured on Remote Office 9150 units, allow the 9150 unit to give incoming, local, PSTN calls access to the following PBX features: Transfer, Call Forward, and Conference.

- Network ports establish PSTN connections between the RLC and its remote units.

  Note: A common mistake in programming a PSTN connection is to enable only a single port (typically Port 16) on the RLC. Keep in mind, that one port must be programmed for each ISDN call that the Remote Office 9150 unit can place to the PBX. Note that typically a BRI line from a CO has the capability of placing two ISDN calls (2 B-channels) and therefore would require two network ports to be configured on the RLC. Refer to the PBX configuration notes for Class of Service requirements.

- Local ports provide local digital telephone connections directly to the RLC.

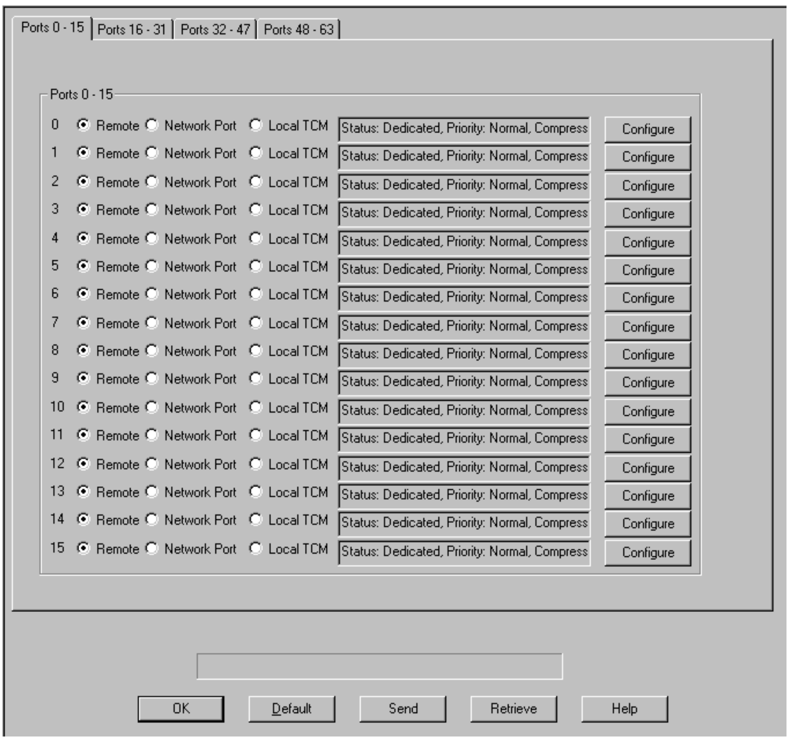
The following table describes port number ranges and how they can be configured.

Ports	Can be assigned to
0 through 15 and 32 through 47	digital telephone sets that are assigned to remote users. **Note:** The associated ports on the host PBX must be configured with voice capability.

Ports	Can be assigned to
16 through 31 and 48 through 63	■ stations equipped with ATAs or MCAs **Note:** For ATA and MCA compatibility with Remote Office 911x series units, refer to “Network port configuration” on page 110. ■ network ports for configuring a trunk between the RLC and a remote unit. **Note:** The associated ports on the host PBX must be configured with data capability.

Getting there RLC → Configuration Manager → RLC Port Configuration

RLC Port Configuration property sheet



Configuring an RLC port

To configure an RLC port:

1 Click on the appropriate tab for the port you are configuring, as in Ports 0-15 or Ports 16-31 for a 16-port RLC, Ports 0-15, Ports 16-31, Ports 32-47, or Ports 48-63 for a 32-port RLC.

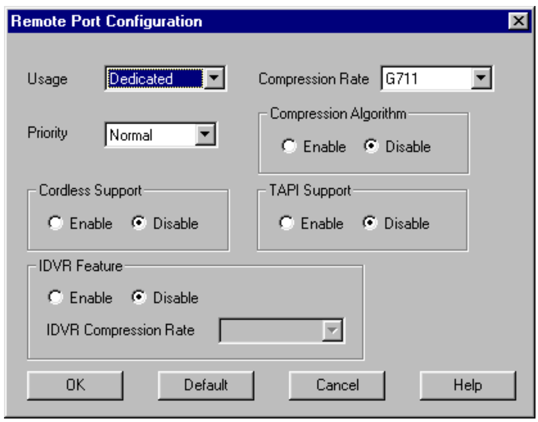
2 In the line for the port you are configuring, choose the type of port you want to configure as follows:

IF you want to configure a	THEN
remote port,	complete the following steps:

a Click on the **Remote** option button on the line of the port number you are configuring.

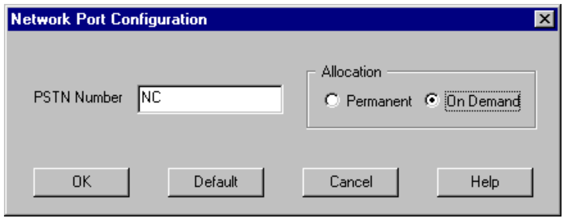
b Click on the **Configure** button on the same line.

Result: The Remote Port Configuration dialog box displays, similar to the following:



c Select the desired settings according to the “Remote port configuration field descriptions table” on page 166.

d Click on the **OK** button to save the information to a temporary file on your administration PC.

<table>
<tr><th>IF you want to configure a</th><th>THEN</th></tr>
<tr><td>network port,</td><td>complete the following steps:
a Click on the Network Port option button on the line of the port number you are configuring.
b Click on the Configure button on the same line.
Result: The Network Port Configuration dialog box displays, similar to the following:


c Select the desired settings according to the “Network port field descriptions table”, on page 169.
d Click on the OK button to save the information to a temporary file on your administration PC.</td></tr>
</table>

5 Click on the **Send** button to update the RLC with the new information.

Result: The administration PC saves the changes in a temporary file.

6 To save changes to the RLC’s flash memory, select Upload → Save to Flash from the Menu Bar.

Note: Refer to page 149 for information on the Integrated Digital Voice Recorder (IDVR).

Remote port configuration field descriptions table

Field	Description
Usage	■ Select Dedicated if this you use this port for one DN only. ■ Select Multiuser if a variety of remote units or different ports on the same remote unit can use this port in a time-share fashion. ■ Select Dynamic Pool if this port is part of a dynamic pool and can be assigned to any remote port requesting access to any port of the RLC pool.
Compression Rate	Select the compression that offers the voice quality and network bandwidth you want for calls on this port. Valid options are: G.711, G.726, G.729, and G.729/FAX.
Priority	■ Select PSTN only to allow access only to the PSTN. PSTN-only ports do not move between networks according to QoS levels. Meridian telephones that place calls to PSTN only telephone sets when there is not enough PSTN bandwidth available receive an error message. In this situation, `Bandwidth Limit` appears on the calling telephone's display. ■ Select High to allow access either to the PSTN or the IP network, based on QoS. Calls through High priority ports move to the PSTN first in a QoS transition. In recovery situations, when IP QoS returns to within configured limits, calls through High priority ports return to the IP network last, ensuring the most consistent QoS.

Remote port configuration field descriptions table (Continued)

Field	Description
Priority (Continued)	■ Select Normal to allow access to either the PSTN or the IP network, based on QoS. Calls through Normal priority ports move to the PSTN only after all calls through High priority ports make the transition. In recovery situations, as QoS on the IP network returns to within configured limits, calls through Normal priority ports return to the IP network first. ■ Select IP only to allow access only to the IP network. IP-only ports do not move between networks according to QoS levels.
Compression algorithm	■ Click on the **Enable** option button if you want to allow compression on this port. ■ Click on the **Disable** option button if you do not want to allow compression on this port.
Cordless Support	RLC ports can support either corded telephones or cordless telephones. ■ Click on the **Enable** option button if you want this port to provide service only to cordless telephones, such as M2616CT. ■ Click on the **Disable** option button if you want this port to provide service only to corded telephones, such as M2616. **Note:** Misconfiguration of this field causes incorrect remote telephone operation.

Remote port configuration field descriptions table (Continued)

Field	Description
TAPI Support	Enabling Telephone Application Programming Interface (TAPI) support allows telephones using the selected port to interact with a TAPI server such as Meridian Communicator. ■ Click on the **Enable** option button if you want this port to interact with a TAPI server. ■ Click on the **Disable** option button if you want to prevent this port from interacting with a TAPI server. When configured for TAPI support, the RLC allocates DSP and bandwidth resources whenever a line key indicator goes active and stays active for Multiple Appearance DNs. To prevent the over-allocation of these resources during midnight routines, either disable LD 35, or configure the RLC as Offline during this period. **Note:** You must configure MSL-100 ATA sets and MSL-100 AAB sets for TAPI support for them to function properly.
IDVR Feature **IDVR Compression Rate**	Refer to page 149 for information on the Integrated Digital Voice Recorder (IDVR).

Network port field descriptions table

Field	Description
PSTN Number	Enter the DN of the port you are configuring in the PSTN Number field.
Allocation	The allocation setting refers to the connection status of the port you make the setting for. ■ Click on the **Permanent** option button if you want connections established over the port you are configuring to remain up until the remote unit goes offline. ■ Click on the **On Demand** option button if you want connections established over this port to go down when they are no longer needed. Connections over ports configured as On Demand remain up until the minimum call duration timer expires.

IDVR Feature Key Configuration field descriptions table

Field	Description
IDVR Status **Key Feature** **Key Number** **IDVR Compression Rate**	Refer to page 149 for information on the Integrated Digital Voice Recorder (IDVR).

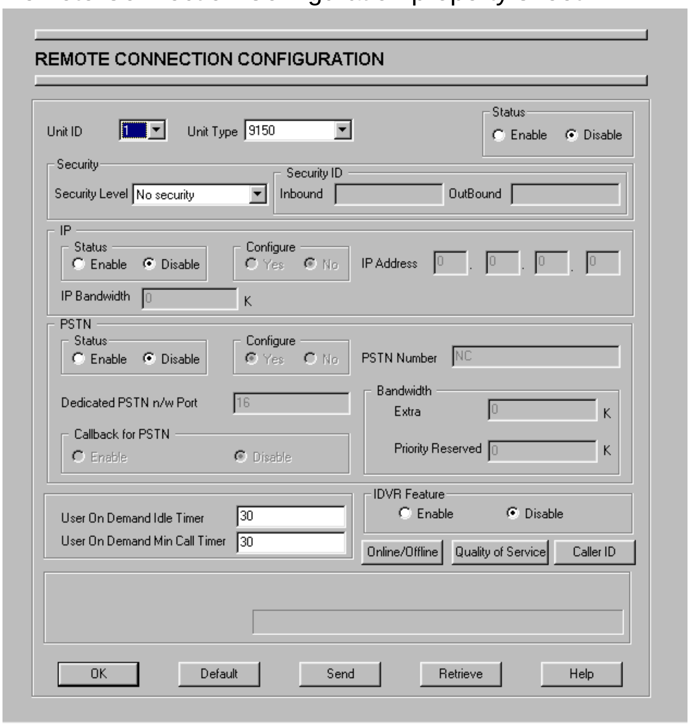
Remote Connection Configuration

This section shows you how to choose the following settings for each remote unit:

- security
- IP connection
- PSTN connection
- call timers

Getting there RLC → Configuration Manager → Remote Connection Configuration

Remote Connection Configuration property sheet



Security

The RLC offers three security levels. For an explanation of each of these levels, refer to “Multiple security levels” on page 17.

To configure security for the RLC:

1 Choose the desired security level in the Security Level drop down box on the Remote Connection Configuration property sheet.

2 If you select Provisioned security, you must also enter a 10-digit Outbound Security identifier and a 10-digit Inbound Security identifier. To see how these Security identifiers effect RLC and Remote Office operation, refer to “Multiple security levels” on page 17.

IP connection

To allow a remote unit to establish VoIP connection with the RLC:

1 Enable the VoIP functionality on the IP network for that unit by selecting the option button located in the Status section.

2 Select the Yes option button located in the IP: Configure section.

3 Enter the unit’s IP address in the IP Address fields.

4 Determine the IP Bandwidth using data rate values provided in the Bandwidth usage table located in the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103). Calculate the number of simultaneous calls allowable on your WAN. This depends on the following information:

- compression algorithms used by the call (refer to the table below)
- your Wide Area Network (WAN) type
- whether Voice Activity Detection (VAD) is enabled or disabled

Compression algorithm	Required voice bandwidth in Kbps
G.711	64
G.726	32
G.729	8
G.729/FAX	14.4

IP Bandwidth calculation examples (using Peak Data Rate values):

- For a one Mbyte Frame Relay WAN supporting only G.711 calls, enter 848 in the IP Bandwidth field according to the following calculation:

  1024K (1 Mbyte) - 16K for signaling = 1008K of available bandwidth
  1008K/76Kbps (peak data rate for a G.711 call according to the Bandwidth Usage table) = 13
  therefore,
  IP Bandwidth = (13 G.711 calls * 64K [required voice bandwidth from the table above]) + 16K (for signaling) = 832 + 16 = **848K**

- For a one Mbyte Frame Relay WAN supporting only G.729 calls, enter 0 in the IP Bandwidth field according to the following calculation:

  1024 (1 Mbyte) - 16K for signaling = 1008K of available bandwidth
  1008/20Kbps (peak data rate for a G.729 call according to the Bandwidth Usage table) = 50
  therefore,
  IP Bandwidth = (50 G.729 calls * 8K [required voice bandwidth according to the table above]) + 16K (for signaling) = 400 + 16 = **416K**

  Note: Since the maximum number of simultaneous calls possible through a Remote Office system is 32 calls, 50 simultaneous calls are not possible. Therefore, the proper IP Bandwidth setting is 0. Zero (0) is the setting for no bandwidth limit.

- For a 128K Frame Relay WAN supporting up to two G.726 and one G.729 call, enter 88 in the IP Bandwidth field according to the following calculation:

  (2 calls * 44K [peak data rate for a G.726 call according to the Bandwidth Usage table]) + (1 call * 22K [peak data rate for a G.729 call according to the Bandwidth Usage table]) + 16K (for signaling) = 88 + 22 + 16 =126K
  therefore,
  IP Bandwidth = (2 G.726 calls * 32K required voice bandwidth from the table above) + (1 G.729 call * 8K required voice bandwidth from the table above) + 16K (for signaling) = (2 * 32) + (1 * 8) + 16 = 64 + 8 + 16 = **88K**

PSTN configuration

To allow a remote unit to establish PSTN connections with the RLC:

1 Enable PSTN functionality on the PSTN for the unit indicated in the Unit ID field by selecting the Enable option button located in the PSTN: Status section.

2 Select the Yes option button located in the PSTN: Configure section.

3 Enter the remote unit's DN in the PSTN Number field.

You must configure PSTN numbers including, the ISDN numbers, in a specific manner. Please read the following examples carefully.

Configuring seven-digit ISDN numbers

If the service documents supplied by the BRI service provider contain a seven-digit ISDN number, then choose from among the following options to configure the number on your Remote Office unit:

- Remote Office 9150 unit BRI configuration

  Configure the PSTN numbers with the seven digits provided by the Central Office without area codes. For example:

  — 5551000 configured against the corresponding B-channel, not 2145551000

- RLC Remote Connection Configuration

  Use the # delimiter to separate the Trunk Access code and area code part of the PSTN number. For example:

  — #9#5551000 (not 95551000) where "5551000" is the primary Remote Office 9150 B-channel

  — #91214#5551000 (if long distance between units), not 92145552000

- RLC Network Port configuration

  Enter the Network Port PSTN Number exactly as the Remote Office unit must dial it. For example:

  — 5552000 (for seven-digit local call) where 5552000 is a PBX DID data port number

  — 12125552000 (if long distance)

  — 912125552000 (if long distance and the 9150 BRI CO uses a "9" access code)

Configuring 10-digit ISDN numbers

If the service documents supplied by the BRI service provider contains a 10-digit ISDN number, then the configuration is as follows:

- Remote Office 9150 BRI configuration

  Configure the PSTN numbers with the 10 digits provided. For example: 2145551000 configured on the corresponding B-channel.

- RLC Remote Connection Configuration

  Use the # delimiter to separate the Trunk Access code from the PSTN number. For example:

  — #9#2145551000 (not 92145551000) where “5551000” is the primary Remote Office 9150 unit B-channel and “9” is the Trunk Access Code.

  — #91#2145551000 (if long distance)

- RLC Network Port configuration

  Enter the Network Port PSTN Number exactly as the Remote Office unit must dial it. For example:

  — 5552000 (for seven digit local call) where 5552000 is a PBX DID data port number

  — 12125552000 (if long distance)

  — 912125552000 (if long distance and the Remote Office 9150 BRI CO uses a 9 access code)

Configuring 911x PSTN connections

To configure a PSTN Remote Office 911x series unit:

1. Access the RLC Connection Configuration sheet in Configuration Manager.
2. Enter the DID number of the dedicated PSTN network port on the RLC for the Remote Office 911x series unit in the PSTN Number to Connect to RLC field.
3. Click on the **OK** button.

Special Configuration for Callback for PSTN

The Callback for the PSTN field on the RLC Remote Connection Configuration property sheet allows you to enable and disable Callback. The default is Callback for PSTN disabled. This means that the RLC places data calls to the Remote Office 9150 unit to establish additional bandwidth during normal operation. If you enable Callback for PSTN, the Remote Office 9150 unit places the call to the RLC to establish additional bandwidth.

Note: During a RLC or Remote Office 9150 reset, or during a sudden IP network failure, both the RLC and the Remote Office 9150 unit attempt to call each other to establish the Primary Signaling Link. When this occurs, either system can actually establish the first connection. Follow the guidelines below when configuring callback for PSTN.

If Callback for PSTN is disabled:

1. Configure the Primary Network Port with a DID number on the host PBX that is routed over a data capable PRI.
2. Configure either DID numbers or internal DNs on all other network ports (one per B Channel).

If Callback for PSTN is enabled:

1. Configure the Primary Network Port with a DID number on the host PBX routed over a data capable PRI.
2. Configure DID numbers on all other network ports (one per B Channel).

Minimum call duration timers and Idle timers

The RLC uses minimum call duration timers and idle timers to help control PSTN costs. For a detailed discussion of these timers, refer to “Timers” on page 20. For information on configuring these timers, refer to “User On Demand Idle Timer” and “User On Demand Min Call Timer” on page 181.

Configuring remote connection settings

To configure remote connection settings:

1 Complete the fields as described in “Remote Connection Configuration field descriptions” on page 178.

2 Click on the **OK** button to save the information in the temporary work file.

3 Click on the **Send** button to update the RLC with the new information.

Result: The RLC writes the changes to a temporary file on the administration PC.

Note: To save changes to the RLC’s flash memory, select Upload → Save to Flash.

Remote Connection Configuration field descriptions

Field	Description
Unit ID	Select the site number assigned to the remote unit you are configuring. Valid options are: 1–20.
Unit Type	Select 911X, or 9150 according to the Remote Office unit you are configuring at the remote site. **Note:** Only four Remote Office 9150 units can be connected to the same RLC.
Status	■ Click on the **Enable** option button to activate the remote unit. ■ Click on the **Disable** option button to deactivate the remote unit.
Security Level	Select the desired security level. Valid options are: No security, Caller ID security, or Provisioned security.
Security ID: Inbound	If you selected provisioned security, enter the Security ID, up to 10 digits in length, that must be presented by calls before they are received at this site.
Security ID: Outbound	If you selected provisioned security, enter the Security ID, up to 10 digits in length, that must be presented by calls before they are allowed to go out from this site.
IP: Status	Select whether or not VoIP is the primary connection type to the remote office. ■ Click on the **Enable** option button to choose the IP network as the primary connection type to the remote unit. ■ Click on the **Disable** option button to disable connectivity to the remote unit over the IP network.

Remote Connection Configuration field descriptions (Continued)

Field	Description
IP: Configure	Enable IP configuration to allow the RLC to initiate IP connections to the remote site. **Note:** You must also configure an IP address for the remote unit. ■ Click on the **Enable** option button to configure a static IP address for the remote unit. The RLC uses this address for connections to the remote unit. ■ Click on the **Disable** option button if you do not wish to configure an IP address for the remote unit.
IP Address	Enter the remote unit's IP address if you want to be able to initiate IP connections to the remote site from the RLC.
IP Bandwidth	Enter the total amount of voice bandwidth needed for the maximum number of simultaneously active telephone calls over your WAN.
PSTN: Status	To use the PSTN mode with this remote unit, you must enable PSTN connectivity. ■ Click on the **Enable** option button to allow the RLC to connect to the remote unit over the PSTN. ■ Click on the **Disable** option button to prevent the RLC from connecting to the remote unit over the PSTN.
PSTN: Configure	To allow the RLC to initiate a PSTN connection to the remote site, you must configure a PSTN number for the remote unit. ■ Click on the **Yes** option button to configure the remote unit's PSTN number. ■ Click on the **No** option button if you do not wish to configure the PSTN number for the remote unit.

Remote Connection Configuration field descriptions (Continued)

Field	Description
PSTN Number	Enter the PSTN number the RLC must dial to connect to the remote unit. For configuration details, refer to “PSTN configuration” on page 174.
Dedicated PSTN n/w (network) Port	Enter the RLC network port number that is dedicated to support the remote unit. **Note:** All network ports that are not dedicated are used as a pool to support additional network connections to remote units.
Bandwidth: Extra	Enter the minimum number of Kbytes of bandwidth to have available at any time for PSTN access to the remote unit.
Bandwidth: Priority Reserved	Enter the Kbytes of PSTN bandwidth you would like to reserve for high priority DNs.
Callback for PSTN	The Callback for PSTN setting determines the site that initiates additional trunk connections when the RLC identifies the need for additional bandwidth. ■ Click on the **Enable** option button if you want the Remote Office 9150 unit to initiate the additional trunk connections. ■ Click on the **Disable** option button if you want the RLC to initiate the additional connections.
User On Demand Idle Timer	Enter the maximum number of seconds that a PSTN connection can remain idle at this remote site before the RLC closes it. For more details, refer to “Minimum call duration timers and Idle timers” on page 176.

Remote Connection Configuration field descriptions (Continued)

Field	Description
User On Demand Min Call Timer	Enter the minimum number of seconds that a PSTN connection must remain open at this remote site before the RLC closes it. For more details, refer to "Minimum call duration timers and Idle timers" on page 176.
IDVR Feature	Refer to page 149 for information on the Integrated Digital Voice Recorder (IDVR).
Online/Offline	Click on the **Online/Offline** button to edit the online/offline table for this remote site. Refer to "Online/Offline table configuration" on page 189 for details on configuring this table.
Quality of Service	Click on the **Quality of Service** button to edit the QoS Transitioning Technology settings for this remote site. Refer to "Configuring Quality of Service" on page 182 for information on configuring these settings.
Caller ID	If you have chosen caller ID security for this remote site, click on the **Caller ID** button to enter the telephone numbers that you want to have access to this remote site.

Configuring Quality of Service

This section shows you how to configure the RLC with quality and duration values for Nortel Networks’ patented QoS Transition Technology.

QoS Transitioning Technology allows you to define *acceptable* voice QoS for Remote Office telephone calls routed using Voice over Internet Protocol (VoIP). The Signal Degrade slide control allows you to set the point where poor voice QoS causes the RLC to transition calls to the PSTN for better QoS. The Signal Recover slide control identifies the IP voice QoS level where you want the RLC to recover calls to the IP network.

You can also define the following duration parameters:

- The degrade duration is the time (in seconds) that QoS must remain below the degrade threshold before the RLC transitions calls to the PSTN.
- The recover duration is the time (in minutes) that QoS must remain above the recover threshold before the RLC recovers the call to the IP network.

The units of the acceptable duration for recovery are minutes rather than seconds in an attempt to minimize *transition thrashing.* Transition thrashing is the rapid transition and recovery between networks. This can occur when QoS hovers around configured degrade and recover thresholds. This phenomenon produces higher than normal PSTN charges.

Note: Quality of Service problems can sometimes be addressed through prioritization of voice packets. For more information, refer to “Quality of service on shared networks” on page 15.

More information

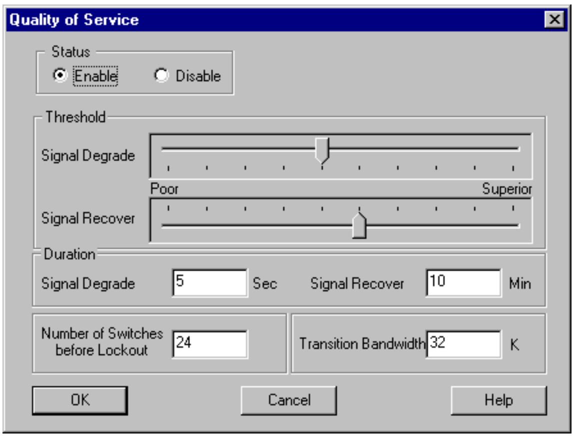
Refer to the *Remote Office Network Engineering Guidelines* (NTP 555-8421-103) for detailed information describing QoS Transitioning Technology. To locate this document, click on the Customer Support, Documentation, and North America links at the following website:

www.nortelnetworks.com

Getting there

RLC → Configuration Manager → Remote Connection Configuration → Quality of Service

Quality of Service dialog box



Configuring QoS

The slide controls allow 10 settings ranging from poor to superior, within the following boundaries:

- 1 (poor) equates to a MOS—mean opinion score—value of 3.0, as calculated by the RLC and based upon the ITU E-Model for serviceability and service integrity performance
- 10 (superior) equates to a MOS value of 4.0

Since the ITU E-Model uses network delay as its sole point of reference, the RLC also factors in average packet-loss to obtain the MOS value. For example, if the user sets the threshold to a MOS value of 3.5 (center tick of slide control), the following scenario can occur. The measured delay on the network may indeed be less than a score of 3.5 according to the ITU E-model. However, excessive packet loss can lower the MOS value calculated by the RLC. In this scenario, the RLC moves the call from the IP network to the PSTN. This move ensures an acceptable quality of service for the user, based on real network conditions.

QoS configuration procedure

1 Complete the fields as described in “Quality of Service field descriptions table” on page 185.

2 Click on the **OK** button to save the information in the temporary work file.

3 Click on the **Send** button to update the RLC with the new information.

Result: The RLC writes the changes to a temporary file on the administration PC.

4 To save changes to the RLC’s Flash memory, in the Menu Bar select Upload → Save to Flash.

Quality of Service field descriptions table

Field	Description
Status	■ Click on the **Enable** option button to allow QoS transitions to occur when the QoS on the IP network degrades. ■ Click on the **Disable** option button if you do not want to use the QoS Transitioning Technology.
Threshold: Signal Degrade	Move the indicator to the appropriate point on the sliding scale, a relative value between poor and superior.
Threshold: Signal Recover	Move the indicator to the appropriate point on the sliding scale, a relative value between poor and superior.
Duration: Signal Degrade	Enter a value, in seconds, between 1 and 60. If poor voice quality lasts for the specified duration, then calls are moved from the IP network to the PSTN.
Duration: Signal Recover	Enter a value, in minutes, between 1 and 10. When the improved voice quality lasts for the duration value chosen (in minutes), then calls are moved back to the IP network.
Number of Switches before Lockout	Enter the number of transitions between the IP network and PSTN in any 24-hour period that causes the RLC to stop making the transition.
Transition Bandwidth	Enter the amount of bandwidth in Kbytes that you want the RLC to have available at all times for use when transitioning between the IP network and PSTN.

How the online/offline table works

Use the online/offline table to schedule the times that the RLC makes a PSTN connection available to an RLC port. The online/offline table gives you the ability to ensure that potentially costly PSTN/ISDN or long distance connections do not stay up after business hours. If the offline command occurs while the connection is in use, Remote Office system users at the remote site can override table settings.

Notes:

- When a remote unit is in the offline mode, users cannot place host-controlled calls with that unit.
- Users can override the online/offline table to establish or terminate a connection to the network.

Online/offline configuration example

The online/offline table allows you to make up to eight entries per day, every day of the week, for each remote site. The following is an example of a standard online/offline program for an RLC port.

Entry	State	State
Entry 1	At 8:00 a.m., the RLC establishes the remote site’s PSTN connection.	Online
Entry 2	At 11:30 a.m., (a common lunchtime) the RLC disables the PSTN connection.	Offline
Entry 3	At 12:30 p.m., (the end of lunchtime) the RLC re-enables the PSTN connection.	Online
Entry 4	And at 5:00 p.m., the RLC disables the PSTN connection for the day.	Offline

Online/Offline table overrides

Any remote user can override the settings of the online/offline table if the table attempts to terminate the connection during a call. A buzz alerts users at the remote site that the connection is going down in 30 seconds. After the initial warning, users can enter the online SPRE code on their telephone key pads to override the termination of the connection. The warning buzz repeats itself 20 and 10 seconds before the system terminates the connection. Any user at the remote site can avoid going offline by entering the online SPRE code.

Multiple offline periods

You can configure multiple offline entries into the table without configuring online entries between each offline entries. In this way, you can program the RLC to terminate a connection that has been left open should a remote site user be forced to override a scheduled PSTN termination.

For example, Mr. Smith, a remote site user, begins a business call with Mr. Jones, at 4:45 p.m. on a Friday. The RLC is programmed to terminate his PSTN connection at 5:00 p.m. However, Mr. Smith overrides the scheduled termination, and the call continues for another 45 minutes. The business call succeeds, but the expensive PSTN connection remains up. If the usual schedule were followed, the connection would not be terminated until lunch time on the following Monday.

Fortunately, Mr. Smith’s system administrator foresaw this situation and configured offline commands for 6:00, 7:00, and 8:00 p.m. So, the RLC terminates the PSTN connection at 6:00 p.m. Mr. Smith’s company accrues only 15 minutes of unnecessary PSTN charges.

How the remote site goes online

When going offline, the remote unit's offline timer activates. When the timer expires, the remote unit automatically initiates a "going online" request to the host PBX. If the RLC receives the request successfully, the remote site and its associated digital telephones go online.

If you configure no online entries in the online/offline table, the RLC instructs the remote unit to go offline forever each time it processes an offline entry. To go back online, a remote user must enter the online SPRE code in order to place host-controlled calls on either the PSTN or IP network.

Online/Offline table configuration

The Online/Offline Table allows you to enter up to eight entries per day for each remote site, every day of the week. You can define each entry as Online, Offline, or Undefined.

Getting there

RLC → Configuration Manager → Remote Connection Configuration → Online/Offline Table

Online/Offline Table

Configuring an Online/Offline Table

To configure the Online/Offline Table:

1 Access the Remote Connection Configuration property sheet.

2 Ensure that the Unit ID drop down box shows the Unit ID for the remote unit you want to configure an Online/Offline Table for. If it does not, choose the proper Unit ID from the drop down box, such as **1—20**.

3 Ensure that the Unit Type drop down box properly reflects the remote unit you want to configure an Online/Offline Table for. If it does not, choose the proper Unit Type from the drop down box, such as **9150** or **911X**.

4 Click on the **Online/Offline** button.

Result: The Online/Offline Table dialog box displays. (Refer to “Online/ Offline Table” on page 189.)

5 From the Day drop down box, select the day of the week that you want the remote unit to have access to the network (PSTN or IP).

6 In the enabled State drop down box, choose **Online** or **Offline**, according to the command you want the system to initiate for this remote site.

Result: Configuration Manager enables the associated Time list box and the State and Time list boxes immediately below. The chosen state (**Online** or **Offline**) displays in the list box described in step 6.

Note: If you choose **Undefined**, the subsequent list boxes remain disabled. Configuration Manager takes your choice of **Undefined** to be an indication that you do not want to configure more commands in this Online/Offline Table.

7 In the associated Time list box, choose the time (24-hour time format) that you would like Configuration Manager to initiate the state chosen in step 5.

8 As you make selections in the State drop down box, Configuration Manager enables list boxes in the subsequent line, with the opposite selection.

chosen as a default selection. For example, **Offline** (if you chose **Online** in step 6) or **Online** (if you chose **Offline** in step 6).

Note: You can make your desired Online/Offline Table selection in any enabled box in any order.

IF you want to	THEN
continue configuring entries (up to eight) in the Online/Offline Table for this remote unit,	return to step 6.
stop configuring the Online/Offline Table for this remote unit,	click on the **OK** button.

Caller ID configuration

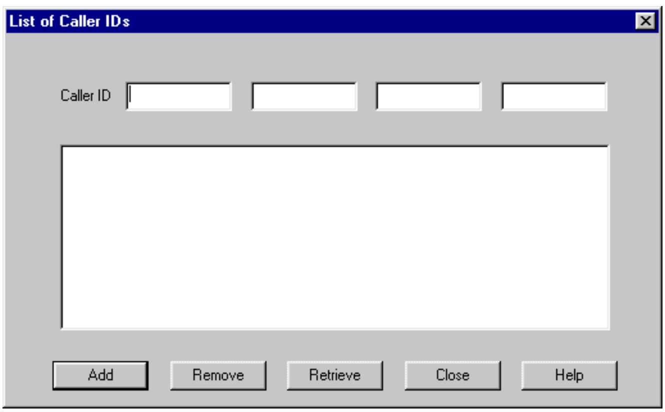
Note: This procedure applies to Remote Office 9150 units only.

In the list of Caller IDs dialog box, enter the DNs of every B-channel assigned to the remote unit you are configuring. The Unit ID field of the associated Remote Connection Configuration property sheet identifies the remote site these Caller IDs apply to. Enter up to 20 telephone numbers using the same format used by the PSTN for presenting these DNs, such as 10 digits or four digits. If you want to use level 2 (Caller ID) security, you must enter the DNs of all associated B-channels. For more information on Caller ID security, refer to “Level 2, caller ID security” on page 17. For the proper procedure to use in Caller ID configuration, refer to “Configuring Caller ID information” on page 193.

Getting there

RLC → Configuration Manager → Remote Connection Configuration → Caller ID

List of Caller IDs



Configuring Caller ID information

To configure Caller ID information for a Remote Office 9150 unit:

1 Access the Remote Connection Configuration property sheet. (Refer to “Remote Connection Configuration” on page 171 for help in locating this property sheet.)

2 Choose the Unit ID of the Remote Office 9150 unit that you want to configure Caller IDs in the Unit ID drop down box, such as **1**–**20**.

Result: 9150 appears in the Unit Type drop down box. If 9150 does not appear in the Unit Type drop down box, for instance, if you are completing an offline configuration, select 9150 from the available options.

3 Click on the **Caller ID** button.

Result: The Caller ID configuration sheet appears. (Refer to “List of Caller IDs” on page 192.)

4 Enter the telephone numbers of the people to whom you want to grant access to the remote unit in the Caller ID fields.

Note: Enter up to four Caller IDs.

5 Click on the **Add** button.

Result: The numbers you entered in the fields appear in the larger window below.

6 When you have entered all of the Caller IDs for the ISDN BRI B-channels assigned to this Remote Office 9150 unit, you can configure up to 8, click on the **Close** button.

Result: The List of Caller IDs dialog box disappears and Configuration Manager returns you to the Remote Connection Configuration property sheet.

7 Click on the **OK** button to save the information in the temporary work file.

8 Click on the **Send** button to update the RLC with the new information.

Result: The RLC writes the changes to a temporary file on the administration PC.

Note: To save changes to the RLC’s flash memory, select Upload → Save to Flash.

DSP configuration

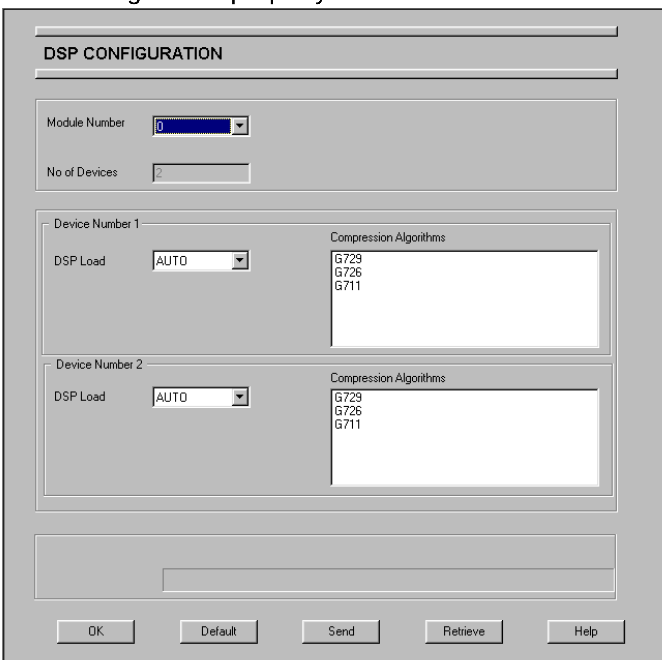
This section shows you how to configure DSP resources on your RLC. The RLC must provide the same number of voice DSP channels as the maximum number of simultaneous calls your remote services network supports. Each DSP *module* holds two DSP *devices*. Currently, each DSP *device* holds four DSP *channels*. To add eight DSP *channels* to your Remote Office system's voice processing capability, add one DSP application *module*.

Calls made from Remote Office 911x series units require two DSP channels (one voice channel, one modem channel) when operating in PSTN mode. This includes QoS transitions. If you want to configure Remote Office 911x series units for analog modem calls, you must set the RLC DSPs to Remote Office 911x. Each DSP configured for the Remote Office 911x series unit supports four modem only connections (no support for G.711, G.729, or G.726).

Getting there

RLC → Configuration Manager → DSP Configuration

DSP Configuration property sheet



Module identification

The upper portion of the DSP configuration property sheet displays fields that identify the module you are currently configuring. In the Module Number drop down box, choose the module position on the RLC that the DSP module occupies. Module 0 represents the built-in DSP resources on the RLC–the equivalent of one DSP application module.

Device configuration

The middle portion of the property sheet displays information describing the DSP loads, and corresponding compression algorithms that you can select for each DSP device.

Configuring DSPs

To configure DSP modules on your RLC, complete the following steps:

1 Access the DSP Configuration property sheet.

2 Complete the fields as described in “DSP Configuration field descriptions” on page 196.

3 Click on the **OK** button to save the information in the temporary work file.

4 Click on the **Send** button to update the RLC with the new information.

Result: The RLC writes changes to a temporary file on the administration PC.

Note: To save changes to the RLC’s flash memory, select Upload → Save to Flash.

DSP Configuration field descriptions

Field	Description
Module Number	Select the number of the module DSP position on the RLC occupied by the DSP application module you are configuring. Valid options are: 1–4.
No of Devices	This is a read-only field displaying the number of DSP devices on the application module in the selected module position. Refer to “DSP configuration” on page 194 for an explanation of DSP *devices* versus DSP *modules* and DSP *channels*.
DSP Load **Note:** This description applies to both appearances of this field.	Select the DSP load that you want to enable on this DSP device. Valid options are: G729, 911X, AUTO. **Note:** Selecting **AUTO** instructs the RLC to choose a *default* DSP load. This *default* load is G.729, depending on DSP channel availability.
Compression Algorithms **Note:** This description applies to both appearances of this field.	This read-only field displays the compression algorithms contained in DSP load displayed in the DSP load drop down box. The compression algorithm (G.711, G.726, or G.729) used on calls to or from the Remote Office unit stations is dictated by the compression setting configured for the remote port over which the call is processed.

Chapter 7

Administration

In this chapter

Changing the administration password

Two layers of password security protect the RLC's configuration. If you want to secure the RLC's configuration so that only those with passwords unique to your RLC can make configuration changes, alter the following items:

- Configuration Manager password

  This password prevents unauthorized users from performing offline configuration changes.
- RLC's password

  This password prevents unauthorized users from performing online changes of the configuration residing in the RLC's Flash memory.

Note: Make sure that you record the password and store it in a safe, secure location. If you forget or lose the password, contact your Nortel Networks customer support representative.

Getting there RLC → Configuration Manager

Changing the Configuration Manager password

To change the Configuration Manager (local) password:

1 From the Menu Bar, choose Connect → Change Password → Local.

Result: The Change Password dialog box displays, similar to the following:

2 Complete the fields in the Change Password dialog box.

3 Click on the **OK** button.

Result: The Password changed successfully dialog box displays.

4 Click on the **OK** button.

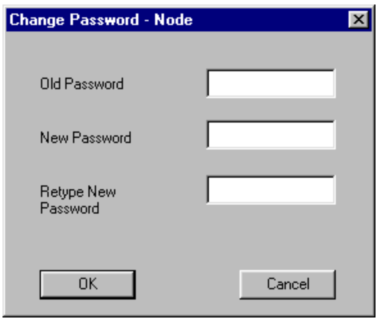
Changing the RLC password

To change the RLC (node) password:

ATTENTION Do not change the RLC's password until the system is up and working.

1 From the Menu Bar, choose Connect → Change Password → Node.

Result: The Change Password dialog box displays, similar to the following:



2 Complete the fields in the Change Password dialog box.

3 Click on the **OK** button.

Result: The Board Password Changed Successfully dialog box displays.

Note: This means that Configuration Manager has written the password to the RLC's Flash memory.

4 Click on the **OK** button.

5 From the Menu Bar, choose Upload/Download → Save to Flash.

Result: Configuration Manager updates RLC's memory with the new password.

6 Restart the RLC.

Creating a backup configuration file

Create a backup copy of the RLC's configuration by downloading the configuration from flash memory to a text file on your administration PC. Nortel Networks recommends that you create a backup of your configuration file whenever you make configuration changes or after you perform a firmware upgrade.

Storing backup configuration files

The RLC is an extension of the telecommunications and data network. It is extremely important that you keep a backup copy of the RLC's configuration. If the RLC's Flash memory or configuration becomes corrupted or is lost, you can easily restore it.

Store the configuration file in a safe, secure location, such as on backup tape or other media that is stored offsite.

Nortel Networks recommends that you keep the backup files indefinitely.

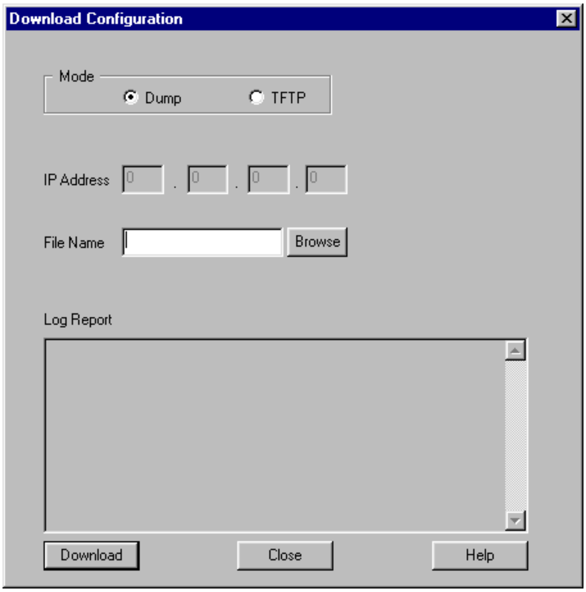
Getting there RLC → Configuration Manager

Creating the backup file

To create the backup file:

1 From the Menu Bar, choose Upload/Download → Download Configuration.

Result: The Download Configuration dialog box displays, similar to the following:



2 Choose the mode you want to use for the file transfer according to the following table:

IF you wish to save the configuration file to	THEN do the following:
the administration PC,	Click on the **Dump** option button.
a different location on the IP network,	1 Click on the **TFTP** option button. **Result:** This enables the IP Address fields. 2 Enter the IP address of the PC that you want to save the configuration file on.

3 Click on the **Browse** button and navigate to the folder where you want to keep the configuration text file.

4 Enter a name for the file in the File name field.

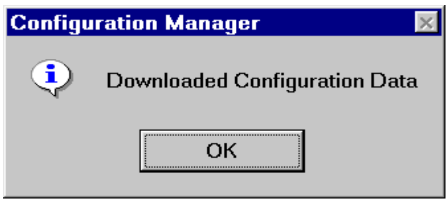
Note: This configuration file becomes your backup file, so ensure the file name is meaningful. The file name's extension must be .TXT.

5 Click on the **Download** button.

Result: The Download configuration dialog box closes, and the following message displays in the status bar at the bottom of the screen:

`Downloading Config From Board`

When the download is complete, the Downloaded Configuration Data dialog box displays, similar to the following:



6 Click on the **OK** button.

Note: Flash downloads to remote M39xx telephones can take twice as long compared to when these telephones are connected directly to a standard Nortel digital line card (XDLC).

Restoring the configuration

Restore the configuration to the RLC’s Flash memory by uploading a configuration text file from a PC on the same network as the RLC. To do this, perform the upload over the IP network using the TFTP protocol.

Before you begin

Before you can upload the configuration file to the RLC, you must complete the following steps:

1. Start the TFTP server application.
2. Ensure that the TFTP base directory points to the location of the configuration file.

Getting there

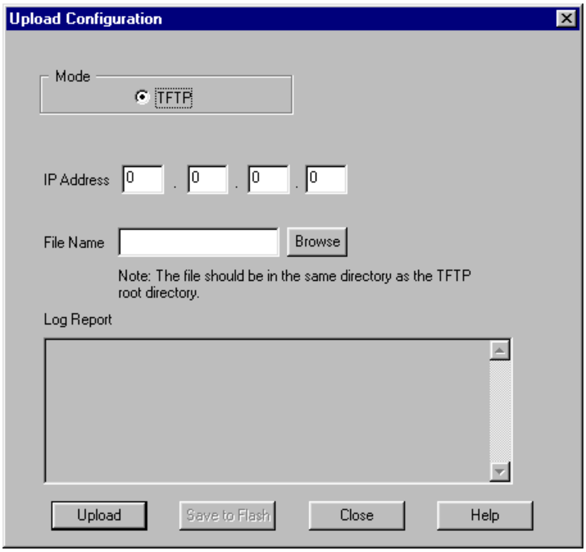
RLC → Configuration Manager

Uploading a configuration file over the IP network

To upload a configuration file over the IP network:

1 From the Menu Bar, choose → Upload/Download → Upload Configuration.

Result: The Upload Configuration dialog box displays, similar to the following:

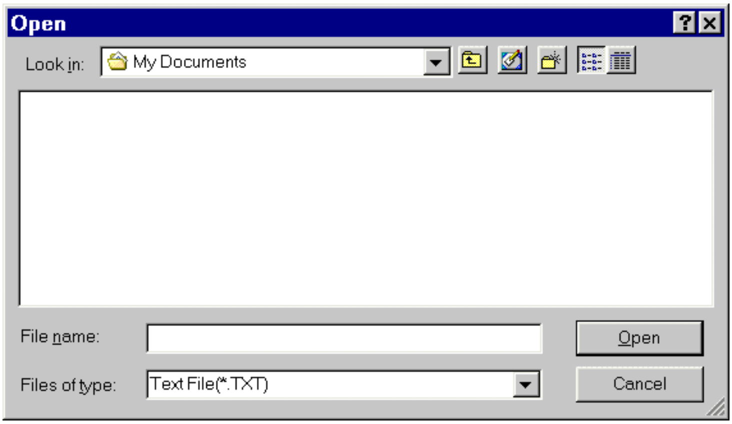


2 Enter the IP address of the TFTP server in the IP Address fields.

Note: Since the TFTP server application is running on your administration PC, this is the IP address of the administration PC.

3 Click on the **Browse** button.

Result: The Open dialog box displays, similar to the following:



4 Ensure the Files of type drop down box shows Text File (*.TXT).

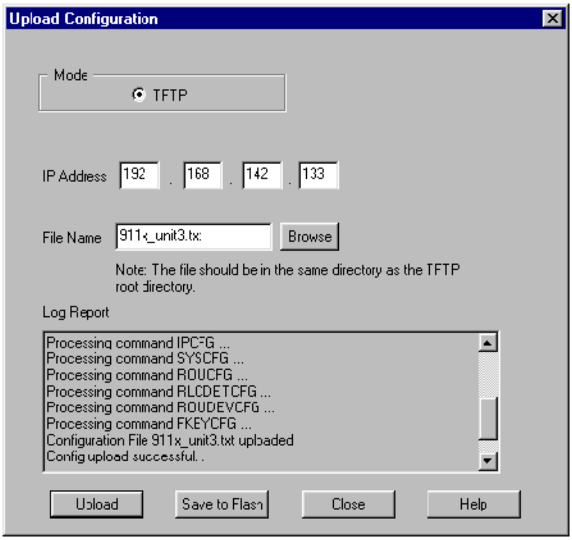
5 Navigate to the folder containing the configuration file.

6 Select the configuration file, and then click on the **Open** button.

Result: The Upload Configuration dialog box displays with the file you selected shown in the File Name field.

7 Click on the **Upload** button.

The middle of the Upload Configuration dialog box displays status messages relating to the upload. The following is an example.



CAUTION

Risk of incorrect operation due to partial configuration.

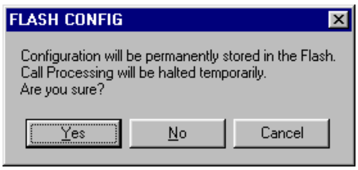
Do not interrupt the configuration upload. If you interrupt the configuration upload, this results in an incomplete configuration in the RLC's database.

If the configuration upload is interrupted, repeat this procedure immediately.

IF the upload was	THEN
successful,	the following message displays: `CONFIG UPLOAD SUCCESSFUL... USE SAVECFG TO UPDATE FLASH.` Proceed to step 8.
not successful,	the following message displays in the middle of the Upload Configuration dialog box: `CONFIG UPLOAD FAILED` For further instructions, refer to Chapter 8, “Troubleshooting”.

8 On the Upload Configuration dialog box, click on the **Save to Flash** button.

Result: The FLASH CONFIG dialog box displays, similar to the following:



9 Click on the **Yes** button.

Result: The following message displays in the status bar at the bottom of the screen:

```
Saving to Flash in Progress
```

When the save is finished, the following message displays in the middle of the Upload Configuration dialog box:

```
CONFIGURATION IS UPDATED INTO FLASH...
```

10 Click on the **Close** button.

11 Restart the RLC.

Note: For instructions, refer to “Performing a system restart or shutdown” on page 143.

Display logs

The RLC keeps track of system performance through the maintenance of display logs. Each line, or display log, represents a separate action completed by the unit. Refer to Configuration Manager Help for a complete listing of all display logs and the condition indicated by each.

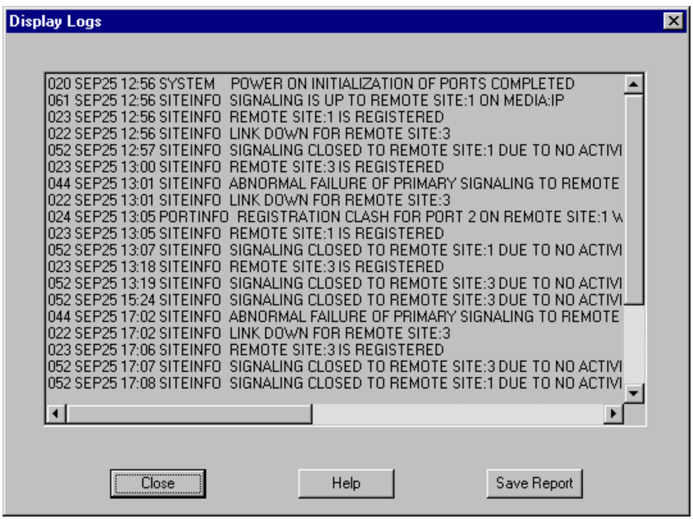
Use the display logs when troubleshooting system problems. Click on the **Save Report** button to print the display logs to a text file, or you can copy the information from the Display Logs window, and paste it into a text file.

Getting there RLC → Configuration Manager

Viewing display logs

From the Menu Bar, choose Alarms/Stats/Logs → Display Logs.

Result: You can view the RLC's display logs in a window similar to the following. You can use the scroll bar to browse through the logs.

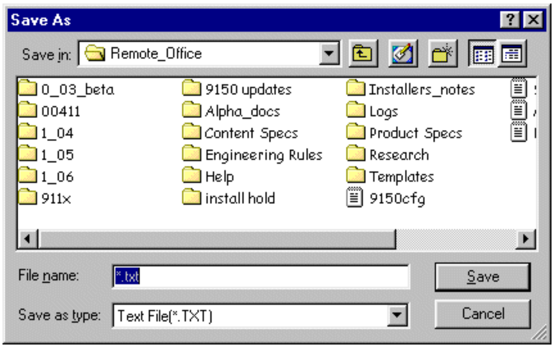


Printing the display logs to a file

If you request technical support, your support representative can ask you to provide a copy of the logs. To recreate the log in a file on your administration PC, follow this procedure:

1 After displaying the logs using the procedure explained under “Viewing display logs” on page 208, click on the **Save Report** button on the Display Logs window.

Result: The Save As dialog box displays, similar to the following:



2 Navigate to the folder where you want to store the log file.

3 Enter a name for the configuration in the File name field.

4 Click on the **Save** button.

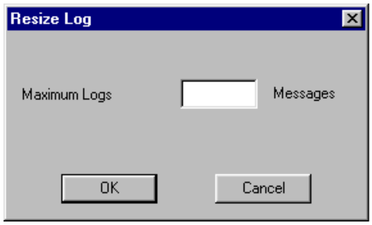
Result: Configuration Manager saves the logs to a text file in the location indicated in the Save As dialog box.

Changing the size of RLC logs

The RLC retains a maximum of 1000 display logs, each requiring one line of text. When the RLC's display logs reach 1000 lines, new display logs overwrite existing display logs on a first in, first out basis. If you want to change the number of display logs retained by the RLC:

1 From the Menu Bar, choose Alarms/Stats/Logs → Resize Logs.

Result: The Resize Log dialog box displays, similar to the following:



Note: "Maximum logs" refers to the number of text lines maintained in the RLC system log. The log holds a maximum of 1000 text lines, or the 1000 most recent display logs, when it shipped from the factory.

2 Enter the maximum number of display logs you want the RLC to keep in the Maximum Logs field.

3 Click on the **OK** button.

Clearing logs

The RLC allows you to delete unneeded information by clearing the display logs that the RLC keeps. To discard or clear display logs that are no longer useful:

1 From the Menu Bar, choose the Alarms/Stats/Logs.

Result: The CLEAR LOGS dialog box displays, similar to the following:

<table>
<tr><th>IF you select</th><th>THEN</th></tr>
<tr><td>No,</td><td>the Clear logs dialog box closes and the logs remain as they are.</td></tr>
<tr><td>Yes,</td><td>

- the RLC deletes its stored display logs.
- the LOGS cleared dialog box displays, similar to the following:

Click on the **OK** button.</td></tr>
</table>

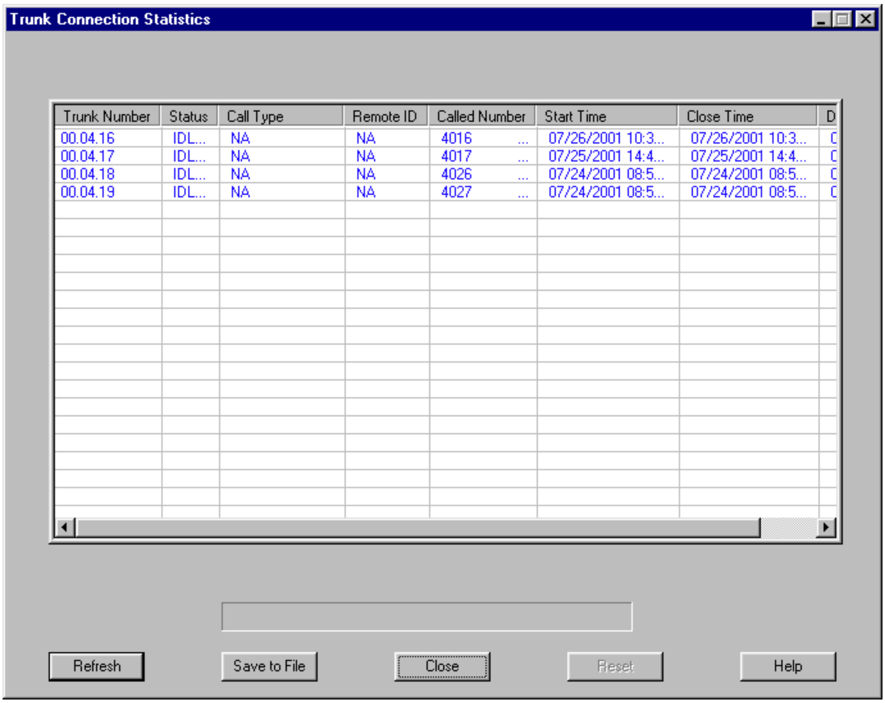
Statistics screens

All statistics screens provided by the Alarms/Stats/Logs menu, function primarily to help you obtain information to provide to technical support personnel, upon request.

Getting there RLC → Configuration Manager

Trunk Connection Statistics

Trunk Connection Statistics show you the PSTN trunk usage for the selected remote site, similar to the following:



To display the Trunk Connection Statistics screen, refer to “Displaying the Trunk Connection Statistics screen”. To obtain the definitions for the statistics presented on the Trunk Connection Statistics screen, refer to “Trunk Connection Statistics field descriptions” on page 214.

Displaying the Trunk Connection Statistics screen

Choose Alarms/Stats/Logs → Trunk Connection Statistics from the Menu Bar to display the Trunk Connection Statistics screen.

Result: Configuration Manager gathers statistics from the RLC and displays the Trunk Connection Statistics screen, similar to the example on page 212.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the Trunk Connection Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the Trunk Connection Statistics screen,	on the **Help** button.

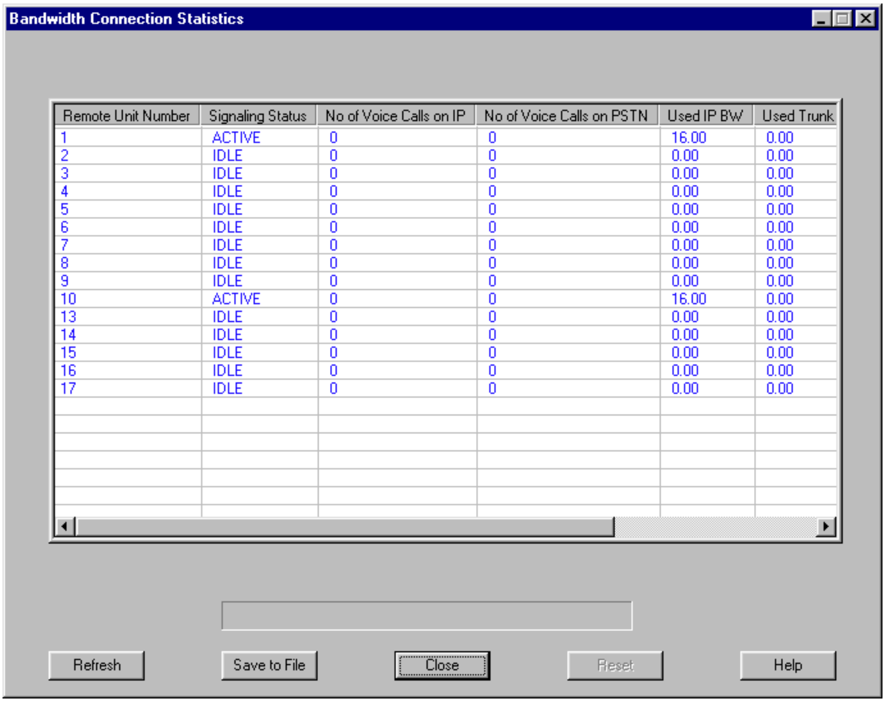
Trunk Connection Statistics field descriptions

The following table describes the statistics on the Trunk Connection Statistics screen:

Statistic	Description
Trunk Number	RLC - Identifies the Network Port number used for the call The third pair of numbers (the third item in the triplet) corresponds to the port on the RLC. 9150 - Identifies the ISDN BRI module and B-channel used for the call. 911x - Identifies the only trunk available to the remote unit with all zeroes.
Status	Identifies the current status of the trunk. Valid options are: Active, Idle.
Call Type	Identifies whether the call is a local call or a remote signaling call. Valid options are: Local, Signaling.
Remote ID	Identifies the remote unit involved in the call.
Called Number	Identifies the remote DN regardless of who initiated the call.
Start Time	Identifies the time that the last call on this trunk began.
Close Time	Identifies the time that the last call on this trunk ended. If the trunk is active, this statistic displays “NA”.
Duration	Identifies the amount of time taken for the call.

Bandwidth Connection Statistics

Bandwidth Connection Statistics allow you to see how much bandwidth is actually being used. These statistics help you determine if you need to add more bandwidth on the PSTN or IP network connections. They show the amount of bandwidth all remote units connected to the logged-on RLC have available to them, similar to the following:



To display the Bandwidth Connection Statistics screen, refer to “Displaying the Bandwidth Connection Statistics screen” on page 216. To obtain the definitions for the statistics presented on the Bandwidth Connection Statistics screen, refer to “Bandwidth Connection Statistics field descriptions” on page 217.

Displaying the Bandwidth Connection Statistics screen

Choose Alarms/Stats/Logs → BW Connection Statistics from the Menu Bar to display the Bandwidth Connection Statistics screen.

Result: Configuration Manager gathers statistics from the RLC and displays the Bandwidth Connection Statistics, similar to the example on page 215.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the Bandwidth Connection Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the Bandwidth Connection Statistics screen,	on the **Help** button.

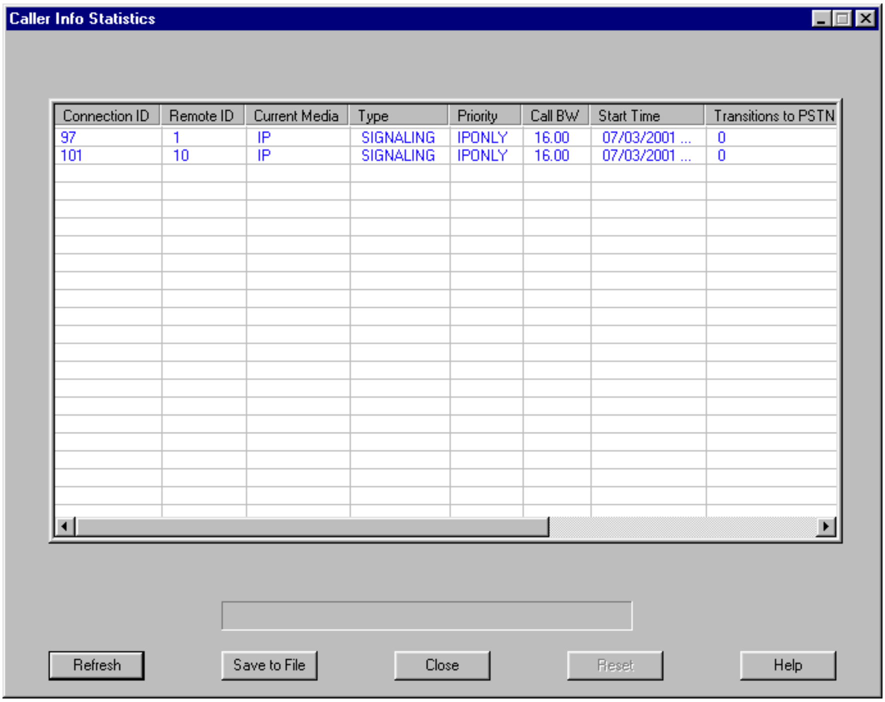
Bandwidth Connection Statistics field descriptions

The following table describes the statistics on the Bandwidth Connection Statistics screen:

Statistic	Description
Remote Unit Number	Identifies the remote unit that initiated the call.
Signaling Status	Identifies whether a connection is up on this unit. Valid. options are: Active, Idle
No of Voice Calls on IP	Identifies the number of calls in progress on this unit's IP connection.
No of Voice Calls on PSTN	Identifies the number of calls in progress on this unit's PSTN connection.
Used IP BW	Identifies the IP bandwidth in use on this unit.
Used Trunk BW	Identifies the PSTN bandwidth in use on this unit.
Total Up Trunk BW	Identifies the total PSTN bandwidth up and available to this unit.
IP QoS Status	Identifies the quality of service level on this unit's IP connection. Valid options are: Good, Bad.

Caller Info Statistics

Caller Info (Information) Statistics show you the types of calls being made (IP or PSTN) and how often QoS transitions occur. Use these statistics to help you determine if voice QoS on your IP network is stable. The Caller Info Statistics screen is similar to the following:



To display the Caller Info Statistics screen, refer to “Displaying the Caller Info Statistics screen” on page 219. To obtain the definitions for the statistics presented on the Caller Info Statistics screen, refer to “Caller Info Statistics field descriptions” on page 220.

Displaying the Caller Info Statistics screen

Choose Alarms/Stats/Logs → Caller Info Statistics from the Menu Bar to display the Caller Info Statistics screen.

Result: Configuration Manager gathers statistics from the RLC and displays the Caller Info Statistics screen, similar to the example on page 218:

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the Caller Info Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the Caller Info Statistics screen,	on the **Help** button.

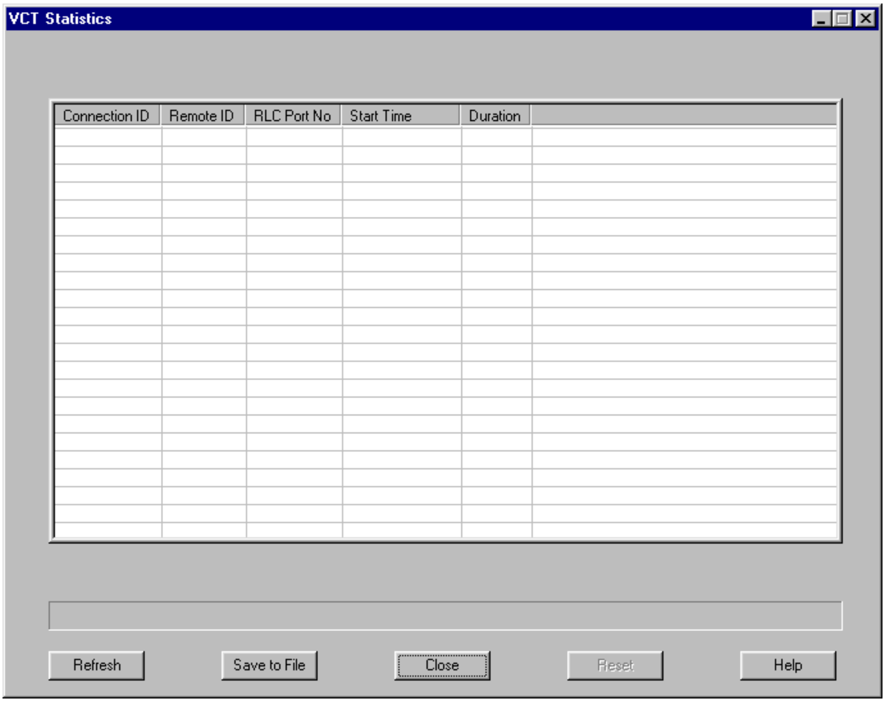
Caller Info Statistics field descriptions

The following table describes the statistics on the Caller Info Statistics screen:

Statistic	Description
Connection ID	Identifies the serial number of this call through the lifetime of the logged on unit.
Remote ID	Identifies the unit ID of the involved remote unit.
Current Media	Identifies whether the call took place over the PSTN or IP network.
Type	Identifies the type of call. Valid options are: Signaling, Voice, Local.
Priority	Identifies the priority setting of the involved trunk.Valid options are: PSTN Only, IP Only, High, or Normal.
Call BW	Identifies the amount of bandwidth used by the call.
Start Time	Identifies the time that the connection initiated.
Transitions to PSTN	Identifies the number of times the RLC moved the call to the PSTN.
Transitions to IP	Identifies the number of times the RLC moved the call to the IP network.
Last Transition to PSTN	Identifies the last time the RLC moved the call from the IP network to the PSTN.
Last Transition to IP	Identifies the last time the RLC moved the call from the PSTN to the IP network.

VCT Statistics

VCT (Voice Connection Table) Statistics provide information concerning certain properties of the voice connections that are active at the time that you request the statistics. Technical support personnel use these statistics for troubleshooting purposes. The VCT Statistics screen is similar to the following:



To display the VCT Statistics screen, refer to “Displaying the VCT Statistics screen” on page 222. To obtain the definitions for the statistics presented on the VCT Statistics screen, refer to “VCT Statistics field descriptions” on page 223.

Displaying the VCT Statistics screen

Choose Alarms/Stats/Logs → VCT from the Menu Bar to display the VCT Statistics screen:

Result: Configuration Manager gathers statistics from the RLC and displays the VCT Statistics screen, similar to the example on page 221.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the VCT Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the VCT Statistics screen,	on the **Help** button.

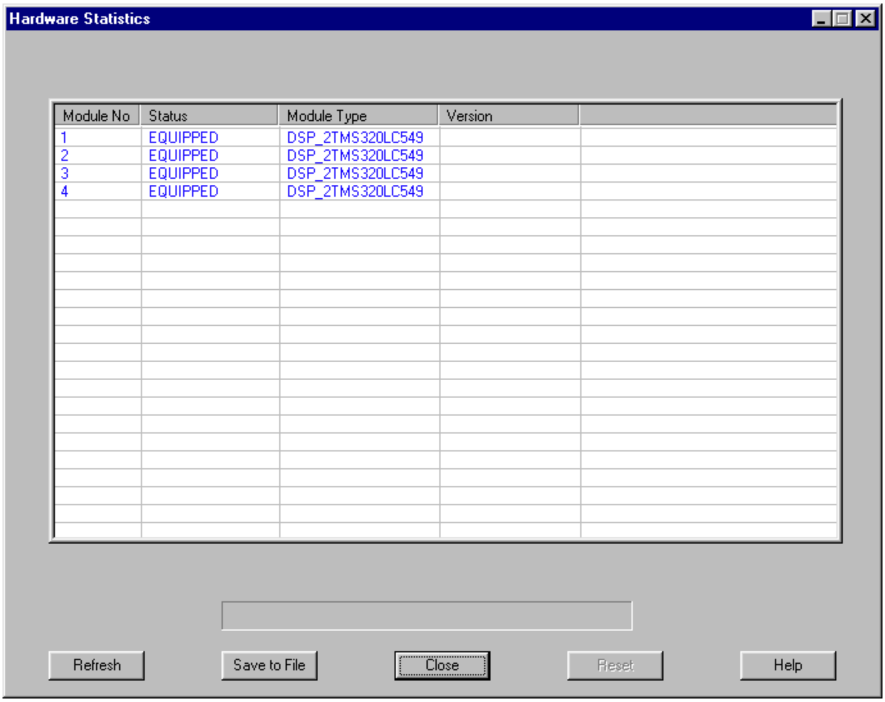
VCT Statistics field descriptions

The following table describes the statistics on the VCT Statistics screen:

Statistic	Description
Connection ID	Identifies the serial number of this call through the lifetime of the logged on unit.
Remote ID	Identifies the unit ID of the remote unit involved in the call.
RLC Port No	Identifies the port the call was processed through at the host site.
Start Time	Identifies the time and date when the call started.
Duration	Identifies how long the call lasted.

Hardware Statistics

Hardware Statistics provide information concerning the DSP modules that are installed on the logged-on RLC. Use these statistics to determine the module positions that are populated and the type of DSP modules present in the populated positions. The Hardware Statistics screen is similar to the following:



To display the Hardware Statistics screen, refer to “Displaying the Hardware Statistics screen” on page 226. To obtain the definitions for the statistics presented on the Hardware Statistics screen, refer to “Hardware Statistics field descriptions” on page 227.

Information concerning the DSP application modules that are installed on the RLC also appears in the Startup Information dialog box. This information includes the following:

The column	contains the following information:
SLOTNO	the slot number occupied by the application module. Valid options are: 1, 2, 3, 4.
STATUS	whether the slot contains a functioning DSP application module. Valid options are: ■ EQUIPPED—a working DSP application module is in the slot ■ OUT SERVICE—a faulty application module is in the slot ■ UNEQUIPPED—no application module is in the slot
TYPE	the type of application module in the slot
VERSION	the version of application module in the slot

This dialog box displays as the result of a successful attempt to log on to a particular RLC. You can locate the information contained in the preceding table by using the scroll bar available in the System Information section of the dialog box. Refer to page 139 for further details.

Displaying the Hardware Statistics screen

Choose Alarms/Stats/Logs → Hardware Statistics from the Menu Bar to display the Hardware Statistics screen:

Result: Configuration Manager gathers statistics from the RLC and displays the Hardware Statistics screen, similar to the example on page 224.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the Hardware Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the Hardware Statistics screen,	on the **Help** button.

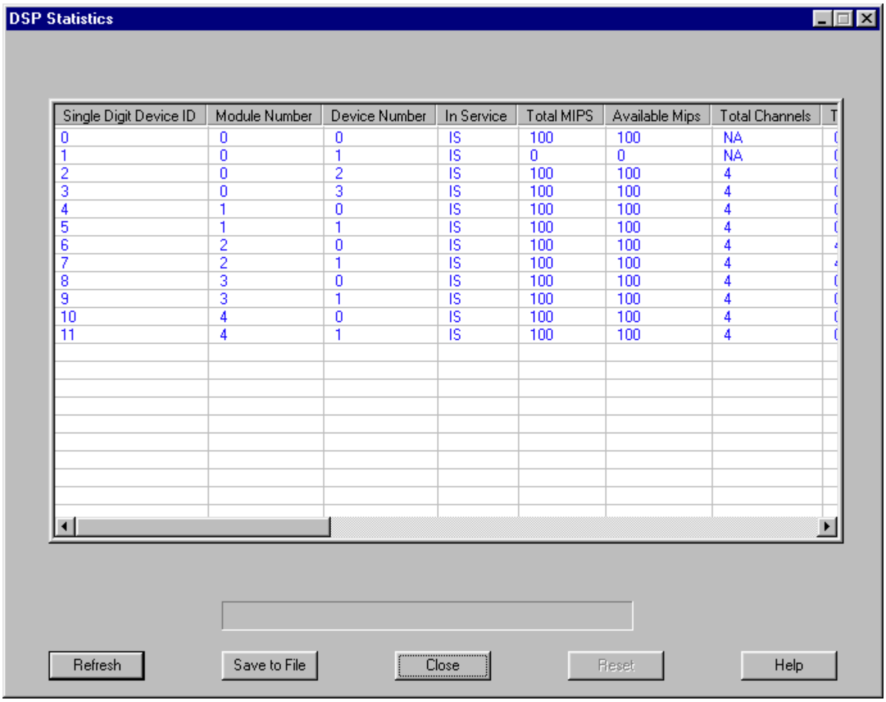
Hardware Statistics field descriptions

The following table describes the statistics on the Hardware Statistics screen:

Statistic	Description
Module No	Identifies the DSP application module's position on the RLC's motherboard.
Status	Identifies whether there is a functional DSP application module in the position identified in the Module No field. Valid options are: Equipped, meaning that a DSP application module is installed in the module position, and Unequipped, meaning that there is not a DSP application module installed in the module position.
Module Type	Identifies the part number of the hardware installed in the module position.
Version	Identifies the version of DSP application module installed in the module position.

Digital Signal Processor (DSP) Statistics

Digital Signal Processor (DSP) Statistics provide information about the DSP application modules installed on the logged-on RLC. Use this screen to determine the module positions that are populated, what type of DSP those positions contain, and the functionality provided by each module. The DSP Statistics screen is similar to the following:



To display the DSP Statistics screen, refer to “Displaying the DSP Statistics screen” on page 229. To obtain the definitions for the statistics presented on the DSP Statistics screen, refer to “DSP Statistics field descriptions” on page 230.

Displaying the DSP Statistics screen

Choose Alarms/Stats/Logs → DSP Statistics from the Menu Bar to display the DSP Statistics screen:

Result: Configuration Manager gathers statistics from the RLC and displays the DSP Statistics screen, similar to the example on page 228.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the DSP Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the DSP Statistics screen,	on the **Help** button.

DSP Statistics field descriptions

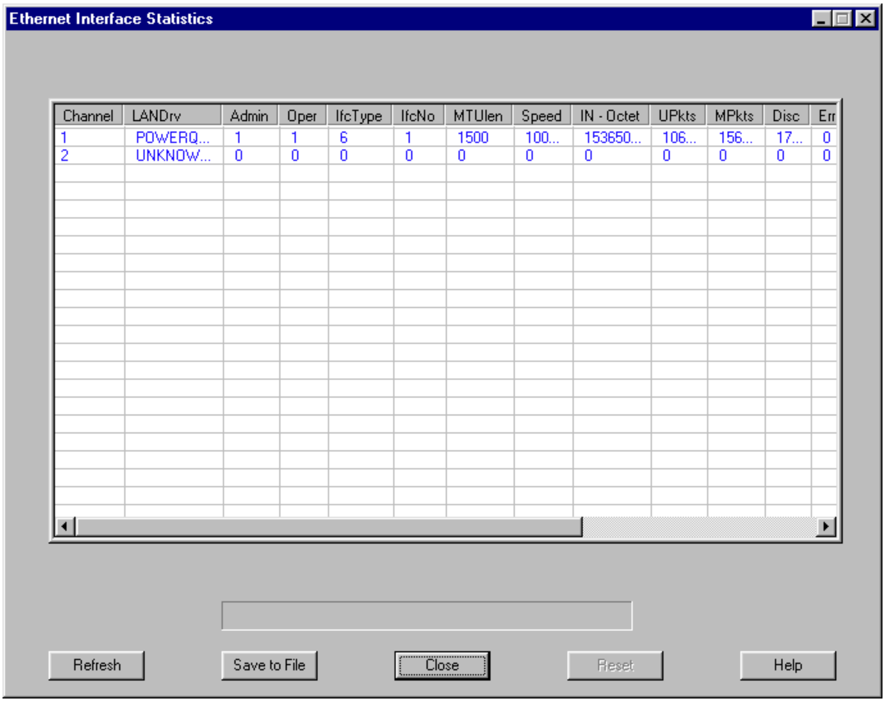
The following table describes the statistics on the DSP Statistics screen:

Statistic	Description
Single Digit Device ID	Identifies an internal sequence number for indexing this DSP device among all others on the RLC.
Module Number	Identifies this DSP Application Module's module number on the RLC. Valid options are: 0, 1, 2, 3, 4.
Device Number	Identifies the DSP device that processed the call.
In Service	Identifies any voice channels operating on this DSP application module.
Total MIPS	Identifies the total millions of instructions per second (MIPS) capacity for this DSP device.
Available Mips	Identifies the millions of instructions per second (MIPS) currently available on this DSP device.
Total Channels	Identifies the total channel capacity for this DSP device.
Total Voice Channels	Identifies the total voice channel capacity for this DSP device.
Available Voice Channels	Identifies the number of unused voice channels on this DSP device.
Total Modem Channels	Identifies the number of channels on this DSP device that can transmit modem calls.

Statistic	Description
Available Modem Channels	Identifies the number of unused channels on this DSP that can transmit modem calls.
Total Flex Channels	Identifies the number of channels on this DSP that can provide multiple functionalities.
Available Flex Channels	Identifies the number of channels on this DSP currently available to provide multiple functionalities.
Total Tones Channels	Identifies the number of channels on this DSP that can transmit tones.
Total Reserved Channels	Identifies the number of special purpose channels on this DSP reserved for internal use.
Name	Identifies the name of the DSP load, that is, the combination of DSP algorithms, on the DSP module.

Ethernet Interface Statistics

Ethernet Interface Statistics provide information about the connection between the IP network and the logged-on RLC that is achieved over the RLC’s Ethernet interface. The Ethernet Interface Statistics screen is similar to the following:



To display the Ethernet Interface Statistics screen, refer to “Displaying the Ethernet Interface Statistics screen” on page 233. To obtain the definitions for the statistics presented on the Ethernet Interface Statistics screen, refer to “Ethernet Interface Statistics field descriptions” on page 234.

Displaying the Ethernet Interface Statistics screen

Choose Alarms/Stats/Logs → Ethernet Interface Statistics from the Menu Bar to display the Ethernet Interface Statistics screen.

Result: Configuration Manager gathers statistics from the RLC and displays the Ethernet Interface Statistics screen, similar to the example on page 232.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the Ethernet Interface Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the Ethernet Interface Statistics screen,	on the **Help** button.

Ethernet Interface Statistics field descriptions

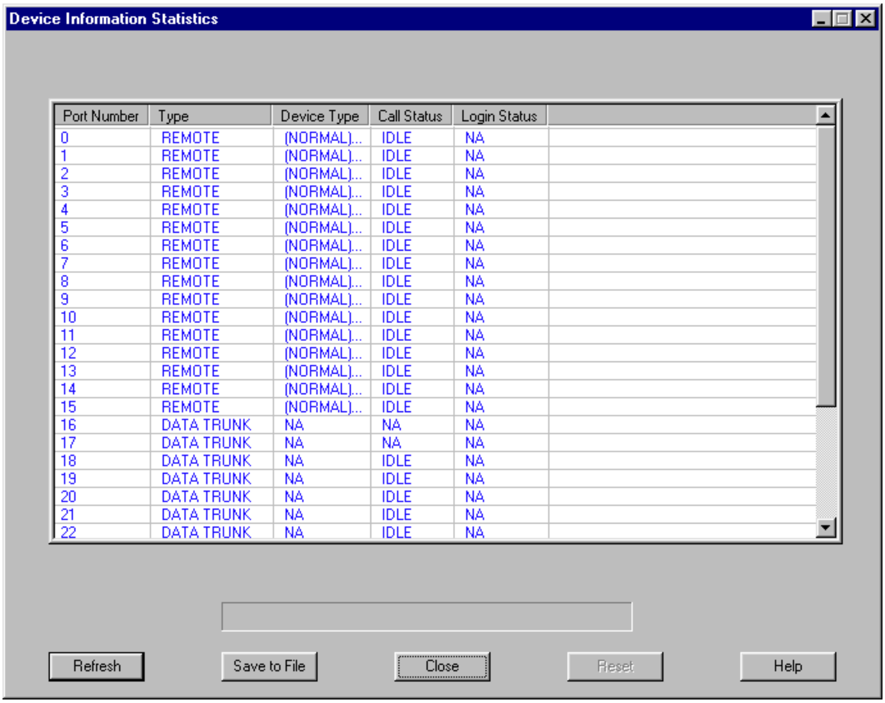
The following table describes the statistics on the Ethernet Interface Statistics screen:

Statistic	Description
Channel	Identifies the Ethernet device that the statistics on that line apply to. Valid options are: 1, 2.
LAN Drv	Identifies the LAN driver used by the call.
Admin	Identifies the desired state of the port.
Oper	Identifies the actual state of the port.
IfcType	Identifies the interface type used by the call.
IfcNo	Identifies the Ethernet interface used by the call. Valid options are: 0 (ELAN), 1 (CLAN).
MTUlen	Identifies the Maximum Transmission Unit for this interface.
Speed	Identifies the data rate of this interface.
In - Octet	Identifies the number of inbound bytes.
UPkts	Identifies the number of inbound packets sent only to this recipient.
MPkts	Identifies the number of inbound packets sent to multiple recipients.
Disc	Identifies the number of packets discarded by the interface.
Err	Identifies the number of error packets received by the interface.
Out - Octet	Identifies the number of outbound bytes.
UPkts	Identifies the number of outbound packets sent only to this recipient.

Statistic	Description
MPkts	Identifies the number of outbound packets sent to multiple recipients.
Disc	Identifies the number of outbound packets discarded by the interface due to resource problems.
Err	Identifies the number of outbound packets discarded due to errors.
QLen	Identifies the number of bytes in the interface’s outbound queue.

Device Information Statistics

Device Information Statistics provide information about the device connected to each port of the logged-on RLC, similar to the following:



Port Number	Type	Device Type	Call Status	Login Status
0	REMOTE	(NORMAL)...	IDLE	NA
1	REMOTE	(NORMAL)...	IDLE	NA
2	REMOTE	(NORMAL)...	IDLE	NA
3	REMOTE	(NORMAL)...	IDLE	NA
4	REMOTE	(NORMAL)...	IDLE	NA
5	REMOTE	(NORMAL)...	IDLE	NA
6	REMOTE	(NORMAL)...	IDLE	NA
7	REMOTE	(NORMAL)...	IDLE	NA
8	REMOTE	(NORMAL)...	IDLE	NA
9	REMOTE	(NORMAL)...	IDLE	NA
10	REMOTE	(NORMAL)...	IDLE	NA
11	REMOTE	(NORMAL)...	IDLE	NA
12	REMOTE	(NORMAL)...	IDLE	NA
13	REMOTE	(NORMAL)...	IDLE	NA
14	REMOTE	(NORMAL)...	IDLE	NA
15	REMOTE	(NORMAL)...	IDLE	NA
16	DATA TRUNK	NA	NA	NA
17	DATA TRUNK	NA	NA	NA
18	DATA TRUNK	NA	IDLE	NA
19	DATA TRUNK	NA	IDLE	NA
20	DATA TRUNK	NA	IDLE	NA
21	DATA TRUNK	NA	IDLE	NA
22	DATA TRUNK	NA	IDLE	NA

To display the Device Information Statistics screen, refer to “Displaying the Device Information Statistics screen” on page 237. To obtain the definitions for the statistics presented on the Device Information Statistics screen, refer to “Device Information Statistics field descriptions” on page 238.

Displaying the Device Information Statistics screen

Choose Alarms/Stats/Logs → Device Information from the Menu Bar to display the Device Information Statistics screen.

Result: Configuration Manager gathers statistics from the RLC and displays the Device Information Statistics screen, similar to the example on page 236.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the Device Information Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the Device Information Statistics screen,	on the **Help** button.

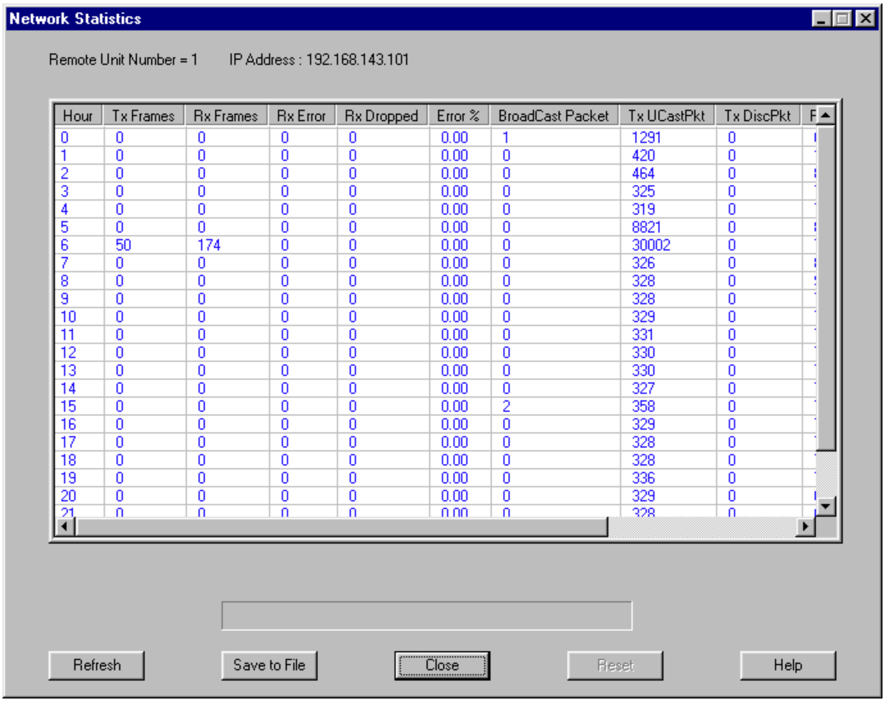
Device Information Statistics field descriptions

The following table describes the information on the Device Information Statistics screen:

Statistic	Description
Port Number	Identifies the RLC Port that the statistics on that line of the table apply to.
Type	Identifies the kind of trunk established to the port identified by the Port Number statistic. Valid options are: Data Trunk, Remote, Local TCM.
Device Type	Identifies whether the device connected to the port identified by the Port Number statistic is part of an ACD queue. Valid options are: ACD, Normal, NA.
Call Status	Identifies whether there is a call active on the port identified by the Port Number statistic. Valid options are: Active, Idle, NA.
Login Status	Identifies whether there is a user logged on to the port identified by the Port Number statistic. Valid options are: Logged In, NA.

Network Statistics screen

Network Statistics allow you to see the performance over the last 24 hours of the remote units connected to the logged-on RLC. Use these statistics to identify periods when other network activity can adversely affect Remote Office system performance. This screen shows remote unit performance in terms of the transmission and reception of frames and packets, similar to the following.



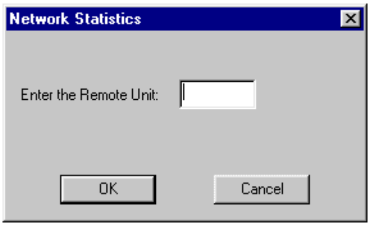
Hour	Tx Frames	Rx Frames	Rx Error	Rx Dropped	Error %	BroadCast Packet	Tx UCastPkt	Tx DiscPkt
0	0	0	0	0	0.00	1	1291	0
1	0	0	0	0	0.00	0	420	0
2	0	0	0	0	0.00	0	464	0
3	0	0	0	0	0.00	0	325	0
4	0	0	0	0	0.00	0	319	0
5	0	0	0	0	0.00	0	8821	0
6	50	174	0	0	0.00	0	30002	0
7	0	0	0	0	0.00	0	326	0
8	0	0	0	0	0.00	0	328	0
9	0	0	0	0	0.00	0	328	0
10	0	0	0	0	0.00	0	329	0
11	0	0	0	0	0.00	0	331	0
12	0	0	0	0	0.00	0	330	0
13	0	0	0	0	0.00	0	330	0
14	0	0	0	0	0.00	0	327	0
15	0	0	0	0	0.00	2	358	0
16	0	0	0	0	0.00	0	329	0
17	0	0	0	0	0.00	0	328	0
18	0	0	0	0	0.00	0	328	0
19	0	0	0	0	0.00	0	336	0
20	0	0	0	0	0.00	0	329	0
21	0	0	0	0	0.00	0	328	0

To display the Network Statistics screen, refer to “Displaying the Network Statistics screen” on page 240. To obtain the definitions for the statistics presented on the Network Statistics screen, refer to “Network Statistics field descriptions” on page 241.

Displaying the Network Statistics screen

1 Choose Alarms/Stats/Logs → Network Statistics from the Menu Bar to display the Network Statistics screen.

Result: Configuration Manager prompts you for the unit ID of the remote unit that you want to check Network Statistics for, similar to the following:



2 Enter the Unit ID.

3 Click on the **OK** button.

Result: The Network Statistics screen displays, similar to the example on page 239.

IF you want to	THEN click
update the statistics with the latest information,	on the **Refresh** button.
create a text file containing these statistics,	on the **Save to File** button.
close the Network Statistics screen,	on the **Close** button.
obtain descriptions of the statistics in the Network Statistics screen,	on the **Help** button.

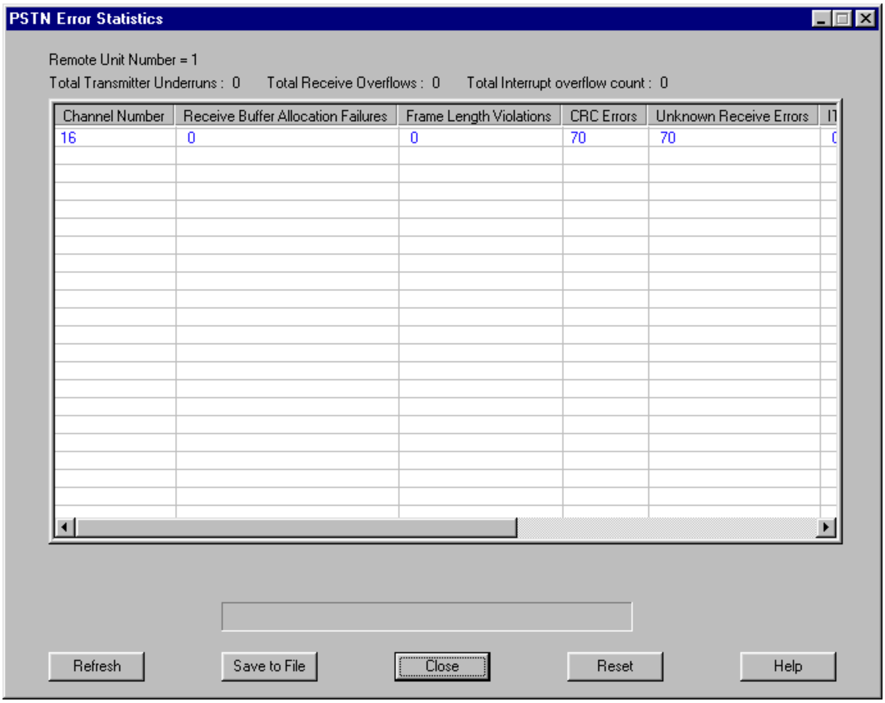
Network Statistics field descriptions

The following table describes the information on the Network Statistics screen:

Statistic	Description
Hour	Identifies the hour that the statistics on that line apply to. These numbers refer to the most recent 24 hours, such that “1” refers to one hour ago, “2” refers to two hours ago, and so on.
Tx Frames	Identifies the number of frames transmitted in the given hour.
Rx Frames	Identifies the number of frames received in the given hour.
Rx Error	Identifies the number of frames received in the given hour with an error.
Rx Dropped	Identifies the number of received frames that the Remote Office system dropped in the given hour.
Error %	Identifies the percentage of frames received in the given hour with an error.
BroadCast Packet	Identifies the number of packets broadcast, or sent to all addresses on the network, by this unit in the given hour.
Tx UCastPkt	Identifies the number of packets unicast, or sent to one specific address, by this unit in the given hour.
Tx DiscPkt	Identifies the number of packets discarded by this unit in the given hour.
Rx MultiPkt	Identifies the number of packets received by this unit that were sent to multiple addresses in the given hour.
Rx UCastPkt	Identifies the number of packets received by this unit that were sent only to this unit in the given hour.
Rx DiscPkt	Identifies the number of received packets that were discarded by this unit in the given hour.

PSTN Error Statistics screen

PSTN Error Statistics allow you to see the PSTN performance, in terms of signaling errors, of remote units connected to the logged-on RLC. Use these statistics to indicate the effectiveness of your connection to the PSTN. The table displays error totals for all active PSTN calls from the specified remote unit, similar to the following.

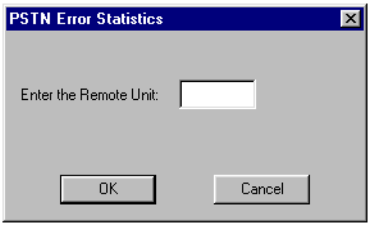


Note: PSTN Error Statistics are only available for Remote Office 9150 units.

Displaying the PSTN Error Statistics screen

1 Choose Alarms/Stats/Logs → PSTN Error Statistics from the Menu Bar to display the PSTN Error Statistics screen.

Result: Configuration Manager prompts you for the unit ID of the remote unit that you want to check PSTN Error Statistics for, similar to the following:



2 Enter the Unit ID.

3 Click on the **OK** button.

Result: The PSTN Error Statistics screen displays, similar to the example on page 242.

IF you want to	THEN click on the
update the statistics by adding PSTN error information that occurred since your original request,	**Refresh** button.
create a text file containing these statistics,	**Save to File** button.
close the PSTN Error Statistics screen,	**Close** button.
begin collecting new statistics,	**Reset** button.
obtain descriptions of the statistics in the PSTN Error Statistics screen,	**Help** button.

PSTN Error Statistics field descriptions

The following table describes the information on the PSTN Error Statistics screen:

Statistic	Description
Channel Number	Identifies the channel that the statistics on that line apply to.
Receive Buffer Allocation Failures	Identifies the number of times since the statistics were last reset that there was an error in the allocation of a packet to the receive buffer.
Frame Length Violations	Identifies the number of times since the statistics were last reset that a frame contained too many packets.
CRC Errors	Identifies the number of times since the statistics were last reset that the cyclic redundancy check (CRC) bits did not match.
Unknown Receive Errors	Identifies the number of times since the statistics were last reset that a receive error that is not otherwise classified in this display occurred.
ITE Frame Length Violations	Identifies the number of bits in the ITE frame since the statistics were last reset.
ITE Transmitter Underruns	Identifies the number of times since the statistics were last reset that the ITE transmitter.
ITE Receive Busy Errors	Identifies the number of times since the last reset.

Verifying the firmware and software version

This section describes how to determine the version of firmware and software currently installed.

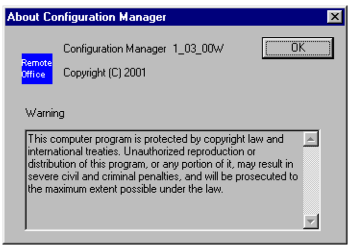
Before you perform a firmware or software upgrade, you should determine what version is currently installed. This ensures that you do not replace the installed firmware or software with an older version.

Verifying the software version

To verify the software version on your RLC:

1 From the Menu Bar, choose Help → About Configuration Manager.

Result: The About Configuration Manager dialog box displays, similar to the following:



2 Review the About Configuration Manager dialog box. This identifies the version of software installed on the unit.

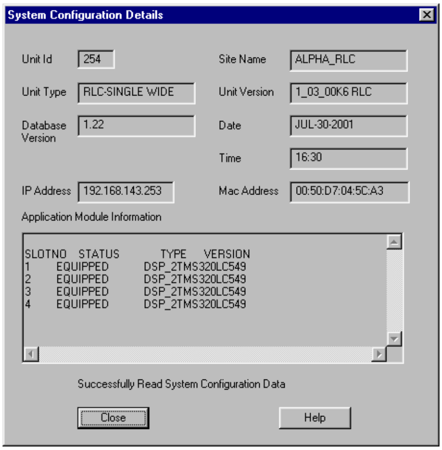
3 Click on the **OK** button.

Verifying the firmware version

To verify the firmware version on your RLC:

1 From the Menu Bar, choose System Information → System Data.

2 The System Configuration Details dialog box displays, similar to the following:



3 Review the Unit Version box. This identifies the version of firmware installed on the unit.

4 Click on the **Close** button.

Determining the current firmware and software versions

To determine what the current firmware and software versions are, refer to the *Remote Office and RLC Release Notes* (NTP 555-8421-102).

Obtaining the latest upgrade file

If you need to upgrade the firmware or software, you can obtain the latest upgrade files by clicking on the Customer Support and Software Distribution links at the following website:

www.nortelnetworks.com

Nortel Networks provides upgrade files in self-extracting executable files. You must extract the upgrade files before you can perform the upgrade.

Types of upgrades

You can perform the following types of upgrades for your RLC:

- Configuration Manager software upgrade

  You use Configuration Manager software to configure or administer the RLC.
- firmware upgrade for the RLC motherboard
  The firmware contains the code necessary for operating the RLC.

  Note: This includes any firmware updates that have been made for DSP application modules.

Downloading the upgrade file

To download the upgrade file:

1 With your web browser, connect to the Nortel Networks website at:

www.nortelnetworks.com

2 Click on the Customer Support and Software Distribution links.

3 Locate the software and firmware you need.

4 Download the files into a temporary location on your PC.

5 Double-click on the **.exe** file to extract the files into a temporary location on your PC.

Performing a firmware upgrade

This section describes how to perform a firmware upgrade on your RLC. You perform the upgrade over the IP network using the TFTP protocol.

You must have a TFTP server application running on the administration PC. Ensure that the TFTP server's base directory points to the directory that contains the upgrade files.

To ensure that the RLC and Remote Office units do not experience communication problems during, or after the firmware upgrade, Nortel Networks recommends that you perform the upgrades as follows:

1 Create backup files for the Remote Office 9150, 911x, and IP Adapter units and RLC configurations. Refer to “Creating a backup configuration file” in the Nortel Networks Installation and Administration Guide for the specific product.

2 Upgrade the Configuration Manager software on the administration PC.

3 Disable the PBX slot where the RLC is installed.

4 Upgrade the RLC firmware.

5 Upgrade the Remote Office units - 9150, 911x, and IP Adapter firmware.

6 Remote Office 9150 units only - Upgrade the BRI module firmware for each BRI module.

7 Restart the RLC.

8 Restart all units.

9 Re-enable the RLC slot.

Note: The Remote Office 9150 unit's BRI module firmware must only be upgraded after the Remote Office 9150 unit's firmware is at the desired compatible level.

When to perform a firmware upgrade

Perform a firmware upgrade if you have determined that you are using out-of-date firmware. For instructions on determining if you need to perform an upgrade, refer to “Verifying the firmware and software version” on page 245.

ATTENTION

The protocol for communication between the RLC and the Remote Office units requires that they be running the same version in order for them to communicate with each other.

About firmware upgrades and configuration files

Each time you perform a firmware upgrade, the configuration database also converts (if necessary) to a format that is compatible with the new firmware. The conversion does not effect configuration settings.

Nortel Networks recommends that each time you perform a firmware upgrade, that you first create a backup copy of the converted configuration file and store it in a safe secure location.

Before you begin

It is important to complete the following steps before performing a firmware upgrade:

1 Obtain the firmware upgrade from Nortel Networks.

2 Extract the upgrade files from the file you received from Nortel Networks.

3 Start the TFTP server application.

4 Ensure the TFTP base directory reflects the directory where the firmware upgrade file you want to use resides.

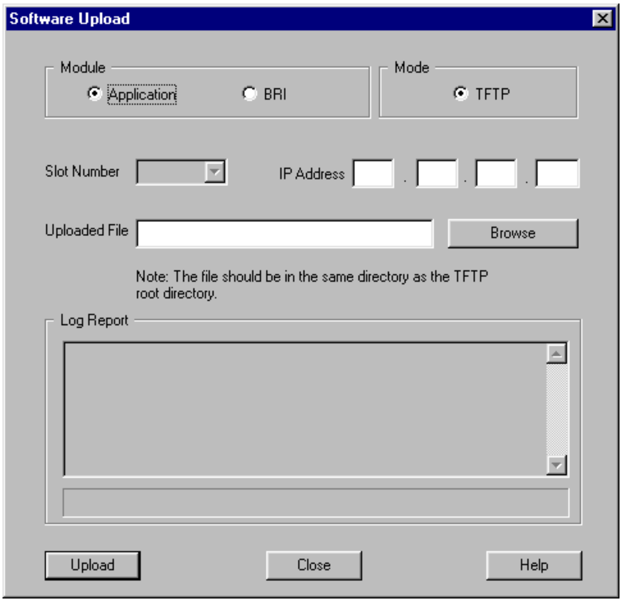
Getting there RLC → Configuration Manager

Upgrading the RLC firmware

To upgrade the RLC firmware:

1 From the Menu Bar, choose Upload/Download → Upload S/W.

Result: The Software Upload dialog box displays, similar to the following:



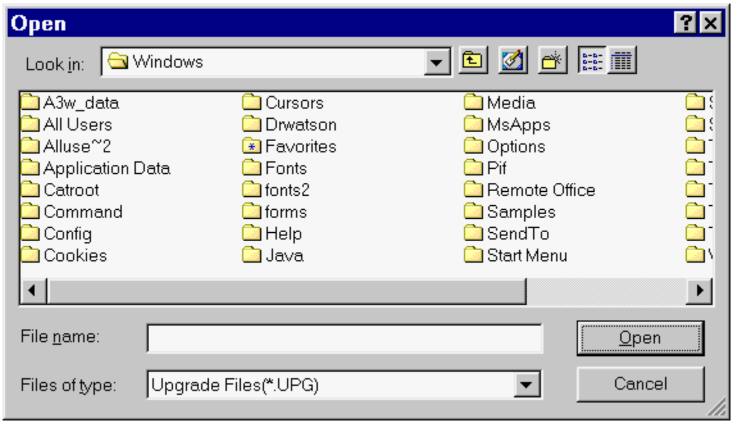
2 In the Module section, click on the **Application** option button.

3 Enter the IP address of the TFTP server in the IP Address fields.

Note: Since the TFTP server application runs on your administration PC, this is the IP address of the PC.

4 Click on the **Browse** button.

Result: The Open dialog box displays, similar to the following:



5 Ensure the Files of type drop down box shows Upgrade Files (*.UPG).

6 Navigate to the folder where the firmware file is located.

7 Select the file, and then click on the **Open** button.

Example: Select rlc-100.upg, and then click on the **Open** button.

Result: The Software Upload dialog box reappears. The file you selected is shown in the Uploaded File field.

8 Click on the **Upload** button.

Wait until the file uploads completely before entering any other commands. The Log Report window displays a confirmation message when the upgrade is completed.

9 Restart the RLC.

Performing a software upgrade

Perform a software upgrade if you have determined that you are using out-of-date software. For instructions on determining if you need to perform an upgrade, refer to “Verifying the firmware and software version” on page 245.

Upgrading the Configuration Manager software

To upgrade the Configuration Manager software:

1. Navigate to the directory that contains the upgrade files you extracted.
2. Double-click on the **setup.exe** file.
3. Follow the prompts on screen.

ATTENTION Do not ignore any warning messages the InstallShield displays about versions of files (such as DLL files) that already exist on your PC. If you overwrite these files, you may inadvertently cause other applications on your PC to stop working.

Result: The InstallShield installs the software, overwriting the previous version.

Chapter 8

Troubleshooting

In this chapter

Before you begin

The questions listed in this section can help you determine the proper course of action for addressing your problem.

Identifying why a problem occurred

Before you begin, ask yourself the questions listed in the following table:

Question	IF you answered	THEN do the following steps
Is this a new installation?	yes	Perform troubleshooting in the sequence presented in this chapter.
	no	Answer the next question.
Did the RLC work, then suddenly stop working?	yes	Answer the next question.
	no	Perform troubleshooting in the sequence presented in this chapter.
Did you modify the configuration or change any hardware components?	yes	Verify that changes were made correctly. Check the hardware components to ensure they are working correctly. Perform troubleshooting for the specific component the problem appears in.
	no	Contact your telecom or data network administrator. There may be a problem with the network.

Reach Line Card LEDs

The Reach Line Card (RLC) LEDs give you an indication of the line card's general health. When you reset your RLC, the LEDs should behave as follows:

- The Maintenance LED should perform as follows upon card insertion:

  — light up solid

  — flash three times after completing its self-test

    Note: The self-test takes approximately 60 seconds.

  — go off after the host PBX enables the RLC

    Note: During normal operation of the RLC, the Maintenance LED should remain off.

- The remaining LEDs flash when there is network activity.

What to do if the LEDs do not display correctly

The following table describes what to do if the LEDs do not display correctly:

Symptom	What to do
The Maintenance LED did not flash three times during the power-up cycle.	**1** Reset the RLC. Watch the Maintenance LED again. Approximately 60 seconds pass before it flashes. **2** If the Maintenance LED still does not flash, contact your Nortel Networks distributor. There may be a hardware problem.
The Maintenance LED is lit after a successful self-test.	**1** Check to see if the slot is enabled on the host PBX. **2** If other LEDs are not lit or flashing, did the Maintenance LED ever light? If not, contact your Nortel Networks distributor. There may be a hardware problem. **3** Ensure that the RLC is properly seated in its slot and is properly inserted into the backplane. If the Maintenance LED remains lit, contact your Nortel Networks distributor. There may be a hardware problem.
The Maintenance LED is flashing.	The power-up self-test failed. Contact your Nortel Networks distributor. There may be a hardware problem.
No LEDs are lit on the RLC.	**1** Ensure that the slot the RLC resides in has power applied. **2** Ensure that the RLC is properly seated in its slot. If the RLC is properly seated in its slot and no LEDs light, contact your Nortel Networks distributor. There may be a hardware problem.

Symptom	What to do
The Ethernet COLL LED is lit solid.	Network collisions are bound to occur and are normal. However, if the Ethernet COLL LED is lit solid, complete the following steps: **1** Check the physical network connection. **2** Verify that the RLC can be PINGed. **3** Check the network configuration (such as routing, traffic load, and so on). Adjust the network configuration, if required. **4** There should be no broadcast or multicast activity on the telephony LAN (TLAN). Interconnect a hub and a network analyzer to the TLAN and monitor for such activity. Identify the source(s) and isolate them from the TLAN.

Network connectivity

This section identifies some problems that can occur on the network, and describes what to do to resolve them.

Symptom descriptions

If you are not able to establish or maintain data network connectivity, perform troubleshooting as described in the following table:

Symptom	What to do
You cannot establish a connection from your administration PC to the RLC.	**1** Ensure that you entered the IP address correctly when trying to establish the connection. **2** Ensure that you entered the logon name and password correctly when trying to establish the connection. **3** Ensure the RLC's IP address, network mask, and default gateway are configured correctly on the RLC. **4** PING the RLC. **5** PING the gateway. **6** If the PING still does not work, contact your data network administrator.

Symptom	What to do
`10060 TELNET CONNECTION FAILED` appears when attempting to connect to the RLC.	**1** Ensure that you entered the IP address correctly when trying to establish the connection. **2** Ensure that you entered the logon name and password correctly when trying to establish the connection. **3** Ensure that no one is already logged on to the RLC. **4** Verify that the Ethernet cable is connected at both ends (RLC and network hub). **5** Check the Ethernet cable and ensure it is good. **6** Ensure the RLC is properly seated in its slot. **7** Verify that the IP address, subnet mask and gateway are all correct on the RLC. **8** PING the RLC. **9** If the RLC does not respond, PING the RLC’s gateway to see if it responds. **10** If the gateway does not respond, PING a known good device on the RLC’s network. **11** If steps 9 and 10 work, but step 8 did not, there may be a gateway configuration error. Check the unit’s IP Configuration property sheet. **12** If the problem still exists, contact your Nortel Networks distributor. There may be a hardware problem.

Symptom	What to do
`SERIAL CONNECTION FAILED` appears when attempting to connect to the RLC.	**1** Ensure that you entered the logon name and password correctly when trying to establish the connection. **2** Ensure that someone is not already logged on to the RLC. **3** Ensure the RLC is properly seated in its slot. **4** Reseat the RLC. **5** Ensure you specified the correct COM port when attempting the connection. **6** Verify that no other applications on the administration PC are using the COM port. **7** Check the serial cable connection to ensure it is good. **8** Using a breakout box, verify that the COM port is active. **9** If the problem still exists, contact your Nortel Networks distributor. There might be a hardware problem.
The RLC does not send or receive Ethernet traffic.	**1** Ensure the RLC is seated in its slot properly and connected to the backplane. **2** Check the Ethernet cable between the RLC and the network and ensure it is good. **3** Ensure the Ethernet cable is connected. **4** If the RLC still does not send or receive traffic, contact your data network administrator. **5** Data network administrator: Ensure other network devices are configured to allow traffic to and from the RLC.

Symptom	**What to do**
An attempt to log off from the RLC does not work.	It is possible that the administration PC and the RLC have lost communication with one another. Close Configuration Manager, then restart it.
The RLC cannot establish a connection with the remote unit.	IP or PSTN installations: **1** Verify security authentication configuration and ensure that it matches at both ends. (For example, if using security identifier, ensure that the inbound and outbound security identifiers are correctly configured at each end.) **2** Ensure that the unit IDs are configured correctly at each end. An incorrect unit ID causes security authentication to fail. **3** Verify that the PSTN and IP networks are operational (up and running) as appropriate to your location. **4** Ensure that the RLC is enabled on the host PBX.

Symptom	**What to do**
The RLC cannot establish a connection with the remote unit. (continued)	Additional steps for IP-only installations: **1** Confirm that the RLC's IP address and PSTN number are correctly configured on the remote unit. Also confirm that correct remote unit configuration exists at the host site. **2** Use the PING option in Configuration Manager to PING the remote unit. For instructions, refer to "Performing a Configuration Manager PING," on page 268. **3** If the remote unit does not respond, check the network configuration (such as, routing, traffic load, and so on). Adjust the network configuration, if required. Additional steps for PSTN only installations: **1** Verify that network ports are configured on the host PBX, one for each BRI channel that is to provide remote connectivity. **2** Verify that the 9150 PSTN telephone number is configured correctly on both the Remote Connection Configuration property sheet (refer to "Remote Connection Configuration" on page 171) and the BRI Configuration property sheet (refer to "Configuring BRI Trunks" in the Remote Office 9150 Installation and Administration Guide NTP 555-8421-215). **Note:** This is the same telephone number configured on both property sheets.

Symptom	What to do
The RLC cannot establish a connection with the remote unit. (continued)	**3** Verify that the network port PSTN telephone number is configured correctly on both the Network Port Configuration window of the RLC Port Configuration property sheet (refer to “Configuring an RLC port” on page 164) and “Configuring the RLC Connection information” in the Remote Office 9150 Installation and Administration Guide NTP 555-8421-215). **Note:** This is the same telephone number configured on both property sheets.

Software problems

This section identifies some problems that can occur with the Configuration Manager software, and describes what to do to resolve them.

Symptom descriptions

If you are not able to complete a task with Configuration Manager, perform troubleshooting as described in the following table:

Symptom	What to do
The Configuration Manager software installation fails.	Ensure that you close all background applications, including anti-virus checking software before performing the installation.
When performing one of the following by TFTP, `ERROR: FILE OPEN FAILED` displays: ▪ configuration upload ▪ RLC firmware upgrade	**1** Ensure the TFTP server application is installed and running on your administration PC. **2** Ensure the file you are trying to upload is present in the target directory. That is, either in the TFTP directory, or in the directory that is specified as the base directory in the TFTP server application. **3** Review messages displayed by the TFTP server application for clues. **4** Ping the remote unit to verify that network connectivity exists.
`CONFIG UPLOAD FAILED` when attempting to perform a configuration upload by TFTP.	**1** Ensure that you selected an appropriate file. That is, ensure that the file you attempted to upload is an RLC configuration file.

Symptom	What to do
`CONFIG UPLOAD FAILED` when attempting to perform a configuration upload by TFTP. (continued)	**2** Ensure that the configuration file you are attempting to upload is compatible with current RLC firmware. **3** Perform the configuration upload using a previous configuration file, if necessary. **Note:** Each time you perform a RLC firmware upgrade, you should also create a backup of the configuration. The configuration database format in the RLC is dependent on the version of firmware installed on the RLC. If you recently downgraded to a previous version of RLC firmware, you may also need to revert to a previous configuration format.
`System not responding` appears when working with Configuration Manager.	It is possible that communication has been lost between the administration PC and the remote unit. Close Configuration Manager, and then restart it.
Nothing happens when attempting to log off from the RLC.	It is possible that communication has been lost between the administration PC and the node you were logged on to. Close Configuration Manager, and then restart it.

Display Logs definitions

You can locate Display Logs definitions in Configuration Manager Help.

QoS testing

This section identifies problems that can occur during Quality of Service (QoS) testing when using IP connectivity as the main method of connectivity, with PSTN connectivity for QoS transition. This section also describes what to do to resolve the problem.

Symptom descriptions

If the Remote Office system does not make the transition to the PSTN connection when you disconnect the Ethernet cable (or the network goes down), perform troubleshooting as described in the following table:

Symptom	What to do
The connection does not transfer from the IP network to the PSTN when the Ethernet connection is broken.	**1** Ensure that you selected PSTN:Status:**Enable** on the Remote Connection Configuration property sheet for the connection in question. ■ Ensure that the PSTN number of the remote unit is entered in the PSTN Number field on the same property sheet. ■ Ensure that the port number of the Dedicated Network Port is entered in the Dedicated PSTN n/w Port field on the same property sheet. **2** Ensure that the Dedicated PSTN n/w Port mentioned above is configured as a network port on the RLC Port Configuration property sheet. ■ Ensure that the appropriate PBX Data port is configured and enabled.

Symptom	What to do
The connection does not transfer from the IP network to the PSTN when the IP connection is lost. (continued)	**3** Ensure that “Type:Remote” or “Type:Local & Remote” and “Status:Enable” are selected for each active BRI channel (refer to “Configuring BRI Trunks” in the Remote Office 9150 Installation and Administration Guide NTP 555-8421-215). **4** Ensure that you selected “Status:Enable” in the Quality of Service window of the Remote Connection Configuration property sheet (refer to “Remote Connection Configuration” on page 171). Verify that the Signal Degrade slide in the same window is set to an acceptable level (refer to “Configuring Quality of Service” on page 182). **5** Understand that the QoS monitoring process monitors the network through sampling, according to the QoS Threshold slider settings. For testing purposes only, set the sliders to the far right and select one second in the Duration:Signal Degrade field.

Using Configuration Manager PING

PING, or Packet InterNet Groper, is a protocol and program to test whether a device is accessible on a network. This section explains how to use the PING option provided in Configuration Manager to verify connectivity. Use this procedure as a troubleshooting tool to determine if you can reach the remote unit, another RLC, or any other device on the network.

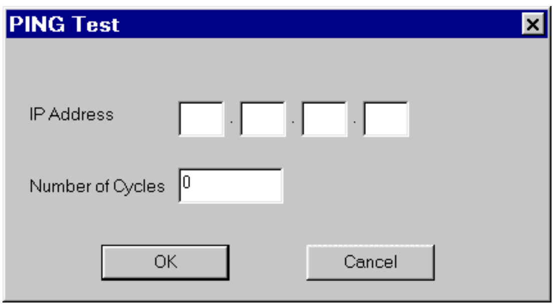
Getting there RLC → Configuration Manager

Performing a Configuration Manager PING

To perform a Configuration Manager PING:

1 From the Menu Bar, choose Tests → Ping.

Result: The PING Test dialog box displays, similar to the following:

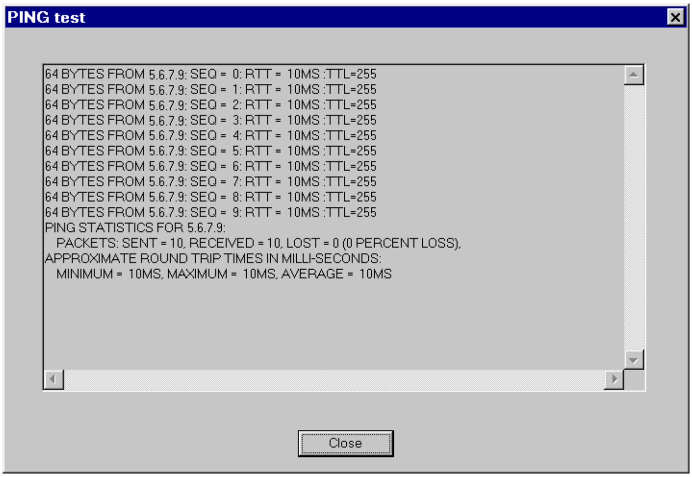


2 Enter the IP Address of the unit you want to PING in the IP Address field.

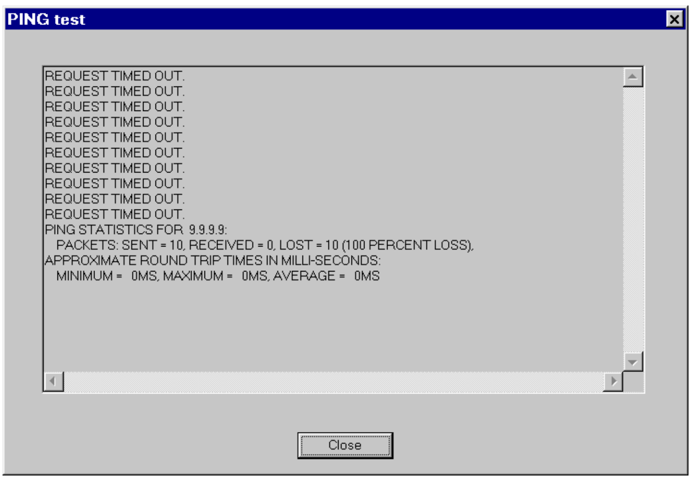
3 Enter the number of times you want to PING the unit in the Number of Cycles field (1 to 100).

4 Click on the **OK** button.

Result: The PING test window displays, showing the PING results. The following is an example of a successful PING.



The following is an example of an unsuccessful PING.



5 Click on the **Close** button.

Result: The PING test window closes.

ATTENTION

It is possible to successfully PING a device on the network and still not be able to log on to that device. If you log on to a device (an RLC) using a serial connection and neglect to log off, you may be able to successfully PING the device but be unable to establish a Telnet connection to it. (The device believes itself to be busy.)

If you cannot log on to a device after a successful PING, access the serial port and ensure that you are not logged on to the device through this port.

Unsuccessful PING options

If the PING was unsuccessful, answer these questions:

1. Did you enter the IP address correctly?
2. Are the subnet mask and default gateway configured properly at your site? (Confirm this by checking the IP Configuration property sheets for the involved units.)
3. Are the subnet mask and default gateway configured properly at the site that you are PINGing? (Confirm with the site's network administrator.)
4. Does the gateway respond to a PING?

If you are able to answer "Yes" to the questions above and the PING still does not work, the problem lies somewhere in the network between the involved sites.

Responding to a catastrophic failure

For the purposes of this discussion, a *catastrophic failure* is defined as a failure of the equipment to operate after review of all troubleshooting information and implementation of appropriate procedures.

Inoperative hardware

Should your RLC fail to operate after thorough review of the troubleshooting information in this and related Guides, consult your Nortel Networks distributor for hardware replacement.

Repair and warranty information

The RLC contains no user-serviceable components. If the problem experienced with your RLC persists after you have used all the appropriate procedures in this chapter, refer to the following contact information for repair and warranty help, depending upon your location.

Note: If the RLC is causing harm to the telephone network, the telephone company may request that you disconnect it pending resolution of the problem.

Canada

Nortel Networks Service Selection Center
30 Norelco Drive
Weston, ON
Canada
M9L 2X6

Telephone: 1-888-977-9444

United States

Nortel Networks
Product Service Center
640 Massman Drive
Nashville, TN 37210
USA

Telephone: 1-800-251-1758

Europe

Nortel Networks (NI) Ltd.
FAO: Irish Express Cargo (IEC)
Raheen Industrial Estate
Raheen, Limerick
Ireland

Telephone: +33 4 9296 1568
Fax: +33 4 9296 1598

Asia/Pacific

Nortel Distribution Center
c/o ACCO Transport
21 South St. Unit#2
Rydalmere, NSW
2116 Australia

CALA

Note: When you need warranty and repair service in Central American and Latin American countries, you must first get an RR (repair and return) number from your Nortel Networks distributor before shipping to the Nortel CALA Repair Center.

Nortel c/o Wesbell
4019 S.W. 30th Avenue
Fort Lauderdale, FL 33312
USA
Notify: Receiving Department
RR no.:

Telephone:
Normal Service Hours (Monday through Friday, 8:00 a.m. to 5:00 p.m. Central Time): 1-954-851-8841
After Normal Hours (weekends and holidays): 1-888-594-8474

Fax: 1-954-581-2334

Appendix A

Planning forms

In this appendix

Completing the forms

ATTENTION

Before you can assign RLC ports to remote users, you must determine the total remote user requirements for the RLC.

1 Assign users on the remote units to remote ports on the RLC.

Note: To do this effectively, obtain information from the configuration information forms for all remote units connected to this RLC.

Record the RLC port assignments in the “Port configuration” section on one of the following RLC forms (according to the type of RLC installed):

- Connection Information—16 ports
- Connection Information—32 ports

Users who are using an MCA to transmit data must be assigned to a PBX data port. Users who are using ATAs can be assigned to PBX voice or data ports. Configure ATA users as voice ports only if there are not enough free data ports. Refer to “Remote port configuration” on page 107 for more information.

Note: The Connection Information forms identify the maximum number of ports that can be associated with MCAs and ATAs that are used to transmit data.

2 If you want to route calls over the PSTN, designate RLC ports to be used as network ports. At the same time, identify the telephone number that will be used to establish the connection with the remote unit.

Note: You must assign Network ports to PBX data ports.

Record the network port assignments and remote unit PSTN numbers on the Connection Information form for your RLC type.

3 Record the IP address for each remote unit on the Connection Information form for your RLC type.

4 If the chosen security level is provisioned security, record the security identifier that each remote unit uses to validate connection requests.

Note: You must configure the same security level on both the RLC and remote unit.

5 On the same form, record the following items for the RLC in the “Reach Line Card information” section:

- IP address, subnet mask, and gateway
- security level, and if required, security identifier

6 If necessary, complete an RLC Online/Offline Table Configuration form for each remote unit.

Reach Line Card

Connection Information—16 ports

Complete one copy of this form for each line card. **Page 1 of 5**

RLC information

IPE position: Loop:________ Shelf: ________________ Card:_____________

IP address: ___ . ___ . ___ . ___

Subnet mask: ___ . ___ . ___ . ___

Default gateway: ___ . ___ . ___ . ___

Host PBX's ELAN IP address: ___ . ___ . ___ . ___

Host PBX's ELAN subnet mask: ___ . ___ . ___ . ___

Security level: ❒ No security is required ❒ Caller ID ❒ Provisioned Security*

*If the security level is *provisioned security,* RLC's security identifier:

Inbound ________________________

Outbound ________________________

Notes:

- This RLC provides 32 total ports. Ports 0–15 are Voice ports and ports 16–31 are Data ports. On the host PBX, you must configure Network ports or Remote ports that use MCAs or ATAs (for data transmission) as Data ports. If there are not enough free Data ports, you can configure Remote ports that use ATAs as Voice ports. You can configure Remote ports used for FAX support as either Voice ports or Data ports. Refer to documentation for your PBX for necessary procedures.
- QoS Transition Technology requires one MCA per B-channel.
- If you want to use MCAs or ATAs to transmit data, you can connect a maximum of four MCAs or ATAs to Remote ports on this RLC.

Reach Line Card

Connection Information—16 ports

Port configuration **Page 2 of 5**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
0	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
1	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
2	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
3	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
4	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
5	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
6	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
7	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
8	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			

Reach Line Card

Connection Information—16 ports

Port configuration (continued) **Page 3 of 5**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
9	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
10	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
11	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
12	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
13	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
14	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
15	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
16	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			
17	❐ Network ❐ Remote ❐ Local TCM	❐ Yes ❐ No			

Reach Line Card

Connection Information—16 ports

Port configuration (continued) **Page 4 of 5**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
18	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
19	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
20	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
21	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
22	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
23	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
24	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
25	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
26	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			

Reach Line Card

Connection Information—16 ports

Port configuration (continued) **Page 5 of 5**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
27	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
28	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
29	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
30	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			
31	❒ Network ❒ Remote ❒ Local TCM	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Complete one copy of this form for each Line Card. **Page 1 of 9**

RLC information

IPE position: Loop:________ Shelf: _______________ Card:____________

IP address: ___ ___ ___ . ___ ___ ___ . ___ ___ ___ . ___ ___ ___

Subnet mask: ___ ___ ___ . ___ ___ ___ . ___ ___ ___ . ___ ___ ___

Default gateway: ___ ___ ___ . ___ ___ ___ . ___ ___ ___ . ___ ___ ___

Host PBX's ELAN IP address: ___ ___ ___ . ___ ___ ___ . ___ ___ ___ . ___ ___ ___

Host PBX's ELAN subnet mask: ___ ___ ___ . ___ ___ ___ . ___ ___ ___ . ___ ___ ___

Security level: ❒ No security required ❒ Caller ID ❒ Provisioned Security*

*If the security level is *provisioned security*, RLC's security identifiers:

Inbound ________________________

Outbound ________________________

Notes:

- This RLC provides 64 total ports. Ports 0–31 are Voice ports and ports 32–63 are Data ports. On the host PBX, you must configure Network ports or Remote ports that use MCAs or ATAs (for data transmission) as data ports. If there are not enough free data ports, you can configure Remote ports that use ATAs as voice ports. You can configure Remote ports used for FAX support as either voice ports or data ports. Refer to documentation for your PBX for necessary procedures.
- QoS Transition Technology requires one MCA per B-channel.
- If MCAs or ATAs are to be used to transmit data, a maximum of seven MCAs or ATAs can be connected to this Reach Line Card.

Reach Line Card

Connection Information—32 ports

Port configuration **Page 2 of 9**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
Slot 1					
0	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
1	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
2	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
3	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
4	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
5	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
6	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
7	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
8	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Port configuration (continued) **Page 3 of 9**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
9	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
10	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
11	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
12	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
13	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
14	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
15	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
16	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
17	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Port configuration (continued) **Page 4 of 9**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
18	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
19	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
20	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
21	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
22	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
23	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
24	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
25	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
26	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Port configuration (continued) **Page 5 of 9**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
27	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
28	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
29	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
30	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
31	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Port configuration (continued) **Page 6 of 9**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
Slot 2					
32	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
33	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
34	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
35	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
36	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
37	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
38	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
39	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
40	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Port configuration (continued) **Page 7 of 9**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
41	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
42	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
43	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
44	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
45	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
46	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
47	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
48	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
49	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Port configuration (continued)

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
50	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
51	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
52	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
53	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
54	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
55	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
56	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
57	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
58	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Connection Information—32 ports

Port configuration (continued) **Page 9 of 9**

RLC port number	Port type	MCA, ATA, or FAX?	PSTN number (if Network port)	IP address	Security ID (if Network port)
59	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
60	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
61	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
62	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			
63	❒ Network ❒ Remote ❒ Local telephone	❒ Yes ❒ No			

Reach Line Card

Online/Offline Table Configuration

Page 1 of 1

RLC unit number: ______*254*______ Remote unit number: ________________

Notes:

- If a schedule is not defined for this remote site, the digital telephone online/offline status is defined solely by the remote site user dialing the online/offline SPRE code on the telephone.
- The schedule, if configured, does not prevent this site from establishing or terminating a connection to the network. Schedule entries can be overridden by the site user by dialing the online/offline SPRE code on the telephone.

Day	On	Off	On	Off	On	Off	On	Off
Monday	______	______	______	______	______	______	______	______
	______	______	______	______	______	______	______	______
Tuesday	______	______	______	______	______	______	______	______
	______	______	______	______	______	______	______	______
Wednesday	______	______	______	______	______	______	______	______
	______	______	______	______	______	______	______	______
Thursday	______	______	______	______	______	______	______	______
	______	______	______	______	______	______	______	______
Friday	______	______	______	______	______	______	______	______
	______	______	______	______	______	______	______	______
Saturday	______	______	______	______	______	______	______	______
	______	______	______	______	______	______	______	______
Sunday	______	______	______	______	______	______	______	______
	______	______	______	______	______	______	______	______

Reach Line Card

System expansion worksheet

Page 1 of 4

Number of DSP application modules needed

Complete one worksheet for each RLC.

1 How many remote users do you want to support?

Notes:

- Up to 16 users can be connected to the NTDR68xx Line Card. Up to 32 users can be connected to the NTDR70xx or NTDR71xx Line Cards.
- If using ATAs or MCAs to transmit data, the NTDR68xx Line Card supports up to four ATAs or MCAs. NTDR70xx or NTDR71xx Line Cards support up to seven ATAs or MCAs. Each ATA requires the resources of one DSP channel for data transmission.

____

2 Do you want to implement call blocking? (Users will receive a fast busy signal when resources are not available.) ❒ Yes ❒ No

3 If step 2 is Yes, calculate the number of calls that can be active at one time.
Note: A conservative estimate of one call in three being blocked when no resources are available is recommended.
Multiply your step 1 answer by your call blocking factor. For example, to calculate the number of simultaneous calls that can be supported at a 3 to 2 blocking ratio, multiply your step 1 answer by 2/3 (0.666). If the result contains a fraction, round up to a whole number.

Step 1: _________ x ___________ = _______________

If step 2 is No, the number of simultaneous calls is the same as the number of user stations installed. (Record your response to line 1 here.) ___________

Reach Line Card

System expansion worksheet

Page 2 of 4

Number of DSP application modules needed (continued)		
4	Divide your step 3 answer by 8, then round down the result to a whole number. Step 3: _____________ / 8 = _______________	___________
	The total number of DSP channels required at the local site equals the total number of simultaneous remote service telephone calls you want to allow on your entire remote network. This includes calls from Remote Office 9150, 9110, 9115 units, and Meridian Digital Telephone IP Adapter units (Internal and External). Assuming that there are eight voice channels available on a single DSP application module (the current DSP application module channel capacity), and taking into account the eight built-in DSP channels on the RLC and Remote Office 9150 mother boards, determine the number of DSP application modules required on your host PBX using the following equations: **A: voice DSP devices required = simultaneous remote service voice channels for 9150 and 911x / 4** **B: 911x DSP devices required = simultaneous PSTN connections for 911x / 4** **total DSP devices required = A + B - 2** **Note:** Each DSP application module consists of two DSP devices.	

Reach Line Card

System expansion worksheet

Page 3 of 4

Number of DSP application modules needed (continued)	
(step 4 continued) If the result of equations A or B is a fraction, round *up* to the nearest whole number. For example, for simultaneous 17 remote service telephone calls and zero PSTN connections for 911x, the equations are as follows: **A: voice DSP devices required = 17 / 4= 4.25 = 5** (For 17 remote service calls, the equation works out to 4.25 and rounds up to five.) **B: 911x DSP devices required = 0 / 4 = 0** **total DSP required = 5 + 0 - 2 = 3** **total DSP application modules required = 2** A remote network supporting 17 simultaneous remote service telephone calls requires two DSP application modules. If the RLC supports more than one remote site, remember that its DSP application modules must support the voice processing for all sites combined.	
5 Record the number of DSP application modules already installed. **Note:** The RLC shipped from Nortel Networks with one DSP module built in. Your response here must include that module.	____________
6 Calculate how many DSP modules you need to purchase. Subtract your step 8 answer from your step 4 answer. **Note:** Only four DSP application modules can be installed on the NTDR68xx Line Card. Up to four DSP application modules can be installed on the NTDR70xx or NTDR71xx Line Cards.	____________
7 Allow for future growth? ❒ Yes ❒ No **Note:** All users at a Remote Office 9150 site must be assigned to one RLC only. Therefore, future assignment of RLC ports should be considered. For example, if a Remote Office 9150 site grows from 8 to 20 users, and 12 more ports are not available on the RLC, then you must reassign of the entire Remote Office 9150 site (20 users) to another RLC.	

Reach Line Card

System expansion worksheet

Page 4 of 4

Number of DSP application modules needed (continued)

8	Record the number of DSP application modules already installed. **Note:** The RLC shipped from Nortel Networks with one DSP module built in. Your response here must include that module.		___________
9	Calculate how many DSP modules you need to purchase. Subtract your step 8 answer from your step 4 answer. **Note:** Only four DSP application modules can be installed on the NTDR68xx Line Card. Up to four DSP application modules can be installed on the NTDR70xx or NTDR71xx Line Cards.		___________
10	Allow for future growth?	❒ Yes	❒ No
	Note: All users at a Remote Office 9150 site must be assigned to one RLC only. Therefore, future assignment of RLC ports should be considered. For example, if a Remote Office 9150 site grows from 8 to 20 users, and 12 more ports are not available on the RLC, then you must reassign of the entire Remote Office 9150 site (20 users) to another RLC.		

Appendix B

Sample configuration files

In this appendix

Example of a network

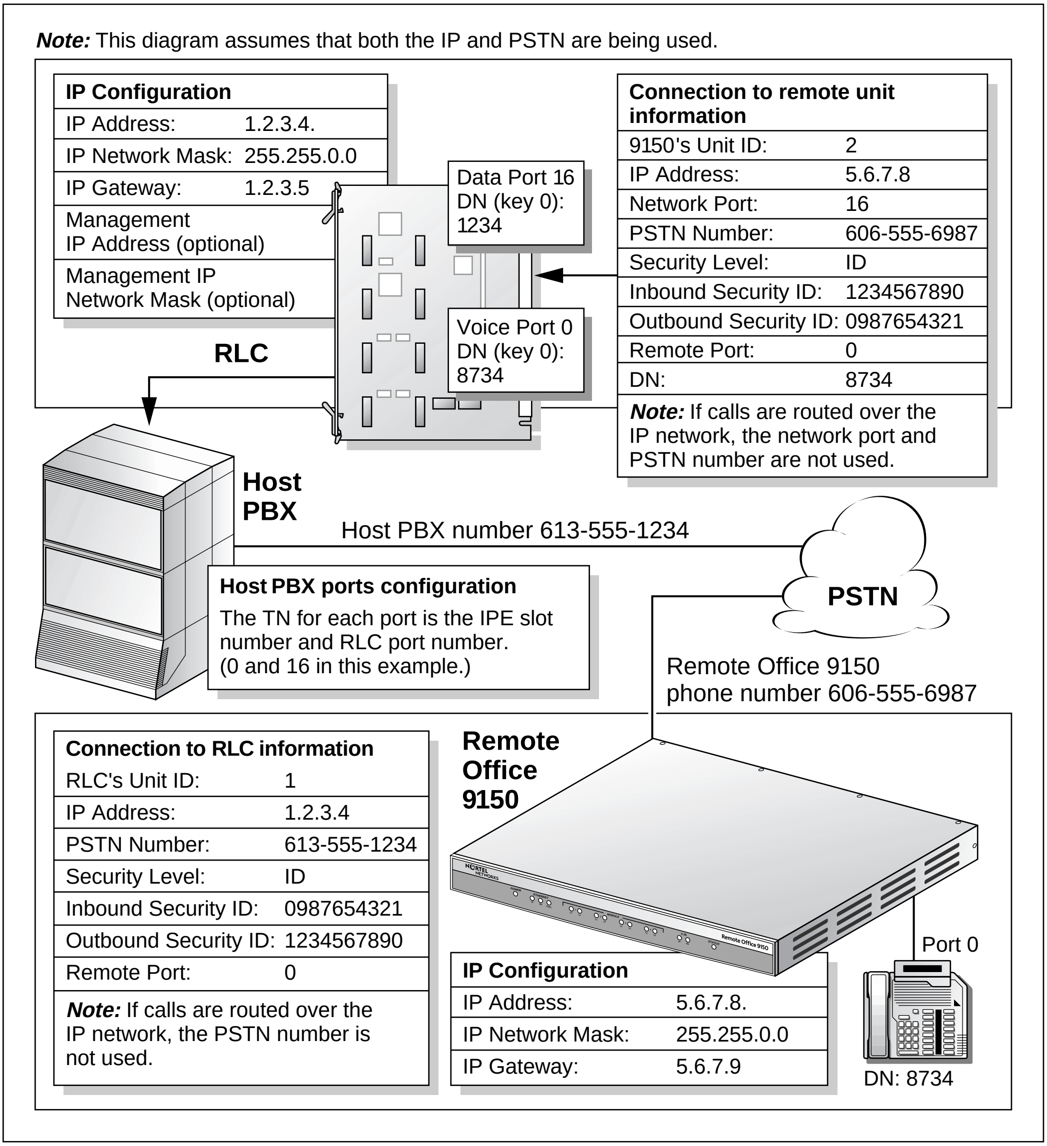
This section provides an example of a network diagram that shows one host site (with one RLC installed on the host PBX) and one Remote Office 9150 unit (with one user station). The purpose of this diagram is to demonstrate the relationship between configuration settings on each unit in the network.

Configuration recommendation

The quickest way to configure the RLC, Remote Office 9150 unit, and Remote Office 911x series unit is to run the Configuration Wizard. For instructions, refer to "Using the Configuration Wizard to perform initial configuration" on page 83. For your reference, the Configuration Wizard screen examples are completed using the same information.

Note: The network diagram shows information that cannot be configured through the Configuration Wizard, such as the security identifiers. You must use Configuration Manager to complete the configuration.

Network diagram



G101413

Voice port configuration on the Meridian 1 PBX

This section shows the configuration settings for the voice port on the Meridian 1 PBX. Generally, define voice ports according to the needs of your remote users.

Configuration example

This configuration example uses the settings identified in the network diagram shown on page 301.

Note: This configuration example is from a Meridian 1 Option 11.

```
REQ: prt
TYPE: 2616                 <---- Telephone type
MARP NOT ACTIVATED

TN   5 0
DATE
PAGE
DES

DES  Bryan Dion
TN   005 0 00 00           <---- RLC slot and port numbers
TYPE 2616
CDEN 8D
CUST 0
AOM  0
FDN
TGAR 1
LDN  NO
NCOS 0
SGRP 0
RNPG 0
SCI  0
SSU
XLST
```

```
CLS  CTD FBD WTA LPR MTD FND HTD ADD HFD
     MWD LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
     POD DSX VMD CMSD CCSD SWD LND CNDD
     CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBD
     ICDD CDMD LLCN MCTD CLBD AUTU
     GPUD DPUD DNDD CFXD ARHD CLTD ASCD
      CPFA CPTA ABDD CFHD FICD NAID BUZZ AHD
      DDGA NAMA
      DRDD EXR0
      USMD USRD ULAD RTDD RBDD RBHD PGND FLXD FTTC DNDY DNO3
CPND_LANG ENG
HUNT
PLEV 02
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY  00 SCR 8734 0     MARP
        CPND
          NAME Bryan Dion
          XPLN 24
          DISPLAY_FMT FIRST,LAST
     01 CWT
     02 MSB
     03 TRN
     04 CFW 4
     05 AO6
     06
     07
     08
     09
     10 MCR 8234 0 MARP
        CPND
          NAME Bryan Dion
          XPLN 24
          DISPLAY_FMT FIRST,LAST
     11 AO6
     12
     13 DSP
     14
     15
```

VCE defines the port as a voice port.

User's DN

User's CPND

Data port configuration for 9150 on the Meridian 1 PBX

This section shows the configuration settings for the data port on the Meridian 1 PBX. The data port provides the communication path between the RLC and the Remote Office 9150 unit, and must be configured as an MCA.

Configuration example

This configuration example uses the settings identified in the network diagram shown on page 301.

Note: This configuration sample is from a Meridian 1 Option 11.

```
REQ: prt
TYPE: 2616                          Telephone type
TN   5 16
DES
DES Remote site 1
TN   005 0 00 16                    RLC slot and port numbers
TYPE 2616
CDEN 8D
CUST 0
AOM  0                              TGAR must be configured to allow
FDN                                 trunk access. Refer to your PBX
TGAR 1                              documentation for more details.
LDN  NO
NCOS 0
SGRP 0
RNPG 0                              DTA defines the port as a data port.
SCI  0
SSU
XLST
CLS  CTD FBD WTD LPR MTD FND HTD ADD HFD
     MWD LMPN RMMD SMWD AAD IMD XHD IRD NID OLD DTA DRG1
     POD DSX VMD CMSD CCSD SWD LND CNDD
     CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBD
     ICDD CDMD LLCN MCTD CLBD AUTU
     GPUD DPUD DNDD CFXD ARHD CLTD ASCD
     CPFA CPTA ABDD CFHD FICD NAID BUZZ AHD
     DDGA NAMA
     DRDD EXR0
     USMD USRD ULAD RTDD RBDD RBHD PGND FLXD FTTC DNDY DNO3
```

```
TOV 0  MINS
DTAO MCA
PSEL  DMDM
HUNT
PSDS  NO
TRAN  ASYN
PAR  SPACE
DTR  ON
DUP  FULL
HOT  OFF
AUT  ON
BAUD 56000
DCD  ON
PRM  KBD ON
VLL  OFF
MOD  YES
INT  OFF
CLK  OFF
KBD  ON
RTS  OFF
PLEV 02
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY  00 SCR 1234 0     MARP
     01
     02
     03
     04
     05
     06
     07
     08
     09
     10
     11
     12
     13
     14
     15
```

Network ports must be defined as MCA.

Baud defaults to 56K, however, the RLC determines actual Baud on a per-call basis.

The number that the Remote Office 9150 unit needs to connect to the RLC. It must be a DID number.

Data port configuration for 911x on the Meridian 1 PBX

This section shows the configuration settings for the data port on the Meridian 1 PBX. The data port provides the communication path between the RLC and the Remote Office 911x series unit, and must be configured as an ATA.

Configuration example

This configuration sample is from a Meridian 1 Option 11.

```
REQ: prt
TYPE: 2616                 <------ Telephone type
MARP NOT ACTIVATED
TN   9 16
DATE
PAGE
DES
DES  NO DES
TN   009 0 00 16           <------ RLC slot and port numbers
TYPE 2616
CDEN 8D
CUST 0
AOM  0
FDN
TGAR 1                     <------ TGAR must be configured to allow trunk access. Refer to your PBX documentation for more details.
LDN  NO
NCOS 0
SGRP 0
RNPG 0
SCI  0
SSU
XLST
SFLT NO
CAC_CIS 3
CAC_MFC 0
```

VCE defines the port as a voice port.

```
CLS  CTD FBD WTA LPR MTD FND HTD ADD HFD
     MWD LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
     POD DSX VMD CMSD SLKD CCSD SWD LND CNDD
     CFTD SFD MRD DDV CNIA CDCA MSID DAPA BFED RCBD
     ICDD CDMD LLCN MCTD CLBD AUTU
     GPUD DPUD DNDD CFXD ARHD CLTD ASCD
     CPFA CPTA HSPD ABDD DELD CFHD FICD NAID DNAA BUZZ AGRD MOAD
UDI RCC HBTD AHD IPND  DDGA NAMA MIND PRSD NRWD NRCD NROD
     DRDD EXR0
    USMD USRD ULAD CCBD RTDD RBDD RBHD PGND OCBD FLXA FTTC DNDY DNO
MCBN
CPND_LANG ENG
HUNT
PLEV 02
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
DTMK
KEY  00 SCR 9016 0     MARP
        ANIE 0
     01
     02
     03
     04
     05
     06
     07
     08
     09
     10
     11
     12
     13
     14
     15
```

The number that the Remote Office 911x series unit needs to connect to the RLC. It must be a DID number.

Voice port configuration on the MSL-100 PBX

This section shows the datafill for a typical M2616 subscriber line. Voice ports (telephones) must be datafilled on the even numbered LENs in the SL-100. The even numbered ports correspond to ports 0-15 on both the RLC at the host site, and the Remote Office 9110, 9115, or 9150 unit(s) at the remote site(s) served by the RLC.

Configuration example

```
>table lninv
TABLE: LNINV
>add
LEN:
>host 19 1 4 0              ← This is the LEN address in the Meridian SL100
CARDCODE:
>DR68AA                     ← This is the card that will be occupying the IPE slot
PADGRP:
>DONS
STATUS:
>hasu                       ← HASU , meaning Hardware Assigned, Software
Unassigned
GND:
>n
BNV:
>nl
MNO:
>y
CARDTYPE:
>nil
TUPLE TO BE ADDED:
HOST  19 1 04 0   DR68AA   DONS     HASU   N  NL   Y             NIL
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>Y

>servord
SO:
>new
```

This is an example of a typical M2616 telephone set:

```
SONUMBER:     NOW   0  9 22 PM
>
DN:
>6846100                    ← Site Specific information, is the DN of the instrument
LCC_ACC:
>m2616                      ← Telephone Type.
RINGTYPE:
>fh
HANDS_FREE:
>y
GROUP:
>ntirich                    ← Site Specific information. This will vary between sites
SUBGRP:
>0                          ← Site Specific information. This will vary between sites
NCOS:
>64                         ← Site Specific information. This will vary between sites
SNPA:
>972                        ← Site Specific information. This will vary between sites
KEY:
>1
RINGING:
>y
LEN_OR_LTID:
>19 1 4 0                   ←This is the LEN of the Voice Port.
OPTKEY:
>1
OPTION:
>m0200                      ← This is the option for a display.
OPTKEY:
>$
COMMAND AS ENTERED:
NEW NOW 0 9 22 PM 9726100 M2616 FH Y NTIRICH 0 64 972 1 Y HOST 19 1 04
00 ( 1
M0200 ) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
2000/09/22 12:34:41.571 FRI.   JOURNAL FILE RECORD ID 62
```

Data port configuration for 9150 on the MSL-100 PBX

This section shows the configuration settings for the MCA data port on the MSL-100 PBX. The data port provides the communication path between the RLC and the Remote Office 9150 unit, and must be configured as an MCA. MCAs must be datafilled on the odd numbered LENs in the MSL-100. The odd numbered ports correspond to ports 16-32 on both the RLC and the Remote Office 9150 unit.

Configuration example

```
>table lninv
TABLE: LNINV
>add
LEN:
>host 19 1 4 31                ← This is the LEN address in the Meridian MSL-100.
CARDCODE:
>DR68AA                        ← This is the card that will be occupying the IPE slot.
PADGRP:
>DONS
STATUS:
>hasu                          ← HASU , meaning Hardware Assigned, Software
Unassigned
GND:
>n
BNV:
>nl
MNO:
>y
CARDTYPE:
>nil
TUPLE TO BE ADDED:
HOST  19 1 04 31   DR68AA   DONS     HASU   N  NL   Y              NIL
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>Y

>servord
SO:
>new
SONUMBER:     NOW   0  9 21 AM
```

MSL-100 Data port configuration (cont'd.)

```
DN:
>6846789                    ← Site Specific information. This will vary between sites.
LCC_ACC:
>mca                        ← Field denotes line type.
GROUP:
>NTIRICH                    ← Site Specific information. This will vary between sites.
SUBGRP:
>0                          ← Site Specific information. This will vary between sites.
NCOS:
>64                         ← Site Specific information. This will vary between sites.
SNPA:
>972                        ← Site Specific information. This will vary between sites.
RINGING:
>y
CLASSDU:
>mca
DOWNLOAD:
>n
SYNCHRO:
>s
DATARATE:
>64000
CLOCKSRC:
>i
V25:
>n
HDLC:
>n
RTS:
>n
HOTLINE:
>n
VLL:
>n
IDLETO:
>0
KBDTYP:
>hayes
DPOPTS:
>$
LATANAME:
>nillata
```

MSL-100 Data port configuration (cont'd.)

```
LEN_OR_LTID:
>19 1 4 31                    ← Site Specific information. This will vary between sites.
OPTION:
>ndc
OPTION:
>$
COMMAND AS ENTERED:
NEW NOW 0 9 21 AM 6846789 MCA NTIRICH 0 64 972 Y MCA N S 64000 I N N N
N N
0 HAYES $ NILLATA HOST 19 1 04 31 ( NDC ) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
```

Data port configuration for 911x on the MSL-100 PBX

This section shows the configuration settings for the ATA data port on the MSL-100 PBX. The data port provides the communication path between the RLC and the Remote Office 911x unit, and must be configured as an ATA. ATAs must be datafilled on the odd numbered LENs in the MSL-100. The odd numbered ports correspond to ports 16-32 on both the RLC and the Remote Office 911x series unit.

Configuration example

```
TABLE: LNINV
>pos 19 1 06 03
HOST  19 1 06 03   DR68AA   DONS  WORKING   N  NL   Y
FLXA
>cha
CARDCODE: DR68AA
>
PADGRP: DONS
>
STATUS: WORKING
>
GND: N
>BNV: NL
>MNO: Y
>CARDTYPE: FLXA      Must be FLXA for 911x network port.
>
TUPLE TO BE CHANGED:
HOST  19 1 06 03   DR68AA   DONS  WORKING   N  NL   Y
FLXA
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
LEN:     HOST  19 1 06 03   This is the LEN address in the Meridian MSL-100.
TYPE: SINGLE PARTY LINE
SNPA: 972
DIRECTORY NUMBER:     6846779
LINE CLASS CODE:  M3904 WITH HANDSFREE
```

This is the card that will be occupying the IPE slot.

```
CUSTGRP:            NTIRICH  SUBGRP: 0  NCOS: 64  RING: Y
CARDCODE:  DR68AA    GND: N  PADGRP: DONS  BNV: NL MNO: Y
PM NODE NUMBER     :    163
PM TERMINAL NUMBER :    196
DNGRPS OPTIONS:
NETNAME: NORTEL
ADDRESS:             DDD44NNNNN
NETNAME: PUBLIC
ADDRESS:             97268NNNNN
OPTIONS:
 NONE

   KEY       DN
   ---       --
     1       DN          9726846779

   KEY     FEATURE
   ---     -------
  NONE
```

RLC configuration

This section shows the configuration settings for the RLC. You can obtain a similar configuration printout by performing a configuration download while connected to the RLC.

Note: Configuration settings are separated by commas (,).

Configuration example

This configuration example uses the settings identified in the network diagram shown on page 301.

```
SYSCFG 254,HOST1
```

RLC's IP address information:

- Unit ID
- Site Name

```
APPMODCFG 0,NC,NC
APPMODCFG 1,E,G729,G729
APPMODCFG 2,NC,NC
APPMODCFG 3,NC,NC
```

DSP application module (only module 1 is configured in this case)

```
SYSCFG 254,HOST1
```

Unit ID and node name

```
RLCCFG E,E
ACCFG D

PORTCFG 0,1,0,2,2,D
PORTCFG 1,1,0,2,2,D
PORTCFG 2,1,0,2,2,D
PORTCFG 3,1,0,2,2,D
PORTCFG 4,1,0,2,2,D
PORTCFG 5,1,0,2,2,D
```

Ports configured as remote ports

```
PORTCFG 6,0
PORTCFG 7,0
PORTCFG 8,0
PORTCFG 9,0
PORTCFG 10,0
PORTCFG 11,0
PORTCFG 12,0
PORTCFG 13,0
PORTCFG 14,0
PORTCFG 15,0

PORTCFG 16,2,2,6065556987
PORTCFG 17,0
PORTCFG 18,0
PORTCFG 19,0
PORTCFG 20,0
PORTCFG 21,0
PORTCFG 22,0
PORTCFG 23,0
PORTCFG 24,0
PORTCFG 25,0
PORTCFG 26,0
PORTCFG 27,0
    .
    .
    .
PORTCFG 63,0

RUNITCFG 1,E,0,2,45,45,3,1234567890,0987654321,E,Y,5.6.7.8,
         E,16,D,16,10,Y,6065556987,D
RUNITCFG 2,D,0,0,2,1,1,D,D,D
RUNITCFG 3,D,0,0,2,1,1,D,D,D
RUNITCFG 4,D,0,0,2,1,1,D,D,D
RUNITCFG 5,D,0,0,2,1,1,D,D,D
RUNITCFG 6,D,0,0,2,1,1,D,D,D
RUNITCFG 7,D,0,0,2,1,1,D,D,D
RUNITCFG 8,D,0,0,2,1,1,D,D,D
RUNITCFG 9,D,0,0,2,1,1,D,D,D
RUNITCFG 10,D,0,0,2,1,1,D,D,D
```

Ports configured as local ports

Port configured as network port

Remote unit connection information (unit 1):

- remote unit number
- unit ID
- security information (inbound and outbound security IDs)
- remote unit's IP address
- network port
- PSTN number

```
ONOFFCFG 1,SUN,0 00:00
ONOFFCFG 1,MON,0 00:00
ONOFFCFG 1,TUE,0 00:00
ONOFFCFG 1,WED,0 00:00
ONOFFCFG 1,THU,0 00:00
ONOFFCFG 1,FRI,0 00:00
ONOFFCFG 1,SAT,0 00:00
ONOFFCFG 2,SUN,0 00:00
ONOFFCFG 2,MON,0 00:00
ONOFFCFG 2,TUE,0 00:00
ONOFFCFG 2,WED,0 00:00
ONOFFCFG 2,THU,0 00:00
ONOFFCFG 2,FRI,0 00:00
ONOFFCFG 2,SAT,0 00:00
ONOFFCFG 3,SUN,0 00:00
ONOFFCFG 3,MON,0 00:00
ONOFFCFG 3,TUE,0 00:00
ONOFFCFG 3,WED,0 00:00
ONOFFCFG 3,THU,0 00:00
ONOFFCFG 3,FRI,0 00:00
ONOFFCFG 3,SAT,0 00:00
ONOFFCFG 4,SUN,0 00:00
ONOFFCFG 4,MON,0 00:00
ONOFFCFG 4,TUE,0 00:00
ONOFFCFG 4,WED,0 00:00
ONOFFCFG 4,THU,0 00:00
ONOFFCFG 4,FRI,0 00:00
ONOFFCFG 4,SAT,0 00:00
ONOFFCFG 5,SUN,0 00:00
ONOFFCFG 5,MON,0 00:00
ONOFFCFG 5,TUE,0 00:00
ONOFFCFG 5,WED,0 00:00
ONOFFCFG 5,THU,0 00:00
ONOFFCFG 5,FRI,0 00:00
ONOFFCFG 5,SAT,0 00:00
ONOFFCFG 6,SUN,0 00:00
ONOFFCFG 6,MON,0 00:00
ONOFFCFG 6,TUE,0 00:00
ONOFFCFG 6,WED,0 00:00
ONOFFCFG 6,THU,0 00:00
ONOFFCFG 6,FRI,0 00:00
```

Online/offline schedule

```
ONOFFCFG 6,SAT,0 00:00
ONOFFCFG 7,SUN,0 00:00
ONOFFCFG 7,MON,0 00:00
ONOFFCFG 7,TUE,0 00:00
ONOFFCFG 7,WED,0 00:00
ONOFFCFG 7,THU,0 00:00
ONOFFCFG 7,FRI,0 00:00
ONOFFCFG 7,SAT,0 00:00
ONOFFCFG 8,SUN,0 00:00
ONOFFCFG 8,MON,0 00:00
ONOFFCFG 8,TUE,0 00:00
ONOFFCFG 8,WED,0 00:00
ONOFFCFG 8,THU,0 00:00
ONOFFCFG 8,FRI,0 00:00
ONOFFCFG 8,SAT,0 00:00
ONOFFCFG 9,SUN,0 00:00
ONOFFCFG 9,MON,0 00:00
ONOFFCFG 9,TUE,0 00:00
ONOFFCFG 9,WED,0 00:00
ONOFFCFG 9,THU,0 00:00
ONOFFCFG 9,FRI,0 00:00
ONOFFCFG 9,SAT,0 00:00
ONOFFCFG 10,SUN,0 00:00
ONOFFCFG 10,MON,0 00:00
ONOFFCFG 10,TUE,0 00:00
ONOFFCFG 10,WED,0 00:00
ONOFFCFG 10,THU,0 00:00
ONOFFCFG 10,FRI,0 00:00
ONOFFCFG 10,SAT,0 00:00

FBQOSCFG 1,E,5,6,5,10,10,32
FBQOSCFG 2,D,5,6,5,10,10,32
FBQOSCFG 3,D,5,6,5,10,10,32
FBQOSCFG 4,D,5,6,5,10,10,32
FBQOSCFG 5,D,5,6,5,10,10,32
FBQOSCFG 6,D,5,6,5,10,10,32
FBQOSCFG 7,D,5,6,5,10,10,32
FBQOSCFG 8,D,5,6,5,10,10,32
FBQOSCFG 9,D,5,6,5,10,10,32
FBQOSCFG 10,D,5,6,5,10,10,32

Item not Configured
```

Quality of Service settings (these are default settings)

Caller ID (not configured; one line for each remote unit)

Remote Office 9150 unit configuration

This section shows the configuration settings for the Remote Office 9150 unit. You can obtain a similar configuration printout by performing a configuration download while connected to the Remote Office 9150 unit.

Note: Configuration settings are separated by commas (,).

Configuration example

This configuration example uses the settings identified in the network diagram shown on page 301.

```
IPCFG 5.6.7.8,255.255.0.0,5.6.7.9
```

9150 unit's IP interface information

- IP address
- Subnet mask
- IP gateway

```
APPMODCFG 0,SPARE,TSIDSP
APPMODCFG 1,E,G729,G729
APPMODCFG 2,NC,NC
APPMODCFG 3,NC,NC
APPMODCFG 4,1,1,E,1,1,5556987,60655569870101,E,1,1,
          5556988,60655569880101

APPMODCFG 5,NC,NC
APPMODCFG 6,NC,NC
APPMODCFG 7,NC,NC
```

On-board DSP module (module 0) and installed DSP application module (module 1)

ISDN BRI module configuration

- module number
- PSTN number for each B-channel
- SPID for each B-channel

```
SYSCFG 2, Remote site 1
```

Unit ID and node name

```
ROUCFG 13:00,0,JAN-13-2000,911,#222,#333,#345,#456,E
ACCFG N
```

System configuration:

- Emergency service number
- System date and time
- SPRE codes

```
RLCDETCFG 254,3,0987654321,1234567890,E,1.2.3.4,E,6135551234,E,D
```

Host PBX connection information:

- RLC’s unit ID
- security information (inbound and outbound

```
ROUDEVCFG 0,2,0,E,E,E,Bryan Dion,8734,04
ROUDEVCFG 1,2,1,E,E,E,Marc Horman,8707,04
ROUDEVCFG 2,2,2,E,E,E,Brad McAllister,8708,04
ROUDEVCFG 3,2,3,E,E,E,Andrew Wong,8760,04
ROUDEVCFG 4,2,4,E,E,E,Corey Smith,8709,04
ROUDEVCFG 5,2,5,E,E,E,Tracey Black,8743,04
ROUDEVCFG 6,0,E,E,E,John Brown,8611,04
```

Port (station) configuration:

- Port number
- Local and remote capability
- CPID

```
ROUDEVCFG 7,1,0
ROUDEVCFG 8,1,0
ROUDEVCFG 9,1,0
ROUDEVCFG 10,1,0
ROUDEVCFG 11,1,0
ROUDEVCFG 12,1,0
ROUDEVCFG 13,1,0
ROUDEVCFG 14,1,0
ROUDEVCFG 15,1,0
ROUDEVCFG 16,1,0
ROUDEVCFG 17,1,0
ROUDEVCFG 18,1,0
ROUDEVCFG 19,1,0
ROUDEVCFG 20,1,0
ROUDEVCFG 21,1,0
ROUDEVCFG 22,1,0
ROUDEVCFG 23,1,0
ROUDEVCFG 24,1,0
ROUDEVCFG 25,1,0
ROUDEVCFG 26,1,0
ROUDEVCFG 27,1,0
ROUDEVCFG 28,1,0
ROUDEVCFG 29,1,0
ROUDEVCFG 30,1,0
ROUDEVCFG 31,1,0
```

Unconfigured ports
Note: The default capability is Remote.

```
ROUDEVCFG 64,2,31,E,E,E,FAX,8664,900
```

Fax port configuration:

- Port number
- Local and remote capability
- CPID

```
FKEYCFG 0,2 TRN 12345678,3 CFW 4000,8 LC1 ,9 LC2 ,NC
FKEYCFG 1,2 TRN 12345678,3 CFW 4000,8 LC1 ,9 LC2 ,NC
FKEYCFG 2,2 TRN 12345678,3 CFW 4000,8 LC1 ,9 LC2 ,NC
FKEYCFG 3,2 TRN 12345678,3 CFW 4000,8 LC1 ,9 LC2 ,NC
FKEYCFG 4,2 TRN 12345678,3 CFW 4000,8 LC1 ,9 LC2 ,NC
FKEYCFG 5,2 TRN 12345678,3 CFW 4000,8 LC1 ,9 LC2 ,NC
FKEYCFG 6,8 LC1 ,9 LC2 ,NC
FKEYCFG 7,NC
FKEYCFG 8,NC
FKEYCFG 9,NC
FKEYCFG 10,NC
FKEYCFG 11,NC
FKEYCFG 12,NC
FKEYCFG 13,NC
FKEYCFG 14,NC
FKEYCFG 15,NC
FKEYCFG 16,NC
FKEYCFG 17,NC
FKEYCFG 18,NC
FKEYCFG 19,NC
FKEYCFG 20,NC
FKEYCFG 21,NC
FKEYCFG 22,NC
FKEYCFG 23,NC
FKEYCFG 24,NC
FKEYCFG 25,NC
FKEYCFG 26,NC
FKEYCFG 27,NC
FKEYCFG 28,NC
FKEYCFG 29,NC
FKEYCFG 30,NC
FKEYCFG 31,NC
FKEYCFG 32,NC
```

Local station feature keys configuration:

- Port number
- Feature key number
- Feature name
- DN (if

Trunk group configuration:

- Trunk group number
- Trunk access code

```
TRKGRPCFG 1,E,#61,4.0.0 4.0.1,8739
TRKGRPCFG 2,D,#62,1.0.0 1.0.1 2.0.0 2.0.1,4002
TRKGRPCFG 3,D,#63,1.0.0 1.0.1 2.0.0 2.0.1,4004
TRKGRPCFG 4,D,#64,1.0.0 1.0.1 2.0.0 2.0.1,4006
TRKGRPCFG 5,D,#65,1.0.0 1.0.1 2.0.0 2.0.1,4008
TRKGRPCFG 6,D,#66,1.0.0 1.0.1 2.0.0 2.0.1,4010
TRKGRPCFG 7,D,#67,1.0.0 1.0.1 2.0.0 2.0.1,4012
TRKGRPCFG 8,D,#68,1.0.0 1.0.1 2.0.0 2.0.1,4014
```

```
Item not Configured
```

Caller ID (not configured)

Remote Office 911x series unit configuration

This section shows the configuration settings for the Remote Office 911x series unit. You can obtain a similar configuration printout by performing a configuration download while connected to the Remote Office 911x series unit.

Note: Configuration settings are separated by commas (,).

Configuration example

This configuration example uses the settings identified in the network diagram shown on page 301.

```
IPCFG 5.6.7.8,255.255.255.0,5.6.7.9
SYSCFG 1,Node 1
ROUCFG 0,911,#99,#98,D,#97,#96
ACCFG N
RLCDETCFG 254,0,1,E,1.2.3.4,E,6135551234
```

911x unit's IP interface information:

- IP address
- Subnet mask
- IP gateway

Unit ID and node name

System configuration:

- Emergency service number
- SPRE codes

Host PBX connection information:

- RLC's unit ID
- security information (inbound and outbound security IDs)
- RLC's IP address
- RLC PSTN number

Appendix C

Pin-out tables for RLC Multi-I/O cables

In this appendix

Reading the tables

When you read the heading, entry, heading, entry, and so on, along a single line in the tables in this appendix, the words form a complete sentence.

For example, the first line of the table below is read as follows:

In pair 1 of bundle W1, the red wire connects pin P1-21 to pin P2-5 and carries the following signal: EN0RXD+.

In pair	of bundle	the	wire connects pin	to pin	and carries the following signal:
1	W1,	RED	P1-21	P2-5	EN0RXD+.
1	W1,	BLK	P1-46	P2-12	EN0RXD-.
2	W1,	WHT	P1-22	P2-6	EN0TXD+.
2	W1,	BLK	P1-47	P2-13	EN0TXD-.

IF the first entry in a row is in column	THEN **the final column shows the**
four	signal carried between the named pins.
five	function of the named pin.

RLC Multi-I/O cable–Basic

One RLC Multi-I/O cable–Basic (NTDR79xx) ships with each Reach Line Card (RLC). This cable provides the following connectivity:

- P1—the switch's I/O panel
- P2—an external (user) Ethernet port
- P3—serial port to admin PC

If you lose your RLC Multi-I/O cable–Basic, contact your Nortel Networks distributor and request order number A0795280 to purchase a new one.

Pin-out information

The following table shows the pin-out of the RLC Multi-I/O cable–Basic:

In pair	of bundle	the	wire connects pin	to pin	and carries the following signal:
1	W1,	RED	P1-21	P2-5	EN0RXD+.
1	W1,	BLK	P1-46	P2-12	EN0RXD-.
2	W1,	WHT	P1-22	P2-6	EN0TXD+.
2	W1,	BLK	P1-47	P2-13	EN0TXD-.
				P2-4	GND (SHD)
1	W2,	RED	P1-17	P3-3	MMIRXD.
1	W2,	BLK	P1-42	P3-2	MMITXD.
2	W2,	WHT	P1-45	P3-5	GND.
2					
			P3-1	P3-4	MMIDTR-MMIDCD
			P3-4	P3-6	MMIDTR-MMIDSR
			P3-7	P3-8	MMIRTS-MMICTS

RLC Multi-I/O cable–Enhanced

The RLC Multi-I/O cable–Enhanced (NTDR80xx) is a 6-plug cable that provides the following connectivity:

- P1—the switch's I/O panel
- P2—an external (user) Ethernet port
- P3—a serial port to admin PC
- P4—the switch's internal Ethernet port
- P5—the cross-connect to local telephones
- P6— (for future use)

You must order this cable separately by contacting your Nortel Networks distributor and requesting order code A0795281.

Pin-out information

The following table shows the pin-out of the RLC Multi-I/O cable–Enhanced:

In pair	of bundle	the	wire connects pin	to pin	and carries the following signal:
1	W1,	BLK	P1-21	P2-5	EN0RXD+.
1	W1,	RED	P1-46	P2-12	EN0RXD-.
2	W1,	BLK	P1-22	P2-6	EN0TXD+.
2	W1,	WHT	P1-47	P2-13	EN0TXD-.
				P2-4	GND (SHD).
1	W2,	BLK	P1-17	P3-3	SDIRXD.
1	W2,	RED	P1-42	P3-2	SDITXD.
2	W2,	BLK	P1-45	P3-5	GND.
2	W2,	WHT			
			P3-1	P3-4	SDIDTR-SDIDCD.
			P3-4	P3-6	SDIDTR-SDIDSR.
			P3-7	P3-8	SDIRTS-SDICTS.
1	W3,	BLK	P1-23	P4-5	EN1RXD+.
1	W3,	RED	P1-48	P4-12	EN1RXD-.
2	W3,	BLK	P1-24	P4-6	EN1TXD+.
2	W3,	WHT	P1-49	P4-13	EN1TXD-.
1	W4,	BLK	P1-1	P5-1	TCMR00.
1	W4,	RED	P1-26	P5-26	TCMT00.

In pair	of bundle	the	wire connects pin	to pin	and carries the following signal:
2	W4,	BLK	P1-2	P5-2	TCMR01.
2	W4,	WHT	P1-27	P5-27	TCMT01.
3	W4,	BLK	P1-3	P5-3	TCMR02.
3	W4,	GRN	P1-28	P5-28	TCMT02.
4	W4,	BLK	P1-4	P5-4	TCMR03.
4	W4,	BLU	P1-29	P5-29	TCMT03.
5	W4,	BLK	P1-5	P5-5	TCMR04.
5	W4,	YEL	P1-30	P5-30	TCMT04.
6	W4,	BLK	P1-6	P5-6	TCMR05.
6	W4,	BRN	P1-31	P5-31	TCMT05.
7	W4,	BLK	P1-7	P5-7	TCMR06.
7	W4,	ORG	P1-32	P5-32	TCMT06.
8	W4,	RED	P1-8	P5-8	TCMR07.
8	W4,	WHT	P1-33	P5-33	TCMT07.
9	W4,	RED	P1-9	P5-9	TCMR08.
9	W4,	GRN	P1-34	P5-34	TCMT08.
10	W4,	RED	P1-10	P5-10	TCMR09.
10	W4,	BLU	P1-35	P5-35	TCMT09.
11	W4,	RED	P1-11	P5-11	TCMR10.
11	W4,	YEL	P1-36	P5-36	TCMT10.
12	W4,	RED	P1-12	P5-12	TCMR11.

In pair	of bundle	the	wire connects pin	to pin	and carries the following signal:
12	W4,	BRN	P1-37	P5-37	TCMT11.
13	W4,	RED	P1-13	P5-13	TCMR12.
13	W4,	ORG	P1-38	P5-38	TCMT12.
14	W4,	GRN	P1-14	P5-14	TCMR13.
14	W4,	WHT	P1-39	P5-39	TCMT13.
15	W4,	GRN	P1-15	P5-15	TCMR14.
15	W4,	BLU	P1-40	P5-40	TCMT14.
16	W4,	GRN	P1-16	P5-16	TCMR15.
16	W4,	YEL	P1-41	P5-41	TCMT15.
1	W5,	BLK	P5-9	P6-2	(reserved)
1	W5,	RED	P5-34	P6-14	(reserved)
2	W5,	BLK	P5-10	P6-3	(reserved)
2	W5,	WHT	P5-35	P6-16	(reserved)
3	W5,	BLK	P5-11	P6-4	(reserved)
3	W5,	GRN	P5-36	P6-5	(reserved)
4	W5,	BLK	P5-12	P6-20	(reserved)
4	W5,	BLU	P5-37	P6-6	(reserved)
5	W5,	BLK	P5-13	P6-8	(reserved)
5	W5,	YEL	P5-38	P6-7	(reserved)
6	W5,	BLK	P5-14	P6-17	(reserved)
6	W5,	BRN	P5-39	P6-9	(reserved)

In pair	of bundle	the	wire connects pin	to pin	and carries the following signal:
7	W5,	BLK	P5-15	P6-24	(reserved)
7	W5,	ORG	P5-40	P6-11	(reserved)
8	W5,	RED	P5-16	P6-15	(reserved)
8	W5,	WHT	P5-41	P6-12	(reserved)

Appendix D

Safety and regulatory information

In this appendix

International safety compliance

The Reach Line Card (RLC) and the Remote Office system comply with international safety regulations as listed on this page.

Underwriters Laboratory (UL)

The RLC complies with and is listed under UL 1950, Third Edition, including revisions based on the Fourth Amendment to IEC 950, Second Edition.

Canadian Standards Association (CSA)

The RLC complies with and is listed under CSA C22.2, No. 950-95.

Europe

The RLC complies with and is listed under EN60950: 1992, incorporating amendments 1, 2, 3, 4 & 11.

Australia

The RLC complies with and is listed under TS001\AS 3260.

Other Countries Deviations Assessed

Refer to Nemko Test Report # 2000 29173.

Electromagnetic compatibility

The Reach Line Card (RLC) does not interfere with operation of other licensed communications systems according to the standards set forth by Australia, the United States, and Canada.

The RLC does not adversely effect the compliance of the Meridian 1 system to:

- AS 3548 Class B (Australia)
- Class A of FCC Part 15, Subpart J
- CSPR B requirements. [1]

The margin is at least 2 dB better than the specified limit.

1. CSPR B limits the number of RLCs that can be used in an Option 11 cabinet with the RLC Multi-I/O cable–Enhanced to five (5).

Electromagnetic immunity

The RLC in a Meridian 1 PBX resists electromagnetic interference.

The RLC performs normally when subjected to narrow band radiated fields in frequency range 500 kHz to 1 GHz (field strength up to 10 V/m, 1 kHz, 50% modulated AM signal) per IEC 1000-4-3.

Electrostatic discharge

The Reach Line Card (RLC) is immune to electrostatic discharges typical for an office environment (carpeted floors, low humidity) according to the test method specified by IEC 1000-4-2.

No damage or malfunction occurs when the RLC is exposed to up to +/-8kV of direct discharge. An indirect discharge of up to +/-16 kV does not result in malfunction of the system (to adjacent equipment or connected cabling).

The requirements for both “closed door” and “open door” have been met.

Glossary

10BaseT Ethernet

The Ethernet standard for baseband local area networks using twisted-pair cable carrying 10 megabits per second (Mbps) in a star topology.

A

A-law

A companding technique used in encoding and decoding audio signals in 30-channel pulse code modulated (PCM) systems. A-law companding is the primary method used in Europe. *See also* Mu-law.

adapter

Hardware required to support a particular device. For example, network adapters provide a port for the network wire. Adapters can be expansion boards or part of the computer’s main circuitry.

administrator

A user who is responsible for maintaining the RLC or its associated remote units.

agent

A person who is responsible for handling customer calls.

analog

The type of signal used by most telephone connections. A modem converts a digital (computer) signal to analog, and vice versa, so that the signal can travel through telephone lines.

API

See application program interface.

application

A program that runs on a computer.

application program interface

A set of routines, protocols, and tools that programmers use to develop software applications. APIs simplify the development process by providing commonly used programming procedures.

Asynchronous Transfer Mode

A network technology that uses start bits and stop bits (identifying the beginning and end of digital code) to facilitate data transfer. ATM equipment can transmit video, audio, and computer data over the same network, ensuring that no single type of data dominates the line.

ATM

See Asynchronous Transfer Mode.

Automatic Call Distribution (ACD) applications

A separate system or built-in feature of a PBX that equally distributes incoming calls to agents. As calls come in, they are placed into a queue (or a waiting line) for the next available agent. The RLC and its associated remote units support all of Nortel Networks' ACD applications.

B

bandwidth

The amount of data that the network can transmit, usually expressed in Mbytes per second.

baseboard

See motherboard.

Basic Input/Output System

Flash ROM-based code that runs the Power-On Self-Test (POST) and bootstrap loader. BIOS contains low-level access routines for hardware that can be called from DOS.

basic rate interface

An ISDN subscriber service that uses two B (64Kbps) channels and one D (64 Kbps) channel to transmit voice, video, and data signals.

BIOS
See Basic Input/Output System.

bit
Short for binary digit, the smallest unit of information on a machine. A single bit can hold only one of two values: 0 or 1.

Boolean logic
A logic system that enables a computer to use electricity to make complex decisions. The basic logic gates (And, Or, and Not) determine the flow of electricity through the computer's circuitry and whether specific computing functions are carried out.

boolean
A value that can only be true or false.

branch station
A Meridian Digital Telephone set located at the Remote Office 9110, 9115, or 9150 site.

BRI
See basic rate interface.

bridge
A protocol-independent device that connects two LANs or two segments of the same LAN. Bridges are faster (and less versatile) than routers because they forward packets without analyzing and rerouting messages.

bridge port
Bridge ports are configured on the Remote Office 9150 unit and are used to connect branch office trunks through the host PBX to accommodate conference calls, remote station to remote station calls, and so on.

bus
A collection of wires that connects the microprocessor and main memory to internal computer components. All buses consist of an address bus that transfers data and a data bus that transfers information about where the data should go.

In a network, the bus (also called the backbone) is the main cable that connects all devices on a LAN.

byte

Abbreviation for binary term, a unit of storage capable of holding a single character. On almost all modern computers, a byte is equal to eight bits. Large amounts of memory are indicated in terms of kilobytes (1024 bytes), megabytes (1 048 576 bytes), and gigabytes (1 073 741 824 bytes).

C

cache

A temporary storage area in computer memory.

call duration timer

Used in PSTN mode only, it specifies the minimum length of time that each call to the host PBX remains open, regardless of telephone activity (or lack thereof).

call on demand

A call connection that is opened only when a connection to the host PBX is required. This is different from a permanent connection, that is open all the time.

call treatment

A method of handling applied to a call while it is waiting to be answered or serviced.

caller ID

Caller ID is used on the RLC to identify the number of the caller requesting access to one of its ports. It is also used on remote units to authenticate incoming calls from the RLC.

calling line identification

An optional service that identifies the telephone number of the caller. This information can then be used to route the call to the appropriate agent or skillset. The caller’s telephone number can also be displayed on a phoneset.

card
A thin, rectangular plate that chips and other electronic components are placed on. Examples of cards include motherboards, expansion boards, daughterboards, controller boards, network interface cards, and video adapters.

central processing unit
This is the system unit that holds a PC's essential components.

CBT
See computer-based training.

CD-ROM
A type of optical disk capable of storing large amounts of data (up to 1 Gbyte), although the most common size is 630 Mbytes. A single CD-ROM has the storage capacity of 700 floppy disks and is particularly well-suited to information that requires large storage capacity.

chip
The small flake of silicon crystal that makes up the microprocessor. 2. A type of controller.

CLAN
See customer local area network.

CLID
See calling line identification.

client
The part of a client/server architecture that runs on a personal computer or workstation and relies on a server to perform some operations. For example, an e-mail client is an application that enables you to send and receive e-mail.

COD
See call on demand.

codec

An acronym for COder-DECoder. A device that codes analog signals into digital signals for transmission and decodes digital signals into analog signals for receiving.

COM or COMM

Communications port. This usually refers to the Logical Device name of PC serial ports as defined by DOS.

computer-based training

A type of education that students learn by running special training programs on a computer. CBT is especially effective for training people to use computer applications, because the CBT program can be integrated with the applications.

Configuration Manager

The software application used to configure and administer remote units and the RLC port that they are connected to.

controller board

A special type of expansion board that contains a controller for a peripheral device. When you attach new devices to a computer, such as a disk drive, often a controller board must also be added.

CPU

See central processing unit.

CPU clock

The clock that regulates the execution of instructions inside a computer. *See also* real-time clock.

crash

A serious computer failure whereby the computer stops working or a program closes unexpectedly. A crash indicates a hardware malfunction or a serious software bug.

customer local area network

The LAN that your corporate services and resources connect to. The RLC and its associated remote units both connect to the CLAN.

D

daughterboard

Usually used as a synonym for an expansion board, a daughterboard is any printed circuit board that connects directly or indirectly to a motherboard.

DB9 connector

A 9-pin connector labeled ADMIN that provides the RS-232 serial port interface. This serial port connection can be used to configure a Remote Office 9150 unit that is directly connected to a PC.

DB25 connector

The DB25 connector on the RLC Multi-I/O cable–Enhanced is for future use.

DC

See direct current.

DHCP

See dynamic host configuration protocol.

digital linear tape

A high-capacity 1/2-inch streaming tape cartridge format.

digital signal processor

A special type of coprocessor that manipulates analog data, such as sound or photographs, that has been converted to digital form.

DIMM

See dual in-line memory module.

direct current

DC, the electrical power used by computers, comes from a single source (such as a battery) that provides a single voltage that stays at a constant level. AC, the power provided by utility companies, must be converted to DC before it can be used in computer systems.

directory number

The number that identifies a phoneset on a switch. The directory number (DN) could be a local extension (local DN), a public network telephone number, or an automatic call distribution directory number (ACD-DN).

DIP
A type of protective packaging for silicon memory chips that provides a safe and convenient means of installing and removing the chip.

DIP switch
A series of tiny switches built into circuit boards that enables you to configure a circuit board for a particular type of computer or application. DIP switches are always toggle switches. This means that they have two possible positions: on or off (or 1 or 0).

direct memory access
DMA speeds up system performance by moving blocks of memory around inside the computer (typically between I/O devices and memory). This process enables the microprocessor to spend its time performing other functions.

DLL
See dynamic link library.

DLT
See digital linear tape.

DMA
See direct memory access.

DN
See directory number.

driver
A program that controls a device. Every device, whether it is a printer, disk drive, or keyboard, must have a driver program. A driver acts like a translator between the device and programs that use the device.

DSP
See digital signal processor.

dual in-line memory module
The protective packaging for microprocessor chips that provides a safe and convenient means of installing and removing the chip.

dynamic host configuration protocol

A protocol for dynamically assigning IP addresses to devices on a network.

dynamic link library

A library of executable functions or data that can be used by a Windows application. Typically, a DLL provides one or more particular functions and a program accesses the functions by creating either a static or dynamic link to the DLL. A DLL can be used by several applications at the same time.

dynamic port pool

A RLC feature that is similar to multiuser ports in that multiple stations can share ports on the RLC. However, users sharing ports from a dynamic pool are assigned to the first available port on the RLC.

E

ECC

See error correction code.

ECP

See extended capabilities port.

EEPROM

See electronically erasable programmable read-only media.

EIDE

See enhanced IDE.

EISA

See extended industry standard architecture bus.

ELAN

See embedded local area network.

electronically erasable programmable read-only media

A memory chip that needs only a higher than normal voltage and current to erase its contents. An EEPROM chip can be erased and reprogrammed without taking it out of its socket. An EEPROM chip gives a computer and its peripherals a means of storing data without the need for a constant supply of electricity.

electrostatic discharge

Discharge of a static charge on a surface or body through a conductive path to ground. Can be damaging to integrated circuits.

embedded local area network

This is the network connection from the host PBX to the RLC. It is an Ethernet LAN that is segmented from the rest of the Ethernet network and enables signaling and administration access to the RLC. Nortel Networks recommends the following:

- IP traffic should not be routed between the main network and the ELAN.
- An IP route should not be established between the two LANs.

Emergency Service Number

The Remote Office 9150 unit allows you to program an emergency service number (such as 911).

EMI

Electro-magnetic interference. Interference in signal transmission or reception caused by the radiation of electrical and magnetic fields.

enhanced IDE

An IDE hard disk interface enhanced with hardware and firmware changes to support disks larger than 540 Mbytes, four disks instead of two, and faster transfer rates. *See also* IDE.

enhanced parallel port

A parallel port standard for PCs that supports bidirectional communication between the PC and attached devices (such as a printer).

EPP

See enhanced parallel port.

error correction code

A scheme that can detect and fix single-bit memory errors without crashing the system. Also known as Error Detection and Correction (EDAC).

ESD

See electrostatic discharge.

Ethernet

A widely used LAN protocol that uses a bus topology and supports data transfer rates of 10 Mbps.

event

An occurrence or action on the RLC or remote unit, such as the sending or receiving of a message, the opening or closing of an application, or the reporting of an error. Some events are for information only, while others can indicate a problem.

expansion board

Any board that plugs in to one of the computer's expansion slots. Expansion boards include controller boards, LAN cards, and video adapters.

expansion bus

Enables expansion boards to access the microprocessor and memory. *See also* bus.

expression

A building block of a script, used to test for conditions, perform calculations, or compare values within scripts. *See also* logical expression, mathematical expressions, and relational expression.

extended capabilities port

A parallel-port standard for PCs that supports bidirectional communication between the PC and attached devices (such as a printer).

extended industry standard architecture bus

A 32-bit bus that accommodates ISA PC boards.

F

first-level threshold

The value that represents the lowest value of the normal range for a given field in a threshold class. The system tracks how often the value for the field falls below this value.

G

G.711

G.711 is the international standard for encoding telephone audio on a 64 Kbps channel. It is a pulse code modulation (PCM) scheme operating at an 8 kHz sample rate, with 8 bits per sample. According to the Nyquist theorem, that states that a signal must be sampled at twice its highest frequency component, G.711 can encode frequencies between 0 and 4 kHz. Telcos can select between two different variants of G.711: A-law and mμ-law. A-law is the standard for international circuits.

G.726

G.726 is a standard ADPCM algorithm specified by the International Telecommunication Union (ITU) for reducing the 64 kbps A-Law or mμ-law logarithmic data of a normal telephone line to 16, 24, 32, or 40 kbps.

G.729

G.729 is a voice compression International Telecommunications Union (ITU) standard that can be used in a wide range of applications including wireless communications, digital satellite systems, packetized speech, and digital leased lines. G.729 provides 8 Kbps bandwidth for compressed speech at toll quality (equivalent to G.726 32 Kbps ADPCM under clean channel condition).

gateway

A device that functions as a node on two or more networks, forwarding packets from one network to addresses in the other networks. In Remote Office context, the gateway is the device on the network that directs traffic to and from the Remote Office 9150 unit or RLC.

Gbyte

See gigabyte.

general protection fault

A computer condition that causes a Windows application to crash. GPFs usually occur when one application attempts to use memory assigned to another application.

gigabyte

1 073 741 824 bytes. One Gbyte is equal to 1024 Mbytes.

GPCP
General purpose computing platform

GPF
See general protection fault.

graphical user interface
The information displayed on the monitor when a Windows application (or another non-command-based application) runs. A graphical user interface uses features such as pointers, icons, I-beams, and menus to make the program easier to use.

GUI
See graphical user interface.

H

handshaking
A process involved in establishing a valid connection or signal between two pieces of hardware or communications software.

host call appearance key
An assigned key on the telephone set at the remote site that is used to establish a connection with the host PBX or to receive incoming calls from the host PBX.

host-controlled call mode
When a call is placed to someone at the host site, or when someone from the host site calls the remote site, the call is in host-controlled call mode. Calls in host-controlled mode are routed through the host PBX.

host station
A telephone set located at the host PBX site.

host trunk
The ISDN PRI or TI connection located at the host site. Host trunks are used to route calls from the host PBX to remote sites over the PSTN.

hub
A common connection point for all 10BaseT cables connected to a small network. A hub enables data to go from one device to another.

I

icon
A small picture that represents an object or program in a graphical user interface.

IDE
Commonly used to describe the AT attachment design, the dominant hard disk interface. IDE is a cost-effective interface technology for mass storage devices that the controller is integrated into the disk or CD-ROM drive in.

idle timer
Identifies the maximum length of time that an ISDN connection should remain idle before it can be closed. Idle means that a voice connection does not exist, and buttons are not being pressed on the digital telephone.

Industry Standard Architecture
A 16-bit standard interface for add-in cards.

input/output
Refers to any operation, program, or device that enters data into a computer or extracts data from a computer.

integrated services digital network
A worldwide digital communication protocol that permits telephone networks to carry data, voice, and other source material. There are two kinds of ISDN lines—Primary Rate Interface (PRI) and Basic Rate Interface (BRI). *See also* BRI.

internet protocol
The protocol within TCP/IP that governs the breakup of data messages into packets, the routing of the packets from sender to destination network, and the reassembly of the packets into the original data messages at the destination.

I/O
See input/output.

IP

See internet protocol.

IP address

Internet Protocol address. An identifier for a computer or device on a TCP/IP network. Networks use the TCP/IP protocol to route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be 0–255. For example, 1.160.10.240 could be an IP address.

IPX

Internetwork Packet Exchange. A networking protocol used by the Novell NetWare operating systems.

ISA

See Industry Standard Architecture.

ISDN

See integrated services digital network.

J

jumper

A metal bridge that closes an electrical circuit. Typically, a jumper consists of a plastic plug that fits over a pair of protruding pins. Jumpers are sometimes used to configure expansion boards. By placing a jumper plug over a different set of pins, you can change a board's parameters.

K

Kbyte

See kilobyte.

kilobyte

1024 bytes. Roughly the amount of information in half a typewritten page.

L

LAN

See local area network.

LCD
Liquid crystal display. An alphanumeric display using liquid crystal sealed between two pieces of glass.

LED
Light emitting diode. A semiconductor diode that emits light when a current is passed through it.

local area network
A computer network that spans a relatively small area. Most LANs connect workstations and personal computers and are confined to a single building or group of buildings.

local call
A call that originates at your site.

local call appearance key
An assigned key on the telephone set at the remote site that is used to call another station at the branch office, or to place and receive calls through the local PSTN.

local station
A telephone set located at a remote site.

locally controlled call mode
When you place a call from a specified local call appearance key, or your call is to another telephone at your branch site, you are in locally controlled call mode. Calls in locally controlled mode are routed through the local PSTN.

logical expression
A symbol used in scripts to test for different conditions. Logical expressions are AND, OR, and NOT. *See also* mathematical expressions and relational expression.

M

M1

Meridian 1 PBX

MAT

Meridian Administration Tools. This is a Nortel Networks software application that is used to administer the Meridian 1 PBX.

mathematical expressions

The expressions used in scripts to add, subtract, multiply, and divide values. Mathematical expressions are addition (+), subtraction (-), division (/), and multiplication (*). *See also* logical expression, relational expression.

Mbyte

See megabyte.

megabyte

A unit of measurement for data storage equal to 1 048 576 bytes.

megahertz

One million cycles per second.

MHz

See megahertz.

motherboard

The principal board that has connectors for attaching devices to the bus. Typically, the motherboard contains the CPU, memory, and basic controllers for the system. On PCs, the motherboard is often called the system board.

MTBF

Mean time between failures.

Mu-law

A companding method for encoding and decoding audio signals in 24-channel pulse-code-modulated (PCM) systems. Mu-law is the method used in North America and Japan *See also* A-law.

multiuser ports

A Remote Office 9150 unit port feature that allows multiple stations to time-share a single port on the host PBX. All stations that use a multiuser port are always assigned to the same port number (TN) on the host PBX.

N

NetBeui

See NetBIOS enhanced user interface.

NetBIOS

See Network Basic Input Output System.

NetBIOS enhanced user interface

An enhanced version of the NetBIOS protocol used by network operating systems such as LAN Manager, LAN Server, Windows for Workgroups, Windows 95 and Windows NT.

Network Basic Input Output System

An application programming interface (API) that augments the DOS BIOS by adding special functions for local-area networks (LANs). Almost all LANs for PCs are based on the NetBIOS. Some LAN manufacturers have even extended it, adding additional network capabilities.

network interface card

An expansion board that enables a PC to be connected to a local area network (LAN).

NIC

See network interface card.

node

A device connected to the network capable of connecting to other network devices. For example, the RLC and each remote unit are nodes on the network.

NPA

See Number Plan Area.

Number Plan Area
Area code

NVRAM
Non-Volatile Random Access Memory. RAM that doesn’t lose its memory when you shut the electricity off to it.

O

OA&M
Operations, administration, and maintenance

object linking and embedding
A compound document standard that enables you to create objects with one application and then link or embed them in a second application.

ODBC
See Open Database Connectivity.

OEM
Original Equipment Manufacturer. The maker of equipment marketed by another vendor, usually under the name of the reseller. The OEM may only manufacture certain components, or complete computers, that are then often configured with software and/or other hardware, by the reseller.

OLE
See object linking and embedding.

online/offline table
The online/offline table is configured on the RLC. It allows you to schedule times that the host PBX connection is made available to the remote site and the times all telephones at the remote site can use only the local telephone service.

The online/offline table is used for controlling ISDN BRI costs.

Open Database Connectivity
A Microsoft-defined database application program interface (API) standard.

Open System Interconnection

A worldwide communications standard that defines a framework for implementing protocols in seven layers.

OS

Operating Standard

OSI

See Open System Interconnection.

P

packetized voice

Digital signal processors (DSPs), located in the Remote Office 9150 unit and RLC, convert analog voice into digital data. The data is constructed as a UDP/IP voice packet for transmission over an IP network.

parity

The quality of being either odd or even. The fact that all numbers have parity is commonly used in data communications to ensure the validity of data.

parallel port

A type of interface used to connect an external device such as a printer to a PC. Most personal computers have both a parallel port and at least one serial port.

PBX

See private branch exchange.

PC

Personal computer. A computer with an architecture that is compatible with the IBM PC.

pegging

The action of incrementing statistical counters to track system events.

pegging threshold

A threshold used to define a cut-off value for statistics such as short call and service level. Pegging thresholds are used in reports and historical statistics.

personal directory number

A DN that an agent can be reached directly on, usually for private calls.

phoneset

The physical device, connected to the switch, calls are presented to.

PING

Packet Internet Groper. A protocol that can be used to test the Ethernet connection to devices on the network (such as the RLC and its associated remote units).

position ID

A unique identifier for a phoneset, used by the switch to route calls to the phoneset.

POST

See power-on self-test.

power-on self-test

Initializes and performs rudimentary tests on baseboard hardware, including CPU, floating point unit, interrupts, memory, real-time clock, video, and auto-initializing PCI and EISA bus.

priority DN

A user station can be configured as a priority DN. There are two levels of priority—high and normal. High priority level allows you to

- ensure a trunk is always available
- use PSTN trunking for the host PBX connections
- move the high priority DN first from the IP network to the PSTN

private branch exchange

A telephone switch, typically used by a business to service its internal telephone needs. A PBX usually offers more advanced features than are generally available on the public network. Users of the PBX share a certain number of outside lines for placing telephone calls external to the PBX.

protocol

A standard format used for communication between two devices. The protocol determines the type of error checking to be used, the data compression method (if any), how the sending device will indicate that it has finished sending a message, and how the receiving device will indicate that it has received a message.

PSTN

See public switched telephone network.

public switched telephone network

Any common carrier network that provides circuit switching between public users. The term is usually applied to the public telephone network.

Q

QoS Transitioning Technology

Nortel Networks' patented technology that can automatically switch calls from the IP network to the PSTN when the voice Quality of Service falls below a predetermined threshold, and back to the IP network when the Quality of Service returns to normal.

R

RAM

Random Access Memory. This is the most common type of memory found in computers and other devices, such as printers. The term RAM is usually synonymous with main memory, the memory available to programs. For example, a computer with 8 Mbytes of RAM has approximately 8 million bytes of memory that programs can use.

RAS

Remote Access Server. A host on the local area network that is equipped with modems to enable users to connect to the network over telephone lines.

real-time clock

A clock that keeps track of the time even when the computer is turned off. *See also* CPU clock.

recorded announcement route

A resource installed on the switch that offers a recorded announcement to callers.

relational expression

An expression used in scripts to test for different conditions. Relational expressions are less than (<), greater than (>), less than or equal (< =), greater than or equal (> =), and not equal (< >). *See also* logical expression and mathematical expressions.

Remote Access Services

A feature built into Windows NT and Windows 95 that enables users to log in to an NT-based LAN using a modem, X.25 connection, or WAN link. Also known as Dial Up Networking.

remote station

A telephone set located at the Remote Office 9150 or Remote Office 911x series site.

remote trunk

From the RLC's point of view, remote trunks are the ISDN BRI connections between the PSTN and the remote unit located at the branch office site.

RJ-11 Connector

A six-conductor modular jack that is typically wired for four conductors. The RJ-11 jack is the most common telephone jack in the entire world.

RJ-45 Connector

An eight position, eight conductor modular jack used for data transmission over a standard telephone wire. The RJ-45 jack provides the 10BaseT Ethernet connection.

RLC

An abbreviation for Reach Line Card. The RLC is installed on the host PBX and relays voice and signaling information from the digital telephones connected at a remote site to the host PBX.

ROM

Read-Only Memory. This is the computer memory that data has been prerecorded on and cannot be removed from.

router

A device that connects two LANs. Routers are similar to bridges but provide additional functionality, such as the ability to filter messages and forward them to different places based on various criteria.

RTC

See real-time clock.

S

SCA

See single connector architecture.

second-level threshold

The value used in display thresholds that represents the highest value of the normal range for a given statistic.

security identifier

The remote unit sends the branch office security identifier (password) to the RLC for each connection request. The RLC matches the identifier configured for the RLC port. When it finds a match, it grants access to the port and allows the call to proceed.

sequenced packet exchange

A transport layer protocol (layer 4 of the OSI Model) used in Novell Netware networks. The SPX layer sits on top of the IPX layer (layer 3) and provides connection-oriented services between two nodes on the network. SPX is used primarily by client/server applications.

serial port

A general-purpose interface that can be used for almost any type of device, including modems, mice, and printers (although most printers are connected to a parallel port). Most serial ports on personal computers conform to the RS-232C or RS-422 standards.

server

A computer or device on a network that manages network resources. Examples of servers include file servers, print servers, network servers, and database servers.

service

A process that adheres to a Windows NT structure and requirements. A service provides system functionality.

Service Control Manager

A Windows NT process that manages the different services on the PC.

service profile identifier

When you order an ISDN line, your phone company provides you with a SPID for every phone number you have.

silence suppression

A feature that prevents packet transmission during periods when there is no voice data present.

SIMM

Single In-line Memory Module. Used on Macs and PCs. A form of chip packaging where leads (pins) are arranged in a single row protruding from the chip.

simple network management protocol

A set of protocols for managing complex networks. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network and then analyzing the responses.

single connector architecture

A method for supplying power and data lines in one connector on hard disks. Provides hot-swap capability.

single-user ports

A RLC port that supports one remote station.

Small Computer System Interface
A standard for connecting and controlling mass storage devices such as CD-ROMS, tape drives, and hard disks.

SNMP
See simple network management protocol.

SPID
See service profile identifier.

SPRE code
A Special Prefix code that is used to initiate use of a host PBX feature. In a Remote Office context, SPRE codes are used to

- toggle a remote site between online and offline modes
- use the paging feature
- switch an analog or ATA equipped station from host-controlled mode to locally controlled mode so that local calls can be made
- register a Remote Office 9150 unit for a multiuser or dynamic port

SPX
See sequenced packet exchange.

SRAM
Static Random Access Memory. A form of RAM that retains its data without the constant refreshing that DRAM requires.

station
A telephone or fax machine located at a remote site.

stop bit
In asynchronous communications, a bit that indicates a byte has just been transmitted. Every byte of data is preceded by a start bit and followed by a stop bit.

subnet mask

A subnet mask is the part of the IP address used to represent a subnetwork within a network. A typical IP address might be 192.210.34.144. Each part of this address is made up of eight bits. The subnet mask identifies to the RLC or remote unit what portion of the IP address represents the network (and subnetwork) and what portion represents the host.

SVGA

Super Video Graphics Adapter. An extension of the VGA video standard.

switch

In a telecommunications network, a switch is the hardware that receives phone calls and provides connections to telephone sets. The switch allows a connection to be established as necessary and terminated when there is no longer a session to support it.

In networks, a device that filters and forwards packets between LAN segments. Switches operate at the data link layer (layer 2) of the OSI Reference Model and therefore support any packet protocol. LANs that use switches to join segments are called switched LANs or, in the case of Ethernet networks, switched Ethernet LANs.

switch resource

A device that is configured on the switch.

T

TAPI

See telephone application programming interface.

TCP/IP

Transport Control Protocol/Internet Protocol. The communication protocol used to connect devices on the Internet. TCP/IP is the standard for transmitting data over networks.

telephone application programming interface

A term that refers to the Windows Telephony API. TAPI is a changing (i.e. improving) set of functions supported by Windows that allow Windows applications to program telephone-line based devices such as single and multi-line phones (both digital and analog), modems and fax machines in a device-independent manner.

telephony

The science of translating sound into electrical signals, transmitting them, and then converting them back to sound. The term is used frequently to refer to computer hardware and software that perform functions traditionally performed by telephone equipment.

TFTP

See trivial file transfer protocol.

threshold

A value for a statistic that system handling of the statistic changes at.

threshold class

A set of options that specifies how statistics are treated in reports and real-time displays. *See also* pegging threshold.

Token Ring

A PC network protocol developed by IBM. A Token Ring network is a type of computer network whereby all the computers are arranged schematically in a circle.

trivial file transfer protocol

A simplified version of FTP that transfers files but does not provide password protection or user-directory capability. It is associated with the TCP/IP family of protocols. TFTP depends on the connectionless datagram delivery service, UDP.

trunk

A communications link between a PBX and the public central office, or between PBXs. Various trunk types provide services such as Direct Inward Dialing (DID), ISDN, and central office connectivity.

trunk access digits

Trunk access digits are numbers that are used by the remote unit to determine the trunk to use when routing a call. For example, 9 is a common trunk access digit used to obtain an outside line.

trunk groups

A trunk group consists of one or more trunk lines that are logically grouped. You can configure up to eight trunk groups on the Remote Office 9150 unit.

trunk interface modules

Used to route calls over the PSTN. The number of modules you must install on the Remote Office 9150 unit depends on the number of simultaneous calls you want in host-controlled or locally controlled mode.

U

uninterruptible power supply

A power supply that includes a battery to maintain power in the event of a power outage. Typically, a UPS keeps a computer running for several minutes after a power outage, enabling you to save data that is in RAM and to shut down the computer safely.

UPS

See uninterruptible power supply.

utility

A program that performs a specific task, usually related to managing system resources. Operating systems contain a number of utilities for managing disk drives, printers, and other devices.

V

V.35

An ITU-T standard describing a synchronous, physical layer protocol used for communications between a network access device and a packet network. V.35 is most commonly used in the United States and in Europe, and is recommended for speeds up to 48 Kbps. In practice, V.35 is used for synchronous transmission up to 2.048 Mbps.

V.35 interface

A Frame Relay network technology used to carry the voice conversation and telephone set control signals over:

- a Frame Relay Access Device to send the voice and signal packets to the Remote Office 9150 unit via a Frame Relay Network
- a Channel Service Unit/Data Service Unit (CSU/DSU) to access a switched 56K line service

voice compression

Prior to transmission, the voice data is compressed; after transmission, the data is converted back to voice data at the destination. Voice compression means that voice consumes less bandwidth, leaving more bandwidth for data or other voice or fax communications.

voice jitter attenuation

A feature that removes the variable delays from the voice packets sent across the IP network, thus avoiding awkward-sounding speech.

Voice over Internet Protocol (VoIP)

Technology that uses the IP data network to carry the voice conversation and telephone set control signals between a remote site and the host PBX.

W

WAN

Wide area network. A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local area networks (LANs). The largest WAN in existence is the Internet.

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Installation and Administration Guide

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