

Nortel Meridian 1

Meridian 1 Small System Overview

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New in this release

The following sections detail what's new in *Meridian 1 Small System Overview* (NN43011-110).

New features

There are no new features in this NTP.

Revision history

December 2007

Standard 02.01. This document is issued to support Communication Server 1000 Release 5.5.

May 2007

Standard 01.01. This document is issued to support Communication Server 1000 Release 5.0. This document contains information previously contained in the following legacy document, now retired: *Communication Server 1000M and Meridian 1: Small System Overview (553-3011-010)*. No new content has been added for Communication Server 1000 Release 5.0. All references to Communication Server 1000 Release 4.5 are applicable to Communication Server 1000 Release 5.0.

A stand-alone IP Trunk (ITG Trunk) configuration is the only IP application supported on the Meridian 1 Option 11C platform in Communication Server 1000 Release 5.0. For information on software-only upgrades, refer to *Meridian 1 Small System Software Upgrade (NN43011-459)*.

Small Systems configured with IP Phones or Signaling Servers using Communication Server 1000 Release 4.5 and want to upgrade to Communication Server 1000 Release 5.0 must be upgraded to Communication Server 1000E with a Common Processor Pentium Mobile (CP PM) call processor. For migrations to Communication Server Release 5.0, refer to:

- *Communication Server 1000E Upgrade - Option 11C Cabinet to CS 1000E (NN43041-464)*
- *Communication Server 1000E Upgrade - Option 11C Chassis to CS 1000E (NN43041-465)*

- *Communication Server 1000E Upgrade - CS 1000M Cabinet to CS 1000E (NN43041-466)*
- *Communication Server 1000E Upgrade - CS 1000M Chassis to CS 1000E (NN43041-467)*

August 2005

Standard 3.00. This document is up-issued to support Communication Server 1000 Release 4.5.

September 2004

Standard 2.00. This document is up-issued for Communication Server 1000 Release 4.0.

October 2003

Standard 1.00. This document is a new NTP for Succession 3.0. It was created to support a restructuring of the Documentation Library, which resulted in the merging of multiple legacy NTPs. This new document consolidates information previously contained in the following legacy documents, now retired:

- *Option 11C and 11C Mini Technical Reference Guide (553-3011-100)* (Content from *Option 11C and 11C Mini Technical Reference Guide (553-3011-100)* also appears in *Communication Server 1000M and Meridian 1: Small System Planning and Engineering (553-3011-120)*, *Transmission Parameters (553-3001-182)*, and *Circuit Card: Description and Installation (553-3001-211)*.)
- *Option 11C Mini: Expansion using Fiber-optic and IP Connectivity Guide (553-3021-208)*

(Content from *Option 11C Mini: Expansion using Fiber-optic and IP Connectivity Guide (553-3021-208)* also appears in *Communication Server 1000M and Meridian 1: Small System Upgrade Procedures (553-3011-258)* and *Communication Server 1000M and Meridian 1: Small System Planning and Engineering (553-3011-120)*.)
- *Option 11C Mini Planning and Installation Guide (553-3021-209)* (Content from *Option 11C Mini Planning and Installation Guide (553-3021-209)* also appears in *Communication Server 1000M and Meridian 1: Small System Installation and Configuration (553-3011-210)* and *Communication Server 1000M and Meridian 1: Small System Planning and Engineering (553-3011-120)*.)
- *Option 11C Planning and Installation Guide (553-3021-210)* (Content from *Option 11C Planning and Installation Guide (553-3021-210)* also appears in *Communication Server 1000M and Meridian 1: Small System Installation and Configuration (553-3011-210)* and *Communication*

*Server 1000M and Meridian 1: Small System Planning and Engineering
(553-3011-120).*

How to get help

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

Getting help from the Nortel Web site

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

www.nortel.com/support

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

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

Getting help over the telephone from a Nortel Solutions Center

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

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

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

www.nortel.com/callus

Getting help from a specialist by using an Express Routing Code

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

www.nortel.com/erc

Getting help through a Nortel distributor or reseller

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

Introduction

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

A stand-alone IP Trunk (ITG Trunk) configuration is the only IP application supported on the Meridian 1 Option 11C platform in Communication Server 1000 Release 5.5. For information on software-only upgrades, refer to Meridian 1 Small System Software Upgrade (NN43011-459).

Systems described within this document that are configured with IP Phones or Signaling Servers using Communication Server 1000 Release 5.0 and want to upgrade to Communication Server 1000 Release 5.5 must be upgraded to Communication Server 1000E with a Common Processor Pentium Mobile (CP PM) call processor. For migrations to Communication Server Release 5.5, refer to:

- Communication Server 1000E Upgrade - Option 11C Cabinet to CS 1000E (NN43041-464)
- Communication Server 1000E Upgrade - Option 11C Chassis to CS 1000E (NN43041-465)
- Communication Server 1000E Upgrade - CS 1000M Cabinet to CS 1000E (NN43041-466)
- Communication Server 1000E Upgrade - CS 1000M Chassis to CS 1000E (NN43041-467)

Subject

This document provides an overview of the general design and features of Small Systems.

**WARNING**

Before a Small System can be installed, a network assessment **must** be performed and the network must be VoIP-ready.

If the minimum VoIP network requirements are not met, the system will not operate properly.

For information on the minimum VoIP network requirements and converging a data network with VoIP, refer to *Converging the Data Network with VoIP* (NN43001-260).

Note on legacy products and releases

This NTP contains information about systems, components, and features that are compatible with Nortel Communication Server 1000 Release 5.5 software. For more information on legacy products and releases, click the **Technical Documentation** link under **Support & Training** on the Nortel home page:

www.nortel.com

Applicable systems

This document applies to the following systems:

- Meridian 1 PBX 11C Chassis
- Meridian 1 PBX 11C Cabinet

System migration

When particular Meridian 1 systems are upgraded to run CS 1000 Release 5.5 and configured to include a Signaling Server, they become CS 1000E systems. [Table 1 "Meridian 1 systems to CS 1000E systems" \(page 12\)](#) lists each Meridian 1 system that supports an upgrade path to a CS 1000E system.

Table 1
Meridian 1 systems to CS 1000E systems

This Meridian 1 system...	Maps to this CS 1000E system
Meridian 1 PBX 11C Chassis	CS 1000E Cabinet
Meridian 1 PBX 11C Cabinet	CS 1000E Cabinet

Note the following:

- When an Option 11C Mini system is upgraded to run CS 1000 Release 5.5 software, that system becomes a Meridian 1 PBX 11C Chassis.

- When an Option 11C system is upgraded to run CS 1000 Release 5.5 software, that system becomes a Meridian 1 PBX 11C Cabinet.

For more information, see *Meridian 1 Small System Upgrade Procedures* (NN43011-458).

Intended audience

This document is intended to be of general interest or an introductory overview for individuals responsible for the sale, acquisition, planning, or installation of small Private Branch Exchange (PBX) telephone systems.

Conventions

Terminology

In this document, the following systems are referred to generically as "system":

- Meridian 1

The following systems are referred to generically as "Small System":

- Meridian 1 PBX 11C Chassis
- Meridian 1 PBX 11C Cabinet

The following systems are referred to generically as "Chassis system":

- Meridian 1 PBX 11C Chassis

The following systems are referred to generically as "Cabinet system":

- Meridian 1 PBX 11C Cabinet

Related information

This section lists information sources that relate to this document.

NTPs

The following NTPs are referenced in this document:

- *Branch Office: Installation and Configuration* (NN43001-314)
- *Set-Based Administration* (NN43001-603)
- *Meridian 1 Small System Planning and Engineering* (NN43011-220)
- *Meridian 1 Small System Installation and Configuration* (NN43011-310)
- *Meridian 1 Small System Upgrade Procedures* (NN43011-458)
- *Meridian 1 Small System Maintenance* (NN43011-700)

Online

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

www.nortel.com

CD-ROM

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

How to get help

Getting Help from the Nortel Web site

The best source of support for Nortel products is the Nortel Support Web site:

www.nortel.com/support

This site enables customers to:

- download software and related tools
- download technical documents, release notes, and product bulletins
- sign up for automatic notification of new software and documentation
- search the Support Web site and Nortel Knowledge Base
- open and manage technical support cases

If you have a Nortel support contract and cannot find the information you require on the Nortel Support Web site, you can get help over the phone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7865).

Outside North America, go to the Web site below and look up the phone number that applies in your region:

www.nortel.com/callus

When you speak to the phone agent, you can reference an Express Routing Code (ERC) to more quickly route your call to the appropriate support specialist. To locate the ERC for your product or service, go to:

www.nortel.com/erc

Getting Help through a Nortel distributor or reseller

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

Description and features

Contents

This section contains information on the following topics:

- "Description" (page 17)
 - "Cabinet system" (page 18)
 - "Chassis system" (page 20)
- "Memory, processing, and data storage" (page 23)
 - "SSC card and components" (page 24)
- "Installation and configuration" (page 25)
 - "Preprogrammed data" (page 26)
 - "Set-Based Administration" (page 26)
 - "Multiple-terminal access" (page 27)
 - "Database Archive feature" (page 27)
 - "Supported telephones" (page 27)
 - "Supported applications" (page 27)
- "Data backup and restore methods" (page 28)
- "Support for IP connectivity" (page 28)
 - "Increased digital trunking/SDI capacity" (page 28)
 - "Survivable IP expansion" (page 29)
 - "Packaging requirements" (page 29)

Description

The Meridian 1 PBX 11C Cabinet and Meridian 1 PBX 11C Chassis are small digital communication systems that offer the advantages of simple installation, maintenance, and administration while retaining the full features of a Large System.

Cabinet system

The Meridian 1 PBX 11C Cabinet is a small, wall- or floor-mounted digital communication system that can include up to five cabinets: one Main Cabinet plus up to four Expansion Cabinets.

Figure 1 "NTAK11 Cabinet" (page 18) shows the NTAK11 Cabinet.

Figure 1
NTAK11 Cabinet



The Cabinet system can be expanded using either fiber or IP connectivity, or a mixture of both. Refer to "Fiber-optic and IP expansion" (page 31) for more information.

A fully expanded Cabinet system can support up to 720 lines.

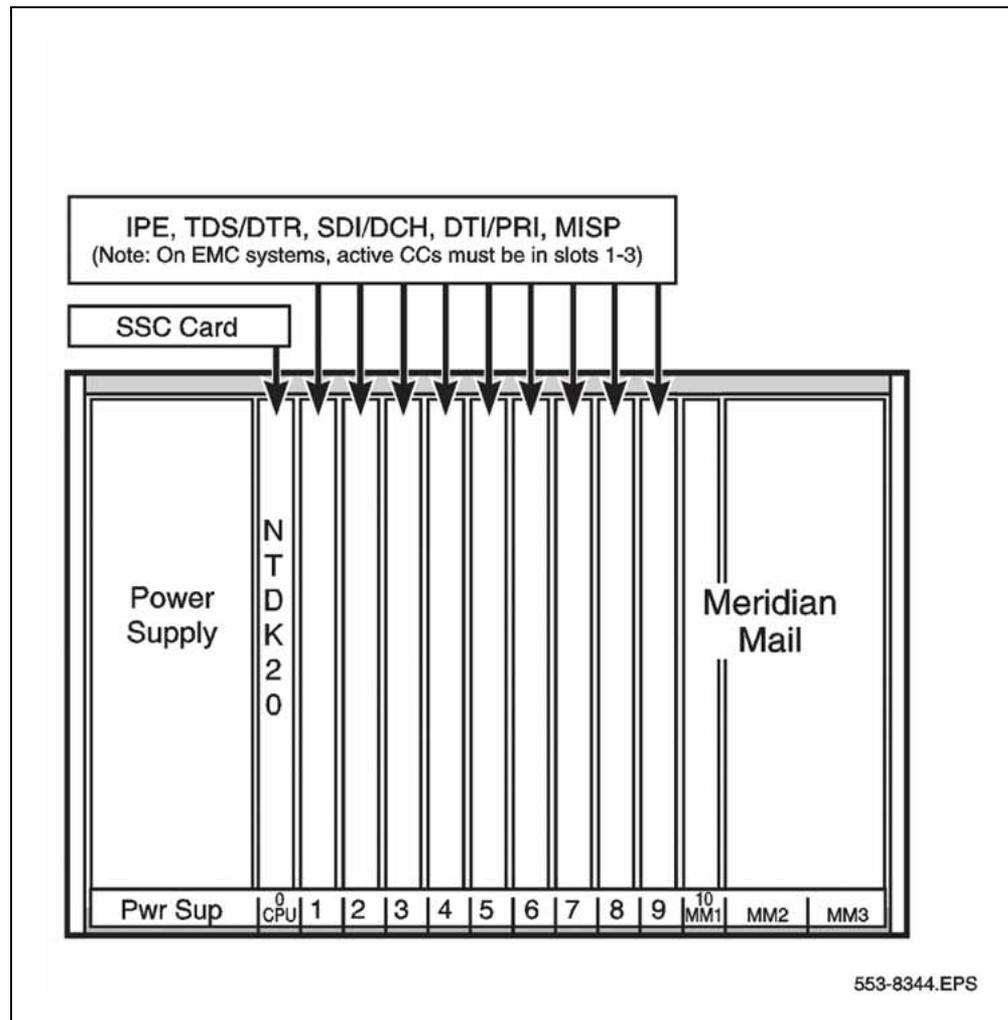
Note: When the term "Main" is used on its own, it refers to a Main Cabinet. When the term "Expansion" is used on its own, it refers to an Expansion Cabinet.

Card slot specifications

In addition to one dedicated card slot for system control functions, the Main and Expansion Cabinets each provide ten Intelligent Peripheral Equipment (IPE) card slots. These card slots support all IPE trunk and line cards. They also support line and trunk cards that have been specially designed to work only in Cabinet systems.

Figure 2 "Circuit card assignments in the Main Cabinet" (page 19) shows the card slot assignments in the Main Cabinet.

Figure 2
Circuit card assignments in the Main Cabinet



Power

Two types of power supply are available for the Cabinet system:

- NTDK70 AC power supply
- NTDK72 DC power supply (when the Cabinet is powered by a -52 V DC source)

In addition, the Cabinet system supports three types of reserve power:

- NTAK75 battery box, which provides a minimum of two hours of reserve DC power
- NTAK76 battery box, which provides a minimum of 15 minutes of reserve DC power

- Uninterruptible Power Supply (UPS) for continuous AC power supply

When the main power is cut off to the system, optional Power Failure Transfer Units (PFTU) connect predetermined analog (500/2500-type) telephones directly to the Central Office (CO) trunks. The PFTU supports five to eight telephones, depending on the PFTU used.

Chassis system

The Meridian 1 PBX 11C Chassis is a small digital communication system that consists of a Chassis plus an optional Chassis Expander. Two copper cables connect the Chassis Expander to the Chassis. In addition, the Chassis system can be expanded to include up to four Chassis (or Chassis + Chassis Expander pairs).

The Chassis system can be mounted:

- in a 19-inch rack/equipment Cabinet
- on a wall in a vertical position
- on a wall in a horizontal position

The Chassis system can be expanded using either fiber or IP connectivity, or a mixture of both. Refer to "[Fiber-optic and IP expansion](#)" (page 31) for more information.

A Chassis with Chassis Expander can support up to 160 lines. A fully expanded Chassis system can support up to 720 lines.

Note: When the term "Main" is used on its own, it refers to a Main Chassis. When the term "Expansion" is used on its own, it refers to an Expansion Chassis.

Card slot specifications

The Main Chassis has five card slots, two of which are dedicated: slot 0 is dedicated to the Small System Controller (SSC) card, and slot 4 is dedicated to the 48-port Digital Line Card (NTDK16). Slots 1–3 support existing IPE and Common Equipment (CE) cards (for example, PRI, PRI2, DTI, DTI2, MISP, and SDI/DCH).

The Chassis Expander has four card slots. The Expander supports Meridian Mail in slot 10 only. You can place any IPE card in slots 7, 8, 9, and 10. The CE-MUX bus extends to slot 10 for Meridian Mail only.

A Main with Expander supports eight physical and ten logical card slots. In a fully expanded system consisting of five Main and Expander pairs, a total of 40 physical and 50 logical card slots are supported.

Figure 3 "Circuit card assignments in the Chassis" (page 21) shows the circuit card assignments in the Main Chassis. Figure 4 "Circuit card assignments in the Chassis Expander" (page 22) shows the circuit card assignments in the Expander.

Figure 3
Circuit card assignments in the Chassis

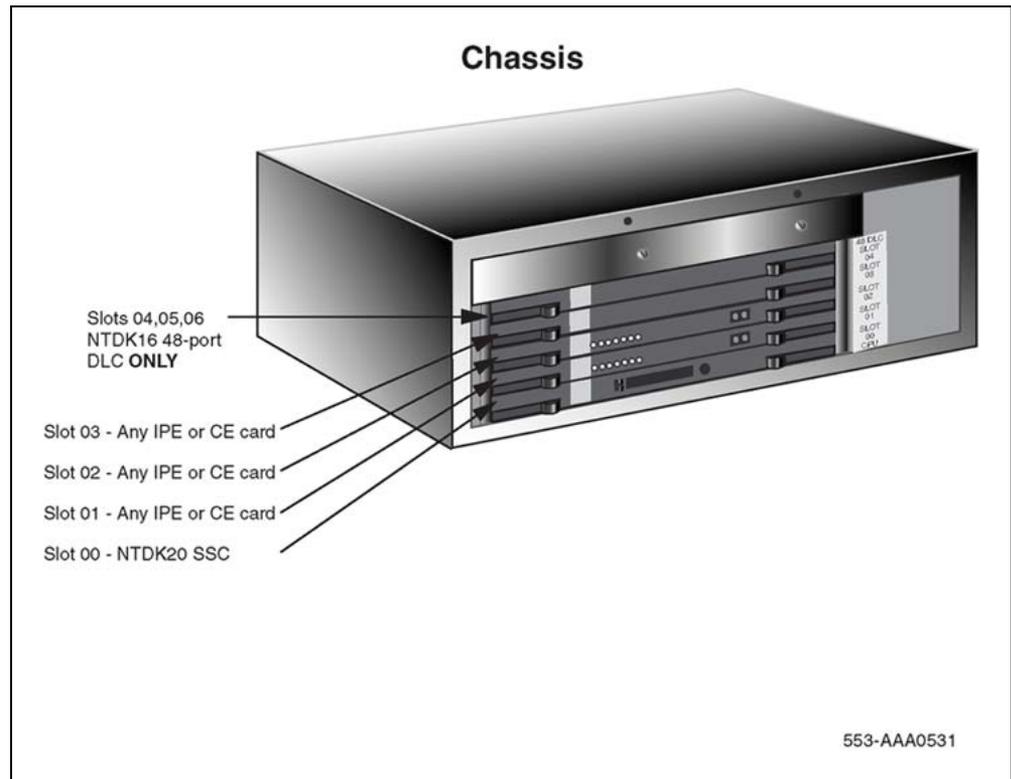
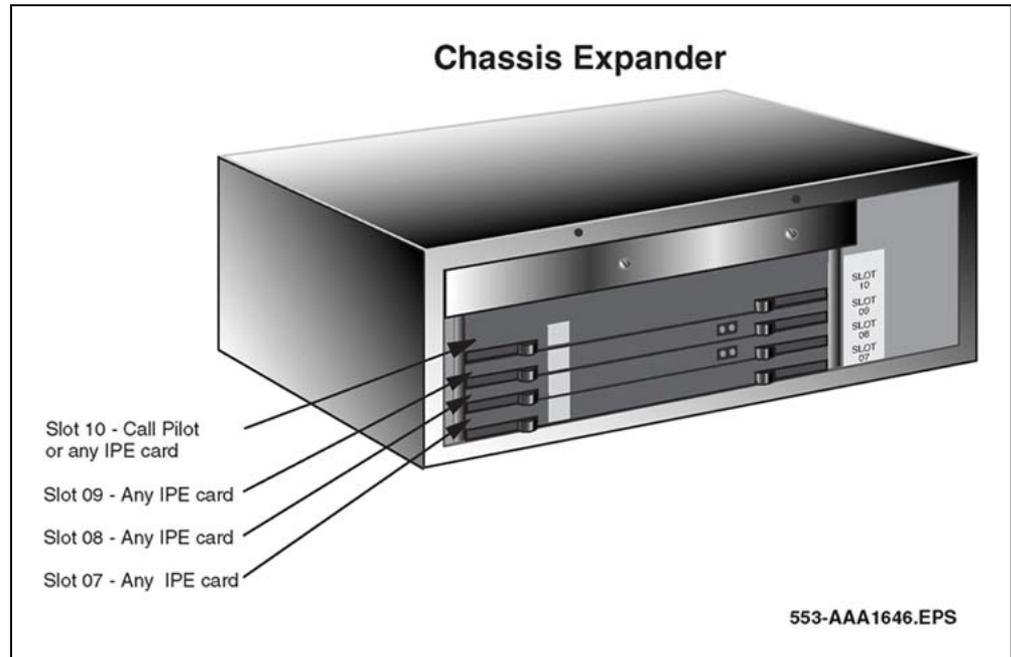


Figure 4
Circuit card assignments in the Chassis Expander



The following is an example of a common Main Chassis configuration:

- one MGC card in slot 0
- one CP PM or analog line card in slot 1, 2, or 3
- one digital trunk card in slot 1, 2, or 3
- one analog trunk card in slot 1, 2, or 3
- one NTDK16, 48-port Digital Line Card in slot 4

The following is an example of a common Chassis Expander configuration:

- line cards in slots 7, 8, and 9

Power

The Universal Power Supply (UPS) unit is installed in the Chassis before it is sent to the customer and requires no installation by the customer. The power supply operates on standard line voltages of 100–240 V AC. Total output power is 363 Watts.

Note: The Chassis system does not support DC power input.

A UPS can provide reserve AC power. The Chassis system does not support battery backup.

When the main power is cut off to the system, optional PFTUs connect predetermined analog (500/2500-type) telephones directly to the CO trunks. The PFTU supports five to eight telephones, depending on the PFTU used.

Memory, processing, and data storage

Small Systems use a Motorola 68040 CP with VxWorks operating system. The processor, which is located on the Small System Controller (SSC) card in the Main Cabinet or Chassis, handles call processing, serial ports, and network traffic.

Small Systems support global software as well as any IP cards.

The memory architecture of the system has program and data stored in physically separate memory components: flash ROM and DRAM, respectively. The majority of system and customer-configured data is both controlled and stored on the SSC card's flash ROM. The DRAM stores and processes temporary automated routines and user-programmed commands.

Two flash drives on the SSC card perform software operations and store customer data:

- The primary flash drive contains system data as well as the first copy of customer data that must exist to load and run the switch. The primary flash drive is programmed with system software before it is shipped to the customer.
- The backup flash drive stores modifiable files containing data such as configuration data, or a second copy of the customer database. If the primary flash drive fails, you can retrieve a backup set of customer data to load into the system's active database.

There are four areas on the SSC card where customer data records can be stored:

- DRAM — stores and accesses the active version of customer records, system data, and overlay data. Data from the primary flash drive overwrites data in DRAM storage during a SYSLOAD (system reload).
- Primary flash drive (C:) — contains two copies of customer records (primary and backup records).
- Backup flash drive (Z:) — retains the true backup copy of the customer database.
- PC Card slot (A: or B:) — allows a complete copy of the customer database to be stored on a Software Delivery card (PC Card) inserted into this slot. The customer database on the PC Card can then be removed for storage away from the SSC card.

SSC card and components

The NTDK20 SSC card controls call processing, stores system and customer data, and provides various expansion interfaces. It includes the following components and features:

- flash daughterboard memory, DRAM, and backup memory
- two expansion daughterboard interfaces
- PC Card socket
- three Serial Data Interface (SDI) ports
- 32 channels of Conferencing (64 if two single-port expansion daughterboards are present, or 96 if two dual-port expansion daughterboards are present)
- 10 Mbps network interface
- 30 channels of Tone and Digit Switch (TDS) and a combination of eight Digitone Receivers (DTR) or Dial Tone Detectors (DTD)
- Networking and Peripheral Signaling
- additional tone service ports (four units of MFC/MFE/MFK5/MFK6/MFR or eight DTR/XTD units)

The SSC card requires a Software Daughterboard in order to function. The Software Daughterboard can be ordered preprogrammed with system software and customer data.

A security device is required on the SSC card of the Main and all Expansions. The security device, which remains on the SSC card for the life of the system, is used for system identification. This device allows the activation of features assigned to the system, through the use of a series of keycodes. The system uses keycodes for validation purposes.

Element Manager

Element Manager is a simple and user-friendly web-based interface that supports a broad range of system management tasks, including:

- configuration and maintenance of traditional routes and trunks
- configuration and maintenance of numbering plans
- configuration of Call Server data blocks (such as configuration data, customer data, Common Equipment data, D-channels)
- maintenance commands, system status inquiries, backup and restore functions
- software download, patch download, patch activation

Element Manager has many features to help administrators manage systems with greater efficiency. Examples are as follows:

- Web pages provide a single point-of-access to parameters that were traditionally available through multiple overlays.
- Parameters are presented in logical groups to increase ease-of-use and speed-of-access.
- The "hide or show information" option enables administrators to see information that relates directly to the task at hand.
- Full-text descriptions of parameters and acronyms help administrators reduce configuration errors.
- Configuration screens offer pre-selected defaults, drop-down lists, checkboxes, and range values to simplify response selection.

The Element Manager web server resides on the Signaling Server and can be accessed directly through a web browser or Optivity Telephony Manager (OTM). The OTM navigator includes integrated links to each network system and their respective instances of Element Manager.

Installation and configuration

A wide choice of software is available. The software contains all of the components related to a release of software, including software patches, preconfigured customer database, feature sets, and other related databases and software.

Small Systems can be configured with software applications, such as Automatic Call Distribution (ACD), Messaging, Automatic Route Selection, Automatic Set Relocation, and Attendant Administration.

The Messaging application comes equipped with features such as Voice Menus, Automated Attendant, Message Networking, and Nortel Hospitality Integrated Voice Services.

Customers can configure the system as a key system or a PBX.

New systems are supplied with a Software Daughterboard that is preconfigured with system and customer data. The system uses a Software Delivery card (PC Card) to upgrade system software and provide storage for a backup copy of customer data.

The Software Installation Program is automatically invoked during first-time installation of the system. This menu-driven program installs the software and makes the system operational.

Preprogrammed data

When you first install the system, you must enter customer data into the overlay programs. For example, you must assign features to telephone keys in order for those features to function correctly. Data can be preprogrammed. If you load preprogrammed data during the installation process, the system automatically configures some overlay entries on the telephones.

If the preprogrammed data does not apply to users at one site, you can revise the data on-site with a TTY. You can also revise the preprogrammed data remotely over a modem connection. You can start with a basic configuration, which is the least possible amount of data required for initial software programming. You must perform this step while you are working in the Software Installation Program.

Model telephones

Small Systems offer a variety of preprogrammed model telephone layouts. By using these telephone layouts (which serve as templates), technicians can perform a few simple steps at installation to activate multiple telephones.

Administration telephone

If you use the default model layouts for telephones and trunk routes, you can use an administrative telephone to make adjustments to items such as the numbering plan and access codes. You do not need a TTY input terminal to program a Small System unless a custom layout is used.

You can use a digital telephone for administrative functions. The administrative telephone can double as a user's working telephone.

Changing or removing preprogrammed data

If preprogrammed data does not apply to users at a particular site, data can be revised on-site with a TTY or remotely over a modem connection. If desired, the user can start with the minimal amount of data required for initial software programming, which is the configuration record. This step must be performed while the user is in the Software Installation Program.

Set-Based Administration

The Set-Based Administration feature simplifies system installation and administration by enabling a telephone to perform several administrative and maintenance procedures. Use the Set-Based Administration feature to perform tasks such as changing data for specific features related to telephones or changing Calling Party Name Display on a telephone.

For more information about Set-Based Administration, refer to *Set-Based Administration* (NN43001-603).

Multiple-terminal access

Small Systems allow access to up to five users for logging in, loading, and executing overlays simultaneously. For example, if you have Expansion Cabinets, users can access the system through the Main or Expansion Cabinets at the same time.

Three SDI ports are provided on the main SSC card, while each Expansion can be accessed through the three SDI ports on the SSC card of each IP Expansion or the single SDI port available on the Fiber Receiver card of each Fiber Expansion.

The advantage of multiple-terminal access is that it allows for more efficient programming and maintenance of the system, especially when system components are located up to 3 km (1.8 mi) apart.

Database Archive feature

The Software Installation program allows the archiving of databases that you can subsequently use to load a customer site. This feature allows you to configure multiple databases in an off-site lab environment. The Database Archive feature also allows you to save databases on a PC Card until the databases are required. You can load the database into the system using the PC Card.

The off-site programming of databases is subject to all security keycode restrictions. The off-site system must either use the security device that will be installed in the system at the customer site, or have its own keycodes for the feature set.

Refer to *Communication Server 1000M and Meridian 1: Small System Upgrade Procedures* (NN43011-458) and *Communication Server 1000M and Meridian 1: Small System Maintenance* (NN43011-700) for additional information.

Supported telephones

Small Systems support Attendant Console (M2250) phones.

Supported applications

Small Systems also support the following applications:

- Nortel Integrated Recorded Announcer
- Nortel Integrated Conference Bridge
- Nortel Messaging Server
- Nortel Integrated DECT
- Optivity Telephony Manager (OTM)

- Symposium Call Center Server
- Symposium Express Call Center
- Symposium Desktop Applications

Data backup and restore methods

Small Systems support several methods to back up customer-configured data during normal system operation:

- on-site backup
 - to primary flash drive
 - to backup flash drive
 - to external PC Card
- remote backup over a modem connection, using the Customer Configuration Backup and Restore (CCBR) feature. The CCBR feature enables you to back up customer-configured data to an external IBM-type PC or a Macintosh computer over a modem connection.

If data becomes corrupt or inoperable, you can restore backed up data to the main database and primary flash drive from one of the following:

- external PC Card drive
- backup flash drive
- computer over a modem connection

For more information about database backup and restore methods, refer to *Communication Server 1000M and Meridian 1: Small System Maintenance* (NN43011-700).

Support for IP connectivity

Both the Cabinet and Chassis systems support IP expansion, which provides IP interconnection between the Main and the Expansion. This IP interconnection enables:

- increased digital trunking capacity
- survivable expansion

Increased digital trunking/SDI capacity

IP Expansion provides increased networking capacity for Small Systems. Any IP Expansion, when connected through CAT5 or 100BaseF cable, can support digital trunks. A Cabinet system can support a total of 45 digital trunk cards. A Chassis system can support a total of 15 digital trunk cards.

IP Expansions can support the following Common Equipment (CE) cards:

- 1.5MB DTI/PRI (NTAK09)
- 1.5MB TMDI (NTRB21)
- 2.0MB DTI (NTAK10)
- 2.0MB PRI (NTAK79)
- 2.0MB PRI (NTBK50)
- MISP (NTBK22)
- SDI/DCH (NTAK02) (only DCH is supported in IP expansion; ESDI AML, and TTY are not supported)

IP expansion also provides increased SDI/D-channel capacity: three SDI ports are provided with each IP Expansion Cabinet/Chassis, and D-channel capacity increases to up to 16 D-channels per IP Expansion.

Refer to "[Fiber-optic and IP expansion](#)" (page 31) for a description of the hardware required for IP expansion.

Survivable IP expansion

IP Expansions can be configured to be survivable in the event of a link failure or a catastrophic failure of the Main.

Based on the system configuration, if IP connectivity to the Main is lost or a manual command is issued, an IP Expansion can enter survival mode, in which it acts as a fully functional "stand-alone" system.

The number of survivable Expansions allowed on one system is controlled through a software license called "Survivability", which has a range of 0–4. The license default value is zero.

Packaging requirements

IP connectivity is provided by IP Expansion (IPEX) package 295. If the IP Expansion package is restricted, IP connectivity between the Main and IP Expansion is not allowed, whether or not IP daughterboards are connected to the Main. CE-MUX expansion is not a separately packaged option, but does depend on IP Expansion (IPEX) package 295.

Fiber-optic and IP expansion

Contents

This section contains information on the following topics:

- "Small System expansion" (page 31)
 - "SSC card" (page 32)
 - "Fiber Expansion and IP Expansion daughterboards" (page 32)
 - "Fiber Receiver card" (page 33)
- "Expansion scenarios" (page 33)
 - "Cabinet and Chassis system mix-and-match expansion" (page 41)

Small System expansion

Both the Cabinet system and the Chassis system support fiber-optic and IP expansion. Up to four Expansion Cabinets or Chassis can be connected to the Main with CAT5 or 100BaseF cable and located up to 3 km (1.8 mi) from the Main. With the introduction of IP connectivity, IP expansion can be distributed over a Campus Data Network.

For fiber-optic expansion, the following three basic components, in addition to other hardware, are required:

- Small System Controller (SSC) card in the Main
- Fiber Expansion daughterboard
- Fiber Receiver card in the Expansion

For IP expansion, the following three basic components, in addition to other hardware, are required:

- SSC card in the Main
- IP Expansion daughterboards (minimum two)
- SSC card in the Expansion

For a complete list of required hardware, refer to

Communication Server 1000M and Meridian 1: Small System Planning and Engineering (NN43011-220). For information on installing Expansions, refer to *Communication Server 1000M and Meridian 1: Small System Installation and Configuration* (NN43011-310). For details on expanding an existing system, refer to *Communication Server 1000M and Meridian 1: Small System Upgrade Procedures* (NN43011-458).

SSC card

For fiber-optic expansion, you must install an SSC card, containing Fiber Expansion daughterboards, in slot 0 of the Main.

For IP expansion, you must install an SSC card, containing IP Expansion daughterboards, in slot 0 of the Main. You must also install an SSC card, containing one IP Expansion daughterboard, in slot 0 of the Expansion.

For CS 1000 Release 5.5 software, the minimum requirements are:

- 32 Mbyte DRAM
- 16 Mbyte primary flash
- 32 Mbyte program store

Note: An NTDK20 SSC card with 32 Mbyte DRAM and equipped with an NTTK13 or NTTK25 Software daughterboard meets the minimum requirements.

New systems are shipped with the NTDK20HA SSC card equipped with the NTTK25BA Software daughterboard.

Existing Cabinet or Chassis systems equipped with earlier vintages of the SSC card must:

- upgrade the SSC card using the NTDK19 SSC upgrade kit
- if necessary, upgrade to the NTTK25 Software daughterboard

Existing Chassis systems equipped with the NTDK97 Mini System Controller (MSC) card must replace the MSC card with a suitable SSC card.

Note: The MSC card supports certain limited configurations.

Fiber Expansion and IP Expansion daughterboards

The SSC card supports both Fiber Expansion daughterboards and IP Expansion daughterboards. You must install Fiber Expansion or IP Expansion daughterboards on the SSC card. The supported daughterboard configurations supported are as follows:

- two single-port daughterboards
- two dual-port daughterboards

Each single-port daughterboard supports one Expansion. Each dual-port daughterboard supports up to two Expansions.

Fiber Expansion daughterboard

The Fiber Expansion daughterboards support the following fiber-optic cable solutions between Expansions:

- 10-meter solution
- 3-kilometer single-mode glass fiber solution
- 3-kilometer multi-mode glass fiber solution

IP Expansion daughterboard

The IP Expansion daughterboards support the following IP cable solutions between Expansions:

- 100-meter solution
- 2-kilometer solution
- Customer Local Area Network (LAN) solution

Fiber Receiver card

You must install a Fiber Receiver card in slot 0 of each Expansion Cabinet or Expansion Chassis. Match the correct Fiber Receiver card with the Fiber Expansion daughterboard installed on the SSC card in the Main.

Like the Fiber Expansion daughterboards, the Fiber Receiver cards support the following fiber-optic cable solutions:

- 10-meter solution
- 3-kilometer single-mode glass fiber solution
- 3 -kilometer multi-mode glass fiber solution

Expansion scenarios

The expansion capabilities for Small Systems allow great flexibility in the design and configuration of a system. [Figure 5 "Main Cabinet connected to Expansion Cabinets with fiber-optic cable"](#) (page 34) through [Figure 10 "Chassis system IP expansion configuration including Chassis Expander"](#) (page 40), starting on [Figure 5 "Main Cabinet connected to Expansion Cabinets with fiber-optic cable"](#) (page 34), illustrate the following options:

- [Figure 5 "Main Cabinet connected to Expansion Cabinets with fiber-optic cable"](#) (page 34) (see [Figure 5 "Main Cabinet connected to Expansion Cabinets with fiber-optic cable"](#) (page 34))
- [Figure 6 "Main Cabinet connected to Expansion Cabinets with IP connectivity"](#) (page 35) (see [Figure 6 "Main Cabinet connected to Expansion Cabinets with IP connectivity"](#) (page 35))

- Figure 7 "Chassis connected to a Chassis Expander" (page 36) (see Figure 7 "Chassis connected to a Chassis Expander" (page 36))
- Figure 8 "Chassis connected to an Expansion Chassis with fiber-optic connectivity" (page 37) (see Figure 8 "Chassis connected to an Expansion Chassis with fiber-optic connectivity" (page 37))
- Figure 9 "Chassis system fiber-optic expansion configuration including Chassis Expander" (page 38) (see Figure 9 "Chassis system fiber-optic expansion configuration including Chassis Expander" (page 38))
- Figure 10 "Chassis system IP expansion configuration including Chassis Expander" (page 40) (see Figure 10 "Chassis system IP expansion configuration including Chassis Expander" (page 40))

Figure 5
Main Cabinet connected to Expansion Cabinets with fiber-optic cable

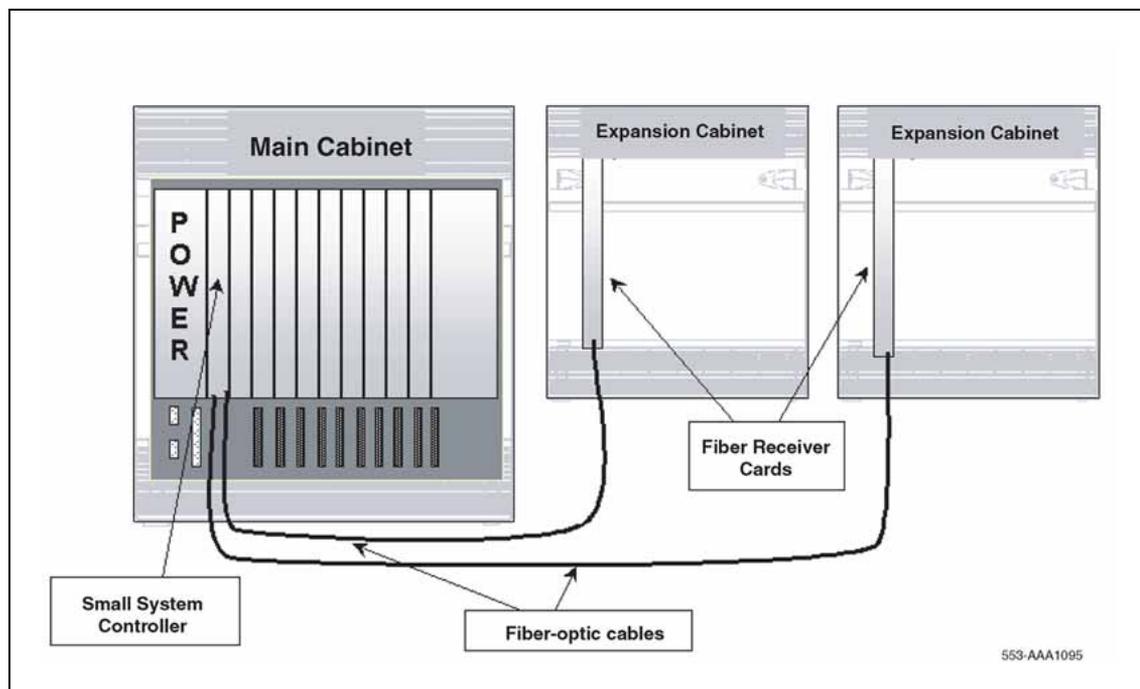
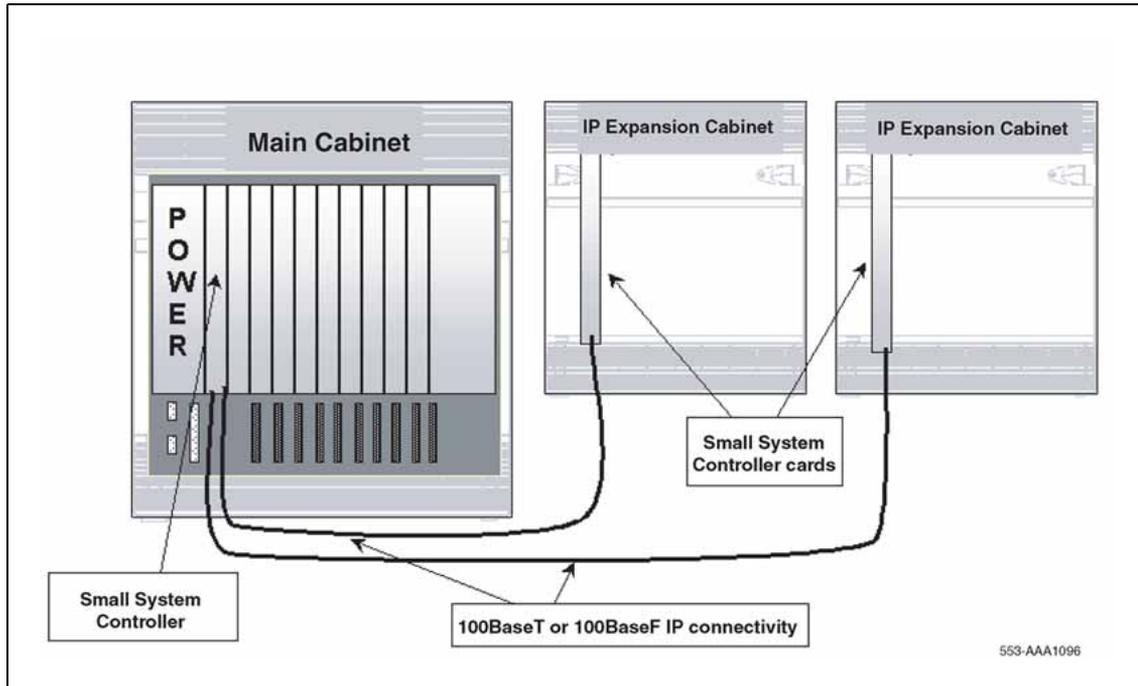
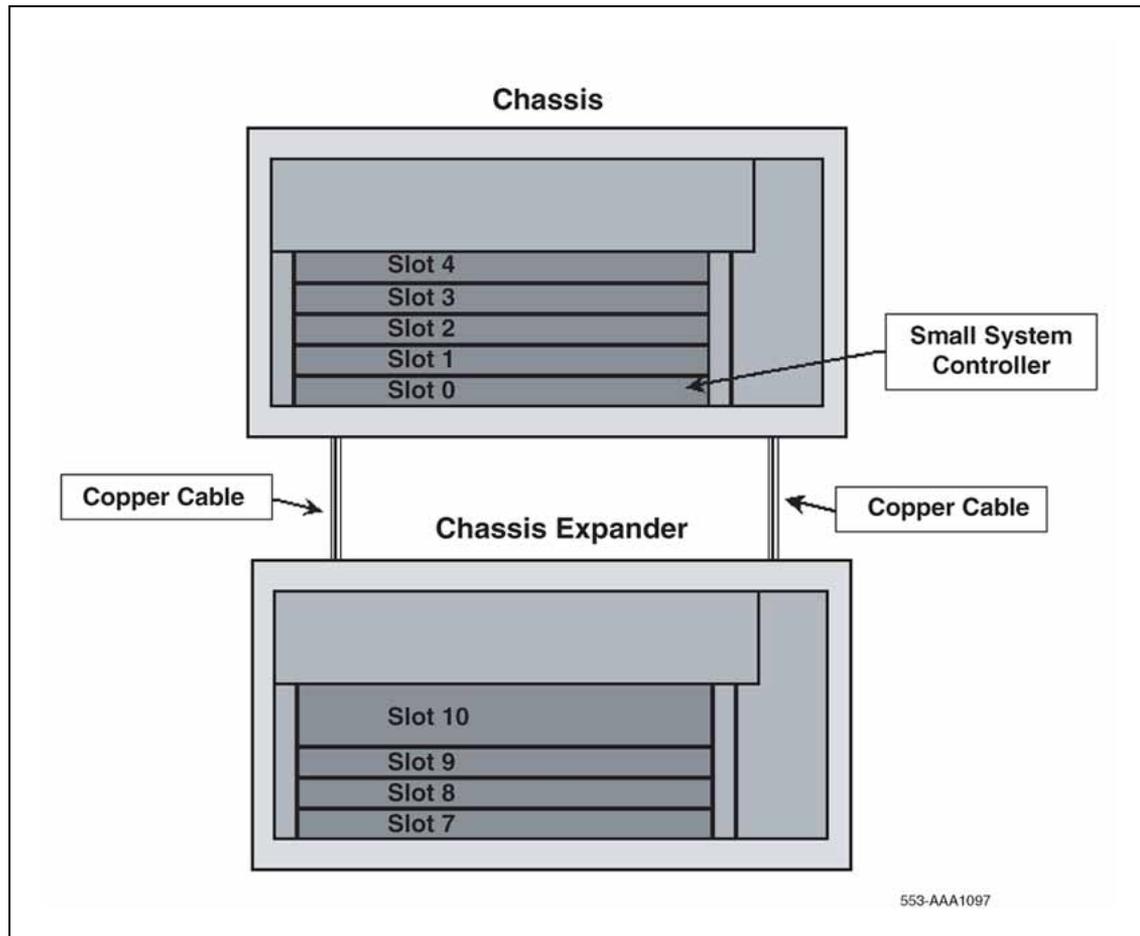


Figure 6
Main Cabinet connected to Expansion Cabinets with IP connectivity



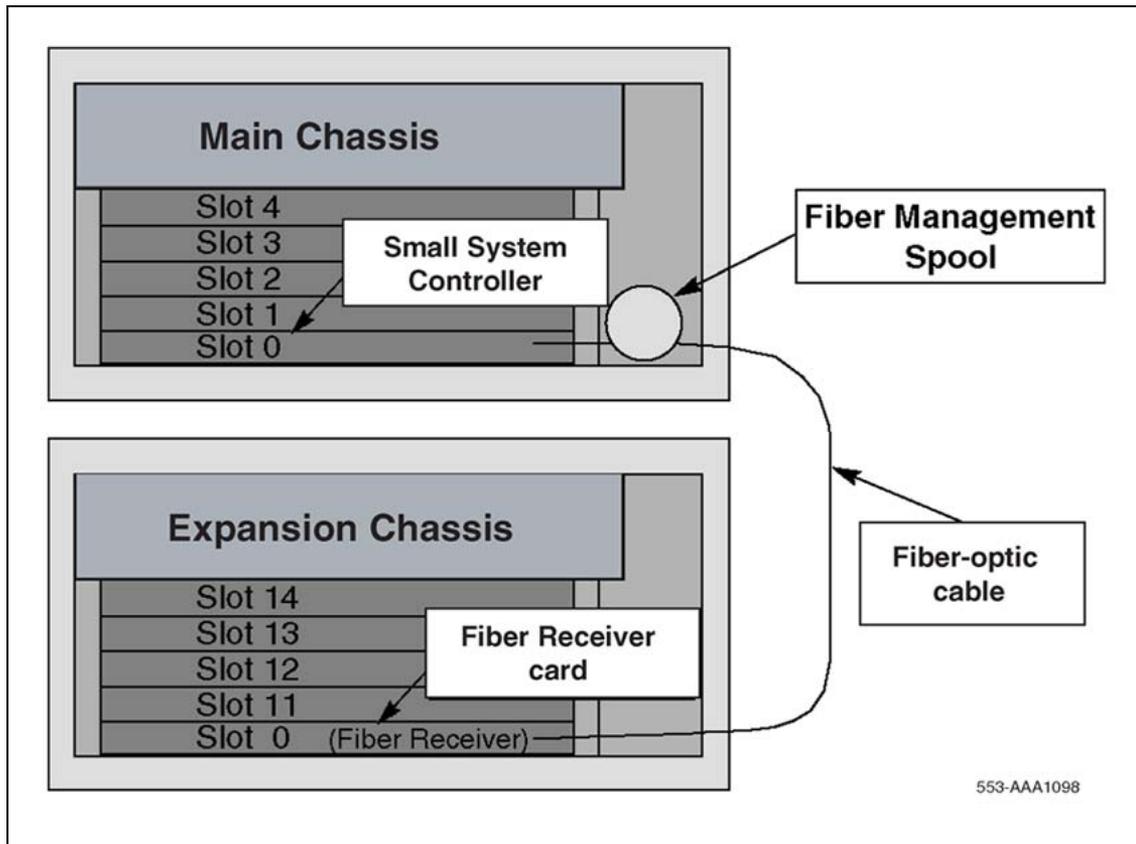
Note: In Figure 5 "Main Cabinet connected to Expansion Cabinets with fiber-optic cable" (page 34) and Figure 6 "Main Cabinet connected to Expansion Cabinets with IP connectivity" (page 35), slots 1 to 10 are available in the Main, and slots 11 to 20 and 21 to 30 are available in the two Expansion Cabinets.

Figure 7
Chassis connected to a Chassis Expander



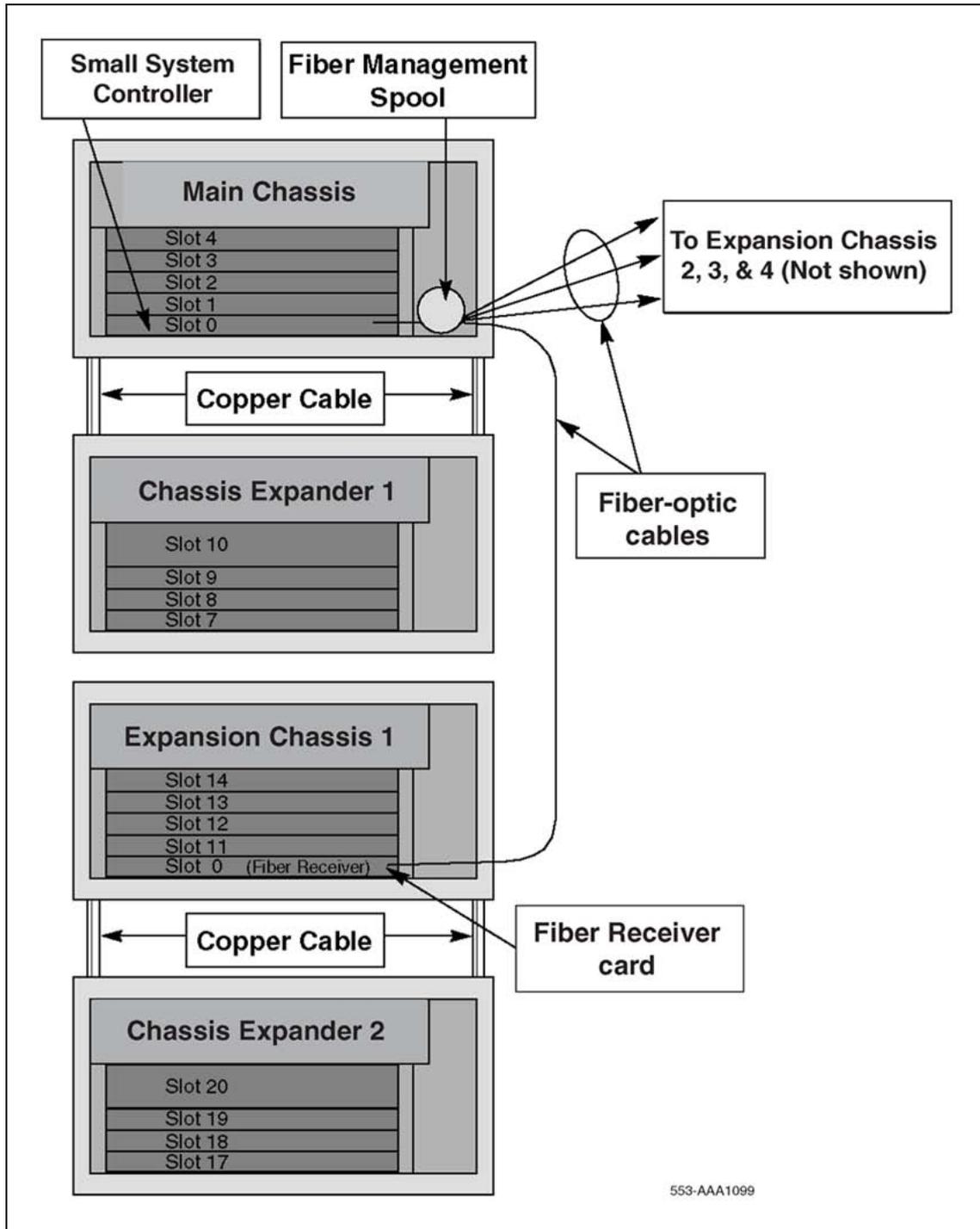
Note: In Figure 7 "Chassis connected to a Chassis Expander" (page 36), slots 0 to 4 are available in the Chassis. Slot 0 is designed to contain the SSC card only. Slot 4 is designed to contain the NTDK16 48-port Digital Line Card only. This is equivalent to three NT8D02 Digital Line Cards (slots 4 to 6). Slots 7 to 10 are available in the Chassis Expander.

Figure 8
Chassis connected to an Expansion Chassis with fiber-optic connectivity



Note: In Figure 8 "Chassis connected to an Expansion Chassis with fiber-optic connectivity" (page 37), slots 0 to 4 are available in the Main. Slots 11 to 14 are available in the Expansion. Slot 0 in the Expansion contains the Fiber Receiver card. Slots 4 and 14 contain the NTDK16 48-port Digital Line card.

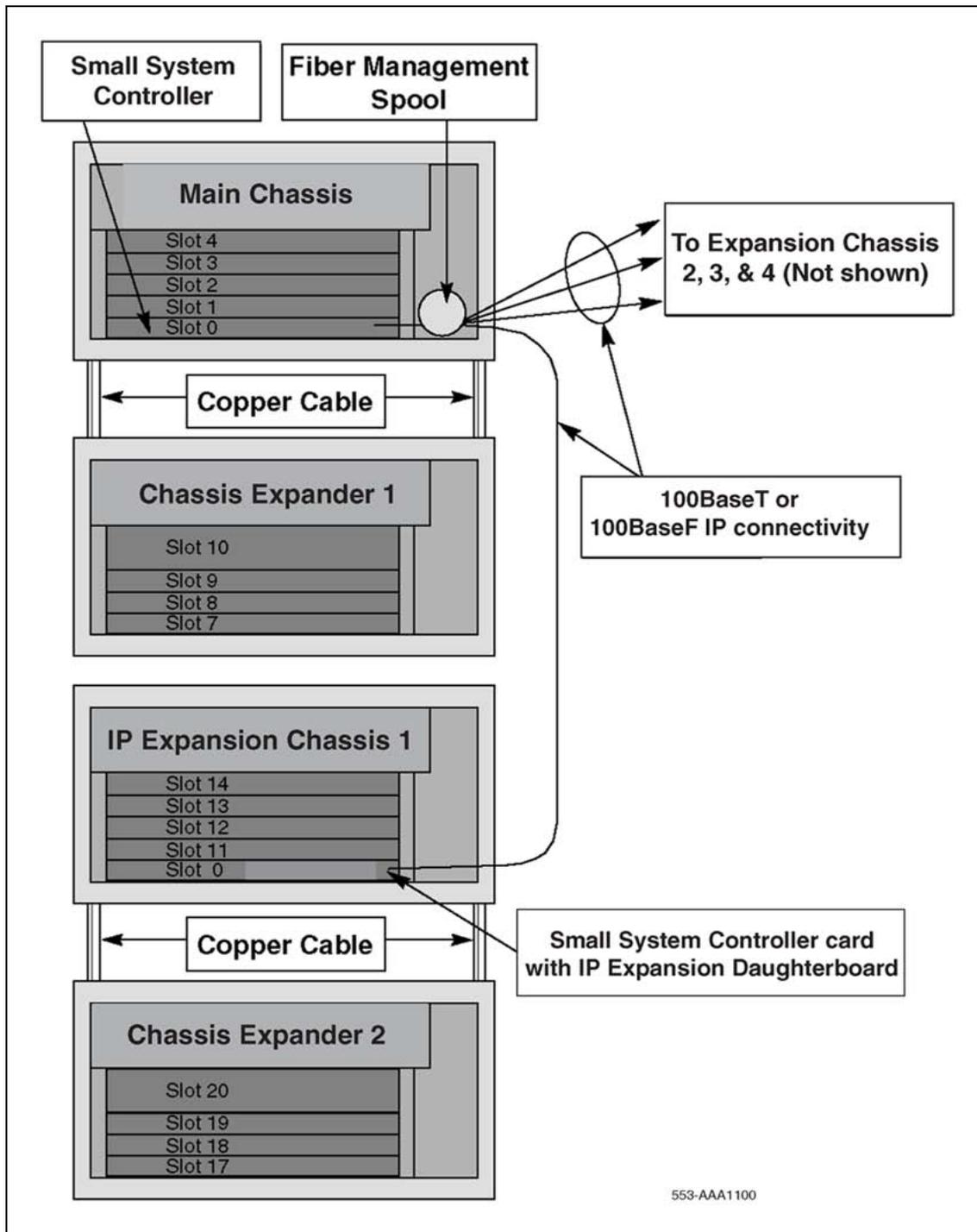
Figure 9
Chassis system fiber-optic expansion configuration including Chassis Expander



Note: In Figure 9 "Chassis system fiber-optic expansion configuration including Chassis Expander" (page 38), slots 0 to 4 are available in the

Main. Slot 4 contains the NTDK16 48-port Digital Line card. Slots 7 to 10 are available in Chassis Expander 1. Slots 11 to 14 are available in Expansion Chassis 1. Slot 0 in Expansion Chassis 1 contains the Fiber Receiver card and slot 14 contains the NTDK16 48-port Digital Line card. Slots 17 to 20 are available in Chassis Expander 2.

Figure 10
Chassis system IP expansion configuration including Chassis Expander



Note: In Figure 10 "Chassis system IP expansion configuration including Chassis Expander" (page 40), slots 0 to 4 are available in the

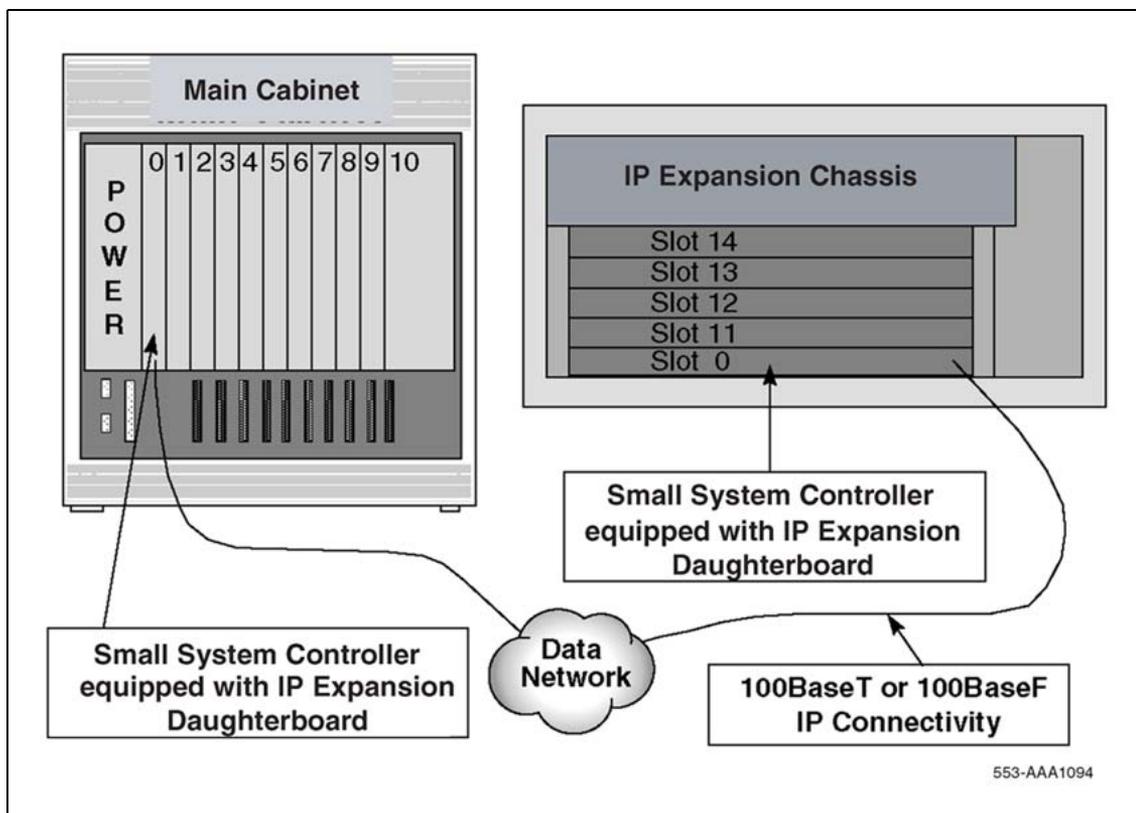
Main. Slot 0 contains the SSC card equipped with an IP Expansion daughterboard. Slot 4 contains the NTDK16 48-port Digital Line card. Slots 7 to 10 are available in Chassis Expander 1. Slots 11 to 14 are available in Expansion Chassis 1. Slot 0 in Expansion Chassis 1 contains the SSC card equipped with an IP Expansion daughterboard, and slot 14 contains the NTDK16 48-port Digital Line card. Slots 17 to 20 are available in Chassis Expander 2.

Cabinet and Chassis system mix-and-match expansion

In a mix-and-match scenario, a Chassis can be connected to IP Expansion Cabinet(s). Similarly, a Main Cabinet can be connected to IP Expansion Chassis.

Figure 11 "Cabinet and Chassis system IP expansion configuration" (page 41) shows an IP configuration in which a Main Cabinet is connected to an Expansion Chassis using IP connectivity.

Figure 11
Cabinet and Chassis system IP expansion configuration



Note: In Figure 11 "Cabinet and Chassis system IP expansion configuration" (page 41), slots 0 to 10 are available in the Main and slots 11 to 14 are available in the Expansion. Slot 0 of the Expansion contains

an SSC card equipped with an IP Expansion daughterboard. Slot 14 of the Expansion contains the NTDK16 48-port Digital Line card.

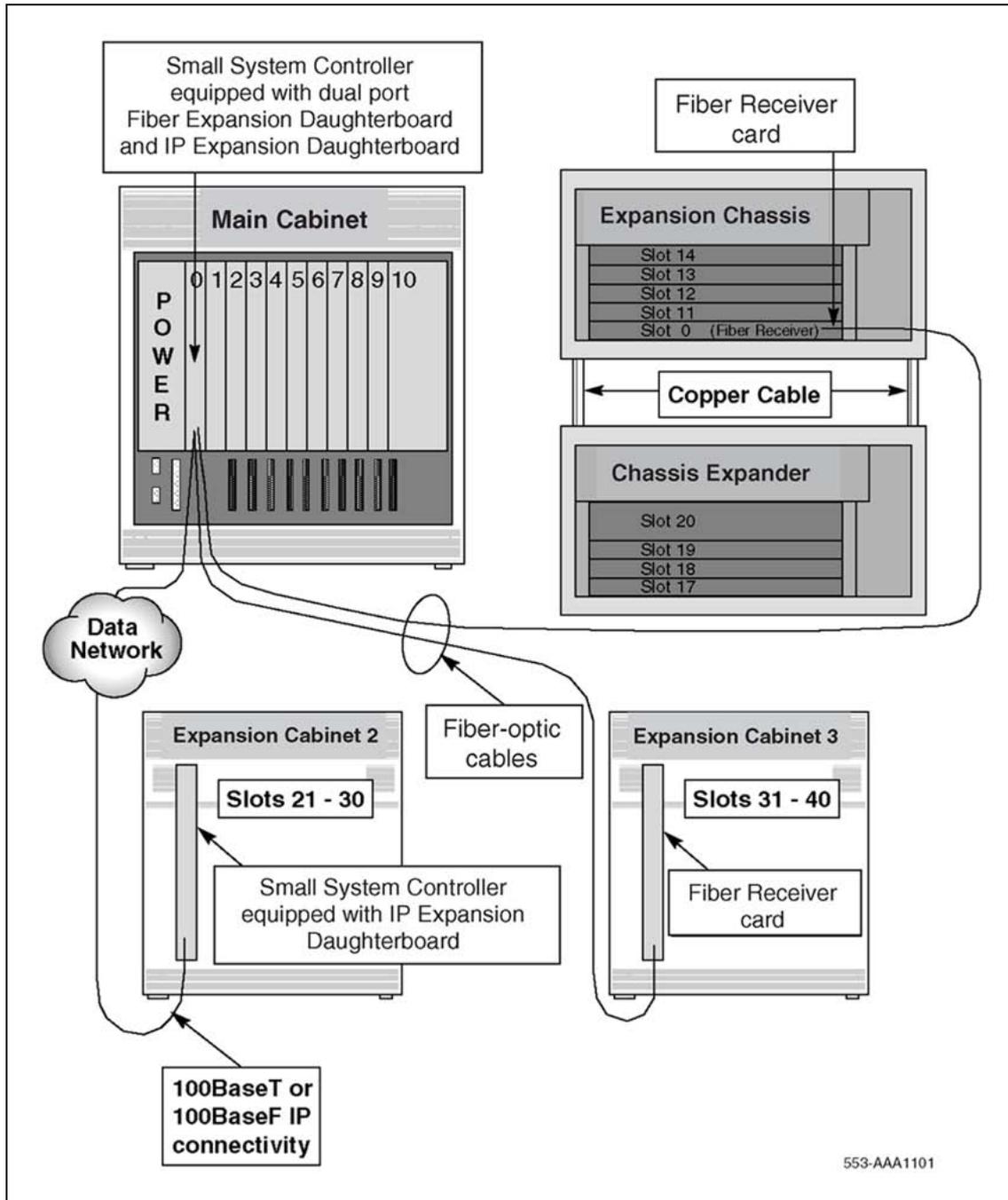
Figure 12 "Cabinet and Chassis system IP and fiber expansion configuration" (page 43) shows another example of a "mix-and-match" configuration in which a Main Cabinet uses both fiber and IP cabling to connect two Expansion Cabinets and one Expansion Chassis. The Expansion Chassis is equipped with a Chassis Expander.

Note: Figure 12 "Cabinet and Chassis system IP and fiber expansion configuration" (page 43) is only an example of one of many possible configurations using Cabinets and Chassis.

In this example, the SSC card in the Main Cabinet has one dual-port Fiber Expansion daughterboard installed in the top connector and one single-port IP Expansion daughterboard installed in the bottom connector. The dual-port Fiber Expansion daughterboard in the top connector supports card slots 11–20 and 31–40. The single-port IP Expansion daughterboard in the bottom connector supports card slots 21–30.

Note: When both Fiber and IP Expansion daughterboards co-exist in a system, configure the Fiber Expansion daughterboard as expansions 1 and 3 and the IP Expansion daughterboard as expansions 2 and 4.

Figure 12
Cabinet and Chassis system IP and fiber expansion configuration



In Figure 12 "Cabinet and Chassis system IP and fiber expansion configuration" (page 43), slots 0 to 10 are available in the Main, slots 11 to 14 in the Expansion Chassis, and slots 17 to 20 in the Chassis Expander. Slots 21 to 30 are available in Expansion Cabinet 2 over the data network.

Slots 31 to 40 are available in Expansion Cabinet 3. Slot 0 in the Expansion Chassis contains the Fiber Receiver card and slot 14 contains the NTDK16 48-port Digital Line card.

Nortel Meridian 1

Meridian 1 Small System Overview

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